



Local Government Energy Audit Report

Dr. Martin Luther King Jr. School

July 31, 2019

Prepared for:

Elizabeth Public Schools
130 Trumbull Street
Elizabeth, NJ 07206

Prepared by:

TRC Energy Services
900 Route 9 North
Woodbridge, NJ 07095

Disclaimer

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

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

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

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

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

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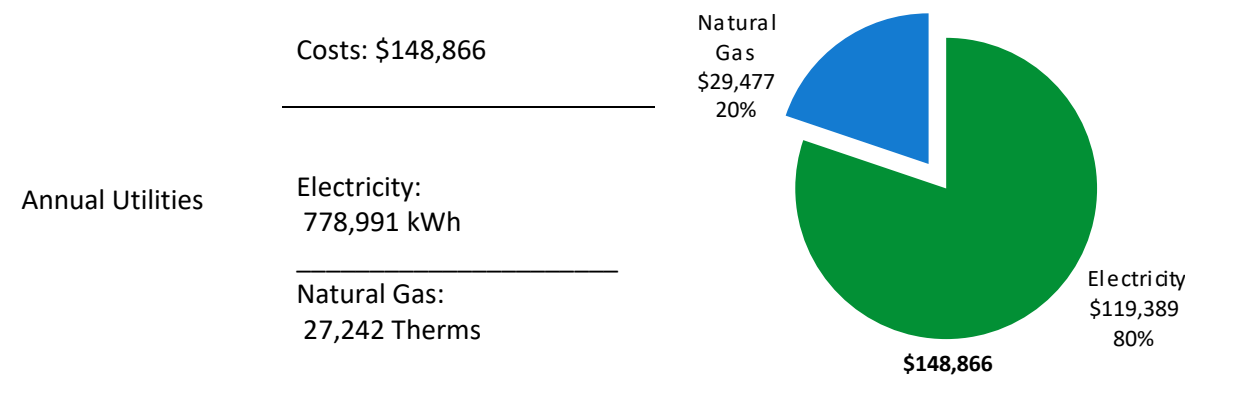
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1 EXECUTIVE SUMMARY

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

BUILDING PERFORMANCE REPORT



ENERGY STAR® Benchmarking Score	16 <i>(1-100 scale)</i>	This building performs at or below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.
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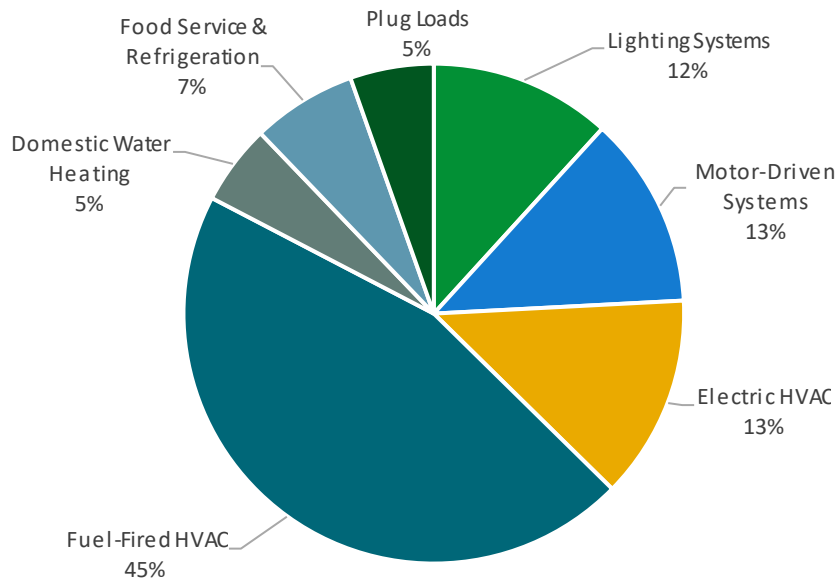


Figure 1 - Energy Use by System

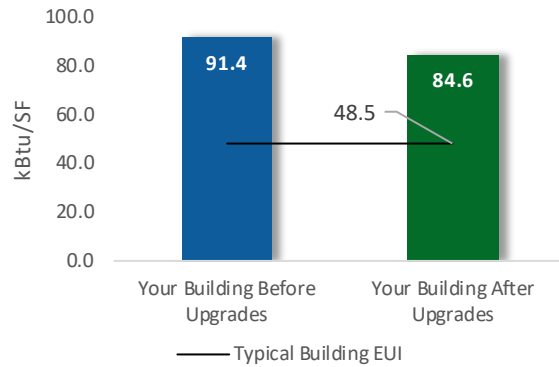
POTENTIAL IMPROVEMENTS



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

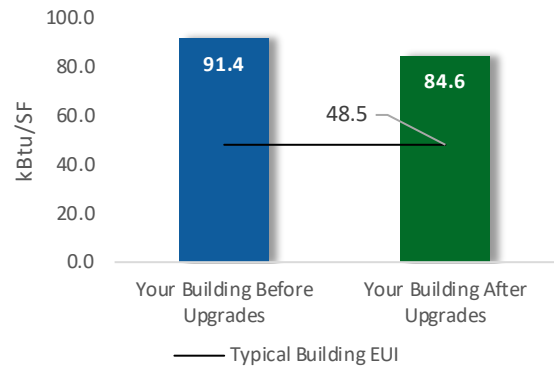
Scenario 1: Full Package (all evaluated measures)

Installation Cost	\$99,690
Potential Rebates & Incentives ¹	\$16,286
Annual Cost Savings	\$18,806
Annual Energy Savings	Electricity: 124,193 kWh
Greenhouse Gas Emission Savings	61 Tons
Simple Payback	4.4 Years
Site Energy Savings (all utilities)	7%



Scenario 2: Cost Effective Package²

Installation Cost	\$99,690
Potential Rebates & Incentives	\$16,286
Annual Cost Savings	\$18,806
Annual Energy Savings	Electricity: 124,193 kWh
Greenhouse Gas Emission Savings	61 Tons
Simple Payback	4.4 Years
Site Energy Savings (all utilities)	7%



On-site Generation Potential

Photovoltaic	Medium
Combined Heat and Power	None

¹ Incentives are based on current SmartStart Prescriptive incentives. Other program incentives may apply.

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

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Lifetime Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		111,873	23.1	-18	\$16,946	\$254,193	\$86,280	\$14,681	\$71,599	4.2	110,496
ECM 1	Install LED Fixtures	26,460	3.3	-1	\$4,049	\$60,728	\$52,019	\$6,400	\$45,619	11.3	26,572
ECM 2	Retrofit Fixtures with LED Lamps	85,414	19.8	-18	\$12,898	\$193,465	\$34,260	\$8,281	\$25,979	2.0	83,923
Lighting Control Measures		12,319	2.4	-3	\$1,860	\$14,882	\$13,410	\$1,605	\$11,805	6.3	12,104
ECM 3	Install Occupancy Sensor Lighting Controls	7,430	1.4	-2	\$1,122	\$8,975	\$8,910	\$1,155	\$7,755	6.9	7,300
ECM 4	Install High/Low Lighting Controls	4,890	0.9	-1	\$738	\$5,907	\$4,500	\$450	\$4,050	5.5	4,804
TOTALS (COST EFFECTIVE MEASURES)		124,193	25.4	-21	\$18,806	\$269,074	\$99,690	\$16,286	\$83,404	4.4	122,599
TOTALS (ALL MEASURES)		124,193	25.4	-21	\$18,806	\$269,074	\$99,690	\$16,286	\$83,404	4.4	122,599

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

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

Energy Conservation Measure		SmartStart	Direct Install	Pay For Performance
ECM 1	Install LED Fixtures	X		
ECM 2	Retrofit Fixtures with LED Lamps	X		
ECM 3	Install Occupancy Sensor Lighting Controls	X		
ECM 4	Install High/Low Lighting Controls	X		

Figure 3 – Funding Options



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

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

Take the next step by visiting www.njcleanenergy.com for program details, applications, and to contact a qualified contractor.

Individual Measures with SmartStart

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

Turnkey Installation with Direct Install

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

Whole Building Approach with Pay for Performance

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

More Options from Around the State

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

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

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

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

Ongoing Electric Savings with Demand Response

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

2 EXISTING CONDITIONS

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

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

2.1 Site Overview

On February 21, 2019, TRC performed an energy audit at Dr. Martin Luther King Jr. School located in Elizabeth, New Jersey. TRC met with Julio Coelho to review the facility operations and help focus our investigation on specific energy-using systems.

Dr. Martin Luther King Jr. School is a two-story, 58,857 square foot school building built in 2005. The building serves an early childhood school (pre-Kindergarten). Spaces include: classrooms, offices, cafeteria, corridors, and a multi-purpose room.

2.2 Building Occupancy

The facility is occupied year-round, from September through June. Typical weekday occupancy is 72 staff and 308 students.

Summer occupancy includes a summer day camp and continuing maintenance activities. There are no weekend activities.

Building Name	Weekday/Weekend	Operating Schedule
Dr. Martin Luther King Jr. School	Weekday	8:15 AM - 5:00 PM
	Weekend	closed

Figure 4 - Building Occupancy Schedule

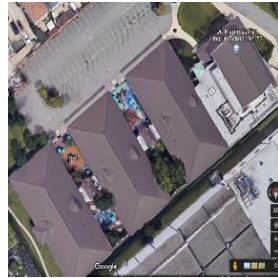
2.3 Building Envelope

Building walls are concrete block over structural steel. Steel trusses support mostly pitched roof sections covered with asphalt shingles. There is a small flat roof section which is covered with an impermeable membrane and is in good condition. The pitched roof is also in good condition.

Most of the windows are operable and are double glazed with metal frames. The windows are in good condition. The exterior doors have metal frames that are also in good condition.



Façade and Windows



Roof



Main Entrance

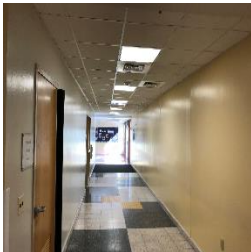


Exterior Doors

2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several compact fluorescent lamps (CFLs), HID, and incandescent lamps. Typically, T8 fluorescent lamps use electronic ballasts.

All exit signs use LED sources. Most fixtures are in good condition. Most lighting fixtures are controlled manually, however, some are automatically switched on by occupancy sensors. Interior lighting levels were generally sufficient.



T8 Fixtures (Hall)



T8 Fixtures (Classroom)



T8s Fixture



Recessed HID

Exterior fixtures include metal halide (MH) and fluorescent. There are recessed and wall pack CFL and MH fixtures throughout the exterior and pole-mounted MH fixtures in the parking lot. Exterior fixtures are timer controlled.



Wall pack



Pole MH (Shoebox)



Bollard

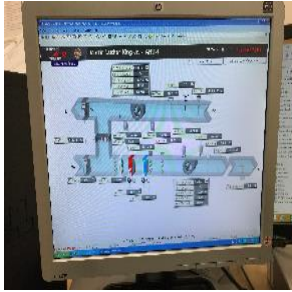


Recessed MH

2.5 Air Handling Systems

Air Handler Units (AHUs)

There are five AHUs located on the roof and in certain mechanical spaces which serve various spaces in the building via variable-air volume (VAV) air flow distribution. The AHUs have hot water and chilled water coils which are served by the heating hot water boilers and a chiller, respectively. The AHU supply fans range between 10 hp to 20 hp, and the return fans range between 5 hp to 7.5 hp. The units provide outside air ventilation via economizers. The AHUs are original to the building and appear to be in good operating condition.



AHU 1 – EMS Screenshot



AHU

Unit Heaters (UHs)

There are eight UHs located in the attic and mechanical rooms. The units serve various spaces in the building. The UHs have hot water coils which are served by the heating hot water boilers. The UHs have a heating capacity that ranges between 17 Mbh to 70 MBh.



Unit Heater in the Attic

Make Up Air Unit (MAU)

There is an indirect gas-fired make-up air unit (MAU) which serves the kitchen area. The unit has a heating capacity of 150 MBh. The unit appears to be in good operating condition.



MAU on roof

2.6 Heating Hot Water System

Two Laars 2040 MBh hot water boilers serve the building's heating load. The burners are fully modulating from 50% to 100% fire rate, with a nominal efficiency of 85%.

The boiler hot water is distributed between a radiation panel loop and a combined AHU and UH loop. The AHU/UH loop is pumped at variable flow, controlled by variable frequency drives, while the radiation panel loop is constant flow. Temperature for the radiation loop is controlled by a mixing valve which mixes supply and return water. Hot water flow for the constant flow radiation loop is served by two 3 hp pumps and the variable flow AHU/UH loop is served by two 7.5 hp pumps.



Heating Hot Water Pump (P-1)



Boilers



EMS – HW System

2.7 Chilled Water Systems

The chiller plant consists of one 207-ton, York, air-cooled screw chiller which is located on the roof. The chiller is configured in a variable flow primary system supplying chilled water to fan coils inside air handler units (AHUs). Chilled water is distributed by two 15 hp pumps.



207-ton York Chiller



Chilled Water Pump (P-6)



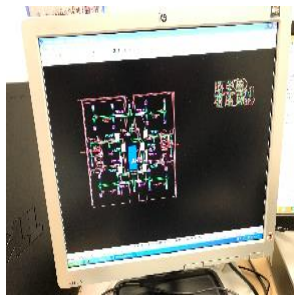
Chiller and CHW Pumps (EMS)



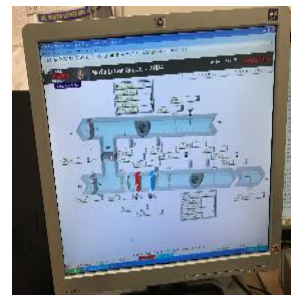
Chilled Water Pump VFD (P-6)

2.8 Building Energy Management Systems (EMS)

A Honeywell EMS controls the HVAC equipment, boilers, air handlers, and VAVs. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, humidity, heating water loop temperatures and chilled water loop temperatures.



EMS - Zone temperatures



EMS - AHU4

2.9 Domestic Hot Water

Domestic hot water (DHW) is produced with two gas-fired storage water heaters with an 80% thermal efficiency. The input heating capacity for the kitchen DHW heater is 300 MBh and is 199 MBh for the water heater serving the restrooms. The water heaters each have a storage capacity of about 125 gallons. The water heaters are in good condition.



Water Heaters (DHW)



DHW- Recirculation Pump

2.10 Food Service Equipment

The kitchen has electric and gas cooking equipment used to prepare meals for students and staff. Most cooking is done using gas convection ovens. Bulk prepared foods are held in several electric holding cabinets. The equipment is in good condition.

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



Warming Oven



Steamer

2.11 Refrigeration

The kitchen has walk-in, chest, and stand-up type refrigeration equipment. All the equipment is in good condition.

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



Walk-in Units



Walk-in Unit Fans

2.12 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 2% of total building energy use. This is lower than a typical building.

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

There are 98 computer work stations throughout the facility. There are 47 desk printers and three photocopiers throughout the building. The faculty room and various offices have a total of 14 small refrigerators and three coffee machines.

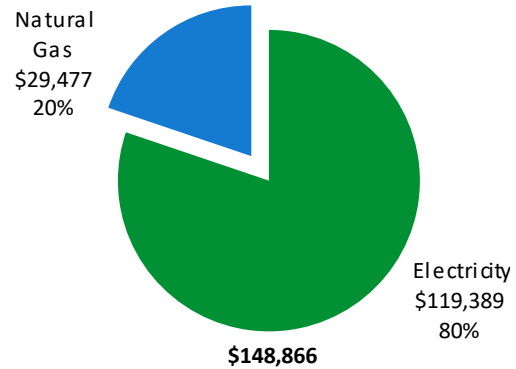
2.13 Water-Using Systems

There are several restrooms at this facility. A sampling of restrooms found that the faucets are rated for 2.2 gallons per minute (gpm) or lower.

3 ENERGY USE AND COSTS

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

Utility Summary		
Fuel	Usage	Cost
Electricity	778,991 kWh	\$119,389
Natural Gas	27,242 Therms	\$29,477
Total		\$148,866



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

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

Please note that TRC’s analysis of utility bills for this site point to **higher** than expected energy use. We have used available building and energy information data to make informed assumptions about equipment load and runtime. Higher than typical operating hours were required to balance the calculated energy use to the historical energy use

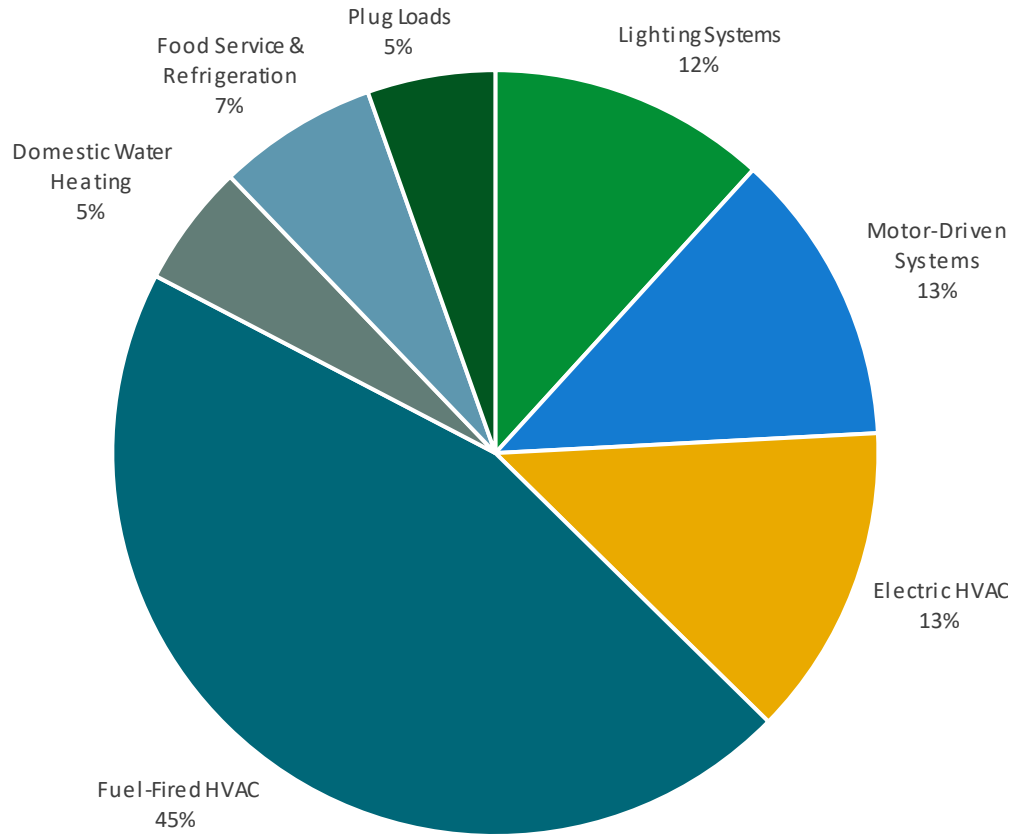
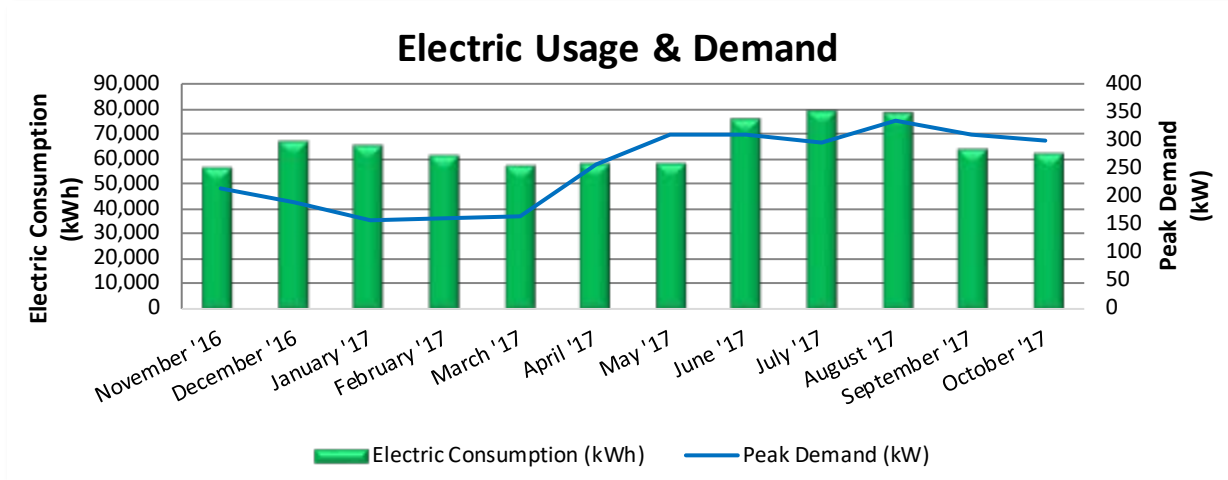


Figure 5 - Energy Balance

3.1 Electricity

PSE&G delivers electricity under rate class LPLS, with electric production provided by a third-party supplier.



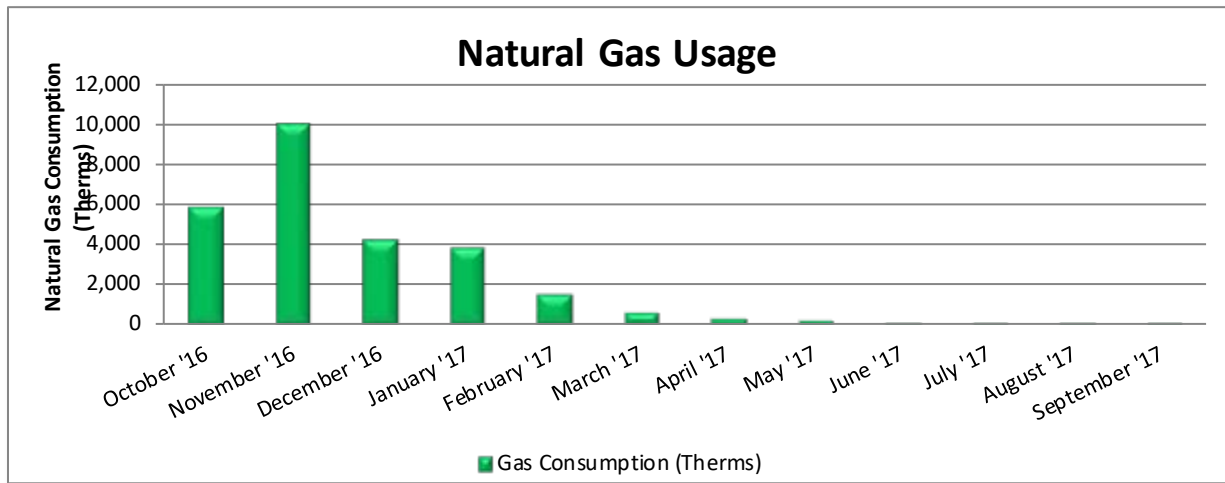
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
11/18/16	28	56,211	213	\$795	\$7,763	No
12/21/16	33	66,667	188	\$700	\$8,968	No
1/23/17	33	64,681	158	\$586	\$8,657	No
2/22/17	30	60,595	161	\$599	\$8,110	Yes
3/23/17	29	56,508	164	\$614	\$7,711	No
4/24/17	32	57,782	255	\$962	\$8,210	No
5/23/17	29	57,637	308	\$1,161	\$8,383	No
6/22/17	30	75,082	309	\$1,164	\$13,226	No
7/24/17	32	78,656	296	\$1,115	\$13,487	No
8/22/17	29	77,841	334	\$1,258	\$13,871	No
9/21/17	30	63,446	308	\$1,174	\$11,883	No
10/20/17	29	61,751	300	\$1,110	\$8,792	No
Totals	364	776,857	334	\$11,238	\$119,062	
Annual	365	778,991	334	\$11,269	\$119,389	

Notes:

- Peak demand of 334 kW occurred in August 2017.
- The average electric cost over the past 12 months was \$0.153/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.
- There is little seasonal variation in energy usage (kWh) between the summer and winter. This building is electrically cooled and heated using natural gas, therefore, we would expect to see more variation between the heating and cooling seasons.

3.2 Natural Gas

Elizabethtown Gas delivers natural gas under rate class General Service - AMR, with natural gas supply provided by UGI Energy Services, a third-party supplier.



Gas Billing Data				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
11/1/16	30	5,820	\$5,121	Yes
12/1/16	30	9,980	\$8,783	Yes
1/1/17	31	4,248	\$3,721	No
2/1/17	31	3,823	\$3,364	Yes
3/1/17	28	1,529	\$1,346	Yes
4/1/17	31	612	\$538	Yes
5/1/17	30	306	\$1,655	Yes
6/1/17	31	236	\$1,275	No
7/1/17	30	165	\$895	No
8/1/17	31	145	\$887	No
9/1/17	31	150	\$919	No
10/1/17	30	155	\$894	No
Totals	364	27,167	\$29,396	
Annual	365	27,242	\$29,477	

Notes:

- The average gas cost for the past 12 months is \$1.082/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

Benchmarking Score	16
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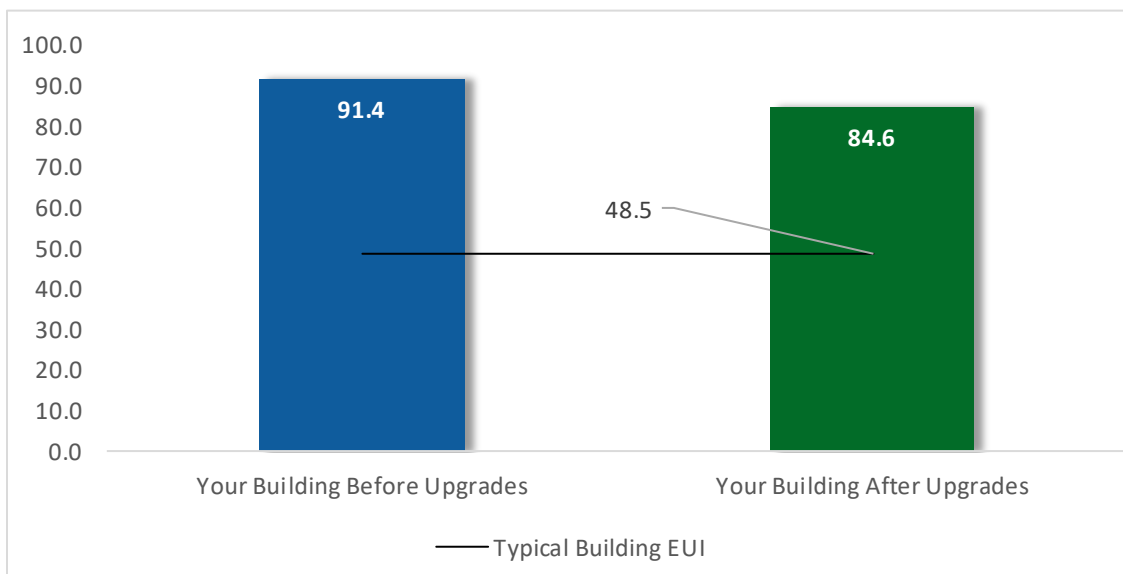


Figure 6 - Energy Use Intensity Comparison

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

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

Tracking Your Energy Performance

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

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

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

For more information on ENERGY STAR® and Portfolio Manager®, visit their website³.

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

4 ENERGY CONSERVATION MEASURES

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

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

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

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

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

#	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 ₂ e Emissions Reduction (lbs)
Lighting Upgrades		111,873	23.1	-18	\$16,946	\$86,280	\$14,681	\$71,599	4.2	110,496
ECM 1	Install LED Fixtures	26,460	3.3	-1	\$4,049	\$52,019	\$6,400	\$45,619	11.3	26,572
ECM 2	Retrofit Fixtures with LED Lamps	85,414	19.8	-18	\$12,898	\$34,260	\$8,281	\$25,979	2.0	83,923
Lighting Control Measures		12,319	2.4	-3	\$1,860	\$13,410	\$1,605	\$11,805	6.3	12,104
ECM 3	Install Occupancy Sensor Lighting Controls	7,430	1.4	-2	\$1,122	\$8,910	\$1,155	\$7,755	6.9	7,300
ECM 4	Install High/Low Lighting Controls	4,890	0.9	-1	\$738	\$4,500	\$450	\$4,050	5.5	4,804
TOTALS		124,193	25.4	-21	\$18,806	\$99,690	\$16,286	\$83,404	4.4	122,599

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

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

Figure 7 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		111,873	23.1	-18	\$16,946	\$86,280	\$14,681	\$71,599	4.2	110,496
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TOTALS		124,193	25.4	-21	\$18,806	\$99,690	\$16,286	\$83,404	4.4	122,599

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

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

Figure 8 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		111,873	23.1	-18	\$16,946	\$86,280	\$14,681	\$71,599	4.2	110,496
ECM 1	Install LED Fixtures	26,460	3.3	-1	\$4,049	\$52,019	\$6,400	\$45,619	11.3	26,572
ECM 2	Retrofit Fixtures with LED Lamps	85,414	19.8	-18	\$12,898	\$34,260	\$8,281	\$25,979	2.0	83,923

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

ECM 1: Install LED Fixtures

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

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

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

Affected building areas: multi-purpose room and exterior fixtures.

ECM 2: Retrofit Fixtures with LED Lamps

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

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

Affected building areas: various locations.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Control Measures		12,319	2.4	-3	\$1,860	\$13,410	\$1,605	\$11,805	6.3	12,104
ECM 3	Install Occupancy Sensor Lighting Controls	7,430	1.4	-2	\$1,122	\$8,910	\$1,155	\$7,755	6.9	7,300
ECM 4	Install High/Low Lighting Controls	4,890	0.9	-1	\$738	\$4,500	\$450	\$4,050	5.5	4,804

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

ECM 3: Install Occupancy Sensor Lighting Controls

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

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

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

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

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

ECM 4: Install High/Low Lighting Controls

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

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

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

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

Affected building areas: hallways.

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

5 ENERGY EFFICIENT BEST PRACTICES

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

Energy Tracking with ENERGY STAR® Portfolio Manager®



You've heard it before - you can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions⁴. Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Doors and Windows

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

Lighting Maintenance



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

Lighting Controls

As part of a lighting maintenance schedule, test lighting controls to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight and photocell sensors, maintenance involves cleaning sensor lenses and confirming that setpoints and sensitivity are configured properly.

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

Motor Controls

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

Motor Maintenance

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

Thermostat Schedules and Temperature Resets



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

Economizer Maintenance

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

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

Chiller Maintenance

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

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

Boiler Maintenance

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

Water Heater Maintenance

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

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

Water Conservation



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

For more information regarding water conservation go to the EPA's WaterSense™ website⁵ or download a copy of EPA's "WaterSense™ at Work: Best Management Practices for Commercial and Institutional Facilities"⁶ to get ideas for creating a water management plan and best practices for a wide range of water using systems.

⁵ <https://www.epa.gov/watersense>

⁶ <https://www.epa.gov/watersense/watersense-work-0>

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

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

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

Procurement Strategies

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

6 ON-SITE GENERATION

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

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

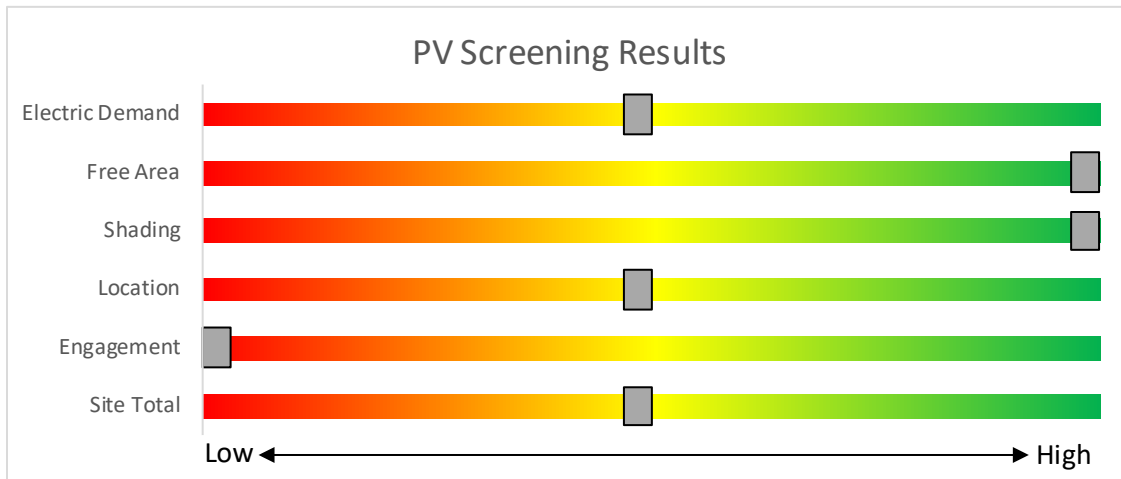
6.1 Solar Photovoltaic

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

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

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

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



Potential	Medium	
System Potential	155	kW DC STC
Electric Generation	184,662	kWh/yr
Displaced Cost	\$28,300	/yr
Installed Cost	\$604,500	

Figure 9 - Photovoltaic Screening

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

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

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

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

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

6.2 Combined Heat and Power

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

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

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

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has no potential for installing a cost-effective CHP system.

Based on a preliminary analysis, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation. The lack of gas service, low or infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

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

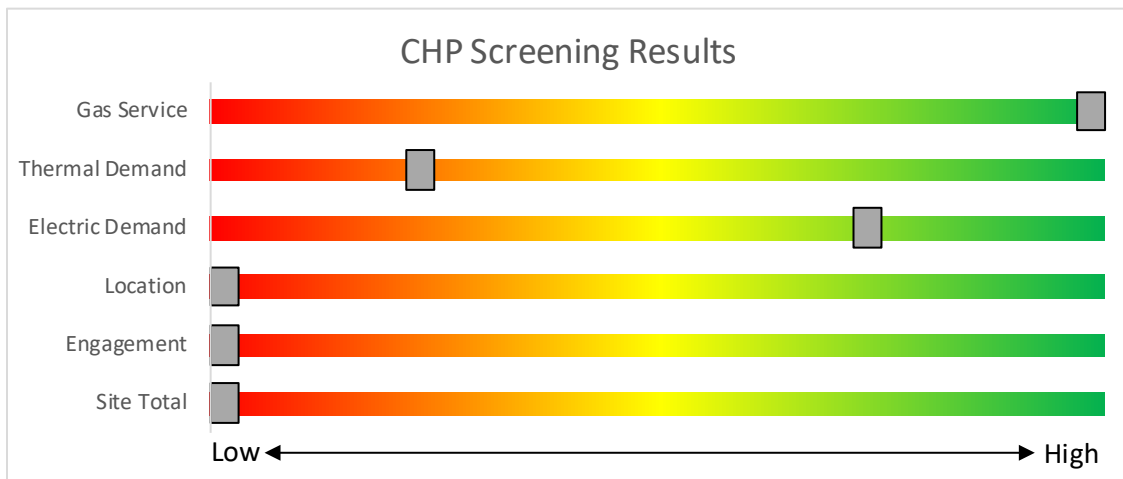


Figure 10 - Combined Heat and Power Screening

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

7 PROJECT FUNDING AND INCENTIVES

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

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

7.1 SmartStart



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

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

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers
Electric Unitary HVAC
Gas Cooling
Gas Heating
Gas Water Heating
Ground Source Heat Pumps
Lighting

Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment
Variable Frequency Drives

Incentives

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

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

How to Participate

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

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

7.2 Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

7.3 SREC Registration Program

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

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

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

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

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

8 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

8.1 Retail Electric Supply Options

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

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

A list of licensed third-party electric suppliers is available at the NJBPU website⁷.

8.2 Retail Natural Gas Supply Options

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

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

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

A list of licensed third-party natural gas suppliers is available at the NJBPU website⁸.

⁷ www.state.nj.us/bpu/commercial/shopping.html.

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Rm	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.3	1,498	0	\$226	\$438	\$120	1.4
Boiler Rm_	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Elec Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	300	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	22	0	\$3	\$73	\$20	16.1
MultiPurpose Rm	8	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch		176	3,440	2, 3	Relamp	Yes	8	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	2,374	0.7	3,511	-1	\$530	\$1,146	\$275	1.6
MultiPurpose Rm	6	Mercury Vapor: (1) 75W Lamp	Wall Switch		93	3,440	1	Fixture Replacement	No	6	LED - Fixtures: Low-Bay	Wall Switch	28	3,440	0.3	1,478	0	\$223	\$3,753	\$900	12.8
MultiPurpose Rm	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Boys MPR	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,440	0.0	187	0	\$28	\$55	\$15	1.4
Girls MPR_	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,440	0.0	187	0	\$28	\$55	\$15	1.4
MPR	8	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch		176	3,440	2, 3	Relamp	Yes	8	LED - Linear Tubes: (6) 4' Lamps	Occupancy Sensor	87	2,374	0.7	3,511	-1	\$530	\$1,146	\$275	1.6
MPR_	6	Mercury Vapor: (1) 75W Lamp	Wall Switch		93	3,440	1	Fixture Replacement	No	6	LED - Fixtures: Low-Bay	Wall Switch	28	3,440	0.3	1,478	0	\$223	\$3,753	\$900	12.8
Stage - MPR	12	Halogen Incandescent: Can Light - 75 W	Wall Switch		75	3,440	2, 3	Relamp	Yes	12	LED Lamps: Screw in Replacement	Occupancy Sensor	9	2,374	0.6	3,124	-1	\$472	\$477	\$47	0.9
Storage-MPR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	300	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	22	0	\$3	\$73	\$20	16.1
MPR	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
106 B storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	300	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	22	0	\$3	\$73	\$20	16.1
108 Kitchen	24	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch		62	3,440	2, 3	Relamp	Yes	24	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,374	0.7	3,563	-1	\$538	\$2,279	\$310	3.7
Kitchen Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.1	477	0	\$72	\$380	\$65	4.4
Kitchen Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	300	2, 3	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	207	0.2	83	0	\$13	\$489	\$95	31.4
108 Kitchen	7	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	7	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Main Lobby	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 4	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,374	0.3	1,668	0	\$252	\$608	\$105	2.0
Main Lobby	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Main Lobby	1	Incandescent: Frame Dir. Light	Wall Switch		60	3,440	2	Relamp	No	1	LED Lamps: Screw in Replacement	Wall Switch	9	3,440	0.0	193	0	\$29	\$17	\$1	0.6
Main Office	3	Compact Fluorescent: Can Lights - 2lamp (2x26W)	Wall Switch		52	3,440	2	Relamp	No	3	LED Lamps: LED Replacement	Wall Switch	36	3,440	0.0	177	0	\$27	\$91	\$3	3.3
Main Office	13	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch		62	3,440	2, 4	Relamp	Yes	13	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,374	0.4	1,930	0	\$291	\$1,167	\$355	2.8
Main Office	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,440	0.0	187	0	\$28	\$55	\$15	1.4

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,440	0.0	61	0	\$9	\$33	\$6	2.9
Main Office	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,374	0.7	3,575	-1	\$540	\$1,047	\$450	1.1
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,440	0.0	187	0	\$28	\$55	\$15	1.4
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,440	0.0	61	0	\$9	\$33	\$6	2.9
165 CopyRm	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.1	477	0	\$72	\$380	\$65	4.4
162 Conf Rm_	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.1	517	0	\$78	\$219	\$60	2.0
163 Principal	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 3	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.1	715	0	\$108	\$434	\$80	3.3
167 Conf Rm	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,374	0.2	794	0	\$120	\$453	\$85	3.1
167 Conf Rm_	6	Compact Fluorescent: CanLights - 2lamp (2x26W)	Wall Switch		52	3,440	2, 3	Relamp	Yes	6	LED Lamps: LED Replacement	Occupancy Sensor	36	2,374	0.1	610	0	\$92	\$451	\$41	4.4
Stock Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,440	0.0	187	0	\$28	\$55	\$15	1.4
160 Lot-C_	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch		62	3,440	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,374	0.1	594	0	\$90	\$560	\$75	5.4
168 Conf.Rm	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	953	0	\$144	\$489	\$95	2.7
161 CST Office	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch		62	3,440	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,374	0.1	594	0	\$90	\$560	\$75	5.4
172 CST OFFICE	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch		62	3,440	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,374	0.1	594	0	\$90	\$560	\$75	5.4
179 idf	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,440	0.0	187	0	\$28	\$55	\$15	1.4
IDF ATTIC	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2, 3	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,374	0.4	2,224	0	\$336	\$781	\$175	1.8
173 CST	4	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,374	0.1	536	0	\$81	\$465	\$71	4.9
174 CST	4	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,374	0.1	536	0	\$81	\$465	\$71	4.9
CST HALL	8	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 2' Lamps	High/Low Control	26	2,374	0.2	1,072	0	\$162	\$615	\$72	3.4
CST HALL_	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
148 ASSIST. PRINCIPAL	4	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,374	0.1	536	0	\$81	\$465	\$71	4.9
159 Practice Kitchen	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 3	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,907	0	\$288	\$708	\$155	1.9
111 CLASSROOM	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
111 CLASSROOM	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
111 BATHROOM	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,440	0.0	187	0	\$28	\$55	\$15	1.4

Location	Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis								
	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
111 BATHROOM	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,440	0.0	61	0	\$9	\$33	\$6	2.9
111 STORAGE	1	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	300	2	Relamp	No	1	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	300	0.0	9	0	\$1	\$49	\$9	29.0
112 SG1	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
113 CLASS	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
113 CLASS	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
114 CLASS	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
114 CLASS_	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
111 CLASSROOM	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
111 CLASSROOM	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
115 SG1	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 3	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.3	1,430	0	\$216	\$599	\$125	2.2
QUAD 1 HALL	5	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 4	Relamp	Yes	5	LED - Linear Tubes: (3) 2' Lamps	High/Low Control	26	2,374	0.1	670	0	\$101	\$469	\$45	4.2
QUAD 1 HALL	2	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch		176	3,440	2, 4	Relamp	Yes	2	LED - Linear Tubes: (6) 4' Lamps	High/Low Control	87	2,374	0.2	878	0	\$133	\$444	\$60	2.9
QUAD 1 HALL	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
158 TECH ROOM	10	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 3	Relamp	Yes	10	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,374	0.3	1,340	0	\$202	\$758	\$125	3.1
119 CUSTODIAN	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 3	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.1	715	0	\$108	\$434	\$80	3.3
119 CUSTODIAN	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.1	477	0	\$72	\$380	\$65	4.4
119 ATTIC	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,374	0.1	636	0	\$96	\$416	\$75	3.6
121 STORAGE_	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	300	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	11	0	\$2	\$37	\$10	16.1
184 ELEC ROOM_	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	300	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	22	0	\$3	\$73	\$20	16.1
129 JAN. CLOSET_	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	300	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	11	0	\$2	\$37	\$10	16.1
130 MAIN IDF	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,374	0.1	477	0	\$72	\$380	\$65	4.4
151 CLASS	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
151 CLASS	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
153 CLASS_	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
153 CLASS	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4

Existing Conditions							Proposed Conditions							Energy Impact & Financial Analysis							
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
154 CLASS_	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
154 CLASS_	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
156 CLASS	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
156 CLASS_	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
155 CLASS_	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
152 CLASS	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
QUAD2 HALL_	5	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 4	Relamp	Yes	5	LED - Linear Tubes: (3) 2' Lamps	High/Low Control	26	2,374	0.1	670	0	\$101	\$469	\$45	4.2
QUAD2 HALL	2	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch		176	3,440	2, 4	Relamp	Yes	2	LED - Linear Tubes: (6) 4' Lamps	High/Low Control	87	2,374	0.2	878	0	\$133	\$444	\$60	2.9
QUAD2 HALL	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
123 CLASSROOM	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
123 CLASSROOM_	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
125 CLASSROOM_	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
125 CLASSROOM	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
126 CLASSROOM	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
126 CLASSROOM	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
128 CLASSROOM	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
128 CLASSROOM	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
124 SG1	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
127 SG1	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
QUAD3 HALL	5	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 4	Relamp	Yes	5	LED - Linear Tubes: (3) 2' Lamps	High/Low Control	26	2,374	0.1	670	0	\$101	\$469	\$45	4.2
QUAD3 HALL_	2	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch		176	3,440	2, 4	Relamp	Yes	2	LED - Linear Tubes: (6) 4' Lamps	High/Low Control	87	2,374	0.2	878	0	\$133	\$444	\$60	2.9
QUAD3 HALL_	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
147 ELEC RM	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	300	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	300	0.0	16	0	\$2	\$55	\$15	16.1
140 TEACHERS RM	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.1	477	0	\$72	\$380	\$65	4.4
140 TEACHERS RM	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	250	0	\$38	\$73	\$20	1.4

		Existing Conditions						Proposed Conditions						Energy Impact & Financial Analysis							
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
140 CLOSET	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	300	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	300	0.0	16	0	\$2	\$55	\$15	16.1
139 CLOSET	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	300	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	11	0	\$2	\$37	\$10	16.1
133 CLASS	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
135 CLASS	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
136 CLASS	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
138 CLASS	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
134 SG1	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
137 SG1	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
QUAD4 HALL	5	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 4	Relamp	Yes	5	LED - Linear Tubes: (3) 2' Lamps	High/Low Control	26	2,374	0.1	670	0	\$101	\$469	\$45	4.2
QUAD4 HALL	2	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch		176	3,440	2, 4	Relamp	Yes	2	LED - Linear Tubes: (6) 4' Lamps	High/Low Control	87	2,374	0.2	878	0	\$133	\$444	\$60	2.9
QUAD4 HALL	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
141 CLASS	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
141 CLASS	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
143 CLASS	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
143 CLASS_	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
144 CLASS	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
144 CLASS_	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
146 CLASS	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.4	1,551	0	\$234	\$657	\$180	2.0
146 CLASS	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,440	0.0	125	0	\$19	\$37	\$10	1.4
142 CLASS	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
145 CLASS	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor		93	2,374	2	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.2	775	0	\$117	\$329	\$90	2.0
QUAD5 HALL	5	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 4	Relamp	Yes	5	LED - Linear Tubes: (3) 2' Lamps	High/Low Control	26	2,374	0.1	670	0	\$101	\$469	\$45	4.2
QUAD5 HALL	2	Linear Fluorescent - T8: 4' T8 (32W) - 6L	Wall Switch		176	3,440	2, 4	Relamp	Yes	2	LED - Linear Tubes: (6) 4' Lamps	High/Low Control	87	2,374	0.2	878	0	\$133	\$444	\$60	2.9
QUAD5 HALL	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
HALLWAY	35	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 4	Relamp	Yes	35	LED - Linear Tubes: (3) 2' Lamps	High/Low Control	26	2,374	0.9	4,689	-1	\$708	\$2,832	\$315	3.6

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis							
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
HALLWAY	7	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	7	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
MAIN ENTRANCE	7	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 4	Relamp	Yes	7	LED - Linear Tubes: (3) 2' Lamps	High/Low Control	26	2,374	0.2	938	0	\$142	\$566	\$63	3.6
BOYS RR	7	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 3	Relamp	Yes	7	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,374	0.2	938	0	\$142	\$611	\$98	3.6
BOYS RR_	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,374	0.1	477	0	\$72	\$380	\$65	4.4
GIRLS RR	7	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2, 3	Relamp	Yes	7	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	2,374	0.2	938	0	\$142	\$611	\$98	3.6
GIRLS RR	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,440	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,374	0.1	477	0	\$72	\$380	\$65	4.4
EXTERIOR SHOEBOX	8	Metal Halide: (1) 175W Lamp	Timeclock		215	4,360	1	Fixture Replacement	No	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	65	4,360	0.6	5,249	0	\$805	\$7,728	\$800	8.6
Storage 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	300	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	11	0	\$2	\$37	\$10	16.1
Storage 2_	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	300	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	11	0	\$2	\$37	\$10	16.1
Storage 3_	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	300	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	11	0	\$2	\$37	\$10	16.1
Storage 4	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	300	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.0	11	0	\$2	\$37	\$10	16.1
EXTERIOR WALL MNT AREA	12	Metal Halide: (1) 70W Lamp	Timeclock		95	4,360	1	Fixture Replacement	No	12	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	29	4,360	0.4	3,479	0	\$533	\$11,592	\$1,200	19.5
164 PARENT	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.1	477	0	\$72	\$380	\$65	4.4
149 PROGRAM	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch		93	3,440	2, 3	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,374	0.1	477	0	\$72	\$380	\$65	4.4
FACILUTOR VESTIBULE	2	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch		53	3,440	2	Relamp	No	2	LED - Linear Tubes: (3) 2' Lamps	Wall Switch	26	3,440	0.0	208	0	\$31	\$98	\$18	2.5
FACILUTOR VESTIBULE	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0
CANOPY LIGHTS	10	Metal Halide: (1) 70W Lamp	Timeclock		95	4,360	1	Fixture Replacement	No	10	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	29	4,360	0.3	2,899	0	\$444	\$9,660	\$1,000	19.5
BOLLARD FIXTURES	2	Metal Halide: (1) 70W Lamp	Timeclock		95	4,360	1	Fixture Replacement	No	2	LED - Fixtures: Bollard Fixture	Timeclock	29	4,360	0.1	580	0	\$89	\$1,435	\$100	15.0
AREA FIXTURES	3	Metal Halide: (1) 100W Lamp	Timeclock		128	4,360	1	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	38	4,360	0.1	1,172	0	\$180	\$2,898	\$300	14.5
SHOEBOX FIXTURE (SHED)	1	Metal Halide: (1) 50W Lamp	Timeclock		72	4,360	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	22	4,360	0.0	220	0	\$34	\$966	\$100	25.7
SHED	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Timeclock		62	4,360	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Timeclock	29	4,360	0.0	144	0	\$22	\$37	\$10	1.2
PARKING LOT	11	Metal Halide: (1) 250W Lamp	Timeclock		295	4,360	1	Fixture Replacement	No	11	LED - Fixtures: Outdoor Pole/Arm Mounted Area/Roadway Fixture	Timeclock	89	4,360	1.1	9,904	0	\$1,518	\$10,236	\$1,100	6.0

Motor Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
		Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Rm.	Building (P-1)	1	Heating Hot Water Pump	7.5	91.0%	Yes	W	1,200		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Rm.	Building (P-2)	1	Heating Hot Water Pump	7.5	91.0%	Yes	W	1,200		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Rm.	Radiators (P-3)	1	Heating Hot Water Pump	3.0	89.5%	No	W	1,200		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Rm.	Radiators (P-4)	1	Heating Hot Water Pump	3.0	89.5%	No	W	1,200		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Rm.	Building (P-5)	1	Chilled Water Pump	15.0	93.0%	Yes	W	1,440		No	93.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Rm.	Building (P-6)	1	Chilled Water Pump	15.0	93.0%	Yes	W	1,440		No	93.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Rm.	Heat Recovery Pump	1	Process Pump	1.0	85.5%	Yes	W	2,745		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Rm.	B-1	1	Boiler Feed Water Pump	3.0	89.5%	No	W	1,440		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Rm.	B-2	1	Boiler Feed Water Pump	3.0	89.5%	No	W	1,440		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Boiler Rm.	DHW PUMP REC	2	Process Pump	0.0	60.0%	No	W	2,745		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mech.Room	Classrooms (AHU-1)	1	Supply Fan	20.0	93.0%	Yes	W	2,640		No	93.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mech.Room	Classrooms (AHU-1)	1	Return Fan	7.5	91.0%	Yes	W	2,640		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mech.Room	Classrooms (AHU-2)	1	Supply Fan	20.0	93.0%	Yes	W	2,640		No	93.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mech.Room	Classrooms (AHU-2)	1	Return Fan	7.5	91.0%	Yes	W	2,640		No	91.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mech.Room	Classrooms (AHU-3)	1	Supply Fan	10.0	91.7%	Yes	W	2,640		No	91.7%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mech.Room	Classrooms (AHU-3)	1	Return Fan	5.0	89.5%	Yes	W	2,640		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mech.Room	Classrooms (AHU-4)	1	Supply Fan	15.0	93.0%	Yes	W	2,640		No	93.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mech.Room	Classrooms (AHU-4)	1	Return Fan	5.0	89.5%	Yes	W	2,640		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mech.Room	Classrooms (AHU-5)	1	Supply Fan	10.0	91.7%	Yes	W	2,640		No	91.7%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mech.Room	Classrooms (AHU-5)	1	Return Fan	5.0	89.5%	Yes	W	2,640		No	89.5%	No		0.0	0	0	\$0	\$0	\$0	0.0

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room	Kitchen(MUA1)	1	Makeup Air Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Mech.Room	Mech Room(MUA2)	1	Makeup Air Fan	1.0	85.5%	No	W	2,640		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Various Zones	Unit Heaters (UH-1 to UH-8)	8	Ventilation Fan	0.2	60.0%	No	W	2,640		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Various Zones	Exhaust Fans	23	Exhaust Fan	0.3	60.0%	No	W	2,640		No	60.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	Kitchen Hood	1	Kitchen Hood Exhaust Fan	1.5	86.5%	No	W	2,640		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Server Room	Server Room	1	Supply Fan	2.0	86.5%	No	W	8,760		No	86.5%	No		0.0	0	0	\$0	\$0	\$0	0.0

Electric HVAC Inventory & Recommendations

		Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Server Room	Server Room	1	Packaged Terminal AC	2.00		W		No							0.0	0	0	\$0	\$0	\$0	0.0

Electric Chiller Inventory & Recommendations

		Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis					
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Remaining Useful Life	ECM #	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	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	Building (ACC-1)	1	Air-Cooled Screw Chiller	207.00	W		No							0.0	0	0	\$0	\$0	\$0	0.0

Fuel Heating Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis					
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Building	2	Non-Condensing Hot Water Boiler	#####	W		No						0.0	0	0	\$0	\$0	\$0	0.0

DHW Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
		System Quantity	System Type	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Kitchen	1	Storage Tank Water Heater (> 50 Gal)	W		No						0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room	Restroom	1	Storage Tank Water Heater (> 50 Gal)	W		No						0.0	0	0	\$0	\$0	\$0	0.0

Walk-In Cooler/Freezer Inventory & Recommendations

Location	Existing Conditions		Proposed Conditions				Energy Impact & Financial Analysis						
	Cooler/Freezer Quantity	Case Type/Temperature	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Medium Temp Freezer (0F to 30F)		No	No	No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen	1	Cooler (35F to 55F)		No	No	No	0.0	0	0	\$0	\$0	\$0	0.0

Cooking Equipment Inventory & Recommendations

Location	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
	Quantity	Equipment Type	High Efficiency Equipment?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	Yes		No	0.0	0	0	FALSE	\$0	\$0	#DIV/0!
Kitchen	2	Electric Convection Oven (Half Size)	Yes		No	0.0	0	0	FALSE	\$0	\$0	#DIV/0!
Kitchen	2	Electric Steamer	Yes		No	0.0	0	0	FALSE	\$0	\$0	#DIV/0!
Kitchen	1	Electric Griddle (3 Feet Width)	Yes		No	0.0	0	0	FALSE	\$0	\$0	#DIV/0!

Dishwasher Inventory & Recommendations

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

Plug Load Inventory

Existing Conditions				
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Building	98	computer	150.0	
Building	5	laptop	100.0	
Building	47	printer-small	40.0	
Building	2	printer-medium	60.0	
Building	3	printer-big	500.0	
Building	2	paper shredder	400.0	
Building	23	projector	300.0	
Building	23	microwave	1,000.0	
Building	1	refrigerator-small	150.0	
Building	1	refrigerator-med	250.0	
Building	14	refrigerator-large	400.0	
Building	3	coffee machine	800.0	
Building	1	toaster	1,000.0	
Building	1	toaster oven	1,500.0	
Building	1	clothes washer	1,200.0	
Building	1	clothes dryer	3,500.0	
Building	1	TV - 42inch Plasma	200.0	
Building	4	server	1,500.0	

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

EUI is presented in terms of *site energy* and *source energy*. Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

ENERGY STAR® Statement of Energy Performance

**ENERGY STAR®
Score¹**

Dr. Martin Luther King Junior Early Childhood Center (52)

Primary Property Type: K-12 School
Gross Floor Area (ft²): 58,857
Built: 2005

For Year Ending: September 30, 2017
Date Generated: March 24, 2019

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

Property & Contact Information			
Property Address Dr. Martin Luther King Junior Early Childhood Center (52) 130 Trumbull Street Elizabeth, New Jersey 07208	Property Owner Elizabeth Board of Education 500 North Broad Street Elizabeth, NJ 07208 908-436-5180	Primary Contact Luis Couto 500 North Broad Street Elizabeth, NJ 07208 908-436-5180 coutolu@epsnj.org	
Property ID: 6688959			
Energy Consumption and Energy Use Intensity (EUI)			
Site EUI 91.3 kBtu/ft ²	Annual Energy by Fuel Natural Gas (kBtu) 2,723,642 (51%) Electric - Grid (kBtu) 2,650,636 (49%)	National Median Comparison National Median Site EUI (kBtu/ft ²) 63.2 National Median Source EUI (kBtu/ft ²) 120.9 % Diff from National Median Source EUI 44%	
Source EUI 174.7 kBtu/ft ²	Annual Emissions Greenhouse Gas Emissions (Metric Tons CO ₂ e/year) 413		

Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

() - _____



Professional Engineer Stamp (if applicable)

APPENDIX C: GLOSSARY

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

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

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