Local Government Energy Audit:
Energy Audit Report

Carl W. Goetz Middle School

835 Patterson Rd

Jackson, NJ 08527

Jackson Township BOE

July 3, 2018

Final Report by:

TRC Energy Services

Disclaimer

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

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

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

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

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1 EXECUTIVE SUMMARY

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

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

1.1 Facility Summary

Carl W. Goetz Middle School is a one-story, 126,081 square foot building built in 1973. Interior spaces include classrooms, offices, hallways, gymnasium, kitchen, storage closets, and a mechanical room. Additionally, ten trailers provide additional space for classrooms, offices and storage. The trailers are served by the main electrical meter. The building is occupied weekdays 8:00 AM to 5:00 PM and winter Saturday mornings.

Two oil-fired hot water boilers provide heat via air handlers and unit ventilators. Cooling is provided by a mix of chillers, packaged units with direct expansion (DX) coils, and split-system AC units depending on location. Each trailer has packaged units with DX cooling coils and electric heaters. Lighting consists of linear T8 tubes, incandescent lamps, CFLs (compact fluorescent lamps) and high pressure sodium fixtures.

The building has poor roofing and weather-stripping that results in a draftiness and energy loss.

A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated ten measures and recommends implementation of eight measures which together represent an opportunity for Carl W. Goetz Middle School to reduce annual energy costs by $50,918 and annual greenhouse gas emissions by 440,677 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 7 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Carl W. Goetz Middle School's annual energy use by 11%.

Figure 1 – Previous 12 Month Utility Costs

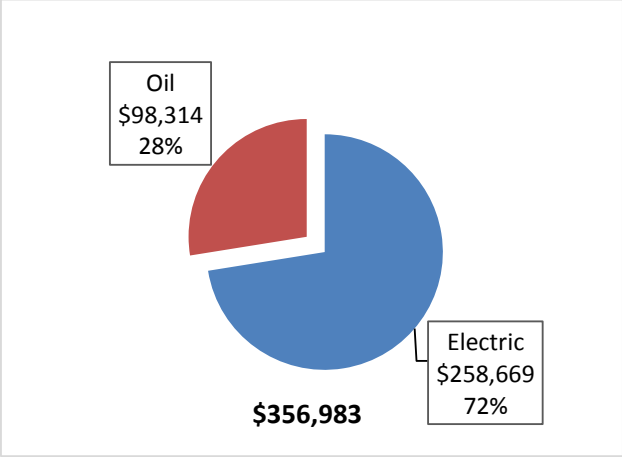
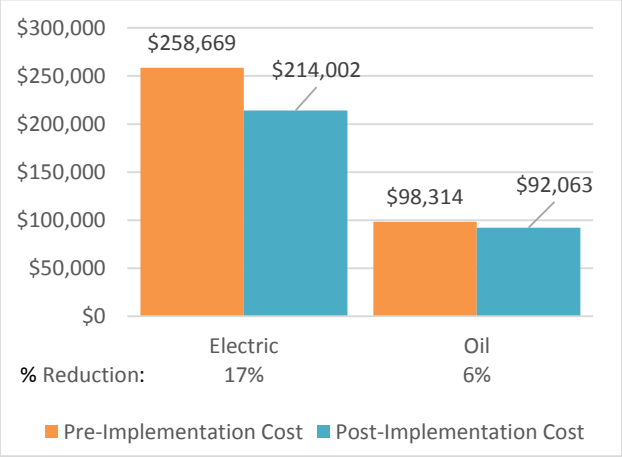


Figure 2 – Potential Post-Implementation Costs



A detailed description of Carl W. Goetz Middle School's existing energy use can be found in Section 3.

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

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**251,346**	**49.7**	**0.0**	**$32,865.45**	**$234,911.32**	**$30,915.00**	**$203,996.32**	**6.2**	**253,104**
ECM 1	Install LED Fixtures	Yes	47,924	6.6	0.0	$6,266.40	$94,522.23	$6,500.00	$88,022.23	14.0	48,259
ECM 2	Retrofit Fixtures with LED Lamps	Yes	203,422	43.1	0.0	$26,599.05	$140,389.10	$24,415.00	$115,974.10	4.4	204,845
Lighting Control Measures			**58,076**	**12.3**	**0.0**	**$7,593.86**	**$154,426.00**	**$6,705.00**	**$147,721.00**	**19.5**	**58,482**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	44,091	9.3	0.0	$5,765.27	$33,026.00	$4,305.00	$28,721.00	5.0	44,399
	Install High/Low Lighitng Controls	No	13,985	3.0	0.0	$1,828.59	$121,400.00	$2,400.00	$119,000.00	65.1	14,082
Variable Frequency Drive (VFD) Measures			**39,713**	**6.8**	**0.0**	**$5,192.77**	**$26,168.41**	**$2,160.00**	**$24,008.41**	**4.6**	**39,991**
ECM 4	Install VFDs on Constant Volume (CV) HVAC	Yes	21,318	4.9	0.0	$2,787.50	$18,954.81	$2,160.00	$16,794.81	6.0	21,467
ECM 5	Install VFDs on Hot Water Pumps	Yes	18,395	1.9	0.0	$2,405.27	$7,213.60	$0.00	$7,213.60	3.0	18,523
	Install High Efficiency Electric AC	No	124,302	63.9	0.0	$16,253.43	$404,403.27	$17,057.40	$387,345.87	23.8	125,171
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**588.6**	**$6,226.01**	**$105,266.85**	**$7,867.86**	**$97,398.99**	**15.6**	**96,294**
ECM 6	Install High Efficiency Hot Water Boilers	Yes	0	0.0	588.6	$6,226.01	$105,266.85	$7,867.86	$97,398.99	15.6	96,294
Domestic Water Heating Upgrade			**0**	**0.0**	**2.4**	**$25.69**	**$14.34**	**$0.00**	**$14.34**	**0.6**	**397**
ECM 7	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	2.4	$25.69	$14.34	$0.00	$14.34	0.6	397
Plug Load Equipment Control - Vending Machine			**6,447**	**0.0**	**0.0**	**$843.04**	**$920.00**	**$0.00**	**$920.00**	**1.1**	**6,492**
ECM 8	Vending Machine Control	Yes	6,447	0.0	0.0	$843.04	$920.00	$0.00	$920.00	1.1	6,492
Custom Measures			**0**	**0.0**	**0.0**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**0.0**	**0**
TOTALS			**479,884**	**132.7**	**591.0**	**$69,000.26**	**$926,110.19**	**$64,705.26**	**$861,404.93**	**12.5**	**579,930**
TOTAL OF ALL RECOMMENDED ECMS			**341,598**	**66**	**591**	**$ 50,918.23**	**$ 400,306.93**	**$ 45,247.86**	**$ 355,059.07**	**7.0**	**440,677**

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

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

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

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

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

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

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

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

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

Energy Efficient Practices

TRC also identified 11 low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities include:

- Reduce Air Leakage
- Close Doors and Windows
- Use Window Treatments/Coverings
- Perform Routine Motor Maintenance
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Ensure Economizers are Functioning Properly
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Perform Proper Boiler Maintenance
- Install Plug Load Controls
- Water Conservation

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

On-Site Generation Measures

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

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	427	kW DC STC
Electric Generation	508,716	kWh/yr
Displaced Cost	$44,260	/yr
Installed Cost	$1,110,200	

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

1.3 Implementation Planning

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

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

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

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

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

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

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.4 for additional information on the ESIP Program.

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

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Michelle Richardson	Business Administrator	mrichardson@jacksond.org	(732) 833-4600
Designated Representative			
John Blair	Energy Education Specialist	jblair@jacksond.org	732-833-4600 ext:4380
TRC Energy Services			
Smruti Srinivasan	Auditor	ssrinivasan@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On November 2, 2017, TRC performed an energy audit at Carl W. Goetz Middle School located in Jackson, New Jersey. TRC met with John Blair to review the facility operations and help focus our investigation on specific energy-using systems.

Carl W. Goetz Middle School is a one-story, 126,081 square foot building built in 1973. Interior spaces include classrooms, offices, hallways, gymnasium, kitchen, storage closets, and a mechanical room. Additionally, ten trailers provide additional space for classrooms, offices and storage. The trailers are served by the main electrical meter. The building is occupied weekdays 8:00 AM to 5:00 PM and winter Saturday mornings.

Two oil-fired hot water boilers provide heat via air handlers and unit ventilators. Cooling is provided by a mix of chillers, packaged units with direct expansion (DX) coils, and split-system AC units depending on location. Each trailer has packaged units with DX cooling coils and electric heaters. Lighting includes linear T8 tubes, incandescent lamps, CFLs and high pressure sodium fixtures.

2.3 Building Occupancy

During the weekdays, the school operates from 8:00 AM to 2:30 PM, followed by after-school sports and club activities until 5:00 PM. In the winter, on Saturdays basketball is scheduled from 8:00 AM to 1:00 PM. Other weekends, the school remains closed. The typical schedule is presented in the table below. Typical occupancy is approximately 130 full time staff (including administration, maintenance and teachers) and 1,280 students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Carl W.Goetz Middle School	Weekday	8AM - 2:30PM
Carl W.Goetz Middle School	Weekend	Saturday: 8AM - 1PM Sunday: No operation

2.4 Building Envelope

The building is constructed of concrete block with a brick facade. The primary roof is flat roof with asphalt and slag finish. The roof is in poor condition. Throughout the school, roof leaks were observed and occupant complaints were common. Additionally, some parts of the roof are pitched with seamed metal panels. The trailers have a vinyl exterior construction with single pane windows.

The building has single pane windows and glass doors with aluminum frame which show signs of excessive infiltration despite the presence of weather stripping. We suggest that the facility be inspected for roof and air leakage in the building so as to improve the building insulation.





2.5 On-Site Generation

Carl W. Goetz Middle School does not have any on-site electric generation systems installed.

2.6 Energy-Using Systems

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

Lighting System

Lighting consists of 32-Watt linear fluorescent T8 lamps with electronic ballasts, as well as some (40-Watt) incandescent and (42-Watt) compact fluorescent lamps. Fixtures are a mix of 1, 2, and 3-lamp, 4-foot long fixtures. Restrooms and some of the other spaces are lit using 2-foot 2-lamp troffers. Exit signs are LED fixtures. Lighting control in most spaces is provided by wall switches.

Exterior lighting consists of wallpacks and pole fixtures with high pressure sodium (HPS) lamps fixtures and canopy fixtures with CFLs that are controlled by photocells.



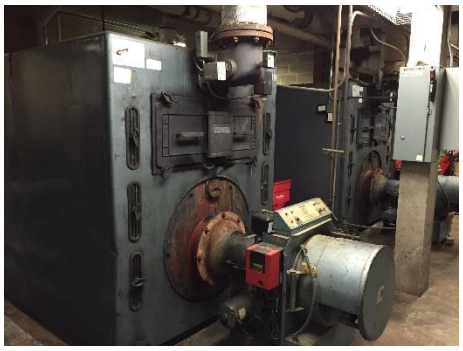
Hot Water Heating System

Heating is provided by two oil-fired, 3,026 kBtuh Weil Mclain hot water boilers with nominal efficiencies of 78%. Hot water from the boilers circulates to unit ventilators and air handling units (AHU) via two constant speed 7.5 HP pumps. The motors are 2 years old. Seven out of the eight air handler are constant volume. AHU 1 is equipped with variable air volume (VAV) boxes. The air handling units serve various spaces such as the hallways (100, 200, 300, 400 and 500), gym, cafeteria, media center, and Home Economics room. The classrooms are heated using the unit ventilators. AHU 1 is equipped with variable air volume (VAV) boxes.

Hot water is supplied at 174°F when the outside air temperature is below 62°F. The setpoint is reset to 160°F when the outside air is above 68°F. The boilers were installed in 1980 and have been evaluated for replacement. The facility does not have dedicated domestic hot water heaters. The boilers are being used for the purpose and are hence being run in the summer.

The restrooms in the building have electric heating units with an approximate heating capacity of 3kW. The trailers have packaged heating and cooling units (from Bard Manufacturing) attached on the sides of each of the trailers providing cooling (3-ton) and electric resistance heating. The trailers and the HVAC units are in fair condition and have been evaluated for replacement.

The space temperature in most spaces is controlled via a building automation system provided by Johnson Controls Metasys. However the JCI section (100 and 200 wings) have pneumatic controls.



Chilled Water Air Conditioning System (CHW)

The building has three variable, air-cooled scroll chillers from YORK. Two of the chillers are 60 tons and the third chiller is a 100 tons. Chilled water circulates to AHUs via two 5 HP pumps (for each of the 60-ton chiller) and two 10 HP pumps respectively. These are equipped with variable frequency drives. The chilled water supply temperature is 45.5°F and return water temperature is 47.7°F.

The chillers serve the 100, 200, 500 wings and cafeterias. All three chillers were installed in 2013. They are in good condition and well maintained.


Direct Expansion Air Conditioning System (DX)

In addition to the chillers described above, a second cooling system serves the classrooms in the 300-400 wings, hallways, offices and media center. The DX cooling for these spaces is provided by several roof-top packaged AC units and split AC units from Lennox ranging in size from 2 - 7.5 tons. The 300 and 400 wing side splits are cooled by a 4-ton split AC unit (Lennox). All Lennox units were installed in 2006 and have been evaluated for replacement.


The maintenance office is cooled using a 1.5 ton window AC unit installed in 2013. This is an ENERGY STAR® unit with an EER of 10.8.

Food Service & Refrigeration

The kitchen functions from 7:00 AM to 2:00 PM every weekday from September through June, serving lunch and snacks to the students. The equipment includes ice-cream chests, milk coolers, food warmers, four electric convection ovens, commercial refrigerators and freezers and one walk-in refrigerator. In the summer months, only the walk-in refrigerator and one freezer operates. All other equipment is shut down. All kitchen equipment is at least 10 years old and in good condition.

Building Plug Load

There are roughly 227 computer work stations, Chromebooks for students, Chromebook carts in every classroom and approximately 54 laptops throughout the facility. There is no centralized PC power management software installed. Other office plug loads at the facility include printers, paper shredders, projectors and smart boards. A few offices and the teacher's lounge have kitchenette plug loads such as refrigerators, coffee machines and microwave ovens. Most of these (refrigerators, printers, and computers) plug loads are ENERGY STAR® rated equipment. The school has four refrigerated and three non-refrigerated vending machine without controls.

2.7 Water-Using Systems

The restroom faucets are rated for 2.2 gallons per minute (gpm) or lower in most areas. The faucets in the nurse's office and nurse's office restroom were found to be 2.5 gpm. Toilets were found to be 1.6 gallons per flush (gpf) and the urinals are rated at 1 gpf.

3 SITE ENERGY USE AND COSTS

Utility data for electricity and No. 2 fuel oil was analyzed to identify opportunities for savings. In addition, data for electricity and No. 2 fuel oil was evaluated to determine the annual energy performance metrics for the building in energy cost per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

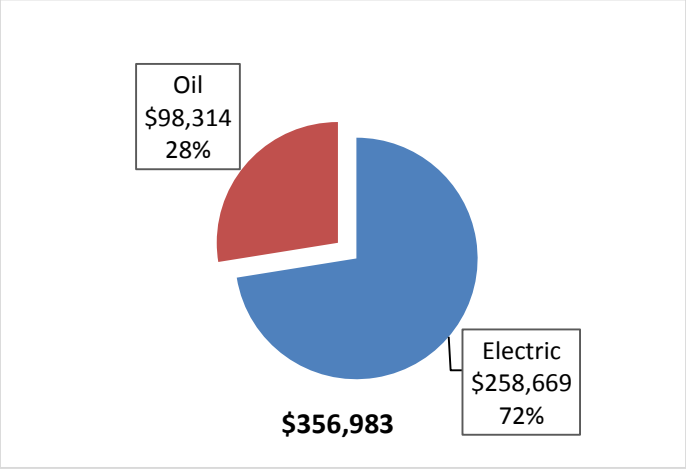
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Carl W. Goetz Middle School		
Fuel	**Usage**	**Cost**
Electricity	1,978,228 kWh	$258,669
No. 2 Fuel Oil	67,057 Gallons	$98,314
Total		**$356,983**

The current annual energy cost for this facility is $356,983 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was $0.131/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The third party electric supply is provided by Constellation. The monthly electricity consumption and peak demand are shown in the chart below. Please note that demand costs were not delineated on the utility bill summaries provided.

Figure 9 - Electric Usage & Demand

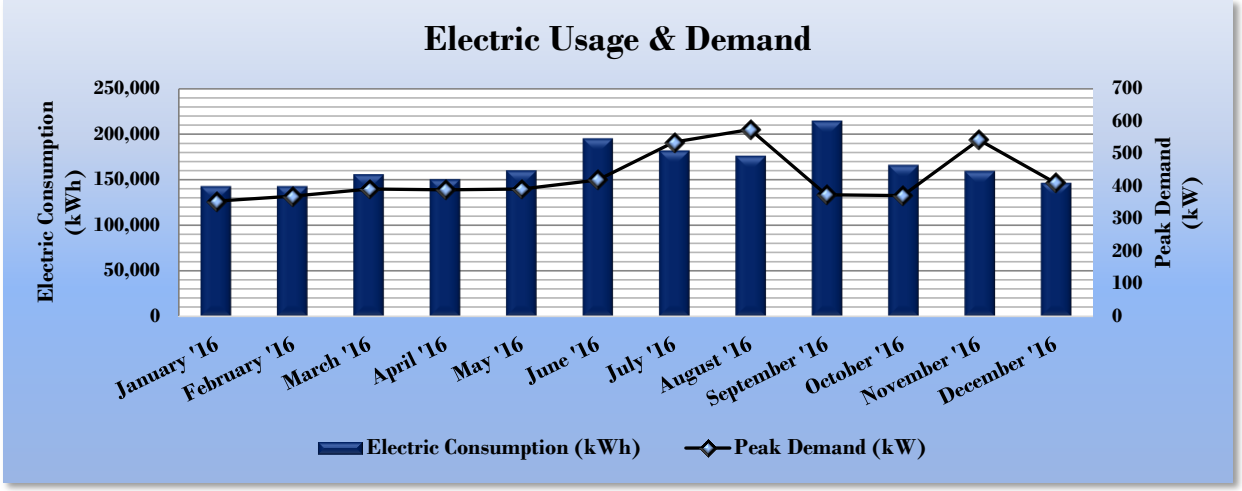


Figure 10 - Electric Usage & Demand

Electric Billing Data for Carl W. Goetz Middle School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
1/28/16	30	142,274	354		$18,529
2/26/16	29	142,338	369		$18,560
3/29/16	32	155,084	391		$20,200
4/27/16	29	149,880	389		$19,529
5/26/16	29	159,347	391		$20,752
6/27/16	32	194,358	419		$25,870
7/27/16	30	181,081	536		$24,187
8/25/16	29	175,503	575		$23,444
9/26/16	32	213,809	374		$28,501
10/27/16	31	165,472	372		$22,188
11/28/16	32	158,663	542		$21,335
12/29/16	31	145,839	411		$16,282
Totals	**366**	**1,983,648**	**574.6**	**$0**	**$259,377**
Annual	**365**	**1,978,228**	**574.6**	**$0**	**$258,669**

3.3 No. 2 Fuel Oil Usage

No. 2 fuel oil is provided by Perdoni. The average oil cost for the past 12 months is $1.466/Gallon, which is the blended rate used throughout the analyses in this report. The oil consumption is shown in the table below.

Figure 11 –No. 2 Fuel Oil Usage

No. 2 Fuel Oil Billing Data for Carl W. Goetz Middle School			
Period Ending	**Days in Period**	**Oil Usage (Gallons)**	**Fuel Cost**
1/28/16	30	8,143	$9,795
2/26/16	29	9,039	$11,583
3/29/16	32	6,350	$8,528
4/27/16	29	4,405	$6,284
5/26/16	29	4,450	$7,283
6/27/16	32	3,150	$1,598
7/27/16	30	1,000	$1,613
8/25/16	29	5,100	$8,009
9/26/16	32	5,095	$8,088
10/27/16	31	1,556	$6,423
11/28/16	32	8,730	$10,981
12/29/16	31	10,222	$18,399
Totals	**366**	**67,241**	**$98,584**
Annual	**365**	**67,057**	**$98,314**

3.4 Benchmarking

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

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

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Carl W. Goetz Middle School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	242.6	141.4
Site Energy Use Intensity (kBtu/ft^2)	127.3	58.2

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Carl W. Goetz Middle School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	208.8	141.4
Site Energy Use Intensity (kBtu/ft^2)	113.3	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 7.

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

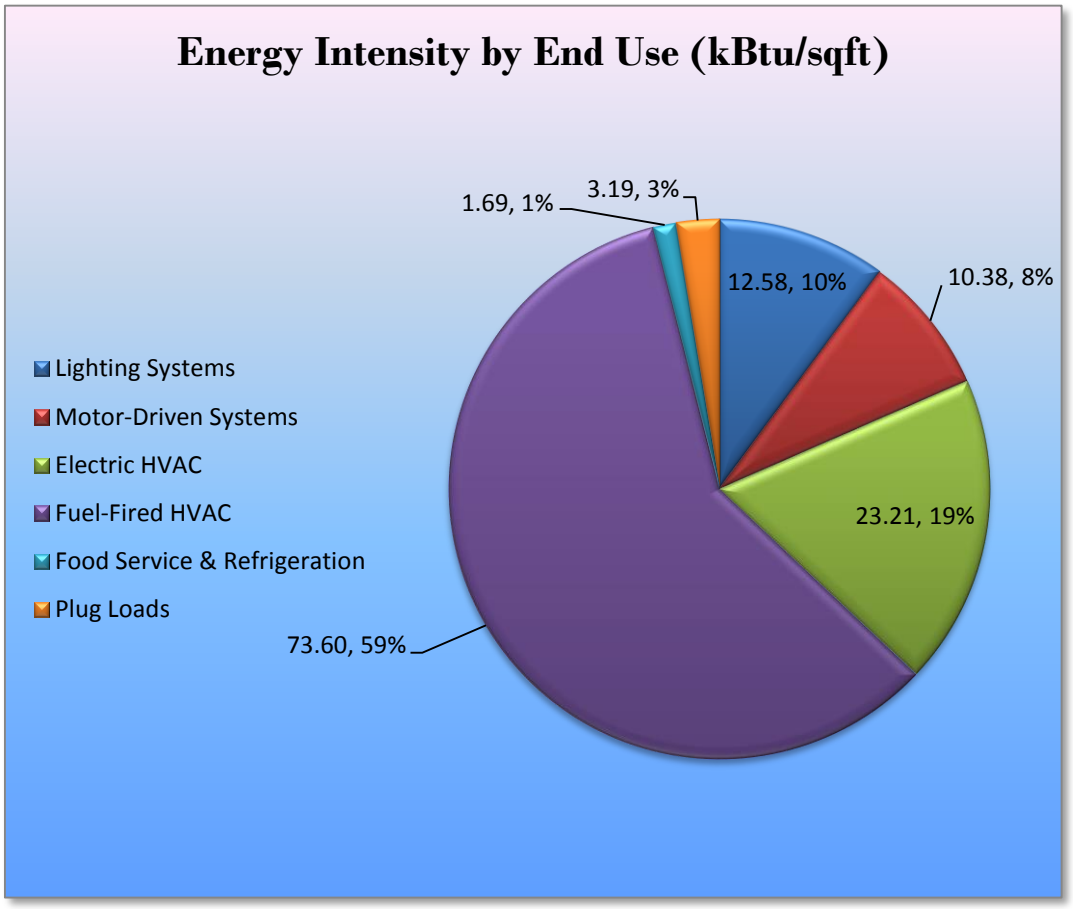
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.5 Energy End-Use Breakdown

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

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



4 ENERGY CONSERVATION MEASURES

Level of Analysis

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

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 15 – Summary of Recommended ECMs

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**251,346**	**49.7**	**0.0**	**$32,865.45**	**$234,911.32**	**$30,915.00**	**$203,996.32**	**6.2**	**253,104**
ECM 1	Install LED Fixtures	Yes	47,924	6.6	0.0	$6,266.40	$94,522.23	$6,500.00	$88,022.23	14.0	48,259
ECM 2	Retrofit Fixtures with LED Lamps	Yes	203,422	43.1	0.0	$26,599.05	$140,389.10	$24,415.00	$115,974.10	4.4	204,845
Lighting Control Measures			**58,076**	**12.3**	**0.0**	**$7,593.86**	**$152,131.56**	**$6,771.67**	**$145,359.89**	**19.1**	**58,482**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	44,091	9.3	0.0	$5,765.27	$33,026.00	$4,305.00	$28,721.00	5.0	44,399
Variable Frequency Drive (VFD) Measures			**39,713**	**6.8**	**0.0**	**$5,192.77**	**$26,168.41**	**$2,160.00**	**$24,008.41**	**4.6**	**39,991**
ECM 4	Install VFDs on Constant Volume (CV) HVAC	Yes	21,318	4.9	0.0	$2,787.50	$18,954.81	$2,160.00	$16,794.81	6.0	21,467
ECM 5	Install VFDs on Hot Water Pumps	Yes	18,395	1.9	0.0	$2,405.27	$7,213.60	$0.00	$7,213.60	3.0	18,523
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**588.6**	**$6,226.01**	**$105,266.85**	**$7,867.86**	**$97,398.99**	**15.6**	**96,294**
ECM 6	Install High Efficiency Hot Water Boilers	Yes	0	0.0	588.6	$6,226.01	$105,266.85	$7,867.86	$97,398.99	15.6	96,294
Domestic Water Heating Upgrade			**0**	**0.0**	**2.4**	**$25.69**	**$14.34**	**$0.00**	**$14.34**	**0.6**	**397**
ECM 7	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	2.4	$25.69	$14.34	$0.00	$14.34	0.6	397
Plug Load Equipment Control - Vending Machine			**6,447**	**0.0**	**0.0**	**$843.04**	**$920.00**	**$0.00**	**$920.00**	**1.1**	**6,492**
ECM 8	Vending Machine Control	Yes	6,447	0.0	0.0	$843.04	$920.00	$0.00	$920.00	1.1	6,492
TOTAL OF ALL RECOMMENDED ECMS			**341,598**	**66**	**591**	**$ 50,918.23**	**$ 400,306.93**	**$ 45,247.86**	**$ 355,059.07**	**7.0**	**440,677**

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 16 below.

Figure 16 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**251,346**	**49.7**	**0.0**	**$32,865.45**	**$234,911.32**	**$30,915.00**	**$203,996.32**	**6.2**	**253,104**
ECM 1	Install LED Fixtures	47,924	6.6	0.0	$6,266.40	$94,522.23	$6,500.00	$88,022.23	14.0	48,259
ECM 2	Retrofit Fixtures with LED Lamps	203,422	43.1	0.0	$26,599.05	$140,389.10	$24,415.00	$115,974.10	4.4	204,845

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

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	4,877	1.0	0.0	$637.72	$64,444.80	$3,600.00	$60,844.80	95.4	4,911
Exterior	43,047	5.6	0.0	$5,628.68	$30,077.43	$2,900.00	$27,177.43	4.8	43,348

Measure Description

We recommend replacing existing exterior fixtures containing HPS lamps with new high performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tubes and more than 10 times longer than many incandescent lamps.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	202,595	43.0	0.0	$26,490.80	$139,582.80	$24,415.00	$115,167.80	4.3	204,011
Exterior	828	0.1	0.0	$108.24	$806.30	$0.00	$806.30	7.4	834

Measure Description

We recommend retrofitting existing incandescent and linear T8 tube lighting technologies with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tubes and more than 10 times longer than many incandescent lamps.

4.1.2 Lighting Control Measures

Our recommendations for lighting control measures are summarized in Figure 17 below.

Figure 17 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**44,091**	**9.3**	**0.0**	**$5,765.27**	**$33,026.00**	**$4,305.00**	**$28,721.00**	**5.0**	**44,399**
ECM 3	Install Occupancy Sensor Lighting Controls	44,091	9.3	0.0	$5,765.27	$33,026.00	$4,305.00	$28,721.00	5.0	44,399

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

ECM 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
44,091	9.3	0.0	$5,765.27	$33,026.00	$4,305.00	$28,721.00	5.0	44,399

Measure Description

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

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

4.1.3 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 18 below.

Figure 18 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**39,713**	**6.8**	**0.0**	**$5,192.77**	**$26,168.41**	**$2,160.00**	**$24,008.41**	**4.6**	**39,991**
ECM 4	Install VFDs on Constant Volume (CV) HVAC	21,318	4.9	0.0	$2,787.50	$18,954.81	$2,160.00	$16,794.81	6.0	21,467
ECM 5	Install VFDs on Hot Water Pumps	18,395	1.9	0.0	$2,405.27	$7,213.60	$0.00	$7,213.60	3.0	18,523

ECM 4: Install VFDs on Constant Volume (CV) HVAC

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
21,318	4.9	0.0	$2,787.50	$18,954.81	$2,160.00	$16,794.81	6.0	21,467

Measure Description

We recommend installing variable frequency drives (VFDs) to control AHUs *5* (501 Home Ec.), 7 (200 wing), 8, and 10 & 11 (gym) by converting the supply and exhaust fan motors from a constant-volume, single-zone air handling system into a variable-air-volume (VAV) system. A separate VFD is usually required to control the return fan motor or dedicated exhaust fan motor, if the air handler has one. Zone thermostats will cause the VFD to modulate fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature. Energy savings results from reducing fan speed (and power) when there is a reduced load required for the zone. The magnitude of energy savings is based on the estimated amount of time that fan motors operate at partial load.

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

ECM 5: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
18,395	1.9	0.0	$2,405.27	$7,213.60	$0.00	$7,213.60	3.0	18,523

Measure Description

We recommend installing a variable frequency drives (VFD) to control the two existing 7.5 HP hot water pumps. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.1.4 Gas-Fired Heating System Replacements

Our recommendations for gas-fired heating system replacements are summarized in Figure 19 below.

Figure 19 - Summary of Gas-Fired Heating Replacement ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**588.6**	**$6,226.01**	**$105,266.85**	**$7,867.86**	**$97,398.99**	**15.6**	**96,294**
ECM 6	Install High Efficiency Hot Water Boilers	0	0.0	588.6	$6,226.01	$105,266.85	$7,867.86	$97,398.99	15.6	96,294

ECM 6: Install High Efficiency Hot Water Boilers

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	588.6	$6,226.01	$105,266.85	$7,867.86	$97,398.99	15.6	96,294

Measure Description

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

The most notable efficiency improvement is condensing hydronic boilers that can achieve over 90% efficiency under the proper conditions. Condensing hydronic boilers typically operate at efficiencies between 85% and 87% (comparable to other high efficiency boilers) when the return water temperature is above 130°F. The boiler efficiency increases as the return water temperature drops below 130°F. Therefore, condensing hydronic boilers were only evaluated when the return water temperature is less than 130°F during most of the operating hours.

4.1.5 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 20 below.

Figure 20 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**2.4**	**$25.69**	**$14.34**	**$0.00**	**$14.34**	**0.6**	**397**
ECM 7	Install Low-Flow Domestic Hot Water Devices	0	0.0	2.4	$25.69	$14.34	$0.00	$14.34	0.6	397

ECM 7: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	2.4	$25.69	$14.34	$0.00	$14.34	0.6	397

Measure Description

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

4.1.6 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment control are summarized in Figure 21 below.

Figure 21 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine		**6,447**	**0.0**	**0.0**	**$843.04**	**$920.00**	**$0.00**	**$920.00**	**1.1**	**6,492**
ECM 8	Vending Machine Control	6,447	0.0	0.0	$843.04	$920.00	$0.00	$920.00	1.1	6,492

ECM 8: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
6,447	0.0	0.0	$843.04	$920.00	$0.00	$920.00	1.1	6,492

Measure Description

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

4.2 ECMs Evaluated But Not Recommended

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

Figure 22 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures	**13,985**	**3.0**	**0.0**	**$1,828.59**	**$119,105.56**	**$2,466.67**	**$116,638.89**	**63.8**	**14,082**
Install High/Low Lighitng Controls	13,985	3.0	0.0	$1,828.59	$119,105.56	$2,466.67	$116,638.89	63.8	14,082
Electric Unitary HVAC Measures	**124,302**	**63.9**	**0.0**	**$16,253.43**	**$404,403.27**	**$17,057.40**	**$387,345.87**	**23.8**	**125,171**
Install High Efficiency Electric AC	124,302	63.9	0.0	$16,253.43	$404,403.27	$17,057.40	$387,345.87	23.8	125,171
TOTALS	**138,286**	**66.9**	**0.0**	**$18,082.03**	**$523,508.82**	**$19,524.07**	**$503,984.76**	**27.9**	**139,253**

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

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

Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
13,985	3.0	0.0	$1,828.59	$119,105.56	$2,466.67	$116,638.89	63.8	14,082

Measure Description

We evaluated installing occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Typical areas for such lighting control evaluated for this building are stairwells the hallways.

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

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

Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
124,302	63.9	0.0	$16,253.43	$404,403.27	$17,057.40	$387,345.87	23.8	125,171

Measure Description

We evaluated (all units that were over 10 years old) replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. Electricity savings can be achieved by replacing older units with new high efficiency units. A higher EER or SEER rating indicates a more efficient cooling system. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

Reasons for not Recommending

The equipment addressed by the measures above is approaching the end of its useful life, and was therefore evaluated for replacement. The payback periods for investments in the replacement equipment is longer than the expected useful life of the proposed replacement equipment. The measures are therefore not cost effective on the basis of energy savings alone. As the District plans for replacement of this equipment, we suggest consideration be given to replacement with a higher efficiency equivalents of the respective units.

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

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

Close Doors and Windows

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

Use Window Treatments/Coverings

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

Perform Routine Motor Maintenance

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

Practice Proper Use of Thermostat Schedules and Temperature Resets

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

Ensure Economizers are Functioning Properly

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

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Perform Proper Boiler Maintenance

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

Plug Load Controls

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

Water Conservation

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

Refer to Section 4.1.5 for any low-flow ECM recommendations.

6 On-Site Generation Measures

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

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

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

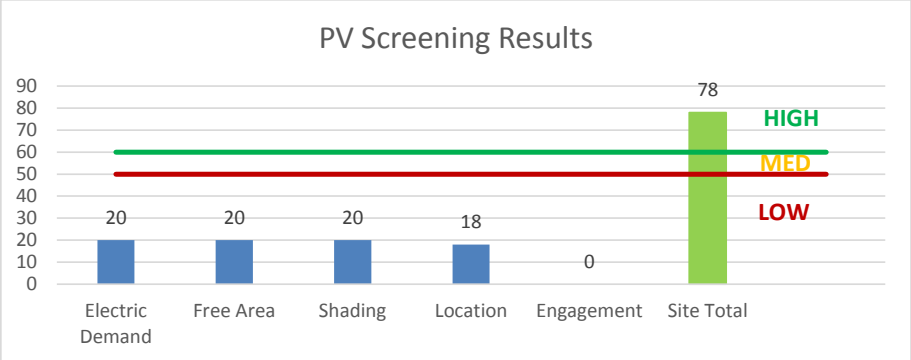
6.1 Photovoltaic

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

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

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the high potential for PV at the site. A PV array located on the roof of the main building/ground next to the building/over the main parking lot may be feasible. If Carl W. Goetz Middle School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 23 - Photovoltaic Screening



Potential	High	
System Potential	427	kW DC STC
Electric Generation	508,716	kWh/yr
Displaced Cost	$44,260	/yr
Installed Cost	$1,110,200	

Solar projects must register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program (SRP) prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about developed new solar projects and insight into future SREC pricing. Refer to Section 8.3 for additional information.

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

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

6.2 Combined Heat and Power

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

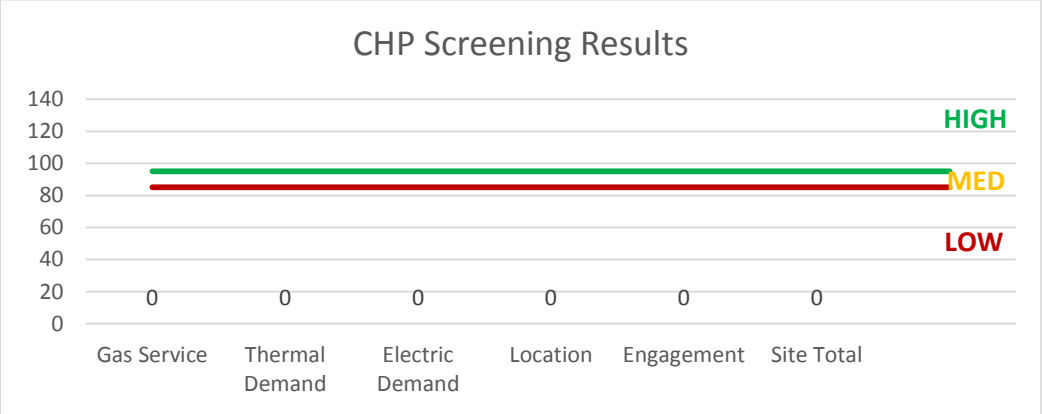
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a Low potential for installing a cost-effective CHP system.

Lack of gas availability to the building is the most significant factor contributing to the potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

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

Figure 24 - Combined Heat and Power Screening



7 DEMAND RESPONSE

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

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

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

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

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

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

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

This facility is already is already participating in a district-wide demand response program.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 25 for a list of the eligible programs identified for each recommended ECM.

Figure 25 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	Pay For Performance Existing Buildings
ECM 1	Install LED Fixtures	x	x
ECM 2	Retrofit Fixtures with LED Lamps	x	x
ECM 3	Install Occupancy Sensor Lighting Controls	x	x
ECM 4	Install VFDs on Constant Volume (CV) HVAC	x	x
ECM 5	Install VFDs on Hot Water Pumps		x
ECM 6	Install High Efficiency Hot Water Boilers	x	x
ECM 7	Install Low-Flow Domestic Hot Water Devices		x
ECM 8	Vending Machine Control		x

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants.

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Pay for Performance - Existing Buildings

Overview

The Pay for Performance – Existing Buildings (P4P EB) program is designed for larger customers with a peak demand over 200 kW in any of the preceding 12 months. Under this program the minimum installed scope of work must include at least two unique measures resulting in at least 15% energy savings, where lighting cannot make up the majority of the savings. P4P is a generally a good option for medium to large sized facilities looking to implement as many measures as possible under a single project in order to achieve deep energy savings. This program has an added benefit of evaluating a broad spectrum of measures that may not otherwise qualify under other programs. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also utilize the P4P program.

Incentives

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

How to Participate

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

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

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

8.3 SREC Registration Program

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

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

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

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

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

8.4 Energy Savings Improvement Program

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

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

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

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Entrance Hallway	43	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	43	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,882	0.54	2,526	0.0	$330.23	$11,577.03	$215.00	34.41
Boiler room hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	No	10	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,688	0.11	541	0.0	$70.73	$359.00	$50.00	4.37
Boiler room	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	No	17	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,688	0.37	1,734	0.0	$226.76	$994.50	$170.00	3.64
Maintenance office	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.19	902	0.0	$117.99	$525.50	$90.00	3.69
Faculty Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.03	129	0.0	$16.86	$174.50	$10.00	9.76
Faculty Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,688	Relamp	Yes	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,882	0.01	50	0.0	$6.49	$147.90	$5.00	22.03
Women's restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.03	129	0.0	$16.86	$174.50	$10.00	9.76
Women's restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.01	68	0.0	$8.83	$151.90	$5.00	16.63
Men's restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.03	129	0.0	$16.86	$174.50	$10.00	9.76
Men's restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.01	68	0.0	$8.83	$151.90	$5.00	16.63
Wrong way hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,688	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,882	0.41	1,934	0.0	$252.83	$1,418.67	$150.00	5.02
Wrong way hallway cross	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,882	0.19	902	0.0	$117.99	$609.50	$70.00	4.57
Attic	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.25	1,160	0.0	$151.70	$796.50	$125.00	4.43
Gym	24	Compact Fluorescent: 6 Lamps	Wall Switch	252	2,688	Fixture Replacement	Yes	24	LED - Fixtures: High-Bay	Occupancy Sensor	176	1,882	2.02	9,535	0.0	$1,246.74	$69,724.80	$4,440.00	52.36
200 wing loft	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.14	645	0.0	$84.28	$408.50	$70.00	4.02
Gym loft	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,688	0.13	612	0.0	$80.03	$351.00	$60.00	3.64
Weight room hallway	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,882	0.16	773	0.0	$101.13	$551.00	$60.00	4.86
Weight room	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,688	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,882	0.66	3,094	0.0	$404.52	$1,743.20	$310.00	3.54
Gym storage	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.44	2,062	0.0	$269.68	$1,052.00	$180.00	3.23
Gym hallway	40	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	40	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,882	0.57	2,702	0.0	$353.27	$10,324.89	$200.00	28.66
Gym hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,688	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,688	0.10	459	0.0	$60.02	$225.60	$45.00	3.01
Gym hallway	24	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	24	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,882	0.34	1,621	0.0	$211.96	$4,061.60	$120.00	18.60
Gym to 200-206 hallway	24	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	24	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,882	0.34	1,621	0.0	$211.96	$4,061.60	$120.00	18.60
200-206 to maintenance hallway	56	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	56	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,882	0.80	3,782	0.0	$494.58	$19,432.62	$280.00	38.73
Band and electric room hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	10	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,882	0.14	675	0.0	$88.32	$914.56	$50.00	9.79

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Wrong way to cafeteria hallway	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	30	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,882	0.82	3,867	0.0	$505.65	$6,755.00	$300.00	12.77
406-410 hallway	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,882	0.22	1,031	0.0	$134.84	$734.67	$80.00	4.86
Cafeteria hallway	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,882	0.25	1,160	0.0	$151.70	$1,126.50	$90.00	6.83
Cafeteria hallway	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,688	0.03	148	0.0	$19.40	$144.60	$30.00	5.91
400-404 hallway (loop)	19	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	19	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,882	0.52	2,449	0.0	$320.25	$3,011.50	$190.00	8.81
Loft AHU 8	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.14	645	0.0	$84.28	$408.50	$70.00	4.02
501 hallway	23	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	23	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,882	0.63	2,965	0.0	$387.67	$4,412.17	$230.00	10.79
Loft AHU 5	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.08	387	0.0	$50.57	$291.50	$50.00	4.78
Room 501	24	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	1.15	5,445	0.0	$712.04	$2,553.20	$515.00	2.86
Room 501	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,688	0.01	49	0.0	$6.47	$48.20	$10.00	5.91
Room 501	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,688	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,688	0.06	306	0.0	$40.02	$150.40	$30.00	3.01
Room 501	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,688	0.07	346	0.0	$45.27	$190.27	$40.00	3.32
Room 5000	23	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	23	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	1.11	5,219	0.0	$682.37	$2,458.07	$495.00	2.88
Loft on 500	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.19	902	0.0	$117.99	$525.50	$90.00	3.69
500 and 501	3	Incandescent: 1 Lamp	Wall Switch	40	2,688	Relamp	No	3	LED Screw-In Lamps: 1 Lamp	Wall Switch	6	2,688	0.07	315	0.0	$41.23	$161.26	$15.00	3.55
Cafeteria	33	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	33	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	1.59	7,488	0.0	$979.05	$3,409.40	$695.00	2.77
Cafeteria	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,688	0.02	99	0.0	$12.93	$96.40	$20.00	5.91
Media center	74	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	74	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	1,882	3.56	16,790	0.0	$2,195.44	$9,506.53	$4,070.00	2.48
Media center tech closet	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.22	1,031	0.0	$134.84	$584.00	$80.00	3.74
Media center storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.19	908	0.0	$118.67	$496.53	$100.00	3.34
Media center hallway	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	1,882	0.72	3,403	0.0	$445.02	$13,427.00	$300.00	29.50
300 hallway loop	25	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	25	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	1,882	1.20	5,672	0.0	$741.70	$5,711.67	$500.00	7.03
Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,688	0.07	346	0.0	$45.27	$190.27	$40.00	3.32
Hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	10	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,882	0.14	675	0.0	$88.32	$914.56	$50.00	9.79
On the way to 100 hallway	45	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	45	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,882	0.64	3,039	0.0	$397.43	$12,865.50	$225.00	31.81

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
On the way to 100 hallway	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,688	0.02	99	0.0	$12.93	$96.40	$20.00	5.91
100-106 hallway	108	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	108	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,882	1.55	7,295	0.0	$953.83	$20,077.20	$540.00	20.48
207-214 hallway	108	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	108	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,882	1.55	7,295	0.0	$953.83	$20,077.20	$540.00	20.48
207-214 hallway	19	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	19	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,882	0.52	2,449	0.0	$320.25	$3,011.50	$190.00	8.81
Main office suite	20	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.29	1,351	0.0	$176.63	$988.00	$135.00	4.83
Main office suite copy room	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.04	203	0.0	$26.50	$223.70	$35.00	7.12
Main office suite restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,688	Relamp	Yes	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,882	0.01	50	0.0	$6.49	$147.90	$5.00	22.03
Main office suite kitchenette	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.09	405	0.0	$52.99	$331.40	$50.00	5.31
Main office suite Principal's room	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	5	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.07	338	0.0	$44.16	$295.50	$45.00	5.67
Main office suite conference room	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.09	405	0.0	$52.99	$331.40	$50.00	5.31
Nurse's office	32	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	32	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.46	2,161	0.0	$282.62	$1,418.80	$195.00	4.33
Nurse's office restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,688	Relamp	Yes	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,882	0.01	50	0.0	$6.49	$147.90	$5.00	22.03
Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.09	405	0.0	$52.99	$331.40	$50.00	5.31
Women's restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.03	135	0.0	$17.66	$187.80	$10.00	10.07
Men's restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.03	135	0.0	$17.66	$187.80	$10.00	10.07
Teacher's lounge	24	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.34	1,621	0.0	$211.96	$1,131.60	$155.00	4.61
Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.09	405	0.0	$52.99	$331.40	$50.00	5.31
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.06	270	0.0	$35.33	$259.60	$40.00	6.22
Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.01	68	0.0	$8.83	$151.90	$5.00	16.63
Girls' restroom	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,882	0.06	261	0.0	$34.11	$462.80	$75.00	11.37
Boys' restroom	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,882	0.06	261	0.0	$34.11	$462.80	$75.00	11.37
Over tap	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,688	0.02	99	0.0	$12.93	$96.40	$20.00	5.91
CR 214	35	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	35	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.50	2,364	0.0	$309.11	$1,526.50	$210.00	4.26
CR 213	35	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	35	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.50	2,364	0.0	$309.11	$1,526.50	$210.00	4.26
CR 212	35	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	35	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.50	2,364	0.0	$309.11	$1,526.50	$210.00	4.26

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
CR 208	25	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.36	1,689	0.0	$220.79	$1,167.50	$160.00	4.56
CR 209	25	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.36	1,689	0.0	$220.79	$1,167.50	$160.00	4.56
CR 207	25	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.36	1,689	0.0	$220.79	$1,167.50	$160.00	4.56
Electrical room	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.03	135	0.0	$17.66	$187.80	$10.00	10.07
Boys' restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.19	908	0.0	$118.67	$650.53	$115.00	4.51
Girls' restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.19	908	0.0	$118.67	$650.53	$115.00	4.51
Custodial closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.03	135	0.0	$17.66	$187.80	$10.00	10.07
CR - Room (1&2) - combined	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
Classroom 3	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
Classroom 4	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
Classroom 6	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
Classroom 8	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.29	1,361	0.0	$178.01	$840.80	$155.00	3.85
Classroom 9	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.29	1,361	0.0	$178.01	$840.80	$155.00	3.85
Classroom 10	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
Classroom 202	25	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.36	1,689	0.0	$220.79	$1,167.50	$160.00	4.56
Classroom 203	25	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.36	1,689	0.0	$220.79	$1,167.50	$160.00	4.56
Classroom 204	25	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.36	1,689	0.0	$220.79	$1,167.50	$160.00	4.56
Classroom 205	25	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.36	1,689	0.0	$220.79	$1,167.50	$160.00	4.56
Classroom 200A	20	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.29	1,351	0.0	$176.63	$988.00	$135.00	4.83
Clasroom 200 B	20	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.29	1,351	0.0	$176.63	$988.00	$135.00	4.83
Classroom 201	20	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.29	1,351	0.0	$176.63	$988.00	$135.00	4.83
Classroom 206	20	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.29	1,351	0.0	$176.63	$988.00	$135.00	4.83
Classroom 210	30	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.43	2,026	0.0	$264.95	$1,347.00	$185.00	4.39
215 - Music room	57	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	57	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.82	3,850	0.0	$503.41	$2,316.30	$320.00	3.97
CR 114	30	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.43	2,026	0.0	$264.95	$1,347.00	$185.00	4.39

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
CR 113 - Computer lab	35	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	35	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.50	2,364	0.0	$309.11	$1,526.50	$210.00	4.26
CR 112	20	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	20	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.29	1,351	0.0	$176.63	$988.00	$135.00	4.83
CR 112	21	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	21	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.30	1,418	0.0	$185.47	$1,023.90	$140.00	4.77
CR 107	30	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.43	2,026	0.0	$264.95	$1,347.00	$185.00	4.39
CR 108	30	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.43	2,026	0.0	$264.95	$1,347.00	$185.00	4.39
CR 109	24	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.34	1,621	0.0	$211.96	$1,131.60	$155.00	4.61
CR 110	35	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	35	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.50	2,364	0.0	$309.11	$1,526.50	$210.00	4.26
CR 103	30	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.43	2,026	0.0	$264.95	$1,347.00	$185.00	4.39
CR 100 A and B comined	41	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	41	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.59	2,769	0.0	$362.10	$1,741.90	$240.00	4.15
CR 104	30	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.43	2,026	0.0	$264.95	$1,347.00	$185.00	4.39
CR 102	30	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	30	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.43	2,026	0.0	$264.95	$1,347.00	$185.00	4.39
CR 101	35	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	35	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.50	2,364	0.0	$309.11	$1,526.50	$210.00	4.26
CR 105	24	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	24	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.34	1,621	0.0	$211.96	$1,131.60	$155.00	4.61
CR 106	36	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	36	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.52	2,432	0.0	$317.94	$1,562.40	$215.00	4.24
115 - Tech room	66	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	66	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.95	4,458	0.0	$582.89	$2,639.40	$365.00	3.90
CR 302	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.38	1,815	0.0	$237.35	$1,031.07	$195.00	3.52
CR 304, 303	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
CR 301	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.87	4,084	0.0	$534.03	$1,982.40	$395.00	2.97
303B	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.38	1,815	0.0	$237.35	$1,031.07	$195.00	3.52
Room 300	10	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	Yes	10	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,882	0.14	652	0.0	$85.29	$752.00	$135.00	7.23
Room 300	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,688	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,688	0.26	1,224	0.0	$160.06	$601.60	$120.00	3.01
CR 308	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
Supervisor	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,882	0.03	130	0.0	$17.06	$212.40	$40.00	10.11
Supervisor	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.10	454	0.0	$59.34	$306.27	$60.00	4.15
Teacher's lounge	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.29	1,361	0.0	$178.01	$686.80	$140.00	3.07

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 309	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.72	3,403	0.0	$445.02	$1,697.00	$335.00	3.06
307	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
310	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.43	2,042	0.0	$267.01	$1,126.20	$215.00	3.41
305	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
311	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.19	908	0.0	$118.67	$650.53	$115.00	4.51
311	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,882	0.03	130	0.0	$17.06	$212.40	$40.00	10.11
312	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.14	681	0.0	$89.00	$555.40	$95.00	5.17
312	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,882	0.03	130	0.0	$17.06	$212.40	$40.00	10.11
313	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.14	681	0.0	$89.00	$555.40	$95.00	5.17
313	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,882	0.03	130	0.0	$17.06	$212.40	$40.00	10.11
314	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.14	681	0.0	$89.00	$555.40	$95.00	5.17
314	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,882	0.03	130	0.0	$17.06	$212.40	$40.00	10.11
Kitchen	17	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	No	17	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,688	0.20	920	0.0	$120.25	$610.30	$85.00	4.37
Kitchen storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,688	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,882	0.06	270	0.0	$35.33	$259.60	$40.00	6.22
Kitchen office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.05	227	0.0	$29.67	$211.13	$20.00	6.44
Kitchen restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,688	0.01	49	0.0	$6.47	$48.20	$10.00	5.91
VP office	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.14	681	0.0	$89.00	$401.40	$80.00	3.61
Assisstant VP office	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.14	681	0.0	$89.00	$401.40	$80.00	3.61
Girls' restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.14	645	0.0	$84.28	$562.50	$85.00	5.67
Boys' restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	0.14	645	0.0	$84.28	$562.50	$85.00	5.67
503 - Art	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,688	0.04	198	0.0	$25.87	$192.80	$40.00	5.91
503 - Art	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.77	3,630	0.0	$474.69	$1,792.13	$355.00	3.03
503 - Art	2	Incandescent: 1 Lamp	Wall Switch	40	2,688	Relamp	No	2	LED Screw-In Lamps: 1 Lamp	Wall Switch	6	2,688	0.04	210	0.0	$27.49	$107.51	$10.00	3.55
502 - Art	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,688	0.04	198	0.0	$25.87	$192.80	$40.00	5.91
502 - Art	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.77	3,630	0.0	$474.69	$1,792.13	$355.00	3.03

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
502 - Art	2	Incandescent: 1 Lamp	Wall Switch	40	2,688	Relamp	No	2	LED Screw-In Lamps: 1 Lamp	Wall Switch	6	2,688	0.04	210	0.0	$27.49	$107.51	$10.00	3.55
Staff restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,688	Relamp	Yes	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,882	0.01	50	0.0	$6.49	$147.90	$5.00	22.03
Staff restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	2,688	Relamp	Yes	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,882	0.01	50	0.0	$6.49	$147.90	$5.00	22.03
CR 410	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.43	2,042	0.0	$267.01	$1,126.20	$215.00	3.41
CR 402	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.43	2,042	0.0	$267.01	$1,126.20	$215.00	3.41
CR 406	11	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	11	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.53	2,496	0.0	$326.35	$1,316.47	$255.00	3.25
CR 407	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
CR 403	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
CR 404	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.05	227	0.0	$29.67	$211.13	$20.00	6.44
CR 409	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.87	4,084	0.0	$534.03	$1,982.40	$395.00	2.97
Office	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.24	1,134	0.0	$148.34	$591.67	$120.00	3.18
Band room	10	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	Yes	10	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,882	0.14	652	0.0	$85.29	$752.00	$135.00	7.23
Band room	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.38	1,815	0.0	$237.35	$1,031.07	$195.00	3.52
CR 408	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.58	2,723	0.0	$356.02	$1,411.60	$275.00	3.19
Office	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,688	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,882	0.03	130	0.0	$17.06	$212.40	$40.00	10.11
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.10	454	0.0	$59.34	$306.27	$60.00	4.15
Child study team	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.29	1,361	0.0	$178.01	$686.80	$140.00	3.07
CR 401	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.72	3,403	0.0	$445.02	$1,697.00	$335.00	3.06
CR 405	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,688	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,882	0.43	2,042	0.0	$267.01	$1,126.20	$215.00	3.41
Wall pack	4	High-Pressure Sodium: (1) 400W Lamp	Daylight Dimming	465	4,380	Fixture Replacement	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	120	4,380	0.90	6,951	0.0	$908.90	$1,562.71	$400.00	1.28
Wall pack	2	High-Pressure Sodium: (1) 250W Lamp	Daylight Dimming	295	4,380	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	75	4,380	0.29	2,216	0.0	$289.80	$781.35	$200.00	2.01
Wall pack	11	High-Pressure Sodium: (1) 100W Lamp	Daylight Dimming	138	4,380	Fixture Replacement	No	11	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	30	4,380	0.78	5,984	0.0	$782.45	$4,297.45	$1,100.00	4.09
Canopy	15	Compact Fluorescent: 1 Lamp	Daylight Dimming	42	4,380	Relamp	No	15	LED Screw-In Lamps: 1 Lamp	Daylight Dimming	29	4,380	0.12	952	0.0	$124.48	$806.30	$0.00	6.48
Pole - with single fixture	4	High-Pressure Sodium: (1) 400W Lamp	Daylight Dimming	465	4,380	Fixture Replacement	No	4	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	120	4,380	0.90	6,951	0.0	$908.90	$7,811.97	$400.00	8.15

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Pole - with double fixture	8	High-Pressure Sodium: (1) 400W Lamp	Daylight Dimming	800	4,380	Fixture Replacement	No	8	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	120	4,380	3.57	27,401	0.0	$3,582.93	$15,623.94	$800.00	4.14
Trailers	130	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,688	Relamp	Yes	130	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,882	3.55	16,757	0.0	$2,191.16	$7,875.00	$1,335.00	2.98
All school	32	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	32	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler room	All school	1	Heating Hot Water Pump	7.5	91.0%	No	3,391	No	91.0%	Yes	1	0.93	9,069	0.0	$1,185.89	$3,606.80	$0.00	3.04
Boiler room	A	1	Heating Hot Water Pump	7.5	88.5%	No	3,391	No	88.5%	Yes	1	0.95	9,326	0.0	$1,219.39	$3,606.80	$0.00	2.96
Boiler room	Boiler	2	Other	0.3	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler room	Air compressor	1	Air Compressor	5.0	85.5%	No	4,957	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler room	Well water	2	Other	7.5	91.0%	No	3,391	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler room	Boiler	1	Other	0.8	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler room	Booster pump	1	Other	0.8	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler room	DHW pump	1	Other	0.8	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Outside	Chiller	2	Chilled Water Pump	10.0	91.7%	Yes	3,391	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Outside	Chiller	2	Chilled Water Pump	5.0	87.5%	Yes	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	AHU 1 (VAV system)	1	Supply Fan	10.0	89.5%	Yes	4,000	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	AHU 2 - 100 wing, Café B	1	Supply Fan	10.0	89.5%	No	4,000	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	AHU 3	1	Supply Fan	2.0	86.5%	No	4,000	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Chiller	2	Chilled Water Pump	5.0	87.5%	Yes	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Loft	AHU 6 - 200 wing	1	Supply Fan	7.5	86.5%	No	4,000	No	86.5%	Yes	1	2.17	9,217	0.0	$1,205.22	$3,606.80	$600.00	2.49
Loft	AHU 6 - 200 wing	1	Return Fan	0.5	60.0%	No	4,000	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Loft	AHU 7 - 200 wing	1	Supply Fan	7.5	86.5%	No	4,000	No	86.5%	Yes	1	1.05	4,657	0.0	$608.95	$3,606.80	$600.00	4.94
Loft	AHU 11 - Gym	1	Supply Fan	2.0	86.5%	No	4,000	No	86.5%	Yes	1	0.28	1,242	0.0	$162.39	$2,728.85	$160.00	15.82
Loft	AHU 10 - Gym	1	Supply Fan	2.0	86.5%	No	4,000	No	86.5%	Yes	1	0.28	1,242	0.0	$162.39	$2,728.85	$160.00	15.82
Loft	AHU 8	1	Supply Fan	5.0	85.0%	No	4,000	No	85.0%	Yes	1	0.71	3,160	0.0	$413.13	$3,275.85	$400.00	6.96

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Loft	AHU 5 - 501 Home EC	1	Supply Fan	3.0	89.5%	No	4,000	No	89.5%	Yes	1	0.41	1,800	0.0	$235.42	$3,007.65	$240.00	11.76
Loft	AHU 4 - 500	1	Supply Fan	1.0	85.5%	No	4,000	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Unit 10, 3	2	Supply Fan	0.5	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Units 8,9,2	3	Supply Fan	0.3	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Unit 5	1	Supply Fan	0.5	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Unit 7	1	Supply Fan	0.5	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Unit 4	1	Supply Fan	0.5	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Unit 6	1	Supply Fan	0.5	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Unit 1	1	Supply Fan	0.3	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms	2	Supply Fan	2.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Unit 117, unit 116	2	Supply Fan	0.5	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Unit 302, Unit 303, Unit 304 (IMC)	3	Supply Fan	0.5	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	300 wing 3, Unit 310	2	Supply Fan	0.5	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	IMC AB. CD, GH, EF	8	Supply Fan	2.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Units - 305, 304, 300 wing, 6,9,308,306, 306-311 hall, 307, 300 wing 12,17,16	11	Supply Fan	0.5	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Units - 410, 406-410 hall, 407, 409 CST hall, T1-T2, 408, 406, 405, 404, CST, CST hall 401, 403, 404 IMC hall, 402, Back of IMC, Back of IMC1	17	Supply Fan	0.3	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 500	1	Supply Fan	1.5	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
All school	Unit vents	12	Supply Fan	0.3	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Maintenance office	Maintenance office	1	Window AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Unit 10, 3	2	Packaged AC	3.75		Yes	2	Packaged AC	3.75		14.00		No	1.72	3,343	0.0	$437.10	$17,017.20	$690.00	37.35
Roof	Units 8,9,2	3	Packaged AC	1.95		Yes	3	Packaged AC	1.95		14.00		No	1.23	2,385	0.0	$311.84	$13,273.42	$538.20	40.84
Roof	Unit 5	1	Packaged AC	3.75		Yes	1	Packaged AC	3.75		14.00		No	0.86	1,671	0.0	$218.55	$8,508.60	$345.00	37.35
Roof	Unit 7	1	Packaged AC	2.77		Yes	1	Packaged AC	2.77		14.00		No	0.63	1,229	0.0	$160.76	$6,285.02	$254.84	37.51
Roof	Unit 4	1	Packaged AC	2.77		Yes	1	Packaged AC	2.77		14.00		No	0.63	1,229	0.0	$160.76	$6,285.02	$254.84	37.51
Roof	Unit 6	1	Packaged AC	2.77		Yes	1	Packaged AC	2.77		14.00		No	0.63	1,229	0.0	$160.76	$6,285.02	$254.84	37.51
Roof	Unit 1	1	Packaged AC	2.38		Yes	1	Packaged AC	2.38		14.00		No	0.52	1,011	0.0	$132.20	$5,400.12	$218.96	39.19
Roof	Classrooms	1	Packaged AC	7.50		Yes	1	Packaged AC	7.50		11.50		No	1.46	2,826	0.0	$369.53	$13,365.79	$547.50	34.69
Roof	Unit 117, unit 116	2	Packaged AC	3.75		Yes	2	Packaged AC	3.75		14.00		No	1.72	3,343	0.0	$437.10	$17,017.20	$690.00	37.35
Roof	Unit 302, Unit 303, Unit 304 (IMC)	3	Packaged AC	2.77		Yes	3	Packaged AC	2.77		14.00		No	1.91	3,704	0.0	$484.31	$18,855.06	$764.52	37.35
Roof	300 wing 3, Unit 310	2	Packaged AC	2.77		Yes	2	Packaged AC	2.77		14.00		No	1.27	2,469	0.0	$322.87	$12,570.04	$509.68	37.35
Roof	IMC AB. CD, GH, EF	4	Packaged AC	7.50		Yes	4	Packaged AC	7.50		11.50		No	5.83	11,304	0.0	$1,478.13	$53,463.17	$2,190.00	34.69
Roof	Units - 305, 304, 300 wing, 6,9,308,306, 306-311 hall, 307, 300 wing 12,17,16	11	Packaged AC	2.77		Yes	11	Packaged AC	2.77		14.00		No	7.00	13,581	0.0	$1,775.81	$69,135.21	$2,803.24	37.35
Roof	Units - 410, 406-410 hall, 407, 409 CST hall, T1-T2, 408, 406, 405, 404, CST, CST hall 401, 403, 404 IMC hall, 402, Back of IMC, Back of IMC1	17	Packaged AC	2.77		Yes	17	Packaged AC	2.77		14.00		No	10.82	20,989	0.0	$2,744.43	$106,845.33	$4,332.28	37.35
Roof	301,300w, 300E, 2 hallway unit	5	Split-System AC	4.00		Yes	5	Split-System AC	4.00		14.00		No	2.14	4,475	0.0	$585.09	$29,924.40	$1,840.00	48.00
Roof	Room 500	1	Packaged AC	7.50		Yes	1	Packaged AC	7.50		11.50		No	3.01	5,838	0.0	$763.35	$13,365.79	$547.50	16.79
Roof	400 wing side splits	3	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attached to the trailers	10 Trailers	10	Packaged AC	3.00		Yes	1	Packaged AC	3.00		14.00		No	22.51	43,675	0.0	$5,710.83	$6,806.88	$276.00	1.14
Attached to the trailers	10 Trailers	10	Electric Resistance Heat		38.40	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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)	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
Grounds	All school	1	Air-Cooled Scroll Chiller	60.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Grounds	All school	1	Air-Cooled Scroll Chiller	60.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	All school	1	Air-Cooled Scroll Chiller	100.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler room	All school	2	Non-Condensing Hot Water Boiler	3,026.10	Yes	2	Non-Condensing Hot Water Boiler	3,026.10	85.00%	Ec	0.00	0	588.6	$6,226.01	$105,266.85	$7,867.86	15.64

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Nurse office	1	Faucet Aerator (Kitchen)	2.50	2.20	0.00	0	0.4	$4.28	$7.17	$0.00	1.67
Nurse's office restroom	1	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	2.0	$21.41	$7.17	$0.00	0.33

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Cooler (35F to 55F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	3	Stand-Up Freezer, Solid Door (31 - 50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria	2	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria	1	Stand-Up Refrigerator, Solid Door (≤15 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	4	Electric Convection Oven (Half Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Carl W. Goetz Middle School	227	Computer	150.0	Yes
Carl W. Goetz Middle School	54	Laptop	45.0	Yes
Carl W. Goetz Middle School	32	Printer - small	20.0	Yes
Carl W. Goetz Middle School	11	Printer - medium	60.0	Yes
Carl W. Goetz Middle School	6	Printer - big	600.0	Yes
Carl W. Goetz Middle School	54	Projector	200.0	Yes
Carl W. Goetz Middle School	22	Microwave	1,000.0	Yes
Carl W. Goetz Middle School	4	Refrigerator - small	153.0	No
Carl W. Goetz Middle School	1	Refrigerator - medium	156.0	No
Carl W. Goetz Middle School	9	Refrigerator - large	207.0	Yes
Carl W. Goetz Middle School	7	Coffee machine	900.0	Yes
Carl W. Goetz Middle School	1	Toaster	850.0	Yes
Carl W. Goetz Middle School	3	Toaster oven	1,200.0	No
Carl W. Goetz Middle School	1	Clothes washer	1,500.0	Yes
Carl W. Goetz Middle School	1	Clothes dryer	900.0	Yes
Carl W. Goetz Middle School	4	Television - CRT	120.0	No
Carl W. Goetz Middle School	1	Water dispenser	500.0	Yes
Carl W. Goetz Middle School	51	Smart Board	5.0	Yes
Carl W. Goetz Middle School	7	Electric stove range	3,000.0	Yes
Carl W. Goetz Middle School	4	Smart TV	80.0	Yes
Carl W. Goetz Middle School	1,280	Chrome books	30.0	Yes
Carl W. Goetz Middle School	40	Chrome book carts	40.0	Yes

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Teachers' lounge	4	Refrigerated	Yes	0.00	6,447	0.0	$843.04	$920.00	$0.00	1.09

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Carl W. Goetz Middle School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 126,081
Built: 1973

For Year Ending: November 30, 2016
Date Generated: March 26, 2018

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Carl W. Goetz Middle School 835 Patterson Road Jackson, New Jersey 08527	Jackson Township BOE 151 Don Connor Boulevard Jackson, NJ 08527 (732) 833-4600	Michelle Richardson 151 Don Connor Boulevard Jackson, NJ 08527 (732) 833-4600 sstewart@trcsolutions.com

Property ID: 2552288

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
123.3 kBtu/ft²

Source EUI
239.7 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	6,816,362 (44%)
Fuel Oil (No. 2) (kBtu)	8,733,872 (56%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	76.6
National Median Source EUI (kBtu/ft²)	148.9
% Diff from National Median Source EUI	61%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	1,404

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)