





# Local Government Energy Audit Report

Memorial Middle School

January 27, 2020

Prepared for: Willingboro Public Schools 451 Van Sciver Parkway Willingboro, NJ 08046 Prepared by: TRC 900 Route 9 North Woodbridge, NJ 07095

# Disclaimer

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

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

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. Cost estimates include material and labor pricing associated with installation of primary recommended equipment only. Cost estimates do not include demolition or removal of hazardous waste. We encourage the owner of the facility to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on individual measures and conditions. TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

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

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

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# **1** EXECUTIVE SUMMARY

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





### POTENTIAL IMPROVEMENTS



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

Scenario 1: Full Pac	kage (all evaluate	d me	asure	s)
Installation Cost	\$229,33	1	100.0	
Potential Rebates & Incention	ves <sup>1</sup> \$81,93	6	80.0	
Annual Cost Savings	\$56,85	-/SF	60.0	79.0 48.5 70.0
Appual Epergy Savings	Electricity: 415,241 kW	k htt	40.0	
	Natural Gas: 30 Therm	S	20.0	
Greenhouse Gas Emission S	avings 209 Ton	S	0.0	
Simple Payback	2.6 Year	S		Your Building Before Your Building After Upgrades Upgrades
Site Energy Savings (all utilit	ties) 119	6		——— Typical Building EUI
Scenario 2: Cost Effe	ective Package <sup>2</sup>			
Installation Cost	\$218,45	6	100.0	
Potential Rebates & Incenti	ves \$81,93	6	80.0	70.0
Annual Cost Savings	\$56,12	2 2/r	60.0	48.5 70.4
Annual Energy Savings	Electricity: 411,953 kW	h H	40.0	
Greenhouse Gas Emission S	avings 205 Ton	S	20.0	
Simple Payback	2.4 Year	s	0.0	Vour Building Refore
Site Energy Savings (all utilit	tios) 110			Upgrades Upgrades
		0		——— Typical Building EUI
<b>On-site Generation</b>	Potential			
Photovoltaic	Hig	h		
Combined Heat and Power	Mediur	n		

<sup>&</sup>lt;sup>1</sup> Incentives are based on current SmartStart Prescriptive incentives. Other program incentives may apply.

<sup>&</sup>lt;sup>2</sup> A cost-effective measure is defined as one where the simple payback does not exceed two-thirds of the expected proposed equipment useful life. Simple payback is based on the net measure cost after potential incentives.



|--|--|

#	Energy Conservation Measure	Cost Effective?	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)**	CO2e Emissions Reduction (Ibs)
Lighting	Upgrades		322,693	53.1	-57	\$43,764	\$149,801	\$57,152	\$92,649	2.1	318,238
ECM 1	Install LED Fixtures	Yes	44,015	0.0	0	\$6,025	\$69,418	\$14,600	\$54,818	9.1	44,323
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	581	0.1	0	\$79	\$183	\$52	\$131	1.7	571
ECM 3	Retrofit Fixtures with LED Lamps	Yes	278,096	53.0	-57	\$37,661	\$80,200	\$42,500	\$37,700	1.0	273,344
Lighting	Control Measures		86,808	16.4	-18	\$11,754	\$64,935	\$24,005	\$40,930	3.5	85,289
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	73,170	13.9	-15	\$9,907	\$50,760	\$10,500	\$40,260	4.1	71,890
ECM 5	Install High/Low Lighting Controls	Yes	13,638	2.6	-3	\$1,847	\$14,175	\$13,505	\$670	0.4	13,399
Variable	Frequency Drive (VFD) Measures		2,453	0.6	0	\$336	\$3,261	\$320	\$2,941	8.8	2,470
ECM 6	Install VFDs on Constant Volume (CV) Fans	Yes	2,453	0.6	0	\$336	\$3,261	\$320	\$2,941	8.8	2,470
HVAC Sy	stem Improvements		3,288	0.0	40	\$732	\$10,875	\$0	\$10,875	14.9	7,990
ECM 7	Implement Demand Control Ventilation (DCV)	No	3,288	0.0	40	\$732	\$10,875	\$0	\$10,875	14.9	7,990
Domestic Water Heating Upgrade			0	0.0	38	\$272	\$459	\$459	\$0	0.0	4,503
ECM 8 Install Low-Flow DHW Devices Yes			0	0.0	38	\$272	\$459	\$459	\$0	0.0	4,503
	TOTALS (COST EFFECTIVE MEASURES)			70.1	-37	\$56,125	\$218,456	\$81,936	\$136,520	2.4	410,500
TOTALS (ALL MEASURES)			415,241	70.1	3	\$56,857	\$229,331	\$81,936	\$147,396	2.6	418,490

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

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

#### Figure 2 – Evaluated Energy Improvements

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

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## 1.1 Planning Your Project

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

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

### **Pick Your Installation Approach**

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

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

	Energy Conservation Measure	SmartStart	Direct Install	Pay For Performance
ECM 1	Install LED Fixtures	Х		
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and	Х		
ECM 3	Retrofit Fixtures with LED Lamps	Х		
ECM 4	Install Occupancy Sensor Lighting Controls	Х		
ECM 5	Install High/Low Lighting Controls	Х		
ECM 6	Install VFDs on Constant Volume (CV) Fans	Х		
ECM 7	Implement Demand Control Ventilation (DCV)			
ECM 8	Install Low-Flow DHW Devices	Х		

Figure 3 – Funding Options





# New Jersey's Clean Energy Programs At-A-Glance

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



### Individual Measures with SmartStart

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

### Turnkey Installation with Direct Install

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

### Whole Building Approach with Pay for Performance

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

### More Options from Around the State

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

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

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

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

### Ongoing Electric Savings with Demand Response

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

# TRC



# 2 EXISTING CONDITIONS

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

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

### 2.1 Site Overview

On October 18, 2019, TRC performed an energy audit at Memorial Middle School located in Willingboro, New Jersey. TRC met with Orlando L. Chandler to review the facility operations and help focus our investigation on specific energy-using systems.

Memorial Middle School is a 2-story, 159,000 square foot building built in 1968. Spaces include: classrooms, main gymnasium, auxiliary gymnasiums, a resource center, an all purpose room, offices, cafeteria, corridors, stairwells, storage, restrooms, locker rooms, a kitchen, and electrical and mechanical spaces.

Around 2013 the school upgraded the HVAC system, installing new packaged terminal heat pumps, ductless mini-split air-conditioning and heat pump units, unit ventilators, and associated DX condensing units as well as replacing hot water boilers with condensing boilers.

## 2.2 Building Occupancy

The facility is occupied ten months of the year. Typical weekday occupancy is 68 staff and 519 students.

There are no weekend activities and minimal summer activities related to maintenance.

Building Name	Weekday/Weekend	<b>Operating Schedule</b>
Mamarial Middle School	Weekday	7:00 AM - 6:30 PM
	Weekend	Closed

Figure 4 - Building Occupancy Schedule





# 2.3 Building Envelope

Building walls are brick masonry over structural steel. The roof is flat and covered with asphalt strips. It is in fair condition.

The interior walls are made of concrete masonry units (CMUs) with a painted CMU interior finish.

Most of the windows are double pane and have aluminum frames. The glass-to-frame seals are in fair condition. The operable window weather seals are in fair condition, showing little evidence of excessive wear. Exterior doors have aluminum frames and are in fair condition with undamaged door seals. However, it was noted that doors and windows are often left open. Open windows and doors increase drafts and outside air infiltration.



Exterior walls, windows, and doors



Roof





# 2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps, although there are a considerable number of LED tube lamps. There are also a few 40-Watt T12 fixtures. Additionally, there are some compact fluorescent lamps (CFL), incandescent, and LED general purpose lamps. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts.

Fixture types include 2- 3- or 4-lamp, 2- or 4-foot long recessed or surface mounted fixtures and 2-foot fixtures with U-bend or linear tube lamps.

Gymnasium fixtures have high bay LED fixtures and are manually controlled via a breaker panel.

All exit signs are LED units. Most fixtures are in good condition. Interior lighting levels were generally sufficient.



Gym lighting



Corridor lighting



Cafeteria lighting



Classroom lighting

Most lighting fixtures are controlled manually and the remainder by occupancy sensors.

Exterior fixtures include wall packs and canopy lights with high intensity discharge (HID) and LED lamps. The pole mounted parking lot fixtures have with high intensity discharge (HID).

Exterior light fixtures are controlled by a time clock, switch, or photocell, depending on the fixture.



Pole mounted fixtures



Canopy fixtures



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# 2.5 Air Handling Systems

### Unit Ventilators

Heating, cooling, and ventilation of classrooms is provided by unit ventilators (UV). These units have constant volume supply fans with either one or two ¼ hp motors. Each UV has hot water heating and reheat coils. Cooling is provided by a DX coil with associated split-system condensing unit on the roof. There are a total of 73 Trane split-system condensing units and each have a cooling capacity of either 2.5, 3, or 3.5 tons. UVs are controlled by thermostats in the classrooms that are tied into the EMS. This system was upgraded around 2013 and is in good operating condition.

### Packaged and Split-System Units

Administrative areas of the building are served with packaged terminal heat pump (PTHP) units controlled by room thermostats. These 10.6 to 11 EER units have a heating capacity of either 8.1 or 10.8 MBh and cooling capacities of either ¾ or 1-ton. Each PTHP has a supplementary 3.5 kW electric resistance heater. Units are controlled by integrated thermostats on the units. Some additional information is provided in the table below.

Common areas and some classrooms are served by packaged roof top units (RTUs) and split-system AC or HP units. Packaged AC units are hot water heating capacity units ranging in size from 32 to 102 MBh. These units are equipped with economizers that are in good condition. The table below provides additional information on the split-system and packaged units.

Unit	Quantity	Area Served	Size	Efficiency
Packaged AC	12	Teacher's Work Areas, Computer Lab, Teacher's Lounge	3.00 tons	13.00 EER
Packaged AC	2	Computer classroom, stage	5.00 tons	13.00 EER
Packaged AC	7	Classroom 502, 503, 504, 505, 506, 507, 508	7.50 tons	11.20 EER
Packaged AC	2	All purpose room	30.00 tons	10.80 EER
Split-System AC	2	Resource Center (AHU 12, 14)	12.50 tons	11.00 EER
Ductless Mini-Split HP	3	Computer lab, classroom	2.00 tons 30.8 MBh	14.50 SEER 3.0 COP
Ductless Mini-Split AC	2	Science Prep	1.00 tons	20.00 SEER
Ductless Mini-Split HP	1	Supplemental cooling	0.75 tons 12 MBh	24.50 SEER 4.45 COP
Packaged Terminal HP	4	Main Office, Conference Room 606, Nurse 607	1.00 tons 10.8 MBh	10.60 EER 4.45 COP
Packaged Terminal HP	3	Asst. Principal, Principal, Vice Principal	0.75 tons 8.1 MBh	11.00 EER 3.2 COP

Refer to Appendix A for detailed information about each unit.





### Air Handlers

The Gym and Resource Center use air-handling units (AHU) for both heating and cooling. The Gym AHU has a constant volume supply fan with a 2 hp motor. It appears to be used for heating only, with heating coils fed from the hot water heating system. The exact capacity could not be determined. The Resource Center AHUs (AHU 12 and 14) each have 12.5 ton DX coils for cooling and hot water coils. Each have a heating capacity of 171 MBh.



Split-system condensing units



Unit ventilators



Rooftop packaged units



Packaged terminal heat pumps



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# 2.6 Heating Hot Water Systems

Four Hydrotherm 2,781 MBh hot water condensing boilers serve the main portion of the building's heating load. The burners are fully-modulating with a nominal efficiency of 92.7%. The boilers are configured in a lead-lag-standby control scheme. Multiple boilers are required under high load conditions. They were installed around 2013 and are in good condition.

The hydronic distribution system is a 2-pipe heating only system.

The boilers are configured in a variable flow primary distribution with two 20 hp VFD controlled hot water pumps operating in a lead-lag control scheme. The boilers provide hot water to air handlers, packaged AC units, unit ventilators, and unit heaters throughout the building.



Condensing coilers



Hot water pumps

# 2.7 Building Energy Management Systems (EMS)

A Jersey State Controls EMS controls the HVAC equipment, boilers, air handlers, and package units. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, humidity, and heating water loop temperatures.

## 2.8 Domestic Hot Water

Hot water is produced with a 98 gallon 200 MBh gas-fired storage water heater with an 80% efficiency.

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



Storage hot water heater





## 2.9 Food Service Equipment

The kitchen has all-electric equipment that is used to prepare meals for students and staff. Most cooking is done using an electric convection oven. Bulk prepared foods are held in several electric holding cabinets. Equipment is high efficiency and is in good condition.

Visit <u>https://www.energystar.gov/products/commercial\_food\_service\_equipment</u> for the latest information on high efficiency food service equipment.



Convection ovens



Insulated holding cabinet

## 2.10 Refrigeration

The kitchen has several stand-up refrigerators with either solid or glass doors. There is also an energy efficient stand-up solid door freezer. There are two novelty freezer chests as well as three milk cooler refrigerator chests. All equipment is high efficiency and in good condition.

Visit <u>https://www.energystar.gov/products/commercial\_food\_service\_equipment</u> for the latest information on high efficiency food service equipment.



Milk coolers



Novelty freezers



Stand-up refrigerators



Ice machine



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# 2.11 Plug Load & Vending Machines

The location is doing a great job managing their electrical plug loads. This report makes additional suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are approximately 272 computer work stations throughout the facility. Plug loads throughout the building include general café and office equipment. There are classroom typical loads such as smart boards, projectors, and fans.

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

There are two refrigerated beverage vending machines and one non-refrigerated vending machine. Vending machines are equipped with occupancy-based controls.



Copiers



Vending machine



Desktop computers



Electric stove

## 2.12 Water-Using Systems

There are restrooms with toilets, urinals, and sinks. There are 64 lavatory faucets with flow rates at 2.2 gallons per minute (gpm) or higher for most with some at 1.5 gpm.

There are also girls and boys locker rooms which are used relatively infrequently.



# **TRC**3 Energy Use and Costs

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



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

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







Figure 5 - Energy Balance



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## 3.1 Electricity

PSE&G delivers electricity under rate class Large Power & Lighting and Private Area Street Lighting, with electric production provided by Tri Eagle (unmetered), a third-party supplier.



Electric Billing Data								
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost			
11/20/17	31	96,971	307	\$1,176	\$13,066			
12/21/17	31	97,451	214	\$818	\$13,881			
1/23/18	33	108,401	226	\$865	\$14,775			
2/22/18	30	109,027	247	\$944	\$15,209			
3/23/18	29	97,334	209	\$805	\$13,965			
4/24/18	32	107,888	221	\$805	\$14,354			
5/23/18	29	106,831	361	\$1,289	\$15,852			
6/22/18	30	132,987	396	\$1,414	\$20,440			
7/24/18	32	145,771	344	\$1,230	\$19,843			
8/22/18	29	145,048	337	\$1,206	\$19,178			
9/21/18	30	153,184	380	\$1,361	\$19,974			
10/22/18	31	125,182	368	\$1,318	\$14,658			
Totals	367	1,426,075	396	\$13,229	\$195,196			
Annual	365	1,418,303	396	\$13,157	\$194,132			

### Notes:

- Peak demand of 396 kW occurred in June '18.
- Average demand over the past 12 months was 301 kW.
- The average electric cost over the past 12 months was \$0.137/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.
- There is significant usage in summer months when the school is supposed to have minimal occupancy for maintenance purposes. This may be due to HVAC control schedules that are not currently optimized.



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### 3.2 Natural Gas

PSE&G delivers natural gas under rate class Large Volume Gas, with natural gas supply provided by South Jersey Gas, a third-party supplier.



Gas Billing Data								
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost					
11/20/17	31	4,900	\$3,588					
12/21/17	31	8,170	\$6,265					
1/23/18	33	15,633	\$12,024					
2/22/18	30	11,331	\$9,173					
3/23/18	29	10,906	\$8,910					
4/24/18	32	8,633	\$4,689					
5/23/18	29	2,992	\$1,694					
6/22/18	30	2,562	\$1,466					
7/24/18	32	2,773	\$1,566					
8/22/18	29	3,041	\$1,707					
9/21/18	30	3,129	\$1,753					
10/22/18	31	3,507	\$1,956					
Totals	367	77,576	\$54,792					
Annual	365	77,154	\$54,494					

Notes:

- The average gas cost for the past 12 months is \$0.706/therm, which is the blended rate used throughout the analysis.
- Gas consumption is greatest in the winter months due to the heating provided by the hot water heating system; however, some gas consumption is also noticeable in other months likely due to the reheat coils throughout the school for dehumidification.



# >TRC

# 3.3 Benchmarking

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

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



Figure 6 - Energy Use Intensity Comparison<sup>3</sup>

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

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

<sup>&</sup>lt;sup>3</sup> Based on all evaluated ECMs





### **Tracking Your Energy Performance**

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

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

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

For more information on ENERGY STAR<sup>®</sup> and Portfolio Manager<sup>®</sup>, visit their website<sup>4</sup>.

<sup>&</sup>lt;sup>4</sup> <u>https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.</u>

#### New Jersey's cleanenergy program

# TRC

# 4 ENERGY CONSERVATION MEASURES

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

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

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

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

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

# >TRC



#	Energy Conservation Measure	Cost Effective?	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 <sub>2</sub> e Emissions Reduction (lbs)
Lighting	Upgrades		322,693	53.1	-57	\$43,764	\$149,801	\$57,152	\$92,649	2.1	318,238
ECM 1	Install LED Fixtures	Yes	44,015	0.0	0	\$6,025	\$69,418	\$14,600	\$54,818	9.1	44,323
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	581	0.1	0	\$79	\$183	\$52	\$131	1.7	571
ECM 3	Retrofit Fixtures with LED Lamps	Yes	278,096	53.0	-57	\$37,661	\$80,200	\$42,500	\$37,700	1.0	273,344
Lighting	Control Measures		86,808	16.4	-18	\$11,754	\$64,935	\$24,005	\$40,930	3.5	85,289
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	73,170	13.9	-15	\$9,907	\$50,760	\$10,500	\$40,260	4.1	71,890
ECM 5	Install High/Low Lighting Controls	Yes	13,638	2.6	-3	\$1,847	\$14,175	\$13,505	\$670	0.4	13,399
Variable	Frequency Drive (VFD) Measures		2,453	0.6	0	\$336	\$3,261	\$320	\$2,941	8.8	2,470
ECM 6	Install VFDs on Constant Volume (CV) Fans	Yes	2,453	0.6	0	\$336	\$3,261	\$320	\$2,941	8.8	2,470
HVAC Sy	stem Improvements		3,288	0.0	40	\$732	\$10,875	\$0	\$10,875	14.9	7,990
ECM 7	Implement Demand Control Ventilation (DCV)	No	3,288	0.0	40	\$732	\$10,875	\$0	\$10,875	14.9	7,990
Domestic Water Heating Upgrade			0	0.0	38	\$272	\$459	\$459	\$0	0.0	4,503
ECM 8	Install Low-Flow DHW Devices	Yes	0	0.0	38	\$272	\$459	\$459	\$0	0.0	4,503
TOTALS			415,241	70.1	3	\$56,857	\$229,331	\$81,936	\$147,396	2.6	418,490

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

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

Figure 7 – All Evaluated ECMs

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#	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)**	CO2e Emissions Reduction (Ibs)
Lighting	Upgrades	322,693	53.1	-57	\$43,764	\$149,801	\$57,152	\$92,649	2.1	318,238
ECM 1	Install LED Fixtures	44,015	0.0	0	\$6,025	\$69,418	\$14,600	\$54,818	9.1	44,323
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	581	0.1	0	\$79	\$183	\$52	\$131	1.7	571
ECM 3	Retrofit Fixtures with LED Lamps	278,096	53.0	-57	\$37,661	\$80,200	\$42,500	\$37,700	1.0	273,344
Lighting	Control Measures	86,808	16.4	-18	\$11,754	\$64,935	\$24,005	\$40,930	3.5	85,289
ECM 4	Install Occupancy Sensor Lighting Controls	73,170	13.9	-15	\$9,907	\$50,760	\$10,500	\$40,260	4.1	71,890
ECM 5	Install High/Low Lighting Controls	13,638	2.6	-3	\$1,847	\$14,175	\$13,505	\$670	0.4	13,399
Variable	Frequency Drive (VFD) Measures	2,453	0.6	0	\$336	\$3,261	\$320	\$2,941	8.8	2,470
ECM 6	Install VFDs on Constant Volume (CV) Fans	2,453	0.6	0	\$336	\$3,261	\$320	\$2,941	8.8	2,470
Domest	ic Water Heating Upgrade	0	0.0	38	\$272	\$459	\$459	\$0	0.0	4,503
ECM 8	Install Low-Flow DHW Devices	0	0.0	38	\$272	\$459	\$459	\$0	0.0	4,503
	TOTALS	411,953	70.1	-37	\$56,125	\$218,456	\$81,936	\$136,520	2.4	410,500

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

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

Figure 8 – Cost Effective ECMs





# 4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting	Upgrades	322,693	53.1	-57	\$43,764	\$149,801	\$57,152	\$92,649	2.1	318,238
ECM 1	Install LED Fixtures	44,015	0.0	0	\$6,025	\$69,418	\$14,600	\$54,818	9.1	44,323
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	581	0.1	0	\$79	\$183	\$52	\$131	1.7	571
ECM 3	Retrofit Fixtures with LED Lamps	278,096	53.0	-57	\$37,661	\$80,200	\$42,500	\$37,700	1.0	273,344

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

### ECM 1: Install LED Fixtures

Replace existing fixtures containing HID lamps with new LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

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

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

Affected building areas: exterior fixtures.

### ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Retrofit fluorescent fixtures by removing the fluorescent tubes and ballasts and replacing them with LED tubes and LED drivers (if necessary), which are designed to be used in retrofitted fluorescent fixtures.

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

Affected building areas: faculty women's restroom and office 431 with fluorescent T12 tube fixtures.



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### ECM 3: Retrofit Fixtures with LED Lamps

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

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

Affected building areas: all areas with fluorescent fixtures with T8 tubes; stage area, storage spaces, restrooms, closets, and exterior fixtures with CFL or incandescent lamps.

#	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 <sub>2</sub> e Emissions Reduction (Ibs)
Lighting	control Measures	86,808	16.4	-18	\$11,754	\$64,935	\$24,005	\$40,930	3.5	85,289
ECM 4	Install Occupancy Sensor Lighting Controls	73,170	13.9	-15	\$9,907	\$50,760	\$10,500	\$40,260	4.1	71,890
ECM 5	Install High/Low Lighting Controls	13,638	2.6	-3	\$1,847	\$14,175	\$13,505	\$670	0.4	13,399

# 4.2 Lighting Controls

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

### ECM 4: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected building areas: offices, conference rooms, classrooms, gymnasium, cafeteria, kitchen, locker rooms, restrooms, and storage rooms.





### ECM 5: Install High/Low Lighting Controls

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

Lighting fixtures with these controls operate at default low levels when the area is unoccupied to provide minimal lighting to meet security or safety code requirements for egress. Sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Fixtures automatically switch back to low level after a predefined period of vacancy. In parking lots and parking garages with significant ambient lighting, this control can sometimes be combined with photocell controls to turn the lights off when there is sufficient daylight.

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

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

Affected building areas: hallways and stairwells.

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





# 4.3 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Variable	e Frequency Drive (VFD) Measures	2,453	0.6	0	\$336	\$3,261	\$320	\$2,941	8.8	2,470
ECM 6	Install VFDs on Constant Volume (CV) Fans	2,453	0.6	0	\$336	\$3,261	\$320	\$2,941	8.8	2,470

Variable frequency drives control motors for fans, pumps, and process equipment based on the actual output required of the driven equipment. Energy savings result from more efficient control of motor energy usage when equipment operates at partial load. The magnitude of energy savings depends on the estimated amount of time that the motor would operate at partial load. For equipment with proposed VFDs, we have included replacing the controlled motor with a new inverter duty rated motor to conservatively account for the cost of an inverter duty rated motor.

### ECM 6: Install VFDs on Constant Volume (CV) Fans

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

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

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

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

Affected air handlers: gym AHU.





## 4.4 HVAC Improvements

#	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 <sub>2</sub> e Emissions Reduction (lbs)
HVAC S	ystem Improvements	3,288	0.0	40	\$732	\$10,875	\$0	\$10,875	14.9	7,990
ECM 7	Implement Demand Control Ventilation (DCV)	3,288	0.0	40	\$732	\$10,875	\$0	\$10,875	14.9	7,990

### ECM 7: Implement Demand Control Ventilation (DCV)

Demand control ventilation (DCV) monitors the indoor air's carbon dioxide (CO<sub>2</sub>) content to measure room occupancy. This data is used to regulate the amount of outdoor air provided to the space for ventilation.

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

Energy savings associated with DCV are based on hours of operation, space occupancy, outside air reduction, and other factors. Energy savings results from eliminating unnecessary ventilation and space conditioning. We evaluated DCV for this site, but the savings are marginal. The site may wish to consider this measure as part of a retro-commissioning study, outlined as an additional measure for consideration but not quantified in this report.

Affected building areas: resource center and all purpose room.

## 4.5 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (Ibs)
Domest	ic Water Heating Upgrade	0	0.0	38	\$272	\$459	\$459	\$0	0.0	4,503
ECM 8	Install Low-Flow DHW Devices	0	0.0	38	\$272	\$459	\$459	\$0	0.0	4,503

### ECM 8: Install Low-Flow DHW Devices

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

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing.

Additional cost savings may result from reduced water usage.





# 4.6 Measures for Future Consideration

There are additional opportunities for improvement that you may wish to consider. Potential upgrades typically require further analysis, involve substantial capital investment and/or include significant system reconfiguration. The measure below is therefore beyond the scope of this energy audit. This measure is described here to support a whole building approach to energy efficiency and sustainability.

### **Retro-Commissioning Study**

Due to the complexity of today's HVAC systems and controls a thorough analysis and rebalance of heating, ventilation, and cooling systems should periodically be conducted. There are indications at this site that systems may be not be operating correctly or as efficiently as they could be. One important tool available to building operators to ensure proper system operation is retro-commissioning.

Retro-commissioning is a common practice recommended by the American Society of Heating Refrigeration and Energy (ASHRAE) to be implemented every few years. We recommend that you contact a reputable engineering firm who specializes in energy control systems and retro-commissioning, a retro-commissioning agent. Ask them to propose a scope of work and an outline of the procedures and processes to be implemented, including a schedule and the roles of all responsible parties.

Once goals and responsibilities are established, the objective of the investigation process is to understand how the building is currently operating, identify the issues, and determine the most cost-effective way to improve performance. The agent will review building documentation, interview building occupants, and inspect and test the equipment. Information is then compiled into a report and shared with facility staff, who will select which recommendations to implement after analyzing the findings.

The implementation phase puts the selected processes into place. Typical measures may include sensor calibration, equipment schedule changes, damper linkage repair and similar relatively low-cost adjustments -- although sophisticated programming and building control system upgrades may add cost. Approved measures may be implemented by the agent, the building staff, or by subcontractors. Typically, a combination of these individuals makes up the retro-commissioning team.

After the approved measures are implemented, the team will verify that the changes are working as expected. Baseline and post-case measurements will allow building staff to monitor equipment and ensure that the benefits are maintained.



# **5 ENERGY EFFICIENT BEST PRACTICES**

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

### Energy Tracking with ENERGY STAR® Portfolio Manager®



TRC

You've heard it before - you can't manage what you don't measure. ENERGY STAR<sup>®</sup> Portfolio Manager<sup>®</sup> is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions<sup>5</sup>. Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

### **Doors and Windows**

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

### Lighting Maintenance



- Clean lamps, reflectors and lenses of dirt, dust, oil, and smoke buildup every six to twelve months. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust. Together, this can reduce total light output by up to 60% while still drawing full power.
- In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-

lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a lighting technician or contractor, decreasing the overall cost of maintenance.

### Motor Maintenance

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

### AC System Evaporator/Condenser Coil Cleaning

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

<sup>&</sup>lt;sup>5</sup> <u>https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager.</u>





### **HVAC Filter Cleaning and Replacement**

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

### **Boiler Maintenance**

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

### Water Heater Maintenance

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

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





### Water Conservation



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

For more information regarding water conservation go to the EPA's WaterSense<sup>®</sup> website<sup>6</sup> or download a copy of EPA's "WaterSense<sup>®</sup> at Work: Best Management

Practices for Commercial and Institutional Facilities"<sup>7</sup> to get ideas for creating a water management plan and best practices for a wide range of water using systems.

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

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

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

#### **Procurement Strategies**

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

<sup>&</sup>lt;sup>6</sup> <u>https://www.epa.gov/watersense.</u>

<sup>&</sup>lt;sup>7</sup> https://www.epa.gov/watersense/watersense-work-0.
# TRC



## 6 ON-SITE GENERATION

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

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



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## 6.1 Solar Photovoltaic

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

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

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

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



Figure 9 - Photovoltaic Screening

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

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

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

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

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





## 6.2 Combined Heat and Power

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

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

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

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has **medium 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. Based on the amount of hot water used throughout the year and the concurrent electric demand a Microturbine may be feasible. If you are interested in pursuing combined heat and power, we recommend performing a detailed feasibility study, which will provide a thorough understanding of the costs and savings associated with this technology.

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



Figure 10 - Combined Heat and Power Screening

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





## 7 PROJECT FUNDING AND INCENTIVES

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

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







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

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

#### Equipment with Prescriptive Incentives Currently Available:

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

#### Incentives

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

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

#### How to Participate

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

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





## 7.2 Direct Install



Direct Install is a turnkey program available to existing small to medium-sized facilities with an average peak electric demand that does not exceed 200 kW over the recent 12-month period. You work directly with a preapproved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and provide a clear scope of work for

installation of selected measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives, and controls.

#### Incentives

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

#### How to Participate

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

Detailed program descriptions and applications can be found at: <u>www.njcleanenergy.com/Dl</u>.





## 7.3 Pay for Performance - Existing Buildings



Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures that results in at least 15% source energy savings, and lighting cannot make up the majority of the savings. P4P is a generally a good option for medium-to-large sized facilities looking to implement as many

measures as possible under a single project to achieve deep energy savings. This program has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program.

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

#### Incentives

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

#### How to Participate

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

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

Detailed program descriptions, instructions for applying, applications and list of Partners can be found at: <a href="http://www.njcleanenergy.com/P4P">www.njcleanenergy.com/P4P</a>.





## 7.4 Combined Heat and Power

The Combined Heat & Power (CHP) program provides incentives for eligible CHP or waste heat to power (WHP) projects. Eligible CHP or WHP projects must achieve an annual system efficiency of at least 65% (lower heating value, or LHV), based on total energy input and total utilized energy output. Mechanical energy may be included in the efficiency evaluation.

#### Incentives

Eligible Technologies	Size (Installed Rated Capacity) <sup>1</sup>	Incentive (\$/kW)	% of Total Cost Cap per Project <sup>3</sup>	\$ Cap per Project <sup>3</sup>
Powered by non- renewable or renewable fuel source <sup>4</sup>	<u>≤</u> 500 kW	\$2,000	30-40% <sup>2</sup>	\$2 million
Gas Internal Combustion Engine	>500 kW - 1 MW	\$1,000		
Gas Combustion Turbine	> 1 MW - 3 MW	\$550		
Microturbine Fuel Cells with Heat Recovery	>3 MW	\$350	30%	\$3 million
Waste Heat to	<1 MW	\$1,000	30%	\$2 million
Power*	> 1MW	\$500	0070	\$3 million

\*Waste Heat to Power: Powered by non-renewable fuel source, heat recovery or other mechanical recovery from existing equipment utilizing new electric generation equipment (e.g. steam turbine).

Check the NJCEP website for details on program availability, current incentive levels, and requirements.

#### How to Participate

You work with a qualified developer or consulting firm to complete the CHP application. Once the application is approved the project can be installed. Information about the CHP program can be found at: <a href="https://www.njcleanenergy.com/CHP">www.njcleanenergy.com/CHP</a>.





## 7.5 Energy Savings Improvement Program

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

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

#### How to Participate

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

- (1) Use an energy services company or "ESCO."
- (2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.
- (3) Use a hybrid approach of the two options described above where the ESCO is used for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

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

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

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





## 7.6 SREC Registration Program

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

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

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

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

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

## TRC



## 8 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

## 8.1 Retail Electric Supply Options

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

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

A list of licensed third-party electric suppliers is available at the NJBPU website<sup>8</sup>.

## 8.2 Retail Natural Gas Supply Options

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

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

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

A list of licensed third-party natural gas suppliers is available at the NJBPU website<sup>9</sup>.

<sup>&</sup>lt;sup>8</sup> www.state.nj.us/bpu/commercial/shopping.html.

<sup>&</sup>lt;sup>9</sup> www.state.nj.us/bpu/commercial/shopping.html.





## APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

## Lighting Inventory & Recommendations

	Existin	g Conditions					Prop	osed Conditio	ns						Energy li	npact & F	inancial A	nalysis			
Location	Fixture Quantit y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	15	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	s	15	3,500		None	No	15	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,500	0.0	0	0	\$0	\$0	\$0	0.0
Boiler 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	0.0	0	0	\$0	\$0	\$0	0.0
Custodial Lounge	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	s	32	3,500	3, 4	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupanc y Sensor	15	2,415	0.1	508	0	\$69	\$380	\$130	3.6
Custodial Lounge	2	Incandescent: Incandescent 1L 60W Fixture	Wall Switch	s	60	3,500	3, 4	Relamp	Yes	2	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	9	2,415	0.1	414	0	\$56	\$34	\$4	0.5
Custodial office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.0	162	0	\$22	\$37	\$20	0.8
Custodial office	2	Incandescent: Incandescent 1L 60W Fixture	Wall Switch	s	60	3,500	3, 4	Relamp	Yes	2	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	9	2,415	0.1	414	0	\$56	\$304	\$4	5.4
500 Gym	26	LED - Fixtures: High-Bay 2x2	Breaker Panel	s	200	3,500	4	None	Yes	26	LED - Fixtures: High-Bay 2x2	Occupanc y Sensor	200	2,415	1.2	6,206	-1	\$840	\$1,620	\$420	1.4
500 Gym	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
513 Aux. Gym	9	LED - Fixtures: High-Bay 2x2	Wall Switch	s	200	3,500	4	None	Yes	9	LED - Fixtures: High-Bay 2x2	Occupanc y Sensor	200	2,415	0.4	2,148	0	\$291	\$270	\$70	0.7
513 Aux. Gym	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Gym Storage	3	Incandescent: Incandescent 1L Bulb	Wall Switch	s	60	1,500	3, 4	Relamp	Yes	3	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	9	1,035	0.1	266	0	\$36	\$322	\$6	8.8
Aux. Gym 512	9	LED - Fixtures: High-Bay 2x2	Wall Switch	s	200	3,500	4	None	Yes	9	LED - Fixtures: High-Bay 2x2	Occupanc y Sensor	200	2,415	0.4	2,148	0	\$291	\$270	\$70	0.7
Aux. Gym 512	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Hall by Aux 513 Gym	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.0	127	0	\$17	\$37	\$20	1.0
Hall by Aux 513 Gym	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Boys locker room	31	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	s	15	3,500	4	None	Yes	31	LED - Linear Tubes: (1) 4' Lamp	Occupanc y Sensor	15	2,415	0.1	536	0	\$73	\$540	\$140	5.5
Boys Shower	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	s	15	3,500	4	None	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupanc y Sensor	15	2,415	0.0	17	0	\$2	\$0	\$0	0.0
Boys Shower	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	s	15	3,500	4	None	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupanc y Sensor	15	2,415	0.0	87	0	\$12	\$270	\$70	17.1
BL3 Storage	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	s	29	1,500		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,500	0.0	0	0	\$0	\$0	\$0	0.0
BL5 Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,415	0.1	485	0	\$66	\$380	\$130	3.8
BL5 Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	3,500	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,500	0.0	112	0	\$15	\$72	\$20	3.5
BL6 Storage	1	Compact Fluorescent: (2) 40W Biax Lamps	Wall Switch	s	80	1,500	3	Relamp	No	1	LED Lamps: (2) 23W Biax Lamps	Wall Switch	46	1,500	0.0	56	0	\$8	\$27	\$4	3.0
BLR Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,415	0.1	485	0	\$66	\$380	\$130	3.8
BLR Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	323	0	\$44	\$73	\$40	0.8
BL7 Team Rm	8	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	s	15	3,500	4	None	Yes	8	LED - Linear Tubes: (1) 4' Lamp	Occupanc y Sensor	15	2,415	0.0	138	0	\$19	\$270	\$70	10.7





	Existin	g Conditions					Prop	osed Conditio	ons						Energy li	npact & F	inancial A	Analysis			
Location	Fixture Quantit y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit y	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
BLR	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
516 cafetria	56	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	3,500	3, 4	Relamp	Yes	56	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	2,415	3.0	15,950	-3	\$2,160	\$5,170	\$2,520	1.2
Stage	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Stage	12	Incandescent: Incandescent Bulb 200W	Wall Switch	s	200	3,500	3, 4	Relamp	Yes	12	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	30	2,415	1.5	8,284	-2	\$1,122	\$477	\$94	0.3
Stage	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Stage Stairs	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	s	32	3,500	3	Relamp	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,500	0.0	202	0	\$27	\$55	\$30	0.9
Kitchen	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	3,500	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	2,415	0.3	1,709	0	\$231	\$708	\$310	1.7
Slop sink	1	Compact Fluorescent: (2) 26W Plug-In Lamps	Wall Switch	s	52	3,500	3	Relamp	No	1	LED Lamps: (2) 18.5W Plug-In Lamps	Wall Switch	37	3,500	0.0	58	0	\$8	\$25	\$4	2.7
511 blocker	1	LED Lamps: (2) 10.5W Plug-In Lamps	Wall Switch	s	21	3,500		None	No	1	LED Lamps: (2) 10.5W Plug-In Lamps	Wall Switch	21	3,500	0.0	0	0	\$0	\$0	\$0	0.0
511B Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	s	32	3,500	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,500	0.0	67	0	\$9	\$18	\$10	0.9
Kitchen Storage	2	LED Lamps: (2) 10.5W Plug-In Lamps	Wall Switch	s	21	1,500	4	None	Yes	2	LED Lamps: (2) 10.5W Plug-In Lamps	Occupanc y Sensor	21	1,035	0.0	21	0	\$3	\$270	\$0	92.8
Kitchen Day Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	1,035	0.0	69	0	\$9	\$307	\$20	30.5
Kitchen Day Storage	1	Compact Fluorescent: (3) 40W Biax Lamps	Wall Switch	s	120	1,500	3, 4	Relamp	Yes	1	LED Lamps: (2) 23W Biax Lamps	Occupanc y Sensor	46	1,035	0.1	146	0	\$20	\$27	\$4	1.2
510 Faculty	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.4	1,940	0	\$263	\$708	\$310	1.5
Hall by cafeteria	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,415	0.1	323	0	\$44	\$298	\$180	2.7
Hall by cafeteria	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
516 C Internet Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	1,500	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,500	0.0	92	0	\$13	\$73	\$40	2.6
508 Class	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.7	3,880	-1	\$525	\$1,416	\$620	1.5
507 Music	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.7	3,880	-1	\$525	\$1,416	\$620	1.5
507 Storage	3	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	s	11	1,500	4	None	Yes	3	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	1,035	0.0	16	0	\$2	\$270	\$0	123.8
507 Office	1	Linear Fluorescent - T8: 8' T8 (59W) - 2L	Wall Switch	s	110	3,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 8' Lamps	Occupanc y Sensor	72	2,415	0.0	232	0	\$31	\$359	\$110	7.9
Faculty Men RR	1	Linear Fluorescent - T8: 1' T8 -1L	Wall Switch	S	13	3,500	3	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	3,500	0.0	17	0	\$2	\$16	\$6	4.4
Faculty Women RR	1	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Wall Switch	s	50	3,500	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,500	0.0	127	0	\$17	\$65	\$12	3.1
509 Janitor	1	Incandescent: Incandescent 100W- 1L	Wall Switch	s	100	1,500	3	Relamp	No	1	LED Lamps: One Lamp Screw-in	Wall Switch	15	1,500	0.1	140	0	\$19	\$17	\$2	0.8
506 Music	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.7	3,880	-1	\$525	\$1,416	\$620	1.5





	Existin	g Conditions					Prop	osed Conditio	ns						Energy Ir	npact & F	inancial A	nalysis			
Location	Fixture Quantit y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit y	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
GLR restroom	8	LED - Fixtures: Ceiling Mount	Wall Switch	S	9	3,500	4	None	Yes	8	LED - Fixtures: Ceiling Mount	Occupanc y Sensor	9	2,415	0.0	86	0	\$12	\$270	\$70	17.2
GL5 Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,415	0.1	485	0	\$66	\$380	\$130	3.8
GL5 Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	3,500	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,500	0.0	112	0	\$15	\$72	\$20	3.5
GL4 Storage	1	LED Lamps: (2) 10.5W Plug-In Lamps	Wall Switch	S	21	1,500		None	No	1	LED Lamps: (2) 10.5W Plug-In Lamps	Wall Switch	21	1,500	0.0	0	0	\$0	\$0	\$0	0.0
GL7 storage	1	LED Lamps: (2) 10.5W Plug-In Lamps	Wall Switch	s	21	1,500		None	No	1	LED Lamps: (2) 10.5W Plug-In Lamps	Wall Switch	21	1,500	0.0	0	0	\$0	\$0	\$0	0.0
GL8 Storage	1	Compact Fluorescent: (3) 40W Biax Lamps	Wall Switch	s	120	1,500	3, 4	Relamp	Yes	1	LED Lamps: (3) 23W Biax Lamps	Occupanc y Sensor	84	1,035	0.0	102	0	\$14	\$41	\$6	2.5
GL8 Storage	2	Incandescent: Incandescent 60W -1L	Wall Switch	s	60	1,500	3, 4	Relamp	Yes	2	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	9	1,035	0.1	178	0	\$24	\$304	\$4	12.5
GL12 Team Room	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	s	15	3,500	4	None	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupanc y Sensor	15	2,415	0.0	52	0	\$7	\$270	\$0	38.4
Gym / Café hall	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.6	3,395	-1	\$460	\$1,442	\$1,095	0.8
Gym / Café hall	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Gym / Café hall	6	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	s	15	3,500	5	None	Yes	6	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,415	0.0	104	0	\$14	\$225	\$225	0.0
600 Main Office	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,910	-1	\$394	\$1,197	\$500	1.8
601 workroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	3,500	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,500	0.0	216	0	\$29	\$73	\$40	1.1
602 office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	3,500	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,500	0.0	216	0	\$29	\$73	\$40	1.1
closet office	1	Incandescent: Incandescent 130W -1L	Wall Switch	s	130	3,500	3	Relamp	No	1	LED Lamps: One Lamp Screw-in	Wall Switch	20	3,500	0.1	425	0	\$58	\$17	\$2	0.3
attendance office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	323	0	\$44	\$343	\$40	6.9
610 storage	2	Incandescent: Incandescent 60W -1L	Wall Switch	s	60	1,500	3, 4	Relamp	Yes	2	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	9	1,035	0.1	178	0	\$24	\$304	\$4	12.5
603 Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	2,415	0.1	570	0	\$77	\$416	\$150	3.4
604 Office	1	Linear Fluorescent - T8: 4' T8 (32W) -8L	Wall Switch	s	228	3,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (4) 8' Lamps	Occupanc y Sensor	144	2,415	0.1	495	0	\$67	\$447	\$150	4.4
605 Office	1	Linear Fluorescent - T8: 4' T8 (32W) -8L	Wall Switch	s	228	3,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (4) 8' Lamps	Occupanc y Sensor	144	2,415	0.1	495	0	\$67	\$447	\$150	4.4
M0- Women RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.0	127	0	\$17	\$37	\$20	1.0
612 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	1,500	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,500	0.0	92	0	\$13	\$73	\$40	2.6
M0- Men RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.0	127	0	\$17	\$37	\$20	1.0
Conf room	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.2	808	0	\$109	\$453	\$170	2.6
600 safe	1	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	s	11	3,500		None	No	1	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	11	3,500	0.0	0	0	\$0	\$0	\$0	0.0





	Existin	g Conditions					Prop	osed Conditio	ons						Energy Ir	npact & F	inancial A	nalysis			
Location	Fixture Quantit y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	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
600 hallway	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 5	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,415	0.2	1,132	0	\$153	\$706	\$590	0.8
607C nurse	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	s	32	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupanc y Sensor	15	2,415	0.0	169	0	\$23	\$307	\$20	12.5
607 nurse	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	647	0	\$88	\$146	\$80	0.8
607 nurse	4	LED - Fixtures: Wall Sconces-2L	Wall Switch	s	20	3,500	4	None	Yes	4	LED - Fixtures: Wall Sconces-2L	Occupanc y Sensor	20	2,415	0.0	95	0	\$13	\$270	\$70	15.5
607 restroom	1	Incandescent: 60W 2L	Wall Switch	s	120	3,500	3	Relamp	No	1	LED Lamps: One Lamp Screw-in	Wall Switch	18	3,500	0.1	393	0	\$53	\$17	\$2	0.3
607 closet	1	Incandescent: 60W 2L	Wall Switch	s	120	1,500	3	Relamp	No	1	LED Lamps: One Lamp Screw-in	Wall Switch	18	1,500	0.1	168	0	\$23	\$17	\$2	0.7
hall by 600 nurse	4	LED - Linear Tubes: (4) 3' Lamps	Wall Switch	s	42	3,500	5	None	Yes	4	LED - Linear Tubes: (4) 3' Lamps	High/Low Control	42	2,415	0.0	201	0	\$27	\$225	\$225	0.0
hall by 600 nurse	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.3	1,697	0	\$230	\$833	\$660	0.8
hall by 600 nurse	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
218 lab science	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 4	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,415	0.5	2,910	-1	\$394	\$927	\$430	1.3
217A prep room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.0	127	0	\$17	\$37	\$20	1.0
225 storage	2	Compact Fluorescent: (1) 32W Plug-In Lamp	Wall Switch	s	32	1,500	3, 4	Relamp	Yes	2	LED Lamps: (1) 23W Biax Lamps	Occupanc y Sensor	22	1,035	0.0	55	0	\$7	\$297	\$4	39.6
201 class	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.4	1,940	0	\$263	\$708	\$310	1.5
219 office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	3,500	3, 4	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	2,415	0.2	1,139	0	\$154	\$562	\$230	2.2
217 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
216 Class	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.4	1,940	0	\$263	\$708	\$310	1.5
216 Storage	12	Compact Fluorescent: Spiral 30W -1L	Wall Switch	s	30	1,500	3, 4	Relamp	Yes	12	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	21	1,035	0.1	307	0	\$42	\$477	\$24	10.9
222 Storage	2	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	s	11	1,500	4	None	Yes	2	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	1,035	0.0	11	0	\$1	\$270	\$0	185.6
222 Storage	1	Compact Fluorescent: Spiral 30W -1L	Wall Switch	s	30	1,500	3, 4	Relamp	Yes	1	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	21	1,035	0.0	26	0	\$3	\$17	\$2	4.4
224 Janitor	1	Compact Fluorescent: (2) 40W Biax Lamps	Wall Switch	s	80	1,500	3	Relamp	No	1	LED Lamps: (2) 23W Biax Lamps	Wall Switch	46	1,500	0.0	56	0	\$8	\$27	\$4	3.0
214 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
223 office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.2	970	0	\$131	\$489	\$190	2.3
213 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
212 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
200 lecturing class	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.7	3,557	-1	\$482	\$1,343	\$580	1.6





	Existin	g Conditions					Prop	osed Conditio	ons						Energy In	npact & F	inancial A	nalysis			
Location	Fixture Quantit y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	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
221 LRC lab	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	647	0	\$88	\$416	\$150	3.0
228 Office	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.2	1,293	0	\$175	\$562	\$230	1.9
211 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
girls RR restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupanc y Sensor	s	93	2,450	3	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.1	267	0	\$36	\$110	\$60	1.4
girls RR restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.0	178	0	\$24	\$73	\$40	1.4
210 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
209 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
208 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
227 faculty lounge	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	323	0	\$44	\$343	\$40	6.9
227 restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	s	33	3,500	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,500	0.0	62	0	\$8	\$33	\$12	2.5
227 rr1	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	s	33	3,500	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,500	0.0	62	0	\$8	\$33	\$12	2.5
207 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
206 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
205 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
Stairs 4	1	LED Lamps: (2) 10.5W Plug-In Lamps	Wall Switch	s	21	3,500	5	None	Yes	1	LED Lamps: (2) 10.5W Plug-In Lamps	High/Low Control	21	2,415	0.0	25	0	\$3	\$0	\$0	0.0
Stairs 4	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,415	0.1	302	0	\$41	\$370	\$180	4.6
204 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
200 Boys RR	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	s	44	2,450		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.0	0	0	\$0	\$0	\$0	0.0
200 Boys RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupanc y Sensor	s	93	2,450	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.0	133	0	\$18	\$55	\$30	1.4
200 Boys RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.0	89	0	\$12	\$37	\$20	1.4
200 Halls	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	4	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	208	0	\$28	\$225	\$225	0.0
200 Halls	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.4	2,182	0	\$295	\$943	\$720	0.8
200 Halls	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
200 Hall CO	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.2	1,212	0	\$164	\$499	\$375	0.8
200 Hall CO	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,500	5	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	104	0	\$14	\$225	\$140	6.0





	Existin	g Conditions					Prop	osed Conditio	ns						Energy Ir	npact & F	inancial A	nalysis			
Location	Fixture Quantit y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	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
200 Hall CO	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
203 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
202 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
200 Hall E	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.3	1,455	0	\$197	\$554	\$405	0.8
200 Hall E	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	104	0	\$14	\$225	\$140	6.0
200 Hall E	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
200 LRC	10	Compact Fluorescent: (1) 32W Plug-In Lamp	Wall Switch	s	32	3,500	3, 4	Relamp	Yes	10	LED Lamps: (1) 23W Biax Lamps	Occupanc y Sensor	22	2,415	0.1	637	0	\$86	\$405	\$90	3.7
229 Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	323	0	\$44	\$343	\$40	6.9
200 Hall N	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	4	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	208	0	\$28	\$225	\$225	0.0
200 Hall N	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.7	3,637	-1	\$492	\$1,497	\$1,125	0.8
200 Hall N	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Stair 3	2	Compact Fluorescent: (1) 32W Plug-In Lamp	Wall Switch	s	32	3,500	3, 5	Relamp	Yes	2	LED Lamps: (1) 23W Biax Lamps	High/Low Control	22	2,415	0.0	127	0	\$17	\$27	\$4	1.3
Stair 3	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Stair 3	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 5	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,415	0.1	453	0	\$61	\$442	\$270	2.8
401 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
419 Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	323	0	\$44	\$343	\$40	6.9
420 Security	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	323	0	\$44	\$73	\$40	0.8
420 Security	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	2,415	0.1	570	0	\$77	\$416	\$150	3.4
Class 402	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
400 La b	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.6	3,395	-1	\$460	\$1,307	\$560	1.6
400 La b	13	Compact Fluorescent: (1) 13W Plug-In Lamp	Wall Switch	s	13	3,500	3, 4	Relamp	Yes	13	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	2,415	0.1	288	0	\$39	\$433	\$96	8.6
400 La b	1	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	s	11	3,500	4	None	Yes	1	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	2,415	0.0	13	0	\$2	\$0	\$0	0.0
400 La b	2	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	s	11	3,500	4	None	Yes	2	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	2,415	0.0	25	0	\$3	\$0	\$0	0.0
400 La b	2	Compact Fluorescent: (1) 32W Plug-In Lamp	Wall Switch	s	32	3,500	3, 4	Relamp	Yes	2	LED Lamps: (1) 23W Biax Lamps	Occupanc y Sensor	22	2,415	0.0	127	0	\$17	\$27	\$4	1.3
425 IT Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	1,035	0.1	139	0	\$19	\$343	\$40	16.2





	Existin	g Conditions					Prop	osed Conditio	ons						Energy Ir	npact & F	inancial A	nalysis			
Location	Fixture Quantit y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	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
403 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
400 Wing Boys RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupanc y Sensor	s	93	2,450	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.0	133	0	\$18	\$55	\$30	1.4
400 Wing Boys RR	1	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	s	11	2,450		None	No	1	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	2,450	0.0	0	0	\$0	\$0	\$0	0.0
400 Wing Boys RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.0	178	0	\$24	\$73	\$40	1.4
404 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
400 Hall W	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.3	1,697	0	\$230	\$833	\$660	0.8
400 Hall W	2	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	s	11	3,500	5	None	Yes	2	LED Lamps: (1) 10.5W Plug-In Lamp	High/Low Control	11	2,415	0.0	25	0	\$3	\$0	\$0	0.0
400 Hall W	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
405 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
406 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
407 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
433 Faculty lounge	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	323	0	\$44	\$343	\$40	6.9
433 Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	s	33	3,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupanc y Sensor	17	2,415	0.0	82	0	\$11	\$33	\$12	1.9
433 Restroom	1	Incandescent: Incadescent 60W - 1L	Wall Switch	s	60	3,500	3, 4	Relamp	Yes	1	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	9	2,415	0.0	207	0	\$28	\$17	\$2	0.5
433 Restroom	1	Compact Fluorescent: CFL 30W- 1L	Wall Switch	s	30	3,500	3, 4	Relamp	Yes	1	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	21	2,415	0.0	60	0	\$8	\$287	\$2	35.3
408 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
409 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
410 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
429 Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	1,035	0.1	139	0	\$19	\$343	\$40	16.2
429 Storage	1	Linear Fluorescent - T8: 8' T8 (59W) - 2L	Wall Switch	s	110	1,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 8' Lamps	Occupanc y Sensor	72	1,035	0.0	100	0	\$13	\$89	\$40	3.6
400 Hall S	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.3	1,697	0	\$230	\$833	\$660	0.8
400 Hall S	3	LED - Linear Tubes: (4) 3' Lamps	Wall Switch	s	42	3,500	5	None	Yes	3	LED - Linear Tubes: (4) 3' Lamps	High/Low Control	42	2,415	0.0	150	0	\$20	\$0	\$0	0.0
400 Hall S	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
400 Wing Girls	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupanc y Sensor	s	93	2,450	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.0	133	0	\$18	\$55	\$30	1.4
400 Wing Girls	1	LED - Linear Tubes: (4) 3' Lamps	Occupanc y Sensor	s	42	2,450		None	No	1	LED - Linear Tubes: (4) 3' Lamps	Occupanc y Sensor	42	2,450	0.0	0	0	\$0	\$0	\$0	0.0





	Existin	Conditions					Prop	osed Conditio	ns						Energy Ir	npact & F	inancial A	nalysis			
Location	Fixture Quantit Y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	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
400 Wing Girls	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.0	178	0	\$24	\$73	\$40	1.4
411 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
412 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
428 Office	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	3,500	3, 4	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	2,415	0.4	2,279	0	\$309	\$854	\$390	1.5
413 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
422 Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.2	970	0	\$131	\$489	\$190	2.3
414 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
424 janitor	1	Incandescent: Incandescent 60W -1L	Wall Switch	s	60	1,500	3	Relamp	No	1	LED Lamps: One Lamp Screw-in	Wall Switch	9	1,500	0.0	84	0	\$11	\$17	\$2	1.3
400 Hall E	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.3	1,697	0	\$230	\$833	\$660	0.8
400 Hall E	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	3	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	156	0	\$21	\$0	\$0	0.0
400 Hall E	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
430 Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	3,500	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,500	0.0	216	0	\$29	\$73	\$40	1.1
418 Class	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.3	1,245	0	\$169	\$511	\$280	1.4
418A prep room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.0	127	0	\$17	\$37	\$20	1.0
417 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
425 Mech Storage	1	Compact Fluorescent: (1) 26W Plug-In Lamp	Wall Switch	s	26	1,500	3, 4	Relamp	Yes	1	LED Lamps: (1) 18.5W Plug-In Lamp	Occupanc y Sensor	19	1,035	0.0	22	0	\$3	\$13	\$2	3.6
425 Mech Storage	2	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	s	11	1,500	4	None	Yes	2	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	1,035	0.0	11	0	\$1	\$270	\$0	185.6
416 class	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.4	1,940	0	\$263	\$708	\$310	1.5
416A storage	1	Incandescent: Incandescent 130W-1L	Wall Switch	s	130	1,500	3	Relamp	No	1	LED Lamps: One Lamp Screw-in	Wall Switch	20	1,500	0.1	182	0	\$25	\$17	\$2	0.6
Stair 6	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	s	33	3,500	3, 5	Relamp	Yes	5	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	2,415	0.1	409	0	\$55	\$388	\$285	1.9
Stair 6	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
400 Hall N	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	3	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	156	0	\$21	\$225	\$210	0.7
400 Hall N	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.5	2,425	-1	\$328	\$998	\$750	0.8
400 Hall N	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
431 Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	s	176	3,500	2	Relamp & Reballast	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,500	0.1	454	0	\$62	\$118	\$40	1.3





	Existin	g Conditions					Prop	osed Conditio	ons						Energy li	npact & F	inancial A	nalysis			
Location	Fixture Quantit y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	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
400 Wing Boys RR	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	4	None	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,415	0.0	52	0	\$7	\$0	\$0	0.0
400 Wing Boys RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,415	0.0	242	0	\$33	\$55	\$30	0.8
400 Wing Boys RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	s	62	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	323	0	\$44	\$343	\$110	5.3
415 Class	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.6	3,233	-1	\$438	\$1,270	\$540	1.7
415A Elec. Room	1	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Wall Switch	s	63	1,500	3	Relamp	No	1	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	1,500	0.0	48	0	\$6	\$65	\$24	6.3
315 Home economics	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.6	3,233	-1	\$438	\$1,270	\$540	1.7
315A Storage	1	Incandescent: Incadescent 60W - 1L	Wall Switch	s	60	1,500	3	Relamp	No	1	LED Lamps: One Lamp Screw-in	Wall Switch	9	1,500	0.0	84	0	\$11	\$17	\$2	1.3
400 Girls Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupanc y Sensor	s	93	2,450	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.0	133	0	\$18	\$55	\$30	1.4
400 Girls Restroom	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	s	44	2,450		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.0	0	0	\$0	\$0	\$0	0.0
400 Girls Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.0	178	0	\$24	\$73	\$40	1.4
332 Storage	1	Incandescent: Incandescent 130W -1L	Wall Switch	s	130	1,500	3	Relamp	No	1	LED Lamps: One Lamp Screw-in	Wall Switch	20	1,500	0.1	182	0	\$25	\$17	\$2	0.6
331 Storage	1	Compact Fluorescent: (1) 18W Plug-In Lamp	Wall Switch	s	18	1,500	3	Relamp	No	1	LED Lamps: (1) 12W Plug-In Lamp	Wall Switch	12	1,500	0.0	10	0	\$1	\$13	\$2	7.8
400 Hall East	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 5	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,415	0.2	1,293	0	\$175	\$742	\$610	0.8
400 Hall East	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	4	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	208	0	\$28	\$0	\$0	0.0
400 Hall East	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
314 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
325 janitor	1	Compact Fluorescent: CFL 30W- 1L	Wall Switch	s	30	1,500	3	Relamp	No	1	LED Lamps: One Lamp Screw-in	Wall Switch	21	1,500	0.0	15	0	\$2	\$17	\$2	7.6
322 office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.2	970	0	\$131	\$489	\$190	2.3
313 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
300 Comp. Lab	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.7	3,557	-1	\$482	\$1,343	\$580	1.6
300 Comp. Lab	11	Compact Fluorescent: CFL 30W- 1L	Wall Switch	s	30	3,500	3, 4	Relamp	Yes	11	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	21	2,415	0.1	657	0	\$89	\$459	\$92	4.1
300 Comp. Lab	3	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	s	11	3,500	4	None	Yes	3	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	2,415	0.0	38	0	\$5	\$0	\$0	0.0
300 Comp. Lab	4	Compact Fluorescent: (1) 26W Plug-In Lamp	Wall Switch	s	26	3,500	3, 4	Relamp	Yes	4	LED Lamps: (1) 18.5W Plug-In Lamp	Occupanc y Sensor	19	2,415	0.0	204	0	\$28	\$50	\$8	1.5
328 Office	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	3,500	3, 4	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	2,415	0.4	2,279	0	\$309	\$854	\$390	1.5
312 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3





	Existin	g Conditions					Prop	osed Conditio	ons						Energy Ir	npact & F	inancial A	nalysis			
Location	Fixture Quantit y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	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
311 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
300 Girls RR	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,500	0.0	0	0	\$0	\$0	\$0	0.0
300 Hall East	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.3	1,697	0	\$230	\$833	\$660	0.8
300 Hall East	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	104	0	\$14	\$0	\$0	0.0
300 Hall East	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
333 Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	1,035	0.1	139	0	\$19	\$343	\$40	16.2
310 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
333 storage	2	Compact Fluorescent: (2) 26W Plug-In Lamps	Wall Switch	s	52	1,500	3, 4	Relamp	Yes	2	LED Lamps: (2) 18.5W Plug-In Lamps	Occupanc y Sensor	37	1,035	0.0	87	0	\$12	\$50	\$8	3.6
309 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
308 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
327 faculty lounge	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	485	0	\$66	\$380	\$130	3.8
327 restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	s	33	3,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupanc y Sensor	17	2,415	0.0	82	0	\$11	\$33	\$12	1.9
327 restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	s	33	3,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupanc y Sensor	17	2,415	0.0	82	0	\$11	\$303	\$12	26.2
307 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
306 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
305 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
300 Hall North	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.3	1,455	0	\$197	\$554	\$405	0.8
300 Hall North	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	4	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	208	0	\$28	\$225	\$225	0.0
300 Hall North	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Stair 1	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,415	0.1	302	0	\$41	\$370	\$180	4.6
Stair 1	1	Compact Fluorescent: (2) 26W Plug-In Lamps	Wall Switch	s	52	3,500	3, 5	Relamp	Yes	1	LED Lamps: (2) 18.5W Plug-In Lamps	High/Low Control	37	2,415	0.0	102	0	\$14	\$25	\$4	1.5
Stair 1	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
304 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
303 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
302 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3





	Existin	g Conditions					Prop	osed Conditio	ons						Energy Ir	mpact & F	inancial A	Analysis			
Location	Fixture Quantit Y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	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
300 Wing Boys RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupanc y Sensor	s	93	2,450	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.0	133	0	\$18	\$55	\$30	1.4
300 Wing Boys RR	1	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	s	11	2,450		None	No	1	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	2,450	0.0	0	0	\$0	\$0	\$0	0.0
300 Wing Boys RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.0	178	0	\$24	\$73	\$40	1.4
320 Office	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	s	33	3,500	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupanc y Sensor	17	2,415	0.1	328	0	\$44	\$400	\$118	6.4
320 Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	485	0	\$66	\$110	\$60	0.8
301 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
319 storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	1,035	0.1	139	0	\$19	\$343	\$40	16.2
Stair 2	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 5	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,415	0.1	453	0	\$61	\$442	\$270	2.8
Stair 2	2	LED Lamps: (2) 10.5W Plug-In Lamps	Wall Switch	s	21	3,500	5	None	Yes	2	LED Lamps: (2) 10.5W Plug-In Lamps	High/Low Control	21	2,415	0.0	50	0	\$7	\$0	\$0	0.0
300 Hall west	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.3	1,697	0	\$230	\$833	\$660	0.8
300 Hall west	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	3	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	156	0	\$21	\$0	\$0	0.0
300 Hall west	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
330 office	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,500	0.0	191	0	\$26	\$55	\$30	1.0
318 science lab	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.3	1,245	0	\$169	\$511	\$280	1.4
318A Prep room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.0	127	0	\$17	\$37	\$20	1.0
317 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
323 storage	3	Compact Fluorescent: CFL 30W- 1L	Wall Switch	s	30	1,500	3, 4	Relamp	Yes	3	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	21	1,035	0.0	77	0	\$10	\$322	\$6	30.4
316 lab	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.4	1,940	0	\$263	\$708	\$310	1.5
316A storage	1	Incandescent: Incandescent 130W -1L	Wall Switch	s	130	1,500	3	Relamp	No	1	LED Lamps: One Lamp Screw-in	Wall Switch	20	1,500	0.1	182	0	\$25	\$17	\$2	0.6
300 Hall south	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.4	2,182	0	\$295	\$943	\$720	0.8
300 Hall south	5	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	5	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	260	0	\$35	\$225	\$225	0.0
300 Hall south	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Stair 5	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 5	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,415	0.1	453	0	\$61	\$442	\$270	2.8
Stair 5	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
115 Comp. Lab	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.6	3,233	-1	\$438	\$1,270	\$540	1.7





	Existin	g Conditions					Prop	osed Conditio	ons						Energy Ir	npact & F	inancial A	nalysis			
Location	Fixture Quantit Y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	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
115 Comp. Lab	1	Compact Fluorescent: (1) 26W Plug-In Lamp	Wall Switch	s	26	3,500	3, 4	Relamp	Yes	1	LED Lamps: (1) 18.5W Plug-In Lamp	Occupanc y Sensor	19	2,415	0.0	51	0	\$7	\$13	\$2	1.5
215 Comp Lab	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.6	3,233	-1	\$438	\$1,270	\$540	1.7
215A Elec. Rm	2	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	s	11	1,500		None	No	2	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	11	1,500	0.0	0	0	\$0	\$0	\$0	0.0
200 Hall East	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.3	1,697	0	\$230	\$833	\$660	0.8
200 Hall East	5	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	5	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	260	0	\$35	\$0	\$0	0.0
200 Hall East	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
114 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
100 La b	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.7	3,557	-1	\$482	\$1,343	\$580	1.6
100 La b	14	Compact Fluorescent: (1) 26W Plug-In Lamp	Wall Switch	s	26	3,500	3, 4	Relamp	Yes	14	LED Lamps: (1) 18.5W Plug-In Lamp	Occupanc y Sensor	19	2,415	0.1	713	0	\$97	\$445	\$98	3.6
100 Lab	4	Compact Fluorescent: (1) 26W Plug-In Lamp	Wall Switch	s	26	3,500	3, 4	Relamp	Yes	4	LED Lamps: (1) 18.5W Plug-In Lamp	Occupanc y Sensor	19	2,415	0.0	204	0	\$28	\$50	\$8	1.5
121 Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	2,415	0.1	570	0	\$77	\$416	\$150	3.4
122 Office	9	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	s	32	3,500	3, 4	Relamp	Yes	9	LED - Linear Tubes: (1) 4' Lamp	Occupanc y Sensor	15	2,415	0.1	762	0	\$103	\$434	\$160	2.7
113 Storage	8	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	s	32	1,500	3, 4	Relamp	Yes	8	LED - Linear Tubes: (1) 4' Lamp	Occupanc y Sensor	15	1,035	0.1	290	0	\$39	\$416	\$80	8.5
113B Storage	2	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	s	11	1,500	4	None	Yes	2	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	1,035	0.0	11	0	\$1	\$270	\$0	185.6
133 Storage	12	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	s	32	1,500	3, 4	Relamp	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupanc y Sensor	15	1,035	0.2	436	0	\$59	\$489	\$120	6.3
Copyarea	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	s	32	3,500	3, 4	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupanc y Sensor	15	2,415	0.1	339	0	\$46	\$343	\$40	6.6
123 Janitor	1	Compact Fluorescent: (1) 26W Plug-In Lamp	Wall Switch	s	26	1,500	3	Relamp	No	1	LED Lamps: (1) 18.5W Plug-In Lamp	Wall Switch	19	1,500	0.0	12	0	\$2	\$13	\$2	6.3
123A ETNR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.0	127	0	\$17	\$37	\$20	1.0
112 Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,500	0.0	127	0	\$17	\$37	\$20	1.0
128 Office	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	3,500	3, 4	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	2,415	0.4	2,279	0	\$309	\$854	\$390	1.5
100 Hall north	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.2	1,212	0	\$164	\$499	\$375	0.8
100 Hall north	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	S	44	3,500	5	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	104	0	\$14	\$0	\$0	0.0
100 Hall north	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
200 Wing Boys RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupanc y Sensor	S	93	2,450	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.0	133	0	\$18	\$55	\$30	1.4
200 Wing Boys RR	1	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	s	11	2,450		None	No	1	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	2,450	0.0	0	0	\$0	\$0	\$0	0.0





	Existin	g Conditions					Prop	osed Conditio	ons						Energy Ir	npact & F	inancial A	nalysis			
Location	Fixture Quantit y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	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
200 Wing Boys RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.0	178	0	\$24	\$73	\$40	1.4
200 Wing Girls RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupanc y Sensor	s	93	2,450	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.0	133	0	\$18	\$55	\$30	1.4
200 Wing Girls RR	1	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	s	11	2,450		None	No	1	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	2,450	0.0	0	0	\$0	\$0	\$0	0.0
200 Wing Girls RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.0	178	0	\$24	\$73	\$40	1.4
111 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.4	1,423	0	\$193	\$584	\$320	1.4
110 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
109 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
108 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
127 Faculty lounge	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	323	0	\$44	\$343	\$40	6.9
127 restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	s	33	3,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupanc y Sensor	17	2,415	0.0	82	0	\$11	\$33	\$12	1.9
127 restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	s	33	3,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupanc y Sensor	17	2,415	0.0	82	0	\$11	\$303	\$12	26.2
104 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
107 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
106 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
105 class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
100 hall North	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	3	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	156	0	\$21	\$225	\$210	0.7
100 hall North	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.5	2,425	-1	\$328	\$998	\$750	0.8
100 hall North	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
103 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
102 Class	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
129 Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	323	0	\$44	\$343	\$40	6.9
120 Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	485	0	\$66	\$380	\$130	3.8
100 Hall west	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.2	1,212	0	\$164	\$499	\$375	0.8
100 Hall west	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	104	0	\$14	\$225	\$140	6.0
100 Hall west	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0





	Existin	g Conditions					Prop	osed Conditio	ons						Energy Ir	npact & F	inancial A	nalysis			
Location	Fixture Quantit y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	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
100 Girls Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupanc y Sensor	s	93	2,450	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.0	133	0	\$18	\$55	\$30	1.4
100 Girls Restroom	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	s	44	2,450		None	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.0	0	0	\$0	\$0	\$0	0.0
100 Girls Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.0	178	0	\$24	\$73	\$40	1.4
100 Wing Boys RR	1	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	s	58	2,450		None	No	1	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	2,450	0.0	0	0	\$0	\$0	\$0	0.0
100 Wing Boys RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupanc y Sensor	s	93	2,450	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,450	0.0	133	0	\$18	\$55	\$30	1.4
100 Wing Boys RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupanc y Sensor	s	62	2,450	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,450	0.0	178	0	\$24	\$73	\$40	1.4
119 Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	323	0	\$44	\$343	\$40	6.9
101 computer	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
science lab 118	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 4	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	2,415	0.5	2,910	-1	\$394	\$927	\$430	1.3
118A prep	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.1	647	0	\$88	\$416	\$150	3.0
117 Lab	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.5	2,587	-1	\$350	\$854	\$390	1.3
117A storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	1,500	3, 4	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	1,035	0.1	122	0	\$17	\$73	\$40	2.0
117A storage	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	1,500	4	None	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupanc y Sensor	44	1,035	0.0	22	0	\$3	\$270	\$0	89.6
124 storage	1	LED Lamps: (1) 10.5W Plug-In Lamp	Wall Switch	s	11	1,500	4	None	Yes	1	LED Lamps: (1) 10.5W Plug-In Lamp	Occupanc y Sensor	11	1,035	0.0	5	0	\$1	\$0	\$0	0.0
124 storage	1	Incandescent: Incandescent Bulb 130W- 1L	Wall Switch	s	130	1,500	3, 4	Relamp	Yes	1	LED Lamps: One Lamp Screw-in	Occupanc y Sensor	20	1,035	0.1	192	0	\$26	\$287	\$2	11.0
116 Tech Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	3,500	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupanc y Sensor	29	2,415	0.4	1,940	0	\$263	\$708	\$310	1.5
116A Class	1	Incandescent: Incandescent Bulb 130W- 1L	Wall Switch	s	130	3,500	3	Relamp	No	1	LED Lamps: One Lamp Screw-in	Wall Switch	20	3,500	0.1	425	0	\$58	\$17	\$2	0.3
Elevator	2	Linear Fluorescent - T8: 3' T8 (25W) - 2L	None	s	48	3,500	3	Relamp	No	2	LED - Linear Tubes: (2) 3' Lamps	None	21	3,500	0.0	208	0	\$28	\$73	\$40	1.2
100 Hall South	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	3,500	3, 5	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.6	3,395	-1	\$460	\$1,442	\$1,095	0.8
100 Hall South	5	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	s	44	3,500	5	None	Yes	5	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,415	0.0	260	0	\$35	\$225	\$225	0.0
100 Hall South	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Courtyard	2	Compact Fluorescent: CFL 30W- 1L	Wall Switch		30	4,380	3	Relamp	No	2	LED Lamps: One Lamp Screw-in	Wall Switch	21	4,380	0.0	79	0	\$11	\$34	\$4	2.8
Canopy Mount	10	LED Lamps: (2) 10.5W Plug-In Lamps	Timeclock		21	4,380		None	No	10	LED Lamps: (2) 10.5W Plug-In Lamps	Timeclock	21	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Wallmount	37	Metal Halide: (1) 100W Lamp	Timeclock		128	4,380	1	Fixture Replacement	No	37	LED - Fixtures: Outdoor Wall- Mounted Area Fixture	Timeclock	38	4,380	0.0	14,521	0	\$1,988	\$35,741	\$7,400	14.3
Parking lot	31	High-Pressure Sodium: (1) 250W Lamp	Photocell		295	4,380	1	Fixture Replacement	No	31	LED - Fixtures: Outdoor Pole/Arm Mounted Area/Roadway Fixture	Photocell	89	4,380	0.0	28,039	0	\$3,838	\$28,847	\$6,200	5.9





	Existin	g Conditions					Prop	osed Conditio	ons						Energy l	mpact & I	Financial A	Analysis			
Location	Fixture Quantit Y	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit Y	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
Wallpack	5	Metal Halide: (1) 70W Lamp	Timeclock		95	4,380	1	Fixture Replacement	No	5	LED - Fixtures: Outdoor Wall- Mounted Area Fixture	Timeclock	29	4,380	0.0	1,456	0	\$199	\$4,830	\$1,000	19.2
Roadwaylight	6	Incandescent: One lamp screw- in	Timeclock		200	4,380	3	Relamp	No	6	LED Lamps: One Lamp Screw-in	Timeclock	30	4,380	0.0	4,468	0	\$612	\$181	\$36	0.2





## **Motor Inventory & Recommendations**

		Existin	g Conditions						Prop	oosed Co	ondition	S		Energy In	ipact & Fii	nancial An	alysis			
Location	Area(s)/System(s) Served	Motor Quantit Y	Motor Application	HP Per Motor	Full Load Efficienc Y	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficienc y Motors?	Full Load Efficiency	Install VFDs?	Numbe r 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
Multiple Locations	Classrooms and facility cooling	126	Supply Fan	0.3	69.5%	No	w	3,500		No	69.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Teacher's Work Areas, Computer Lab, Teacher's Lounge	12	Supply Fan	0.8	81.1%	Yes	w	3,500		No	81.1%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Computer classroom, stage	2	Supply Fan	1.0	85.5%	Yes	w	3,500		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	All Purpose Room	2	Supply Fan	20.0	93.0%	Yes	w	3,500		No	93.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	All Purpose Room	2	Return Fan	3.0	89.5%	Yes	w	3,500		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	Classroom 502, 503, 504, 505, 506, 507, 508	7	Supply Fan	3.5	89.5%	Yes	w	3,500		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mechanical Room	Gym	1	Supply Fan	2.0	84.0%	No	w	3,500	6	No	86.5%	Yes	1	0.6	2,453	0	\$336	\$3,261	\$320	8.8
Storage Room	Resource Center	2	Supply Fan	5.0	89.5%	Yes	w	3,500		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Elevator Room	Elevator	1	Other	25.0	75.0%	No	w	330		No	75.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	HHW System	2	Heating Hot Water Pump	20.0	93.0%	Yes	w	3,500		No	93.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	restrooms	13	Exhaust Fan	0.3	69.5%	No	w	3,500		No	69.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Roof	restrooms, lockers, general science rooms	8	Exhaust Fan	0.2	60.0%	No	w	3,500		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0





## **Electric HVAC Inventory & Recommendations**

		Existin	g Conditions				Prop	osed Co	onditio	ns					Energy Im	ipact & Fii	nancial An	alysis			
Location	Area(s)/System(s) Served	System Quantit y	System Type	Cooling Capacit y per Unit (Tons)	Heating Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficienc y System?	System Quantit y	System Type	Cooling Capacit y per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/EER )	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Classroom and facility unit ventilator cooling	24	Split-System AC	2.50		w		No							0.0	0	0	\$0	\$0	\$0	0.0
Roof	Classroom and facility unit ventilator cooling	34	Split-System AC	3.00		w		No							0.0	0	0	\$0	\$0	\$0	0.0
Roof	Classroom and facility unit ventilator cooling	15	Split-System AC	3.50		w		No							0.0	0	0	\$0	\$0	\$0	0.0
Roof	Teacher's Work Areas, Computer Lab, Teacher's Lounge	12	Packaged AC	3.00		w		No							0.0	0	0	\$0	\$0	\$0	0.0
Roof	Computer classroom, stage	2	Packaged AC	5.00		w		No							0.0	0	0	\$0	\$0	\$0	0.0
Roof	Classroom 502, 503, 504, 505, 506, 507, 508	7	Packaged AC	7.50		w		No							0.0	0	0	\$0	\$0	\$0	0.0
Roof	All purpose room	2	Packaged AC	30.00		w		No							0.0	0	0	\$0	\$0	\$0	0.0
Roof	Resource Center (AHU 12, 14)	2	Split-System AC	12.50		w		No							0.0	0	0	\$0	\$0	\$0	0.0
Roof	Computer lab, classroom	3	Ductless Mini-Split HP	2.00	30.80	w		No							0.0	0	0	\$0	\$0	\$0	0.0
Roof	Science Prep	2	Ductless Mini-Split AC	1.00		w		No							0.0	0	0	\$0	\$0	\$0	0.0
Roof	Supplemental cooling	1	Ductless Mini-Split HP	0.75	12.00	w		No							0.0	0	0	\$0	\$0	\$0	0.0
Classrooms	Main Office, Conference Room 606, Nurse 607	4	Packaged Terminal HP	1.00	10.80	w		No							0.0	0	0	\$0	\$0	\$0	0.0
Classrooms	Asst. Principal, Principal, Vice Principal	3	Packaged Terminal HP	0.75	8.10	w		No							0.0	0	0	\$0	\$0	\$0	0.0
Classrooms	Multiple Offices and conference room	7	Electric Resistance Heat		11.94	w		No							0.0	0	0	\$0	\$0	\$0	0.0

## Fuel Heating Inventory & Recommendations

-	-	Existin	g Conditions	-		Prop	oosed Co	onditio	ns				Energy In	npact & Fi	nancial An	alysis			
Location	Area(s)/System(s) Served	System Quantit Y	System Type	Output Capacit y per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficienc y System?	System Quantit y	System Type	Output Capacit y per Unit (MBh)	Heating Efficienc Y	Heating Efficienc y 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	Entire Facility	4	Condensing Hot Water Boiler	######	w		No						0.0	0	0	\$0	\$0	\$0	0.0





## **Demand Control Ventilation Recommendations**

		Reco	ommenda	ition Inputs			Energy In	npact & Fir	nancial An	alysis			
Location	Area(s)/System(s) Affected	ECM #	Number of Zones	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Storage Room	Resource Center	7	4.00	25.00		342.00	0.0	955	12	\$217	\$5,438	\$0	25.0
Roof	All purpose room	7	4.00	60.00		770.00	0.0	2,333	28	\$515	\$5,438	\$0	10.6

## **DHW Inventory & Recommendations**

		Existin	g Conditions		Prop	osed Co	onditio	ns				Energy In	npact & Fir	nancial An	alysis			
Location	Area(s)/System(s) Served	System Quantit y	System Type	Remaining Useful Life	ECM #	Replace?	System Quantit y	System Type	Fuel Type	System Efficiency	Efficienc y 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	Restrooms and Kitchen	1	Storage Tank Water Heater (> 50 Gal)	w		No						0.0	0	0	\$0	\$0	\$0	0.0

#### **Low-Flow Device Recommendations**

	Reco	mmeda	ation Inputs			Energy Im	npact & Fir	nancial An	alysis			
Location	ECM #	Device Quantit Y	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
Multiple Locations	8	57	Faucet Aerator (Lavatory)	1.50	0.50	0.0	0	32	\$225	\$409	\$409	0.0
Multiple Locations	8	7	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	7	\$47	\$50	\$50	0.0





## **Commercial Refrigerator/Freezer Inventory & Recommendations**

	Existin	g Conditions		Proposed	Conditions	Energy Im	npact & Fir	nancial An	alysis			
Location	Quantit y	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Stand-Up Freezer, Solid Door (>50 cu. ft.)	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	3	Refrigerator Chest	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Stand-Up Refrigerator, Glass Door (≤15 cu. ft.)	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0

#### **Commercial Ice Maker Inventory & Recommendations**

Existing Conditions				Proposed	Conditions	Energy Impact & Financial Analysis							
Location	Quantit y	Ice Maker Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years	
Kitchen	1	Ice Making Head (<450 Ibs/day), Batch	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0	





## **Novelty Cooler Inventory & Recommendations**

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis							
Location	Quantit y	Cooler Description	ECM #	Install Automatic Shutoff Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years	
Kitchen	2	Icecream Novelty Glass lid Freezer Chest		No	0.00	0	0	\$0	\$0	\$0	0.0	

## **Cooking Equipment Inventory & Recommendations**

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





## Plug Load Inventory

	Existin	g Conditions		
Location	Quantit y	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified ?
Multiple Locations	272	Desktops	75.0	
Multiple Locations	8	Laptops	40.0	
Multiple Locations	4	Servers	850.0	
Multiple Locations	30	Laptop carts	500.0	
Multiple Locations	41	Printer (S)	20.0	
Multiple Locations	2	Printer (M)	250.0	
Multiple Locations	3	Printer (L)	515.0	
Multiple Locations	22	Projector	200.0	
Multiple Locations	11	Microwave	1,000.0	
Multiple Locations	56	TV	120.0	
Multiple Locations	6	Minifridge	30.0	
Multiple Locations	5	Refrigerator	600.0	
Multiple Locations	21	Floor fan	100.0	
Multiple Locations	5	Smartboards	15.0	
Classroom	1	Clothes Washer	900.0	
Classroom	1	Clothes Dryer	1,600.0	
Classroom	1	Dishwasher	1,500.0	
Multiple Locations	5	water cooler	500.0	
Multiple Locations	3	paper shredder	360.0	
Classroom	1	Electric stove	3,000.0	
Multiple Locations	4	Coffee Machine	400.0	
Staff Lounge	1	Toaster	850.0	





## Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis							
Location	Quantit y	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years	
Multiple Locations	2	Refrigerated	N/A	No	0.0	0	0	\$0	\$0	\$0	0.0	
Staff Lounge	1	Non-Refrigerated	N/A	No	0.0	0	0	\$0	\$0	\$0	0.0	





## APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

TRC

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.



# **TRC** APPENDIX C: GLOSSARY



TERM	DEFINITION
Blended Rate	Used to calculate fiscal savings associated with measures. The blended rate is calculated by dividing the amount of your bill by the total energy use. For example, if your bill is \$22,217.22, and you used 266,400 kilowatt-hours, your blended rate is 8.3 cents per kilowatt-hour.
Btu	<i>British thermal unit</i> : a unit of energy equal to the amount of heat required to increase the temperature of one pound of water by one-degree Fahrenheit.
СНР	Combined heat and power. Also referred to as cogeneration.
СОР	<i>Coefficient of performance</i> : a measure of efficiency in terms of useful energy delivered divided by total energy input.
Demand Response	Demand response reduces or shifts electricity usage at or among participating buildings/sites during peak energy use periods in response to time-based rates or other forms of financial incentives.
DCV	Demand control ventilation: a control strategy to limit the amount of outside air introduced to the conditioned space based on actual occupancy need.
US DOE	United States Department of Energy
EC Motor	Electronically commutated motor
ECM	Energy conservation measure
EER	<i>Energy efficiency ratio</i> : a measure of efficiency in terms of cooling energy provided divided by electric input.
EUI	<i>Energy Use Intensity:</i> measures energy consumption per square foot and is a standard metric for comparing buildings' energy performance.
Energy Efficiency	Reducing the amount of energy necessary to provide comfort and service to a building/area. Achieved through the installation of new equipment and/or optimizing the operation of energy use systems. Unlike conservation, which involves some reduction of service, energy efficiency provides energy reductions without sacrifice of service.
ENERGY STAR®	ENERGY STAR <sup>®</sup> is the government-backed symbol for energy efficiency. The ENERGY STAR <sup>®</sup> program is managed by the EPA.
EPA	United States Environmental Protection Agency
Generation	The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil).
GHG	<i>Greenhouse gas</i> gases that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.
gpf	Gallons per flush





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




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