Local Government Energy Audit:
Energy Audit Report

Lacey Township High School

Lacey Township Board of Education

73 Haines Street

Lanoka Harbor, NJ 08734

March 16, 2018

Final Report by:

TRC Energy Services

Disclaimer

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

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

Estimated installation costs are based on TRC's experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from *RS Means*. The owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Since actual installed costs can vary widely for certain measures and conditions, TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

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

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Lacey Township High School. The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

This study was conducted by TRC Energy Services (TRC) as part of a comprehensive effort to assist the Lacey Township Board of Education in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Lacey Township High School is a 288,500 square foot facility comprised of a two-story building serving grades 9 through 12. The building was constructed in 1981.

Lighting consists primarily of T8 fluorescent sources, which are inefficient compared to currently available alternatives. Some fixtures contain less efficient T12 lamps. Compact fluorescent sources provide lighting in some hallway and service spaces. The auditorium is lit by high wattage, halogen sources.

Cooling and ventilation are provided by a combination of packaged rooftop units and split system units with a mix of air conditioners and heat pumps. Heating in the gymnasium is provided by rooftop mounted, forced air furnaces. Heat for other locations is provided by hydronic boilers and distributed by one of two hot water circulating loops. Some classroom heating is distributed by unit ventilators. Heat for most spaces is provided by supply fans served by heating coils located within rooftop package or heating only units. Building systems are monitored and controlled by a building management system.

The facility is equipped with rooftop mounted solar photovoltaic panels that can generate up to 616 kW. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated seven (7) measures which together represent an opportunity to reduce annual energy costs by $87,927 and annual greenhouse gas emissions by 934,444 lbs. CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 4.3 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Lacey Township High School's annual energy use by 16%.

Figure 1 – Previous 12 Month Utility Costs

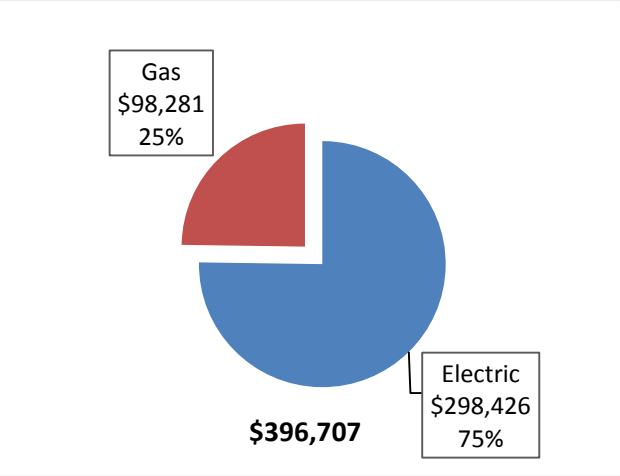
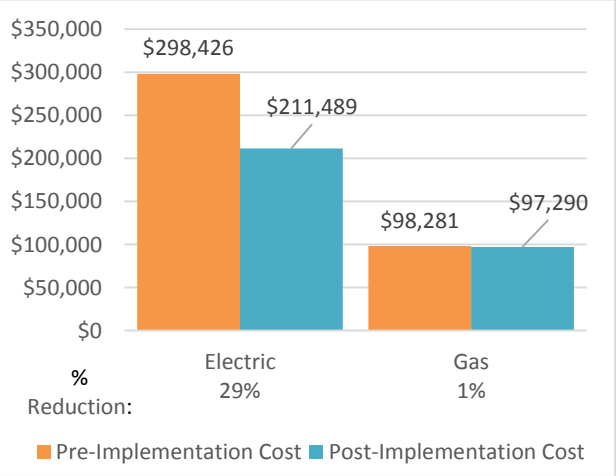


Figure 2 – Potential Post-Implementation Costs



A detailed description of Lacey Township High School's existing energy use can be found in Section 3. Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. A brief description of each category can be found below and a description of savings opportunities can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**765,601**	**116.0**	**0.0**	**$72,608.75**	**$378,332.63**	**$39,900.00**	**$338,432.63**	**4.7**	**770,954**
ECM 1	Install LED Fixtures	Yes	231,495	35.3	0.0	$21,954.77	$210,392.48	$16,570.00	$193,822.48	8.8	233,114
ECM 2	Retrofit Fixtures with LED Lamps	Yes	533,884	80.7	0.0	$50,633.00	$167,617.49	$23,330.00	$144,287.49	2.8	537,617
ECM 3	Install LED Exit Signs	Yes	221	0.0	0.0	$20.97	$322.67	$0.00	$322.67	15.4	223
Lighting Control Measures			**142,333**	**21.5**	**0.0**	**$13,498.68**	**$45,488.00**	**$4,950.00**	**$40,538.00**	**3.0**	**143,328**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	119,752	18.1	0.0	$11,357.16	$37,688.00	$4,950.00	$32,738.00	2.9	120,589
ECM 5	Install High/Low Lighitng Controls	Yes	22,581	3.4	0.0	$2,141.51	$7,800.00	$0.00	$7,800.00	3.6	22,738
Domestic Water Heating Upgrade			**0**	**0.0**	**97.0**	**$990.68**	**$580.77**	**$0.00**	**$580.77**	**0.6**	**11,357**
ECM 6	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	97.0	$990.68	$580.77	$0.00	$580.77	0.6	11,357
Plug Load Equipment Control - Vending Machine			**8,744**	**0.0**	**0.0**	**$829.29**	**$1,610.00**	**$0.00**	**$1,610.00**	**1.9**	**8,805**
ECM 7	Vending Machine Control	Yes	8,744	0.0	0.0	$829.29	$1,610.00	$0.00	$1,610.00	1.9	8,805
TOTALS			**916,678**	**137.5**	**97.0**	**$87,927.40**	**$426,011.40**	**$44,850.00**	**$381,161.40**	**4.3**	**934,444**

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

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

Retro commissioning is recommended for the High School. Savings were not evaluated for this measure, however, based on historical utility bills the summer electricity use is much higher than expected for a school that is not in session during the summer (see Section 4.1.5).

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

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

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

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

Energy Efficient Practices

TRC also identified 15 low cost or no cost energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Lacey Township High School include:

- Reduce Air Leakage
- Close Doors and Windows
- Use Window Treatments/Coverings
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Perform Routine Motor Maintenance
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- Replace Computer Monitors
- Water Conservation

For details on these Energy Efficient Practices, please refer to Section 5.

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Lacey High School. The site currently has a 616 kW photovoltaic (PV) array that supplies electricity to the school. Based on the configuration of the site and its loads there is a potential for installing additional PV but not for combined heat and power measures. For details on our evaluation and on-site generation potential, please refer to Section 6.

1.3 Implementation Planning

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

Rebates, incentives, and financing are available from NJCEP, as well as other sources, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any measure, please review the relevant incentive program guidelines before proceeding. This is important

because in most cases you will need to submit applications for the incentives prior to purchasing materials or commencing with installation.

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

- SmartStart

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

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.2 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce 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. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability. By enabling grid operators to call upon commercial facilities to reduce their electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this program.

Additional information on relevant incentive programs is located in Section 8. or: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Patrick S. DeGeorge	Business Administrator	pdegeorge@laceyschools.org	(609) 971-2000 x 1001
Designated Representative			
David Klink			
TRC Energy Services			
Smruti Srinivasan	Auditor	SSrinivasan@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On March 20, 2017, TRC performed an energy audit at Lacey Township High School located in Lanoka Harbor, NJ. TRC's team met with David Klink to review the facility operations and help focus our investigation on specific energy-using systems.

2.3 Building Occupancy

The school building is open Monday through Friday from approximately 7:00 AM through 3:00 PM during the school year, September through June. Sports activities occur on weekends, but no classes are held. During a typical day, the facility is occupied by a total of approximately 1,500 staff and students.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Lacey Township High School	Weekday	7:00 AM - 3:00 PM
Lacey Township High School	Weekend	unoccupied

2.4 Building Envelope

The High School is a single two story building. The construction is concrete masonry blocks with brick façade and double pane windows. The flat roof is constructed of built-up roofing material. Photovoltaic solar panels cover a significant portion of the roof.

2.5 On-Site Generation

As part of a 2009 District-wide effort, Lacey Township High School installed a 616 kW solar energy project consisting of rooftop mounted photovoltaic panels. The array was sized to displace a portion of the sites electric

use. Solar production does not exceed the site electricity usage. Additional solar capacity could be installed.

2.6 Energy-Using Systems

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

Lighting System

Interior lighting is provided mostly by fixtures containing 32-Watt, linear fluorescent T8 lamps and electronic ballasts. Some fixtures contain less efficient T12 lamps. Fixtures containing compact fluorescent lamps provide lighting for several areas, including portions of the LGI room and hallways. There are additional fixtures in high bay areas that contain multiple compact fluorescent lamps. Building exit signs use LED sources. Interior lighting control is provided primarily by manually operated switches.

Exterior lighting consists primarily of pole mounted metal halide (MH) parking fixtures and wall pack fixtures controlled to operate only during non-daylight hours. Additional building wallpacks contain compact fluorescent lamps.

Hot Water Heating System

The heating water system consists of two hot water loops, one serving the original building and the other serving the new wing. The original building is served by two (2) forced draft Kewanee model L3SW-250-04 boilers, rated at 8,369 MBh output. The new wing is served by two forced draft Patterson Kelley model SN-2000-2 Patterson Kelley boilers, rated at 1,700 MBh output.

The boilers provide heating water throughout the building by one of two loops using several pumps of varying sizes. Some classroom heating is provided to the zones by local unit ventilator fans. Heat for most spaces is provided by heating coils located within rooftop package or heating only units.

The Kewanee boilers are original equipment (1981) and the Patterson-Kelley boilers were added in 2003. The boilers remain in operational condition.

Direct Expansion Air Conditioning System (DX)

Space cooling is provided to 90% of the building, including most classrooms and common support areas. Cooling and ventilation are supplied by a mixture of packaged rooftop air and split system air conditioning units and heat pumps. Cooling is provided to the gymnasium, library, cafeteria and other support areas by approximately 25 units ranging in capacity from 5 to 30 tons. Split system air conditioning units, with capacities ranging between one (1) and five (5) tons, serve some classrooms and some offices. The systems range in age from new to 20 years old; some are original to the initial building (36 years old) and are nearing the end of their useful life.

HVAC systems are controlled by the building EMS which schedules and optimizes cooling systems based on control algorithms and control inputs including zone and outside air temperature sensor readings.

Domestic Hot Water Heating System

The domestic hot water is provided by three (3) AO Smith gas-fired water heaters. One, serving the main campus, has a storage capacity of 600 gallons with an input rating of 1,000 MBh. There are two additional 500 gallon storage tank water heaters; one serves the new wing and the other the gymnasium areas. Both of these have input capacity of 500 MBh. Circulating pumps provide hot water throughout the respective zones.

Food Service Equipment

The school has an all-electric warming kitchen. Food warming equipment consists of six full sized convection ovens, five insulated food holding cabinets, and an electric warmer. The kitchen also contains a Hobart dishwasher with electric booster heater.

Refrigeration

The facility has four (4) cold storage areas, two (2) walk-in cooler boxes and two (2) walk-in freezers. Both the coolers and freezers have three (3) evaporators each. The facility also has a reach in milk cooler, ice cream freezer, and several stand up commercial refrigerators.

Building Plug Load

There are roughly 119 computer work stations throughout the facility, the majority with LCD monitors. Classroom areas are equipped with smart boards and projectors. The facility plug load includes several copiers, printers, and other office equipment. Coffee machines, refrigerators, microwaves, and toasters are located throughout the premises and available for staff use. The kitchen area and faculty room have refrigerated beverage and non-refrigerated vending machines.

2.7 Water-Using Systems

There are several faculty and student restrooms at this facility. A sampling of restrooms found that the faucets are rated for 2.5 gallons per minute (gpm) or higher. Additionally, there are kitchen sink fixtures located in some classrooms and lounges. Replacement of sink aerators with low flow devices is recommended.

3 SITE ENERGY USE AND COSTS

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. In addition, data for electricity and natural gas was evaluated to determine the annual energy performance metrics for the building in energy cost per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 0 for additional information.

3.1 Total Cost of Energy

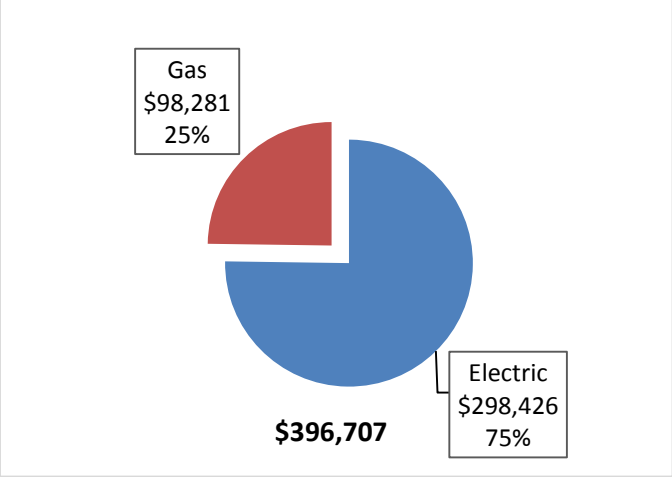
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Lacey Township High School		
Fuel	**Usage**	**Cost**
Electricity	3,146,664 kWh	$298,426
Natural Gas	96,222 Therms	$98,281
Total		**$396,707**

The current annual energy cost for this facility is $396,707 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was $0.095/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. Solar production accounts for about 19% of the facility total electricity use. Costs are not tabulated for the energy produced by the solar panels, which, brings down the site's overall cost of electricity.

The monthly electricity consumption and peak demand are shown in the chart below. The summer electricity use is reasonably close to the September use which is high for a site that does not have summer school. The use profile indicates that lighting and HVAC equipment are operating during summer vacation. Based on the audited connected load, which balances to the energy demand profile, there are indications that equipment runs considerably beyond facility occupancy hours. For example, one assumption made for this report in order to account for the site energy use was that supply fan motor operating hours are continuous. A detailed study of equipment runtime hours is beyond the scope of this study but is further discussed as a recommendation in Section 4.1.5.

Figure 8 - Electric Usage & Demand

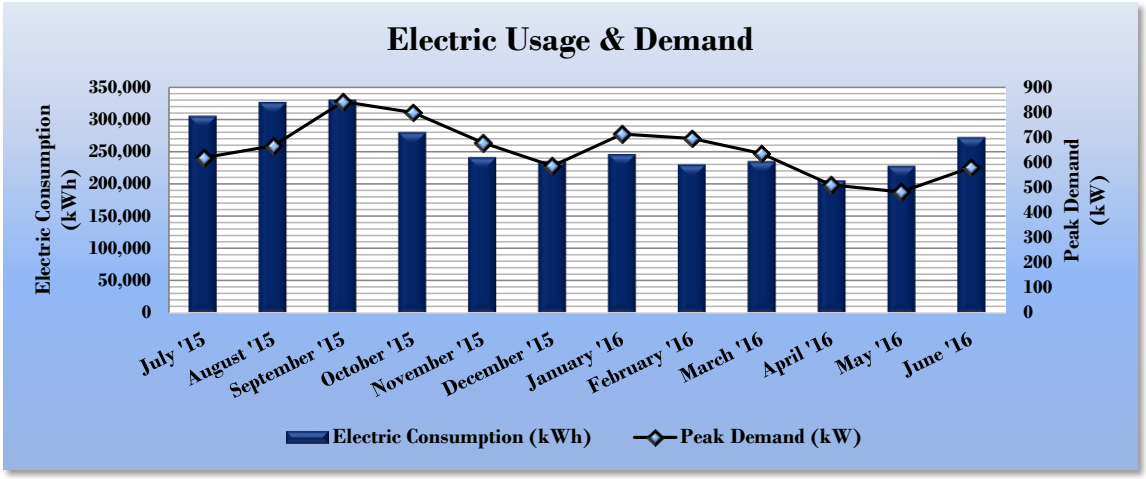


Figure 9 - Electric Usage & Demand

Summary Electric Billing Data for Lacey Township High School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
7/23/15	30	305,451	619	$3,657	$24,456
8/24/15	29	326,950	667	$3,948	$26,589
9/24/15	32	330,476	843	$5,003	$30,490
10/26/15	30	280,134	799	$4,427	$24,264
11/24/15	32	241,356	679	$3,757	$24,012
12/24/15	30	235,340	586	$3,232	$23,841
1/25/16	33	246,406	713	$3,143	$26,528
2/23/16	29	230,092	696	$3,046	$23,048
3/24/16	29	235,375	635	$3,505	$23,053
4/22/16	29	205,827	510	$2,804	$21,236
5/20/16	29	228,303	482	$2,650	$22,026
6/21/16	32	272,334	580	$4,917	$28,066
Totals	**364**	**3,138,043**	**843**	**$44,089**	**$297,609**
Annual	**365**	**3,146,664**	**843**	**$44,210**	**$298,426**

3.3 Natural Gas Usage

Natural gas is provided by New Jersey Natural Gas. The average gas cost for the past 12 months is $1.02/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below. The gas use indicates seasonal variation due to winter heating. The low baseline gas use corresponds to domestic hot water heating, a year- round activity.

Figure 10 - Natural Gas Usage

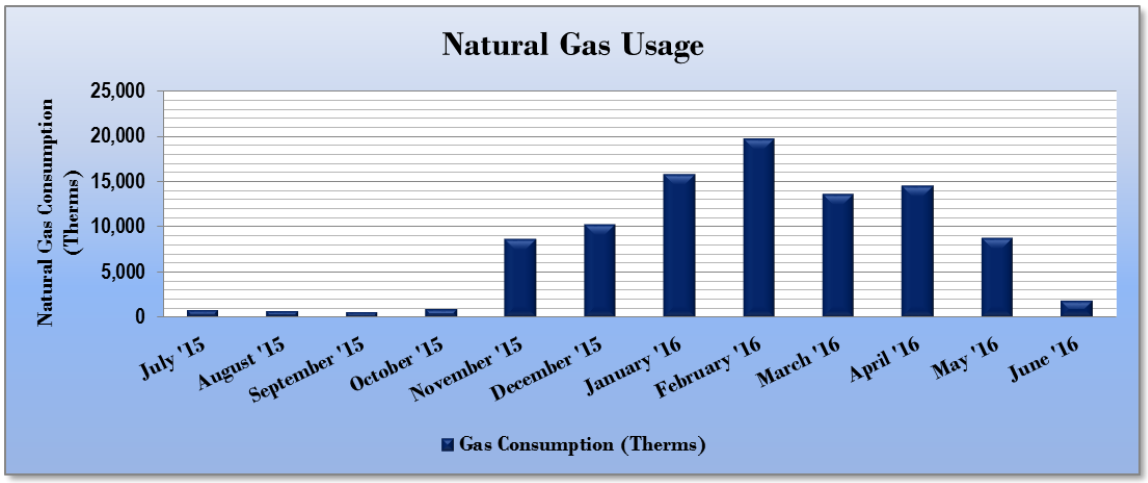


Figure 11 - Natural Gas Usage

Summary Gas Billing Data for Lacey Township High School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
7/17/15	30	816	$2,445
8/14/15	29	641	$2,303
9/15/15	32	587	$2,259
10/16/15	30	964	$2,552
11/16/15	32	8,637	$8,612
12/16/15	30	10,197	$9,929
1/16/16	33	15,721	$14,342
2/16/16	29	19,692	$17,515
3/18/16	29	13,615	$12,662
4/20/16	29	14,531	$13,391
5/18/16	29	8,713	$8,744
6/20/16	32	1,844	$3,258
Totals	**364**	**95,958**	**$98,012**
Annual	**365**	**96,222**	**$98,281**

3.4 Benchmarking

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

The EUI is a measure of a facility's energy consumption per square foot, and it is the standard metric for comparing buildings' energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more or less energy than similar buildings of its type on a square foot basis. EUI is presented in terms of "site energy" and "source energy." Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Lacey Township High School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	151.9	141.4
Site Energy Use Intensity (kBtu/ft^2)	70.6	58.2

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

Figure 13 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Lacey Township High School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	117.5	141.4
Site Energy Use Intensity (kBtu/ft^2)	59.4	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 68.

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

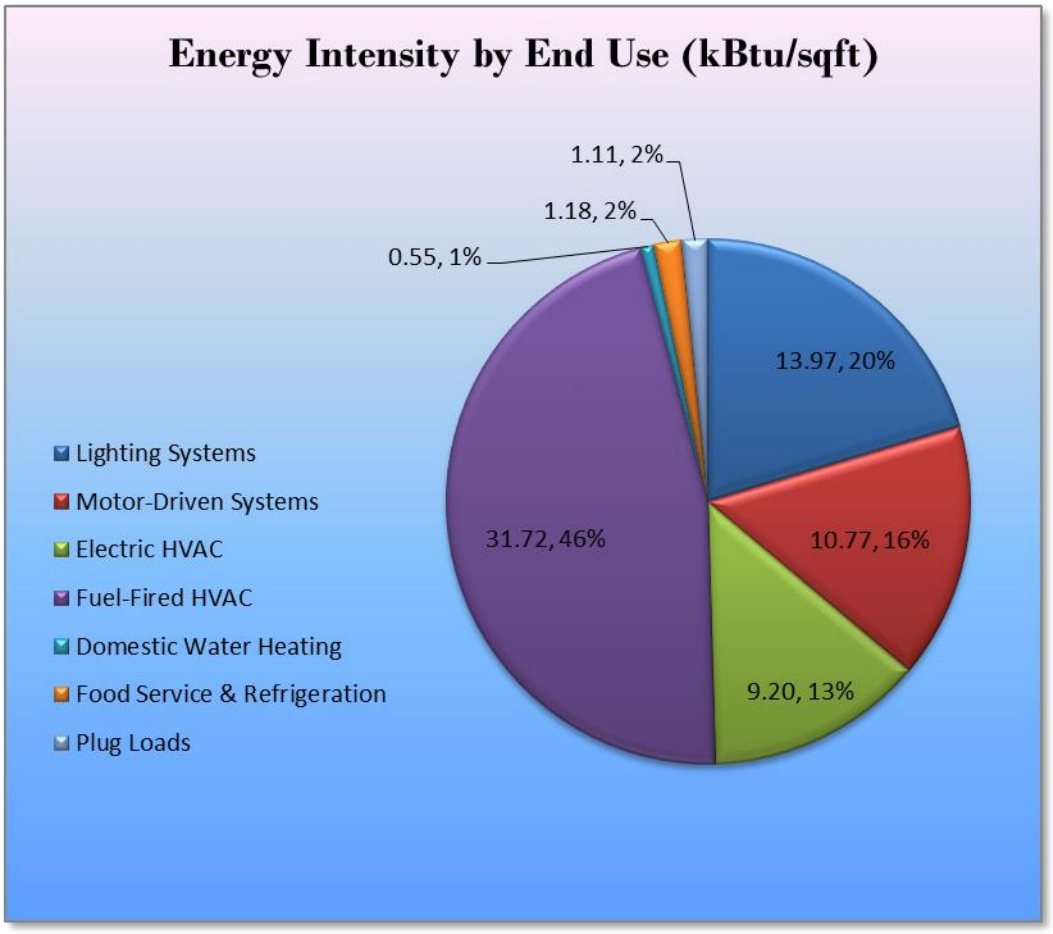
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

A Portfolio Manager account has been created online for your facility and you will be provided with the login information for the account. We encourage you to update your utility information in Portfolio Manager regularly, so that you can keep track of your building's performance. Free online training is available to help you use ENERGY STAR ® Portfolio Manager to track your building's performance at: https://www.energystar.gov/buildings/training.

3.5 Energy End-Use Breakdown

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

Figure 14 - Energy Balance (kBtu/SF, %)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

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

4.1 Recommended ECMs

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

Figure 15 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**765,601**	**116.0**	**0.0**	**$72,608.75**	**$378,332.63**	**$39,900.00**	**$338,432.63**	**4.7**	**770,954**
ECM 1	Install LED Fixtures	231,495	35.3	0.0	$21,954.77	$210,392.48	$16,570.00	$193,822.48	8.8	233,114
ECM 2	Retrofit Fixtures with LED Lamps	533,884	80.7	0.0	$50,633.00	$167,617.49	$23,330.00	$144,287.49	2.8	537,617
ECM 3	Install LED Exit Signs	221	0.0	0.0	$20.97	$322.67	$0.00	$322.67	15.4	223
Lighting Control Measures		**142,333**	**21.5**	**0.0**	**$13,498.68**	**$45,488.00**	**$4,950.00**	**$40,538.00**	**3.0**	**143,328**
ECM 4	Install Occupancy Sensor Lighting Controls	119,752	18.1	0.0	$11,357.16	$37,688.00	$4,950.00	$32,738.00	2.9	120,589
ECM 5	Install High/Low Lighitng Controls	22,581	3.4	0.0	$2,141.51	$7,800.00	$0.00	$7,800.00	3.6	22,738
Domestic Water Heating Upgrade		**0**	**0.0**	**97.0**	**$990.68**	**$580.77**	**$0.00**	**$580.77**	**0.6**	**11,357**
ECM 6	Install Low-Flow Domestic Hot Water Devices	0	0.0	97.0	$990.68	$580.77	$0.00	$580.77	0.6	11,357
Plug Load Equipment Control - Vending Machine		**8,744**	**0.0**	**0.0**	**$829.29**	**$1,610.00**	**$0.00**	**$1,610.00**	**1.9**	**8,805**
ECM 7	Vending Machine Control	8,744	0.0	0.0	$829.29	$1,610.00	$0.00	$1,610.00	1.9	8,805
TOTALS		**916,678**	**137.5**	**97.0**	**$87,927.40**	**$426,011.40**	**$44,850.00**	**$381,161.40**	**4.3**	**934,444**

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

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

4.1.1 Lighting Upgrades

Recommended upgrades to existing lighting fixtures are summarized in Figure 16 below.

Figure 16 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**765,601**	**116.0**	**0.0**	**$72,608.75**	**$378,332.63**	**$39,900.00**	**$338,432.63**	**4.7**	**770,954**
ECM 1	Install LED Fixtures	231,495	35.3	0.0	$21,954.77	$210,392.48	$16,570.00	$193,822.48	8.8	233,114
ECM 2	Retrofit Fixtures with LED Lamps	533,884	80.7	0.0	$50,633.00	$167,617.49	$23,330.00	$144,287.49	2.8	537,617
ECM 3	Install LED Exit Signs	221	0.0	0.0	$20.97	$322.67	$0.00	$322.67	15.4	223

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

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	165,532	25.0	0.0	$15,698.84	$129,686.98	$12,840.00	$116,846.98	7.4	166,689
Exterior	65,964	10.2	0.0	$6,255.94	$80,705.50	$3,730.00	$76,975.50	12.3	66,425

Measure Description

We recommend replacing existing fixtures containing fluorescent, halogen, or metal halide lamps with new high performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent lamps or metal halide sources.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	533,884	80.7	0.0	$50,633.00	$167,617.49	$23,330.00	$144,287.49	2.8	537,617
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing fluorescent fixtures with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of fluorescent tubes.

ECM 3: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	221	0.0	0.0	$20.97	$322.67	$0.00	$322.67	15.4	223
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend replacing all incandescent or compact fluorescent exit signs with LED exit signs. LED exit signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output.

4.1.2 Lighting Control Measures

Figure 17 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**142,333**	**21.5**	**0.0**	**$13,498.68**	**$45,488.00**	**$4,950.00**	**$40,538.00**	**3.0**	**143,328**
ECM 4	Install Occupancy Sensor Lighting Controls	119,752	18.1	0.0	$11,357.16	$37,688.00	$4,950.00	$32,738.00	2.9	120,589
ECM 5	Install High/Low Lighitng Controls	22,581	3.4	0.0	$2,141.51	$7,800.00	$0.00	$7,800.00	3.6	22,738

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

ECM 4: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
119,752	18.1	0.0	$11,357.16	$37,688.00	$4,950.00	$32,738.00	2.9	120,589

Measure Description

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

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

ECM 5: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
22,581	3.4	0.0	$2,141.51	$7,800.00	$0.00	$7,800.00	3.6	22,738

Measure Description

We recommend installing occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Typical areas for such lighting control are stairwells, interior corridors, parking lots, and parking garages.

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

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

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

4.1.3 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 18 below.

Figure 18 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**97.0**	**$990.68**	**$580.77**	**$0.00**	**$580.77**	**0.6**	**11,357**
ECM 6	Install Low-Flow Domestic Hot Water Devices	0	0.0	97.0	$990.68	$580.77	$0.00	$580.77	0.6	11,357

ECM 6: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	97.0	$990.68	$580.77	$0.00	$580.77	0.6	11,357

Measure Description

We recommend installing low-flow domestic hot water devices to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators and low-flow showerheads can reduce hot water usage, relative to standard showerheads and aerators, which saves energy.

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing. This reduces the amount of water used per day resulting in energy and water savings.

4.1.4 Plug Load Equipment Control - Vending Machines

ECM 7: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
8,744	0.0	0.0	$829.29	$1,610.00	$0.00	$1,610.00	1.9	8,805

Measure Description

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

4.1.5 ECMs for Further Evaluation

Summer electricity use is higher than expected for many of the Lacey Township schools included in the LGEA Program. School is not in session July through August, however for the High School specifically, the daily electricity use during those months ranges from 99% to 109% of the daily use in September. Even accounting for summer maintenance and community activities at the schools, the electricity use should decrease when school is not in session.

In addition, the lighting, and fan motor operating hours at the Lacey Township High School had to be set considerably higher than the normal school occupancy schedule in order to balance the calculated electricity use to the historical electric bills. The longer operating hours also adversely effects natural gas use by requiring heating operation during the night and weekends.

All of the above indicate that equipment, and in particular HVAC equipment, are operating longer than necessary. It is recommended that a retro-commissioning study be conducted at this site with particular focus on the building management system. It is also recommended that a control strategy be implemented that turns off the HVAC fans and package units when the buildings are not occupied and then uses a high/low temperature limit to turn the equipment back on if the interior temperature exceeds the limits. This will reduce HVAC equipment operations while still maintaining freeze protection control. Replacing air conditioning units that are more than 15 years old should also be evaluated in conjunction with a retro-commissioning study once the equipment operating hours have been optimized.

The boiler systems seem to be oversized for the building heating requirements. As part of the retro-commissioning project we recommend evaluating optimization of the heating generation and distribution system.

We estimate that a retro-commissioning study will identify opportunities for reducing HVAC energy use in the range of 20% at this campus which corresponds to a potential additional 5% electricity savings and 19% natural gas savings above what is tabulated in the Executive Summary. The projected savings from energy conservation measures identified in this report are mostly due to lighting which would preclude participation in the P4P Program. Participation in the P4P Program should be reassessed once the retro-commissioning study is completed since additional measures that qualify for the P4P Program may be identified at that time.

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

Air leakage, or infiltration, occurs when outside air enters a building uncontrollably through cracks and openings. Properly sealing such cracks and openings can significantly reduce heating and cooling costs, improve building durability, and create a healthier indoor environment. This includes caulking or installing weather stripping around leaky doors and windows allowing for better control of indoor air quality through controlled ventilation.

Close Doors and Windows

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

Use Window Treatments/Coverings

A substantial amount of heat gain can occur through uncovered or untreated windows, especially older single pane windows and east or west-facing windows. Treatments such as high-reflectivity films or covering windows with shades or shutters can reduce solar heat gain and, consequently, cooling load and can reduce internal heat loss and the associated heating load.

Perform Proper Lighting Maintenance

In order to sustain optimal lighting levels, lighting fixtures should undergo routine maintenance. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust on lamps, fixtures and reflective surfaces. Together, these factors can reduce total illumination by 20% - 60% or more, while operating fixtures continue drawing full power. To limit this reduction, lamps, reflectors and diffusers should be thoroughly cleaned of dirt, dust, oil, and smoke film buildup approximately every 6 – 12 months.

Develop a Lighting Maintenance Schedule

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

Perform Routine Motor Maintenance

Motors consist of many moving parts whose collective degradation can contribute to a significant loss of motor efficiency. In order to prevent damage to motor components, routine maintenance should be performed. This maintenance consists of cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

Practice Proper Use of Thermostat Schedules and Temperature Resets

Ensure thermostats are correctly set back. By employing proper set back temperatures and schedules, facility heating and cooling costs can be reduced dramatically during periods of low or no occupancy. As such, thermostats should be programmed for a setback of 5-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced further by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Check for and Seal Duct Leakage

Duct leakage in commercial buildings typically accounts for 5 to 25 percent of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building, significantly increasing cooling and heating costs. By sealing sources of leakage, cooling, heating, and ventilation energy use can be reduced significantly, depending on the severity of air leakage.

Perform Proper Boiler Maintenance

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

Perform Proper Water Heater Maintenance

At least once a year, drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Once a year check for any leaks or heavy corrosion on the pipes and valves. For gas water heaters, check the draft hood and make sure it is placed properly, with a few inches of air space between the tank and where it connects to the vent. Look for any corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional. For electric water heaters, look for any signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank. For water heaters over three to four years old have a technician inspect the sacrificial anode annually.

Plug Load Controls

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

Replace Computer Monitors

Replacing old computer monitors or displays with efficient monitors will reduce energy use. ENERGY STAR® rated monitors have specific requirements for on mode power consumption as well as idle and sleep mode power. According to the ENERGY STAR® website monitors that have earned the ENERGY STAR® label are 25% more efficient than standard monitors.

Water Conservation

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

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. Any reduction in water use does however ultimately reduce grid level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users. The EPA WaterSense™ ratings for urinals is 0.5 gallons per flush (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

Refer to Section 4.1.3 for any low-flow ECM recommendations.

6 On-Site Generation Measures

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

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

Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

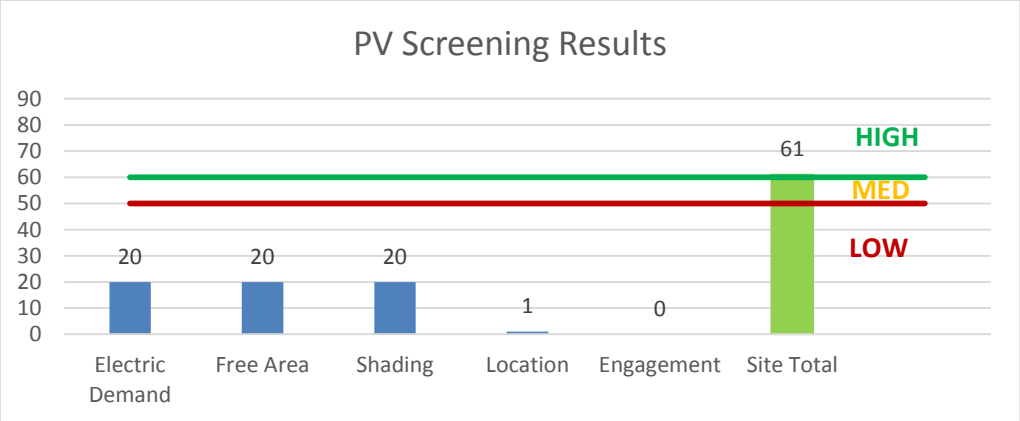
6.1 Photovoltaic

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

The District installed a PV array at this site in 2009, using much of the available roof area for this self-generation measure. The existing PV array currently produces about 19% of the site's total electricity use. A preliminary screening based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has a High potential for installing additional PV arrays.

Additional solar production would offset more utility purchases. The roof area is largely utilized however, the parking lot area is a candidate for locating additional panels.

Figure 19 - Photovoltaic Screening



Solar projects must register their projects in the SREC Registration Program prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about developed new solar projects and insight into future SREC pricing.

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

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

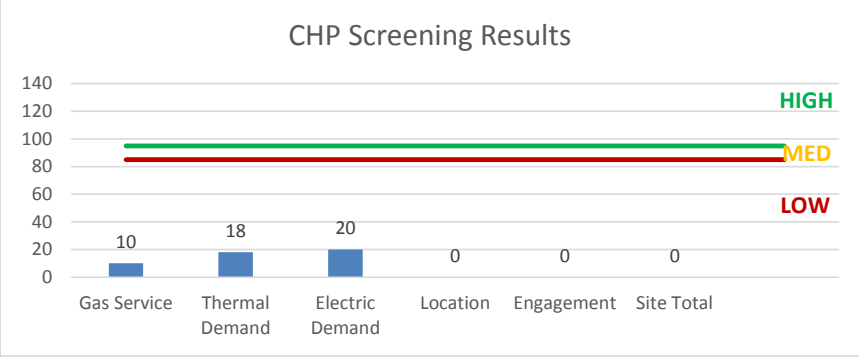
6.2 Combined Heat and Power

Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for the purpose of space cooling. The key criteria used for screening, however, is the amount of time the system operates at full load and the facility's ability to use the recovered heat. Facilities with continuous use for large quantities of waste heat are the best candidates for CHP.

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a Low potential for installing a cost-effective CHP system. Low, infrequent thermal load, and lack of space near the existing boilers are the most significant factors contributing to the potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

Figure 20 - Combined Heat and Power Screening



7 DEMAND RESPONSE

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

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities to reduce electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail their electric usage.

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

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

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

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

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

In our opinion Lacey High School is not a good candidate for DR due to the limited loads that could be shed.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 21 for a list of the eligible programs identified for each recommended ECM.

Figure 21 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	x					
ECM 2	Retrofit Fixtures with LED Lamps	x					
ECM 3	Install LED Exit Signs						
ECM 4	Install Occupancy Sensor Lighting Controls	x					
ECM 5	Install High/Low Lighitng Controls						
ECM 6	Install Low-Flow Domestic Hot Water Devices						
ECM 7	Vending Machine Control						

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

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom Measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, capped at 50% of the total installed incremental project cost, or a project cost buy down to a one year payback (whichever is less). Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

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

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

8.2 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. An ESIP is a type of "performance contract," whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. This is done in a manner that ensures that annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive in year one, and every year thereafter. ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs can be leveraged to help further reduce the total project cost of eligible measures.

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

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

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

If your facility is not purchasing electricity from a third party supplier, consider shopping for a reduced rate from third party electric suppliers. If your facility is purchasing electricity from a third party supplier, review and compare prices at the end of the current contract or every couple years.

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

9.2 Retail Natural Gas Supply Options

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

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

If your facility is not purchasing natural gas from a third party supplier, consider shopping for a reduced rate from third party natural gas suppliers. If your facility is purchasing natural gas from a third party supplier, review and compare prices at the end of the current contract or every couple years.

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Rm 1	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,500	Relamp	No	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.06	369	0.0	$34.95	$143.60	$20.00	3.54
Boiler Rm 1	9	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	No	9	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.23	1,493	0.0	$141.56	$323.10	$0.00	2.28
Boiler Rm 1	2	Exit Signs: Incandescent	None	20	4,500	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	4,500	0.02	147	0.0	$13.98	$215.11	$0.00	15.39
Boiler Rm 2	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.29	1,911	0.0	$181.26	$643.50	$110.00	2.94
Boiler Rm 2	2	Exit Signs: LED - 2 W Lamp	Wall Switch	6	4,500	None	No	2	Exit Signs: LED - 2 W Lamp	Wall Switch	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	396	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	396	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	3,150	12.26	81,104	0.0	$7,691.83	$32,227.20	$0.00	4.19
Receiving	12	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	0.34	2,265	0.0	$214.81	$700.80	$35.00	3.10
Receiving	1	Exit Signs: Incandescent	None	20	4,500	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	4,500	0.01	74	0.0	$6.99	$107.56	$0.00	15.39
Kitchen	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.30	1,976	0.0	$187.40	$721.20	$125.00	3.18
Kitchen	67	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	67	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	2.22	14,710	0.0	$1,395.07	$4,729.50	$775.00	2.83
Kitchen	6	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	6	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Café	66	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	66	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	2.19	14,490	0.0	$1,374.25	$4,941.00	$800.00	3.01
Café	5	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Woodshop	28	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Wall Switch	63	4,500	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.95	6,295	0.0	$597.00	$2,178.00	$350.00	3.06
Woodshop	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	4,500	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,150	0.07	444	0.0	$42.14	$192.80	$40.00	3.63
Woodshop	8	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	8	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	0.23	1,510	0.0	$143.21	$287.20	$0.00	2.01
Woodshop	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	4,500	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.22	1,426	0.0	$135.22	$234.00	$0.00	1.73
Woodshop	1	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Copy Rm	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,500	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	0.07	460	0.0	$43.64	$413.60	$55.00	8.22
Copy Rm	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,150	0.06	410	0.0	$38.85	$126.40	$0.00	3.25
Copy Rm	4	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	0.11	755	0.0	$71.60	$143.60	$0.00	2.01
Copy Rm	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	4,500	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.22	1,426	0.0	$135.22	$234.00	$0.00	1.73
Elec Rm CR	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	0.88	5,797	0.0	$549.76	$1,697.00	$335.00	2.48
CR 107B	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	0.35	2,319	0.0	$219.90	$686.80	$140.00	2.49
CR 107A	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	0.35	2,319	0.0	$219.90	$686.80	$140.00	2.49

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Wrestling Hall	12	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	12	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	3,150	0.37	2,458	0.0	$233.09	$958.40	$0.00	4.11
Wrestling Hall	10	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	10	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Computer Lab	32	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	32	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	1.06	7,026	0.0	$666.30	$2,412.00	$390.00	3.03
Computer Lab	2	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	4,500	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	0.22	1,426	0.0	$135.22	$190.27	$0.00	1.41
B103 Art	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	0.93	6,183	0.0	$586.41	$1,792.13	$355.00	2.45
B103 Art	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.13	878	0.0	$83.29	$234.00	$40.00	2.33
B102 Fam Living	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.66	4,391	0.0	$416.44	$1,440.00	$235.00	2.89
B101	32	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	32	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	1.06	7,026	0.0	$666.30	$2,412.00	$390.00	3.03
B101	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	0.06	378	0.0	$35.80	$71.80	$0.00	2.01
B100	32	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	32	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	1.06	7,026	0.0	$666.30	$2,412.00	$390.00	3.03
Mens RR	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.13	878	0.0	$83.29	$504.00	$75.00	5.15
Wmn RR	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.13	878	0.0	$83.29	$234.00	$40.00	2.33
Custodial	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.05	332	0.0	$31.46	$71.80	$0.00	2.28
Mens RR	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.17	1,098	0.0	$104.11	$562.50	$85.00	4.59
Wmn RR	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.17	1,098	0.0	$104.11	$292.50	$50.00	2.33
Books	5	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	0.14	944	0.0	$89.50	$449.50	$35.00	4.63
Books	2	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	158	4,500	Relamp	Yes	2	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	3,150	0.17	1,133	0.0	$107.46	$220.00	$0.00	2.05
Fac RR	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.03	166	0.0	$15.73	$35.90	$0.00	2.28
A100-109 (9)	29	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	29	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.96	6,367	0.0	$603.84	$2,506.50	$395.00	3.50
A100-109 (9)	66	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	66	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	3.85	25,506	0.0	$2,418.94	$7,898.80	$1,530.00	2.63
A100-109 (9)	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	0.03	189	0.0	$17.90	$35.90	$0.00	2.01
A100-109 (9)	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	4,500	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	0.11	713	0.0	$67.61	$95.13	$0.00	1.41
North Stairwell	3	Linear Fluorescent - T12: 4' T12 (40W) - 1L	None	46	4,500	Relamp	No	3	LED - Linear Tubes: (1) 4' Lamp	None	15	4,500	0.08	498	0.0	$47.19	$107.70	$0.00	2.28
Restroom	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.05	332	0.0	$31.46	$71.80	$0.00	2.28
Main off center n. stairs	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,500	0.18	1,179	0.0	$111.85	$380.53	$80.00	2.69

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Main off center n. stairs	1	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
A110-A112, A114-115	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	30	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	1.00	6,587	0.0	$624.66	$2,565.00	$405.00	3.46
A110-A112, A114-115	24	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	24	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	1.19	7,904	0.0	$749.59	$2,344.80	$430.00	2.55
A113,115-116,118-120	40	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	40	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	1.33	8,782	0.0	$832.88	$3,420.00	$540.00	3.46
A113,115-116,118-120	21	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	21	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	1.23	8,115	0.0	$769.66	$2,537.80	$490.00	2.66
A113,115-116,118-120	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	0.06	378	0.0	$35.80	$71.80	$0.00	2.01
A121 Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.08	521	0.0	$49.43	$175.50	$30.00	2.94
South Center Stairs	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	32	4,500	Relamp	No	3	LED - Linear Tubes: (1) 4' Lamp	None	15	4,500	0.04	276	0.0	$26.21	$107.70	$15.00	3.54
South Center Stairs	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	None	46	4,500	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	None	15	4,500	0.05	332	0.0	$31.46	$71.80	$0.00	2.28
A122-A127	76	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	76	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	2.52	16,686	0.0	$1,582.47	$6,336.00	$1,005.00	3.37
A129	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.13	878	0.0	$83.29	$350.00	$60.00	3.48
A217-A218	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.80	5,269	0.0	$499.73	$1,944.00	$310.00	3.27
A214-A216	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.70	4,611	0.0	$437.26	$1,768.50	$280.00	3.40
A214-A216	21	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	21	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	1.05	6,916	0.0	$655.89	$1,849.20	$350.00	2.29
Hallway	4	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
A210-A213	74	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	74	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	3.68	24,370	0.0	$2,311.23	$6,644.80	$1,250.00	2.33
A205, A209	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.90	5,928	0.0	$562.19	$1,893.60	$340.00	2.76
A208	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.75	4,940	0.0	$468.49	$1,398.00	$260.00	2.43
87	4	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	0.11	755	0.0	$71.60	$259.60	$20.00	3.35
A207	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	4,500	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.14	932	0.0	$88.38	$175.50	$0.00	1.99
Boys RR	8	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Wall Switch	92	4,500	Relamp	No	8	LED - Linear Tubes: (3) U-Lamp	Wall Switch	50	4,500	0.27	1,790	0.0	$169.77	$639.20	$0.00	3.77
Girls RR	8	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Wall Switch	92	4,500	Relamp	No	8	LED - Linear Tubes: (3) U-Lamp	Wall Switch	50	4,500	0.27	1,790	0.0	$169.77	$639.20	$0.00	3.77
A206	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.40	2,635	0.0	$249.86	$717.60	$140.00	2.31
Custodial	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.03	166	0.0	$15.73	$35.90	$0.00	2.28
A204	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.75	4,940	0.0	$468.49	$1,398.00	$260.00	2.43

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
A200-203	39	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	39	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	1.94	12,844	0.0	$1,218.08	$3,742.80	$690.00	2.51
Hallway	8	Compact Fluorescent: 2x26W	None	52	4,500	None	No	8	Compact Fluorescent: 2x26W	None	52	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	6	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	6	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Girl RR	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.13	869	0.0	$82.39	$292.50	$50.00	2.94
Boy RR	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.13	869	0.0	$82.39	$292.50	$50.00	2.94
Comp Lab W202	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.80	5,269	0.0	$499.73	$1,674.00	$275.00	2.80
W201	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.60	3,952	0.0	$374.79	$1,172.40	$215.00	2.55
W204	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.80	5,269	0.0	$499.73	$1,674.00	$275.00	2.80
W204A	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,500	0.08	521	0.0	$49.43	$150.40	$30.00	2.44
W206	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.66	4,391	0.0	$416.44	$1,440.00	$235.00	2.89
W203-W205	24	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	24	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	1.19	7,904	0.0	$749.59	$2,344.80	$430.00	2.55
W208 Science	23	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	23	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	1.14	7,574	0.0	$718.36	$1,999.60	$380.00	2.25
W207	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.60	3,952	0.0	$374.79	$1,172.40	$215.00	2.55
Hallway	8	Compact Fluorescent: 2x26W	None	52	4,500	None	Yes	8	Compact Fluorescent: 2x26W	High/Low Control	52	3,150	0.10	657	0.0	$62.32	$200.00	$0.00	3.21
Hallway	3	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,500	0.04	261	0.0	$24.72	$75.20	$15.00	2.44
Stairwell	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	62	4,500	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	None	29	4,500	0.08	521	0.0	$49.43	$175.50	$30.00	2.94
Fac Rm	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.45	2,964	0.0	$281.10	$946.80	$170.00	2.76
Lav	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	62	4,500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	None	29	4,500	0.05	347	0.0	$32.96	$117.00	$20.00	2.94
W210,212,213,215	48	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	48	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	2.39	15,808	0.0	$1,499.18	$4,689.60	$860.00	2.55
Stair C	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	62	4,500	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	None	29	4,500	0.11	695	0.0	$65.91	$234.00	$40.00	2.94
Stair C	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	62	4,500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	None	29	4,500	0.03	174	0.0	$16.48	$58.50	$10.00	2.94
Stair C	1	Compact Fluorescent: 2x26W	None	52	4,500	None	No	1	Compact Fluorescent: 2x26W	None	52	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Stair C	2	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
W110-113	48	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	48	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	2.39	15,808	0.0	$1,499.18	$4,419.60	$825.00	2.40

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Hallway	8	Compact Fluorescent: 2x26W	None	52	4,500	None	Yes	8	Compact Fluorescent: 2x26W	High/Low Control	52	3,150	0.10	657	0.0	$62.32	$200.00	$0.00	3.21
Hallway	11	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	11	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.03	174	0.0	$16.48	$58.50	$10.00	2.94
Fac Rm	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.50	3,293	0.0	$312.33	$1,022.00	$185.00	2.68
Fac Rm	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,150	0.06	410	0.0	$38.85	$126.40	$0.00	3.25
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,500	0.09	590	0.0	$55.92	$190.27	$40.00	2.69
W108	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	0.12	773	0.0	$73.30	$190.27	$40.00	2.05
W108	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	1.00	6,587	0.0	$624.66	$1,774.00	$335.00	2.30
Elec Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.05	347	0.0	$32.96	$117.00	$20.00	2.94
W109	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.80	5,269	0.0	$499.73	$1,473.20	$275.00	2.40
Elec Rm	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.56	3,732	0.0	$353.97	$1,264.50	$205.00	2.99
W106	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	1.00	6,587	0.0	$624.66	$1,774.00	$335.00	2.30
W103,104,105,107	60	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	60	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	2.99	19,760	0.0	$1,873.97	$5,592.00	$1,040.00	2.43
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.03	174	0.0	$16.48	$58.50	$10.00	2.94
W102A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.03	220	0.0	$20.82	$58.50	$10.00	2.33
W102A	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.90	5,928	0.0	$562.19	$1,623.60	$305.00	2.35
W102A	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,150	0.03	205	0.0	$19.42	$63.20	$0.00	3.25
Entry	5	Compact Fluorescent: Chandelier 9Lx35W	Wall Switch	315	4,500	Fixture Replacement	No	5	LED - Fixtures: Low-Bay	Wall Switch	86	4,500	0.91	6,028	0.0	$571.73	$7,098.88	$750.00	11.10
Entry	4	Compact Fluorescent: 2x26W	Wall Switch	52	4,500	None	No	4	Compact Fluorescent: 2x26W	Wall Switch	52	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Entry	3	Metal Halide: (1) 250W Lamp	Wall Switch	295	4,500	Fixture Replacement	No	3	LED - Fixtures: Wall-Wash Lights	Wall Switch	86	4,500	0.50	3,301	0.0	$313.08	$872.59	$90.00	2.50
LGI room	48	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	48	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	1.59	10,538	0.0	$999.45	$3,348.00	$550.00	2.80
LGI room	32	Compact Fluorescent: 2x26W	Wall Switch	52	4,500	None	Yes	32	Compact Fluorescent: 2x26W	Occupancy Sensor	52	3,150	0.40	2,628	0.0	$249.26	$540.00	$70.00	1.89
LGI room	3	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
LGI room	7	Compact Fluorescent: 1x42W	Wall Switch	42	4,500	None	Yes	7	Compact Fluorescent: 1x42W	Occupancy Sensor	42	3,150	0.07	464	0.0	$44.04	$0.00	$0.00	0.00
LGI room	2	Linear Fluorescent - T12: 3' T12 (30W) - 1L	Wall Switch	46	4,500	Relamp	Yes	2	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	3,150	0.04	296	0.0	$28.11	$123.40	$0.00	4.39

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
LGI room	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	0.06	378	0.0	$35.80	$71.80	$0.00	2.01
W101	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.20	1,317	0.0	$124.93	$621.00	$95.00	4.21
W101	4	Compact Fluorescent: 6x26 chand	Wall Switch	156	4,500	Fixture Replacement	Yes	4	LED - Fixtures: Low-Bay	Occupancy Sensor	45	3,150	0.40	2,622	0.0	$248.66	$5,679.10	$600.00	20.43
W101	2	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
W101	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.30	1,976	0.0	$187.40	$721.20	$125.00	3.18
W101	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.07	439	0.0	$41.64	$117.00	$20.00	2.33
Courtyard	6	Compact Fluorescent: 2x26W	Wall Switch	52	4,380	None	No	6	Compact Fluorescent: 2x26W	Wall Switch	52	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,380	Relamp	No	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,380	0.13	861	0.0	$81.65	$285.40	$60.00	2.76
S3 N Hall	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,500	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.03	184	0.0	$17.48	$71.80	$10.00	3.54
N100	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.10	659	0.0	$62.47	$291.50	$50.00	3.87
N102	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.30	1,976	0.0	$187.40	$796.50	$125.00	3.58
Media Center	40	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	40	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	2.34	15,458	0.0	$1,466.02	$4,615.33	$905.00	2.53
Media Center	33	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	33	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	1.09	7,245	0.0	$687.12	$2,470.50	$400.00	3.01
Guidance	9	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Wall Switch	92	4,500	Relamp	Yes	9	LED - Linear Tubes: (3) U-Lamp	Occupancy Sensor	50	3,150	0.41	2,718	0.0	$257.73	$989.10	$35.00	3.70
Main Office	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,150	0.50	3,277	0.0	$310.78	$1,281.20	$35.00	4.01
N010	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	0.23	1,546	0.0	$146.60	$496.53	$100.00	2.70
N011	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,500	0.08	521	0.0	$49.43	$150.40	$30.00	2.44
N008	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,500	0.08	521	0.0	$49.43	$150.40	$30.00	2.44
N006,007,012,013	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,500	0.32	2,085	0.0	$197.73	$601.60	$120.00	2.44
Lav	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,500	0.05	305	0.0	$28.96	$126.40	$0.00	4.36
N014	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.15	988	0.0	$93.70	$225.60	$45.00	1.93
N014	6	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Wall Switch	92	4,500	Relamp	Yes	6	LED - Linear Tubes: (3) U-Lamp	Occupancy Sensor	50	3,150	0.27	1,812	0.0	$171.82	$749.40	$35.00	4.16
N014	1	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
N015, 016, VP	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,500	0.24	1,564	0.0	$148.30	$451.20	$90.00	2.44
Kitchenette	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.20	1,317	0.0	$124.93	$416.80	$80.00	2.70

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Conf	9	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Wall Switch	92	4,500	Relamp	Yes	9	LED - Linear Tubes: (3) U-Lamp	Occupancy Sensor	50	3,150	0.41	2,718	0.0	$257.73	$989.10	$35.00	3.70
Conf	3	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Office	15	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Wall Switch	92	4,500	Relamp	Yes	15	LED - Linear Tubes: (3) U-Lamp	Occupancy Sensor	50	3,150	0.68	4,529	0.0	$429.55	$1,738.50	$70.00	3.88
N001	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,500	0.09	590	0.0	$55.92	$190.27	$40.00	2.69
N002	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,500	0.08	521	0.0	$49.43	$150.40	$30.00	2.44
Main Office 2	4	U-Bend Fluorescent - T8: U T8 (32W) - 3L	Wall Switch	92	4,500	Relamp	Yes	4	LED - Linear Tubes: (3) U-Lamp	Occupancy Sensor	50	3,150	0.18	1,208	0.0	$114.55	$435.60	$20.00	3.63
Princ Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.20	1,317	0.0	$124.93	$416.80	$80.00	2.70
Lav (2)	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,500	0.05	305	0.0	$28.96	$126.40	$0.00	4.36
N031 Nurse	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,500	0.08	521	0.0	$49.43	$150.40	$30.00	2.44
N031 Nurse	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.05	347	0.0	$32.96	$117.00	$20.00	2.94
N031 Nurse	3	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	4,500	Relamp	No	3	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	4,500	0.03	213	0.0	$20.22	$95.70	$15.00	3.99
Lav	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.03	174	0.0	$16.48	$58.50	$10.00	2.94
Attendance	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.08	521	0.0	$49.43	$175.50	$30.00	2.94
Attendance	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,500	0.07	458	0.0	$43.44	$189.60	$0.00	4.36
Hallway	3	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Auditorium	30	Halogen Incandescent: 500W House lights	Wall Switch	500	4,500	Fixture Replacement	No	30	LED - Fixtures: Downlight Recessed	Wall Switch	146	4,500	8.45	55,914	0.0	$5,302.85	$8,133.51	$0.00	1.53
Auditorium	5	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
S28	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.15	988	0.0	$93.70	$225.60	$45.00	1.93
S28	8	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	8	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	0.23	1,510	0.0	$143.21	$557.20	$35.00	3.65
Music	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.27	1,756	0.0	$166.58	$738.00	$115.00	3.74
Music	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	0.18	1,159	0.0	$109.95	$285.40	$60.00	2.05
Music	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	1.00	6,587	0.0	$624.66	$1,774.00	$335.00	2.30
Music	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	4,500	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.22	1,426	0.0	$135.22	$234.00	$0.00	1.73
Music	40	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	40	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	1.14	7,550	0.0	$716.03	$1,706.00	$35.00	2.33
Music	1	Incandescent: 60 W	Wall Switch	60	4,500	Relamp	Yes	1	LED Screw-In Lamps: bare lamp	Occupancy Sensor	9	3,150	0.04	283	0.0	$26.81	$53.75	$5.00	1.82

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Music	1	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	72	4,500	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,150	0.04	257	0.0	$24.42	$63.20	$0.00	2.59
E100, E102	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	1.05	6,956	0.0	$659.71	$2,252.40	$430.00	2.76
AD	4	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	0.11	755	0.0	$71.60	$259.60	$20.00	3.35
Gym	48	Metal Halide: (1) 350W Lamp	Wall Switch	400	4,500	Fixture Replacement	No	48	LED - Fixtures: Low-Bay	Wall Switch	146	4,500	9.70	64,191	0.0	$6,087.79	$68,149.20	$7,200.00	10.01
Gym	16	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	72	4,500	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,500	0.50	3,285	0.0	$311.58	$1,011.20	$0.00	3.25
Gym	8	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	8	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Coach	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.05	347	0.0	$32.96	$117.00	$20.00	2.94
Coach	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,500	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.01	92	0.0	$8.74	$35.90	$5.00	3.54
Boys Lockers	13	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch	176	4,500	Relamp	Yes	13	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	3,150	1.19	7,878	0.0	$747.14	$2,014.90	$425.00	2.13
Boys Lockers	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	0.23	1,546	0.0	$146.60	$380.53	$80.00	2.05
Boys Lockers	10	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	4,500	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.77	5,083	0.0	$482.10	$1,022.00	$35.00	2.05
Boys Lockers	5	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	4,500	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.27	1,782	0.0	$169.02	$562.50	$35.00	3.12
Girls Lockers	13	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch	176	4,500	Relamp	Yes	13	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	3,150	1.19	7,878	0.0	$747.14	$2,014.90	$425.00	2.13
Girls Lockers	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	0.23	1,546	0.0	$146.60	$650.53	$115.00	3.65
Girls Lockers	10	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	4,500	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.77	5,083	0.0	$482.10	$752.00	$0.00	1.56
Girls Lockers	5	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	4,500	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.27	1,782	0.0	$169.02	$292.50	$0.00	1.73
Custodian	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	4,500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.05	311	0.0	$29.46	$58.50	$0.00	1.99
Ad's Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.20	1,317	0.0	$124.93	$416.80	$80.00	2.70
Ad's Office	3	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
GRR	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,500	0.04	295	0.0	$27.96	$95.13	$20.00	2.69
GRR	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	4,500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.09	621	0.0	$58.92	$117.00	$0.00	1.99
BRR	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,500	0.04	295	0.0	$27.96	$95.13	$20.00	2.69
BRR	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	4,500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.09	621	0.0	$58.92	$117.00	$0.00	1.99
GRR	3	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.08	498	0.0	$47.19	$107.70	$0.00	2.28
BRR	3	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.08	498	0.0	$47.19	$107.70	$0.00	2.28

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Fac M RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,500	0.02	153	0.0	$14.48	$63.20	$0.00	4.36
Fac Wmn RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,500	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.01	92	0.0	$8.74	$35.90	$5.00	3.54
Aux Gym	16	Compact Fluorescent: 9Lx35W chandelier	Wall Switch	315	4,500	Fixture Replacement	Yes	16	LED - Fixtures: Low-Bay	Occupancy Sensor	86	3,150	3.24	21,464	0.0	$2,035.66	$23,256.40	$2,470.00	10.21
Aux Gym	4	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Girls Locker 2	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.53	3,513	0.0	$333.15	$1,476.00	$230.00	3.74
Girls Locker 2	4	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boys Locker 2	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.53	3,513	0.0	$333.15	$1,476.00	$230.00	3.74
Boys Locker 2	4	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Coaches Ofice 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,500	0.08	521	0.0	$49.43	$150.40	$30.00	2.44
Coaches Ofice 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.03	174	0.0	$16.48	$58.50	$10.00	2.94
Mech Rm	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.08	521	0.0	$49.43	$175.50	$30.00	2.94
Wrestling	12	Compact Fluorescent: 9Lx35W chandelier	Wall Switch	315	4,500	Fixture Replacement	Yes	12	LED - Fixtures: Low-Bay	Occupancy Sensor	86	3,150	2.43	16,098	0.0	$1,526.74	$17,307.30	$1,835.00	10.13
Wrestling	2	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Training	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	0.17	1,098	0.0	$104.11	$408.50	$70.00	3.25
Training	3	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lav	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.03	174	0.0	$16.48	$58.50	$10.00	2.94
BRR	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,500	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.07	461	0.0	$43.69	$179.50	$25.00	3.54
BRR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.03	174	0.0	$16.48	$58.50	$10.00	2.94
GRR	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,500	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	4,500	0.07	461	0.0	$43.69	$179.50	$25.00	3.54
GRR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.03	174	0.0	$16.48	$58.50	$10.00	2.94
Closet	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,500	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.08	521	0.0	$49.43	$175.50	$30.00	2.94
Closet	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	4,500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,500	0.09	621	0.0	$58.92	$117.00	$0.00	1.99
C102 Foods	44	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	4,500	Relamp	Yes	44	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,150	1.25	8,305	0.0	$787.64	$2,119.60	$70.00	2.60
Fac Dining	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,500	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,150	0.90	5,928	0.0	$562.19	$1,623.60	$305.00	2.35
Fac Dining	34	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	4,500	Relamp	Yes	34	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,150	1.83	12,119	0.0	$1,149.35	$2,259.00	$35.00	1.94

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Fac Dining	1	Compact Fluorescent: 2x26W	Wall Switch	52	4,500	None	Yes	1	Compact Fluorescent: 2x26W	Occupancy Sensor	52	3,150	0.01	82	0.0	$7.79	$0.00	$0.00	0.00
Fac Dining	1	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lav	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,500	0.04	295	0.0	$27.96	$95.13	$20.00	2.69
Lav	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,500	0.09	590	0.0	$55.92	$190.27	$40.00	2.69
S100	20	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,500	Relamp	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,150	1.17	7,729	0.0	$733.01	$2,172.67	$435.00	2.37
S100	1	Exit Signs: LED - 2 W Lamp	None	6	4,500	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	4,500	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Bldg Exterior Wallpacks	40	Compact Fluorescent: 2x13W	Daylight Dimming	26	4,380	None	No	40	Compact Fluorescent: 2x13W	Daylight Dimming	26	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garden Lights	16	Metal Halide: (1) 100W Lamp	Daylight Dimming	128	4,380	Fixture Replacement	No	16	LED - Fixtures: Outdoor Post-Mount	Daylight Dimming	45	4,380	1.06	6,805	0.0	$645.42	$9,172.80	$80.00	14.09
Parking Lot - Single	16	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	4,380	Fixture Replacement	No	16	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	146	4,380	3.97	25,582	0.0	$2,426.17	$31,247.89	$1,600.00	12.22
Parking Lot - Twin	20	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	4,380	Fixture Replacement	No	20	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	146	4,380	4.96	31,978	0.0	$3,032.71	$39,059.86	$2,000.00	12.22
Roof Flood	1	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	4,380	Fixture Replacement	No	1	LED - Fixtures: Architectural Flood/Spot Luminaire	Daylight Dimming	146	4,380	0.25	1,599	0.0	$151.64	$1,224.95	$50.00	7.75

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Rm 1	Building	1	Water Supply Pump	0.8	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm 1	Building	1	Heating Hot Water Pump	3.0	87.5%	No	8,760	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm 1	Building	1	Heating Hot Water Pump	3.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm 1	Building	1	Heating Hot Water Pump	5.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm 1	Building	1	Heating Hot Water Pump	5.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm 1	Building	1	Heating Hot Water Pump	5.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm 1	Building	1	Heating Hot Water Pump	5.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm 2	Building	2	Heating Hot Water Pump	0.8	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm 2	Building	2	Heating Hot Water Pump	7.5	89.5%	No	3,391	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	?	2	Supply Fan	0.2	74.0%	No	8,760	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	?	1	Supply Fan	0.3	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 25 Library	1	Supply Fan	7.5	89.5%	No	8,760	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	home ec	1	Supply Fan	0.4	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Art Rm/2nd location	2	Supply Fan	0.3	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU ?	1	Supply Fan	1.8	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 10 Faculty dining	1	Supply Fan	1.8	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	photo lab	1	Supply Fan	0.3	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	woodshop paint	1	Supply Fan	0.1	74.0%	No	8,760	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	CR -	2	Supply Fan	0.2	74.0%	No	8,760	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Wrestling Rm	1	Supply Fan	0.4	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Copier Rm	1	Supply Fan	0.3	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 8 Café S	1	Supply Fan	3.0	87.5%	No	8,760	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 9 Café N	1	Supply Fan	3.0	87.5%	No	8,760	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 7 Kitchen office	1	Supply Fan	7.5	89.5%	No	8,760	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 16 / Guidance Office	1	Supply Fan	5.0	87.5%	No	8,760	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 15 main office	1	Supply Fan	5.0	87.5%	No	8,760	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	AHU 3/AHU 4 Aud.	2	Supply Fan	2.0	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU locker room corridor	1	Supply Fan	2.0	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 4 Girls locker	1	Supply Fan	0.8	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 3 Gym	1	Supply Fan	1.6	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 2 Boys LR	1	Supply Fan	1.0	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms (AC-G type)	7	Supply Fan	0.5	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms (AC type)	31	Supply Fan	0.4	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU #? Band and Music	1	Supply Fan	1.0	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	?	1	Supply Fan	0.2	74.0%	No	8,760	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	AHU 2	1	Supply Fan	2.0	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 1 Ads office/Gym offices	1	Supply Fan	1.3	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	?	1	Supply Fan	0.3	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 5/ Locker corridor	1	Supply Fan	1.5	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU ?/ Science corridor	2	Supply Fan	1.5	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	IT Department	1	Supply Fan	0.4	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	A209	1	Supply Fan	0.2	74.0%	No	8,760	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 5/ Hallway South, A & W	2	Supply Fan	1.5	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Sering (4) 2nd flor classrooms	4	Supply Fan	0.2	74.0%	No	8,760	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Sering (2) 2nd flor classrooms	2	Supply Fan	0.4	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 12 TV room	1	Supply Fan	2.0	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 14 LGI Rm	1	Supply Fan	1.5	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Serving offices 1st flr	1	Supply Fan	0.8	82.5%	No	8,760	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Serving offices 1st flr	6	Supply Fan	0.2	74.0%	No	8,760	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
roof	RTU 19, 20, 21, 22 (Gym)	4	Supply Fan	10.0	91.0%	No	8,760	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator Rm	Elevator	1	Process Pump	20.0	93.6%	No	720	No	93.6%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Heat for Rooms	9	Supply Fan	0.3	93.6%	No	8,760	No	93.6%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Restrooms	21	Exhaust Fan	0.3	93.6%	No	8,760	No	93.6%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
High School	?	1	Electric Resistance Heat		5.12	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	?	2	Split-System Air-Source HP	2.00	2.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	?	1	Split-System Air-Source HP	3.00	3.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU25 Library	1	Packaged AC	30.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	home ec	1	Split-System AC	3.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Art Rm/2nd location	2	Split-System Air-Source HP	3.00	3.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU ?	1	Packaged AC	17.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 10 Faculty dining	1	Packaged AC	17.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	photo lab	1	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	woodshop paint	1	Packaged Air-Source HP	0.75	1.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	CR -	2	Split-System Air-Source HP	2.00	2.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Wrestling Rm	1	Split-System AC	3.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Copier Rm	1	Split-System Air-Source HP	3.00	3.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 8 Café S	1	Packaged AC	16.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 9 Café N	1	Packaged AC	16.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 7 Kitchen office	1	Packaged AC	25.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 16 / Guidance Office	1	Packaged AC	15.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 15 main office	1	Packaged AC	18.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	AHU 3/AHU 4 Aud.	2	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU locker room corridor	1	Packaged AC	10.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	RTU 4 Girls locker	1	Packaged AC	8.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 3 Gym	1	Packaged AC	16.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 2 Boys LR	1	Packaged AC	10.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms (AC-G type)	7	Split-System AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms (AC type)	31	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU #? Band and Music	1	Packaged AC	10.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	?	1	Split-System Air-Source HP	2.00	2.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	AHU 2	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 1 Ads office/Gym offices	1	Packaged AC	13.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	?	1	Split-System Air-Source HP	3.00	3.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 5/ Locker corridor	1	Packaged AC	15.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU ?/ Science corridor	2	Packaged AC	15.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	IT Department	1	Split-System AC	3.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	A209	1	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 5/ Hallway South, A & W	2	Packaged AC	15.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Sering (4) 2nd flor classrooms	4	Packaged AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Sering (2) 2nd flor classrooms	2	Packaged AC	3.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 12 TV room	1	Packaged AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 14 LGI Rm	1	Packaged AC	15.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Serving offices 1st flr	1	Packaged AC	7.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Serving offices 1st flr	6	Split-System AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Rm 1	School	2	Non-Condensing Hot Water Boiler	8,369.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm 2	New Wing	2	Non-Condensing Hot Water Boiler	1,700.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Trane RTU locker Rm corridor	1	Furnace	120.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 4 Girls locker	1	Furnace	146.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 3 Gym	1	Furnace	219.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 2 Boys LR	1	Furnace	146.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	RTU 19, 20, 21, 22 (Gym)	4	Furnace	437.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Rm 1	Main campus	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm 2	New Wing	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym Area?	UNK	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Various	66	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	92.8	$947.61	$473.22	$0.00	0.50
Various	15	Faucet Aerator (Kitchen)	2.50	2.20	0.00	0	4.2	$43.07	$107.55	$0.00	2.50

Reach-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions					Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Energy Efficient Doors?	Install Door Heater Control?	Install Aluminum Night Covers?	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
Milk Cooler	1	Cooler (35F to 55F)	no	no	No	no	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ice Cream Fridge	2	Medium Temp Freezer (0F to 30F)	no	no	No	no	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Medium Temp Freezer (0F to 30F)	no	no	no	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Cooler (35F to 55F)	no	no	no	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	3	Stand-Up Refrigerator, Glass Door (31 - 50 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	3	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Glass Door (>50 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitch	1	Self-Contained Unit (≥175 lbs/day), Batch	No	no	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
F011	1	Self-Contained Unit (<175 lbs/day), Batch	No	no	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	6	Electric Convection Oven (Full Size)	No	no	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	5	Insulated Food Holding Cabinet (Full Size)	No	no	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Steamer	No	no	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

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

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Various	119	Computer	75.0	
Various	26	Printer/Copier S	20.0	
Various	24	Printer/Copier M	300.0	
Various	12	Printer/Copier L	515.0	
Various	6	Paper shredder	360.0	
Various	39	Projector	200.0	
Various	17	Microwave	1,000.0	
Various	2	Refigerator S	27.6	
Various	1	Refigerator M	50.0	
Various	11	Refigerator L	600.0	
Various	4	Coffee Machine	400.0	
Various	5	Toaster Oven	1,200.0	
Various	2	Clothes Washer	900.0	
Various	2	Clothes Dryer	1,600.0	
Various	2	TV 24"	120.0	
Various	7	TV 50"	150.0	
Various	24	Smart Board	7.0	
Various	34	Smart Board/other projector	230.0	
Kitchen	1	Blender	1,000.0	

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	4	Refrigerated	Yes	0.00	6,447	0.0	$611.46	$920.00	$0.00	1.50
Kitchen	1	Non-Refrigerated	Yes	0.00	343	0.0	$32.48	$230.00	$0.00	7.08
Fac Rm	1	Refrigerated	yes	0.00	1,612	0.0	$152.87	$230.00	$0.00	1.50
Fac Rm	1	Non-Refrigerated	Yes	0.00	343	0.0	$32.48	$230.00	$0.00	7.08

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Lacey Township High School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 300,000
Built: 1981

For Year Ending: May 31, 2016
Date Generated: June 13, 2017

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Lacey Township High School 73 Haines Street Lanoka Harbor, New Jersey 08734	_____ , (____)____-_____	____ _____ , (____)____-_____ _____

Property ID: 2388309

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
66.6 kBtu/ft²

Source EUI
138.1 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	9,340,414 (47%)
Natural Gas (kBtu)	9,450,216 (47%)
Electric - Solar (kBtu)	1,203,669 (6%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	79.5
National Median Source EUI (kBtu/ft²)	164.7
% Diff from National Median Source EUI	-16%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	1,626

Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp (if applicable)