Local Government Energy Audit:
Energy Audit Report

Deerfield Township Elementary School

419 Morton Avenue

Rosenhayn, New Jersey 08352

Deerfield Township Board of Education

October 16, 2018

Final Report by:

TRC Energy Services

Disclaimer

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

The energy conservation measures and estimates of energy savings have been reviewed for technical accuracy. However, estimates of final energy savings are not guaranteed, because final savings may depend on behavioral factors and other uncontrollable variables. TRC 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 Deerfield Township Elementary 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 schools in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Deerfield Township Elementary School is a 60,300 square foot, one story building. It was built in 1958, underwent renovations in 1994, and a new section of the building was added in 2002. Interior spaces include classrooms, kitchen, gym, library, cafeteria, administration offices, meeting rooms, hallways, locker rooms and restrooms.

Interior lighting consists of T8 linear fluorescent fixtures in 2, 3 and 4-lamp configurations, compact fluorescent (CFL) recessed cans, low and high-bay metal halide (MH) fixtures, and few incandescent fixtures. Most interior lighting is controlled by manual switches. Exterior lighting is mainly comprised of MH wall-pack fixtures and few CFL fixtures, all controlled by photocells.

Cooling and ventilation is provided by an array of split-system air conditioners and packaged air conditioning units that range in capacity from 1.5 to 30-tons. Heating is provided by four forced-draft boilers that feed air handling unit (AHU) hot water coils.

A thorough description of the facility and our observations can be found in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated 11 measures and recommends nine measures which together represent an opportunity to reduce annual energy costs by $20,247 and annual greenhouse gas emissions by 125,671 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 8.9 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Deerfield Township Elementary School's annual energy use by 10%.

Figure 1 – Previous 12 Month Utility Costs

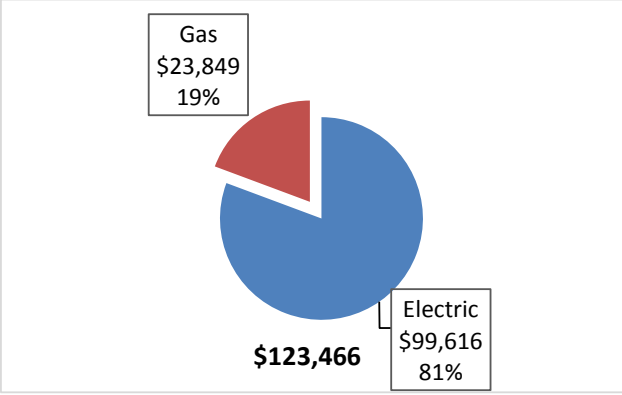
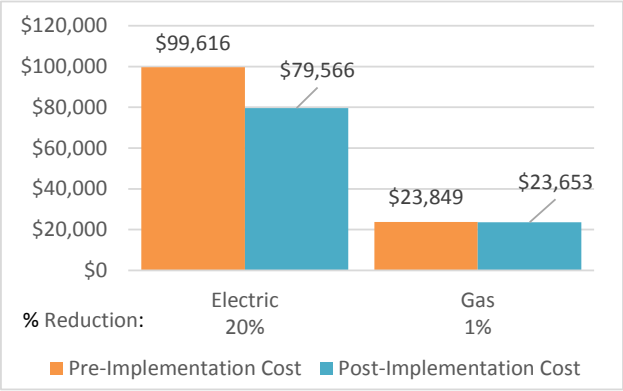


Figure 2 – Potential Post-Implementation Costs



A detailed description of Deerfield Township Elementary 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			**96,453**	**22.8**	**0.0**	**$15,747.58**	**$161,351.11**	**$18,805.00**	**$142,546.11**	**9.1**	**97,127**
ECM 1	Install LED Fixtures	Yes	31,596	6.4	0.0	$5,158.54	$105,519.39	$10,205.00	$95,314.39	18.5	31,817
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	1,041	0.3	0.0	$169.92	$936.00	$80.00	$856.00	5.0	1,048
ECM 3	Retrofit Fixtures with LED Lamps	Yes	62,205	16.0	0.0	$10,155.96	$52,099.29	$8,520.00	$43,579.29	4.3	62,640
ECM 4	Install LED Exit Signs	Yes	1,612	0.1	0.0	$263.16	$2,796.43	$0.00	$2,796.43	10.6	1,623
Lighting Control Measures			**18,523**	**4.8**	**0.0**	**$3,024.25**	**$24,972.00**	**$3,140.00**	**$21,832.00**	**7.2**	**18,653**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	16,815	4.3	0.0	$2,745.30	$23,372.00	$3,140.00	$20,232.00	7.4	16,932
ECM 6	Install High/Low Lighitng Controls	Yes	1,709	0.4	0.0	$278.95	$1,600.00	$0.00	$1,600.00	5.7	1,720
Motor Upgrades			**675**	**0.3**	**0.0**	**$110.18**	**$3,863.62**	**$0.00**	**$3,863.62**	**35.1**	**680**
ECM 7	Premium Efficiency Motors	Yes	675	0.3	0.0	$110.18	$3,863.62	$0.00	$3,863.62	35.1	680
Variable Frequency Drive (VFD) Measures			**7,156**	**3.3**	**0.0**	**$1,168.39**	**$13,765.30**	**$2,000.00**	**$11,765.30**	**10.1**	**7,206**
ECM 8	Install VFDs on Constant Volume (CV) HVAC	Yes	7,156	3.3	0.0	$1,168.39	$13,765.30	$2,000.00	$11,765.30	10.1	7,206
Electric Unitary HVAC Measures			**28,329**	**19.3**	**0.0**	**$4,625.19**	**$230,625.00**	**$12,592.50**	**$218,032.50**	**47.1**	**28,527**
	Install High Efficiency Electric AC	No	28,329	19.3	0.0	$4,625.19	$230,625.00	$12,592.50	$218,032.50	47.1	28,527
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**187.6**	**$2,150.89**	**$88,716.65**	**$8,131.20**	**$80,585.45**	**37.5**	**21,971**
	Install High Efficiency Hot Water Boilers	No	0	0.0	187.6	$2,150.89	$88,716.65	$8,131.20	$80,585.45	37.5	21,971
Domestic Water Heating Upgrade			**0**	**0.0**	**17.1**	**$196.26**	**$415.86**	**$0.00**	**$415.86**	**2.1**	**2,005**
ECM 9	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	17.1	$196.26	$415.86	$0.00	$415.86	2.1	2,005
TOTALS FOR ALL RECOMMENDED MEASURES			**122,807**	**31.2**	**17.1**	**$20,246.65**	**$204,367.89**	**$23,945.00**	**$180,422.89**	**8.9**	**125,671**
TOTALS FOR ALL EVALUATED MEASURES			**151,137**	**50.5**	**204.8**	**$27,022.73**	**$523,709.54**	**$44,668.70**	**$479,040.84**	**17.7**	**176,169**

* - 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.

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

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

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

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

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.

Energy Efficient Practices

TRC 10 low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by behavioral or operational adjustments and by performing 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 Proper Lighting Maintenance
- Perform Routine Motor Maintenance
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Water Conservation

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

On-Site Generation Measures

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

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	280	kW DC STC
Electric Generation	333,584	kWh/yr
Displaced Cost	$29,020	/yr
Installed Cost	$1,092,000	

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.

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			
Melanie M. Allen	School Business Admir	mallen@deerfield.k12.nj.us	(856) 451-2804
Designated Representative			
Robert N. Garrison Jr.	President	rngjr@garrisonarch.com	(856) 396-6200
TRC Energy Services			
Vish Nimbalkar	Auditor	vnaiknimbalkar@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On April 5, 2018, TRC performed an energy audit at Deerfield Township Elementary School located in Rosenhayn, New Jersey. TRC's team met with Frank Manno to review the facility operations and help focus our investigation on specific energy-using systems.

2.3 Building Occupancy

The Deerfield Township Elementary School is open Monday through Friday and closed on weekends. The typical schedule is presented in the table below. During a typical day, the school is occupied by approximately 58 staff and 330 students. Although the school is in session 10 months of the year there are summer classes and other activities hence the building is operational all year.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Deerfield Township Elementary School	Weekday	5:30AM - 4:00PM
Deerfield Township Elementary School	Weekend	Closed

2.4 Building Envelope

Deerfield Township Elementary School is a single-story building constructed of concrete masonry block with brick exterior. The building has clear double pane windows, metal doors, and a partially sloped/partially flat roof constructed of built-up material, all in good condition.

Figure 7 – Building Façade

2.5 On-Site Generation

There is no on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Interior lighting consists of T8 linear fluorescent fixtures in 2, 3 and 4-lamp configurations; few T12 linear fluorescent fixtures are still found in the mechanical AHU room. Pin-base CFL recessed cans were primarily found in hallways, and low/high-bay metal halide fixtures were found in large common areas of the school such as the cafeteria, gym, and library. There are approximately 31 exit signs of which 25 are CFL, one is incandescent, and five are LED. Very few incandescent lamps are still found in the facility. A majority of the interior lighting is controlled by manual switches.

Exterior lighting is mainly comprised of 100-Watt metal halide wall-pack fixtures surrounding the building, and few CFL pin-base fixtures at the school entrance. Exterior lighting is controlled by photocells.

The existing lighting sources are inefficient in performance when compared to the latest lighting technology available in the market.

Figure 8 - Building Lighting Systems

Interior 3-Lamp T8 Fixture 	*Interior 2-Lamp T8 Fixture* 
Interior Low/High- Bay MH Fixtures 	*Interior CFL Recessed Cans* 
Exterior MH Wall-Pack Fixture 	*Exterior CFL Fixtures* 

Hot Water Heating System

The heating hot water system consists of four Smith cast iron, 924 kBtu/hr forced-draft boilers configured in a variable-flow distribution loop. Hot water is supplied at 180°F when the outside air temperature is 35°F and the setpoint is reset to 140°F when the outside air is 55°F. Building global space temperature setpoints are set to 68°F. The boilers are 16-years old, and the lead boiler is rotated automatically by the building energy management system (BEMS).

Each boiler is equipped with a 0.75 hp recirculating pump and the heating hot water distribution loop is served by three pumps on variable frequency drives. The distribution loop pumps are each 3, 5, and 5 hp and operate in a lead/lag configuration. Three fractional hp booster pumps in the distribution loop assist in the delivery of heating hot water to the AHU hot water coils.

Figure 9 - Building Heating System

Smith Cast Iron Forced-Draft Boiler

Recirculating Pump Motor

Heating Hot Water Distribution Pumps

Fractional HP Booster Pump

Direct Expansion Air Conditioning System (DX)

Majority of classrooms and spaces of comparable square footage are conditioned by 24 split-system air conditioners with capacities ranging between 2 and 6-tons. A vast majority of condensing units for these split-systems are located in the outer perimeter of the building. Large spaces, which include the cafeteria and gym, are conditioned by three large-capacity split-system air conditioners between 20 and 30-tons. The condensing units for the larger systems are located on the roof.

There are 11 package air conditioners, the largest of these a 13-ton unit dedicated to the library. The remaining package units, between 1.5 and 7.5-ton capacity, are located on the roof and serve select spaces that include some classrooms and offices.

With the exception of a single 2-ton split-system air-source heat pump that is two years old serving the computer room, the air conditioning systems described above are between 16 and 24 years old and at the end of their useful life.

Figure 10 - Building AC Systems

30-Ton Split-System AC Condenser Unit 	*2.5-Ton Split-System AC Condenser Unit* 
2-Ton Split-System Air Source HP 	*1.5-Ton Package AC unit* 

Split-System AC Condenser Units	*Package AC Units*
	

Building Energy Management System (BEMS)

The majority of the facility is controlled with a Johnson Controls building energy management system (BEMS). The BEMS aggregates the DDC points from various areas throughout the building. The BEMS provides scheduling and global setpoint adjustment capabilities, as well as monitoring and control over a majority of cooling and heating systems.

Domestic Hot Water Heating (DHW) System

The domestic hot water heating system is comprised of two natural gas and two electric water heaters. The Bradford-White natural gas water heaters each have an input rating of 250 kBtu/hr and a nominal efficiency of 80%. These water heaters each have an 80-gallon storage tank and are 16 years old. The Polyshield electric waters heaters each have an input capacity of 4.5 kW and an 80-gallon storage tank; these water heaters are 24 years old.

Figure 11 - Domestic Hot Water System

Bradford-White Natural Gas DHW Heaters	*Polyshield Electric DWH Heaters*
	

Food Service Equipment

The school has an all-electric kitchen that is used to serve lunch to over 300 students. The kitchen is equipped with convection and steam ovens, serving wells, a stove and a hot food cabinet. The kitchen has a medium-sized conveyor-type dishwater.

Figure 12 – Food Service

Vulcan Electric Convection Ovens 	*Vulcan Electric Stove* 
Dishwasher 	*Electric Steamer* 

Refrigeration

The kitchen has two medium-sized and one large-sized solid-door commercial refrigerators, and one batch ice-making machine.

The facility has two separate walk-in cold storage areas: a walk-in cooler area and a walk-in freezer area. The cooler and freezer areas are each served by one evaporator with two fans. There two cold storage areas are connected to a single condensing unit, and one 1 hp and one 2 hp compressors serve the walk-in refrigerated system.

Figure 13 – Refrigeration Equipment

Traulson Commercial Refrigerator

Manitowoc Batch Ice-Making Machine

Walk-in Cooler Area

Walk-in Freezer Area

Building Plug Load

There facility has roughly 81 computer workstations and 189 laptops that staff and students can access. Nine printer/copy machines are found throughout the facility, and approximately 17 media projectors are found in the classrooms. Five residential-type refrigerators, ranging from small to large, are installed in different areas of the school.

2.7 Water-Using Systems

There are 58 faucets throughout the facility that each have an estimated flow rate of 2.5 gallons per minute (gpm).

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

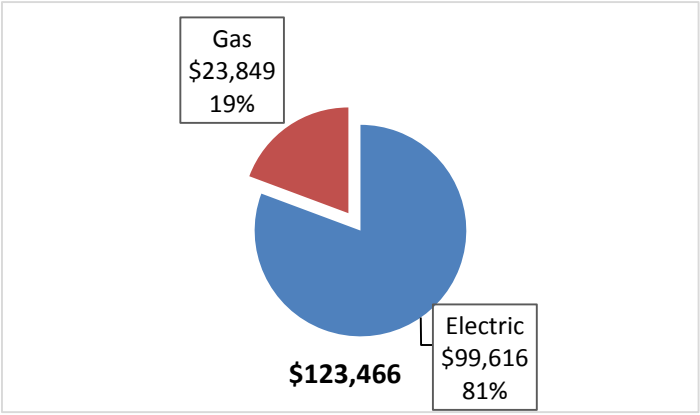
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 14 - Utility Summary

Utility Summary for Deerfield Township Elementary School		
Fuel	**Usage**	**Cost**
Electricity	610,144 kWh	$99,616
Natural Gas	20,806 Therms	$23,849
Total		**$123,466**

The current annual energy cost for this facility is $123,466 as shown in the chart below.

Figure 15 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Atlantic City Electric. The average electric cost over the past 12 months was $0.163/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 16 - Electric Usage & Demand

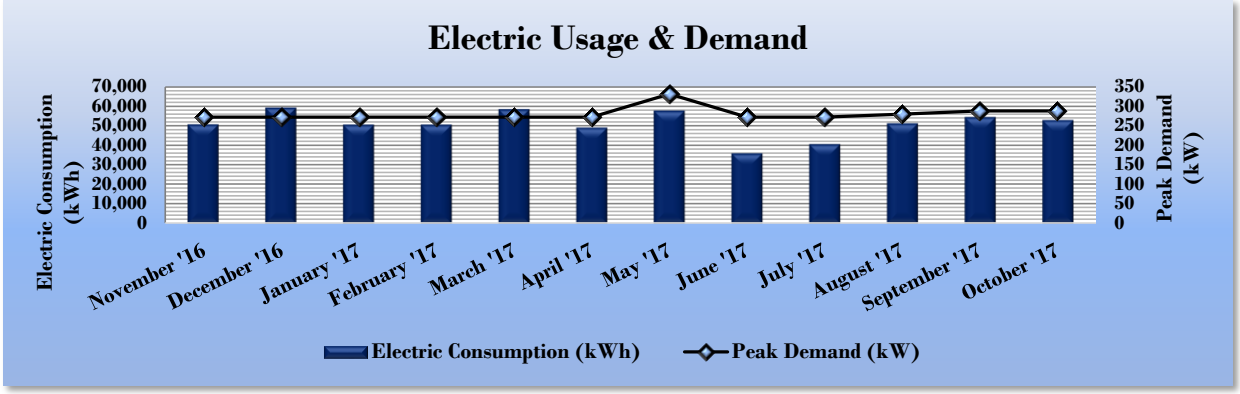


Figure 17 - Electric Usage & Demand

Electric Billing Data for Deerfield Township Elementary School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
12/9/16	30	50,554	272	$2,322	$8,633
1/11/17	33	59,130	272	$2,800	$10,179
2/9/17	29	50,500	272	$2,239	$8,519
3/10/17	29	50,402	272	$2,319	$8,602
4/10/17	31	58,367	272	$2,719	$9,981
5/10/17	30	48,992	272	$2,239	$8,366
6/9/17	30	57,700	332	$3,123	$9,002
7/12/17	33	35,759	272	$2,319	$5,934
8/10/17	29	40,488	272	$2,479	$6,514
9/12/17	33	51,133	280	$2,634	$7,870
10/10/17	28	54,268	288	$2,526	$7,959
11/9/17	30	52,851	288	$2,814	$8,058
Totals	**365**	**610,144**	**332**	**$30,534**	**$99,616**
Annual	**365**	**610,144**	**332**	**$30,534**	**$99,616**

3.3 Natural Gas Usage

Natural gas is provided by South Jersey Gas. The average gas cost for the past 12 months is $1.146/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 18 - Natural Gas Usage

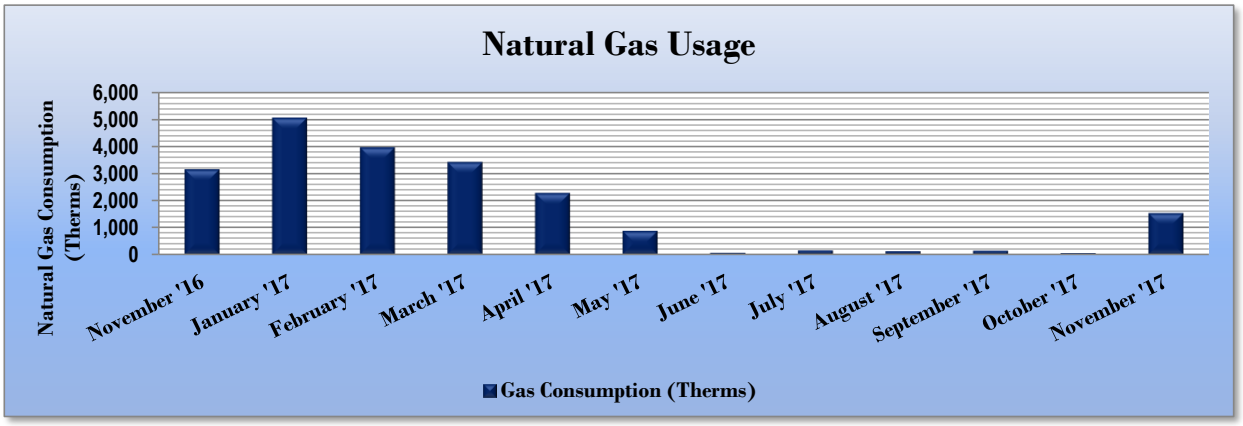


Figure 19 - Natural Gas Usage

Gas Billing Data for Deerfield Township Elementary School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/15/16	29	3,158	$3,361
1/19/17	35	5,069	$6,125
2/16/17	28	3,974	$4,566
3/17/17	29	3,425	$3,657
4/19/17	33	2,275	$2,577
5/18/17	29	875	$1,004
6/19/17	32	54	$91
7/18/17	29	151	$199
8/18/17	31	115	$161
9/19/17	32	136	$184
10/17/17	28	44	$77
11/16/17	30	1,531	$1,849
Totals	**365**	**20,806**	**$23,849**
Annual	**365**	**20,806**	**$23,849**

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 20 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Deerfield Township Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	144.6	141.4
Site Energy Use Intensity (kBtu/ft^2)	69.0	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 21 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Deerfield Township Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	122.5	141.4
Site Energy Use Intensity (kBtu/ft^2)	61.8	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 54.

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

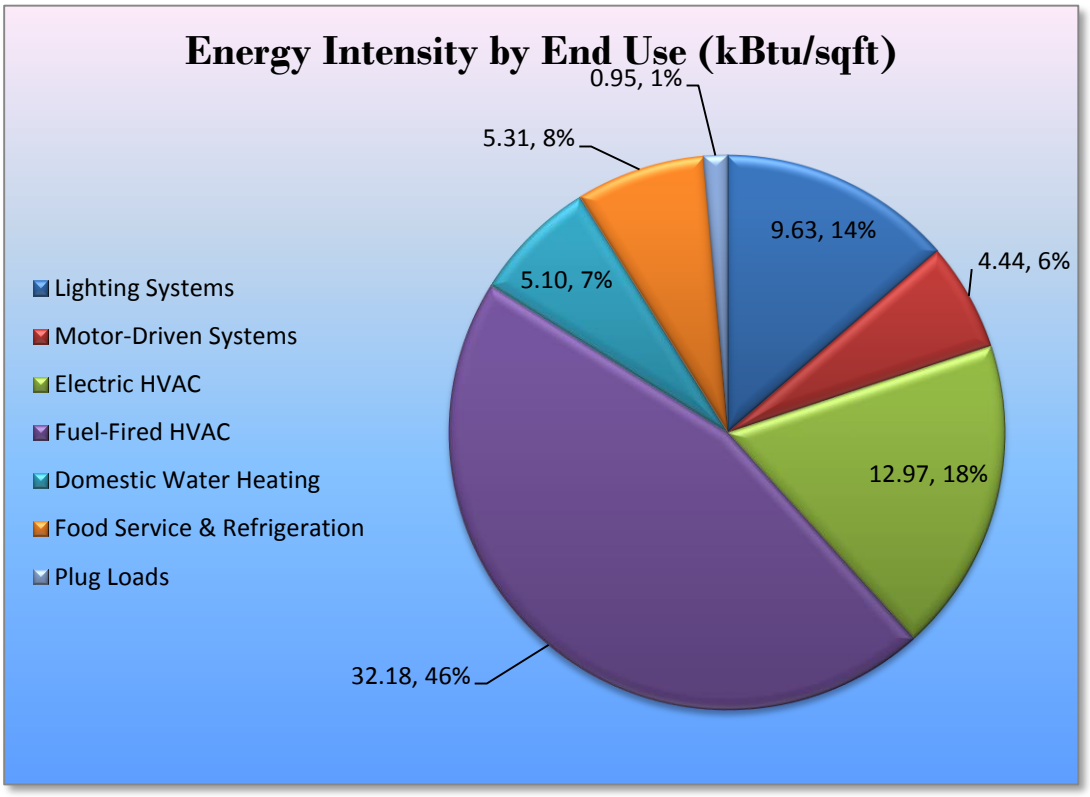
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 22 - Energy Balance (% and kBtu/SF)



4 ENERGY CONSERVATION MEASURES

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

4.1 Recommended ECMs

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

Figure 23 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**96,453**	**22.8**	**0.0**	**$15,747.58**	**$161,351.11**	**$18,805.00**	**$142,546.11**	**9.1**	**97,127**
ECM 1	Install LED Fixtures	31,596	6.4	0.0	$5,158.54	$105,519.39	$10,205.00	$95,314.39	18.5	31,817
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,041	0.3	0.0	$169.92	$936.00	$80.00	$856.00	5.0	1,048
ECM 3	Retrofit Fixtures with LED Lamps	62,205	16.0	0.0	$10,155.96	$52,099.29	$8,520.00	$43,579.29	4.3	62,640
ECM 4	Install LED Exit Signs	1,612	0.1	0.0	$263.16	$2,796.43	$0.00	$2,796.43	10.6	1,623
Lighting Control Measures		**18,523**	**4.8**	**0.0**	**$3,024.25**	**$24,972.00**	**$3,140.00**	**$21,832.00**	**7.2**	**18,653**
ECM 5	Install Occupancy Sensor Lighting Controls	16,815	4.3	0.0	$2,745.30	$23,372.00	$3,140.00	$20,232.00	7.4	16,932
ECM 6	Install High/Low Lighitng Controls	1,709	0.4	0.0	$278.95	$1,600.00	$0.00	$1,600.00	5.7	1,720
Motor Upgrades		**675**	**0.3**	**0.0**	**$110.18**	**$3,863.62**	**$0.00**	**$3,863.62**	**35.1**	**680**
ECM 7	Premium Efficiency Motors	675	0.3	0.0	$110.18	$3,863.62	$0.00	$3,863.62	35.1	680
Variable Frequency Drive (VFD) Measures		**7,156**	**3.3**	**0.0**	**$1,168.39**	**$13,765.30**	**$2,000.00**	**$11,765.30**	**10.1**	**7,206**
ECM 8	Install VFDs on Constant Volume (CV) HVAC	7,156	3.3	0.0	$1,168.39	$13,765.30	$2,000.00	$11,765.30	10.1	7,206
Domestic Water Heating Upgrade		**0**	**0.0**	**17.1**	**$196.26**	**$415.86**	**$0.00**	**$415.86**	**2.1**	**2,005**
ECM 9	Install Low-Flow Domestic Hot Water Devices	0	0.0	17.1	$196.26	$415.86	$0.00	$415.86	2.1	2,005
TOTALS		**122,807**	**31.2**	**17.1**	**$20,246.65**	**$204,367.89**	**$23,945.00**	**$180,422.89**	**8.9**	**125,671**

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

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

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 24 below.

Figure 24 – 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		**96,453**	**22.8**	**0.0**	**$15,747.58**	**$161,351.11**	**$18,805.00**	**$142,546.11**	**9.1**	**97,127**
ECM 1	Install LED Fixtures	31,596	6.4	0.0	$5,158.54	$105,519.39	$10,205.00	$95,314.39	18.5	31,817
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,041	0.3	0.0	$169.92	$936.00	$80.00	$856.00	5.0	1,048
ECM 3	Retrofit Fixtures with LED Lamps	62,205	16.0	0.0	$10,155.96	$52,099.29	$8,520.00	$43,579.29	4.3	62,640
ECM 4	Install LED Exit Signs	1,612	0.1	0.0	$263.16	$2,796.43	$0.00	$2,796.43	10.6	1,623

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	16,901	4.4	0.0	$2,759.43	$90,000.75	$6,300.00	$83,700.75	30.3	17,019
Exterior	14,694	2.0	0.0	$2,399.11	$15,518.64	$3,905.00	$11,613.64	4.8	14,797

Measure Description

We recommend replacing metal halide low and high bay interior fixtures and MH exterior wall-mounted fixtures 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 may be more than twice that of a fluorescent and MH lamps, and more than 10 times longer than many incandescent lamps.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	1,041	0.3	0.0	$169.92	$936.00	$80.00	$856.00	5.0	1,048
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing T12 fluorescent fixtures by removing fluorescent tubes and ballasts and replacing them with LEDs and LED drivers (if necessary), which are designed to be used retrofitted fluorescent fixtures. The measure uses the existing fixture housing but replaces the rest of the components with more efficient lighting technology. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

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

ECM 3: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	61,853	16.0	0.0	$10,098.53	$50,916.72	$8,520.00	$42,396.72	4.2	62,285
Exterior	352	0.0	0.0	$57.43	$1,182.57	$0.00	$1,182.57	20.6	354

Measure Description

We recommend retrofitting existing incandescent, compact fluorescent and linear fluorescent 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.

ECM 4: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	1,612	0.1	0.0	$263.16	$2,796.43	$0.00	$2,796.43	10.6	1,623
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

4.1.2 Lighting Control Measures

Our recommendations for lighting control upgrades are summarized below.

Figure 25 – 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		**18,523**	**4.8**	**0.0**	**$3,024.25**	**$24,972.00**	**$3,140.00**	**$21,832.00**	**7.2**	**18,653**
ECM 5	Install Occupancy Sensor Lighting Controls	16,815	4.3	0.0	$2,745.30	$23,372.00	$3,140.00	$20,232.00	7.4	16,932
ECM 6	Install High/Low Lighitng Controls	1,709	0.4	0.0	$278.95	$1,600.00	$0.00	$1,600.00	5.7	1,720

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 5: 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)
16,815	4.3	0.0	$2,745.30	$23,372.00	$3,140.00	$20,232.00	7.4	16,932

Measure Description

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

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

ECM 6: 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)
1,709	0.4	0.0	$278.95	$1,600.00	$0.00	$1,600.00	5.7	1,720

Measure Description

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

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

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

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

4.1.3 Motor Upgrades

Our recommendations for motor upgrades are summarized in Figure 26 below.

Figure 26-Summary of Motor 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)
Motor Upgrades		**675**	**0.3**	**0.0**	**$110.18**	**$3,863.62**	**$0.00**	**$3,863.62**	**35.1**	**680**
ECM 7	Premium Efficiency Motors	675	0.3	0.0	$110.18	$3,863.62	$0.00	$3,863.62	35.1	680

ECM 7: Premium Efficiency Motors (Select AHUs)

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)
675	0.3	0.0	$110.18	$3,863.62	$0.00	$3,863.62	35.1	680

Measure Description

We recommend replacing standard efficiency motors in the gym AHUs and in AHU-5 and HV-1 with NEMA Premium® efficiency motors. Premium efficiency motors are proposed in conjunction with VFDs (see Section 4.1.4) to cover the cost of installing inverter duty rated motors if they are required. If the site decides to not pursue the VFD measures we do not recommend replacing the associated motors with premium efficiency motors.

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

4.1.4 Variable Frequency Drive Measures

Our recommendations for variable frequency drive measures are summarized in Figure 27 below.

Figure 27-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		**7,156**	**3.3**	**0.0**	**$1,168.39**	**$13,765.30**	**$2,000.00**	**$11,765.30**	**10.1**	**7,206**
ECM 8	Install VFDs on Constant Volume (CV) HVAC	7,156	3.3	0.0	$1,168.39	$13,765.30	$2,000.00	$11,765.30	10.1	7,206

ECM 8: 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)
7,156	3.3	0.0	$1,168.39	$13,765.30	$2,000.00	$11,765.30	10.1	7,206

Measure Description

We recommend installing variable frequency drives (VFDs) to control supply fan motor speeds to convert 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.

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coil required to prevent the coil from freezing will have to be determined during the final project design. The control system should be programmed to maintain the minimum air flow whenever the compressor is operating.

4.1.5 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic hot water heating system upgrade measures are summarized in Figure 28 below.

Figure 28-Summary of Domestic Hot Water Heating System 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)
Domestic Water Heating Upgrade		**0**	**0.0**	**17.1**	**$196.26**	**$415.86**	**$0.00**	**$415.86**	**2.1**	**2,005**
ECM 9	Install Low-Flow Domestic Hot Water Devices	0	0.0	17.1	$196.26	$415.86	$0.00	$415.86	2.1	2,005

ECM 9: 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	17.1	$196.26	$415.86	$0.00	$415.86	2.1	2,005

Measure Description

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.

4.2 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 29 – 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)
Electric Unitary HVAC Measures	**28,329**	**19.3**	**0.0**	**$4,625.19**	**$230,625.00**	**$12,592.50**	**$218,032.50**	**47.1**	**28,527**
Install High Efficiency Electric AC	28,329	19.3	0.0	$4,625.19	$230,625.00	$12,592.50	$218,032.50	47.1	28,527
Gas Heating (HVAC/Process) Replacement	**0**	**0.0**	**187.6**	**$2,150.89**	**$88,716.65**	**$8,131.20**	**$80,585.45**	**37.5**	**21,971**
Install High Efficiency Hot Water Boilers	0	0.0	187.6	$2,150.89	$88,716.65	$8,131.20	$80,585.45	37.5	21,971
TOTALS	**28,329**	**19.3**	**187.6**	**$6,776.08**	**$319,341.65**	**$20,723.70**	**$298,617.95**	**44.1**	**50,498**
* - 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 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)
28,329	19.3	0.0	$4,625.19	$230,625.00	$12,592.50	$218,032.50	47.1	28,527

Measure Description

Replace standard efficiency air conditioning units between 1.5 and 13-tons and greater than 16 years old with high efficiency air conditioning 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 simple payback for this measure is greater than the typical useful life of 15 years for package units. Therefore, this measure is not recommended on the basis of energy savings alone. The site may wish to consider high efficiency options as they contemplate replacement.

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	187.6	$2,150.89	$88,716.65	$8,131.20	$80,585.45	37.5	21,971

Measure Description

We evaluated the replacement of older inefficient hot water boilers with high efficiency hot water boilers. 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 are generally only recommended in hot water heating system designs where the system can be configured with the return water temperature at below 130°F during most of the operating hours.

Reasons for not Recommending

The simple payback for this measure is greater than the typical useful life of 25 years for commercial hot water boilers. Since the existing hot water boilers are only approximately 16 years old and the simple payback exceeds the useful life of the equipment, this measure is not recommended.

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.

Perform Lighting Maintenance

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

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.

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 Boiler Maintenance

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

Perform Water Heater Maintenance

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

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.

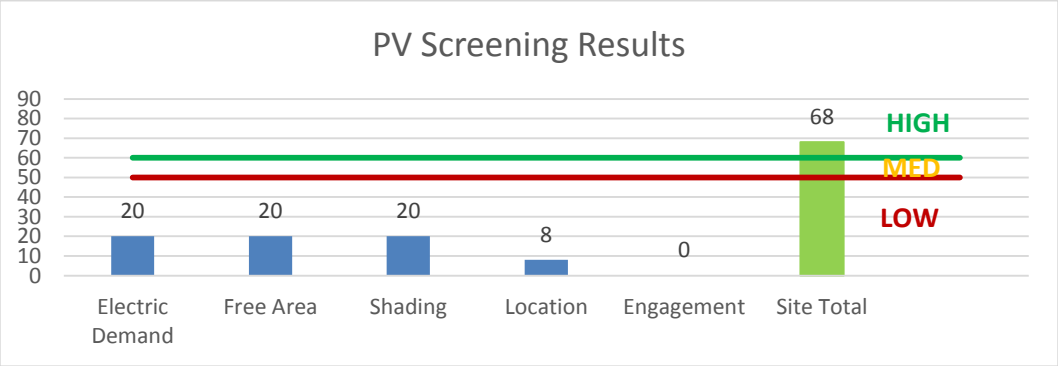
6.1 Photovoltaic

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 building and/or over the parking lot areas may be feasible. If Deerfield Township Elementary School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 30 - Photovoltaic Screening



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

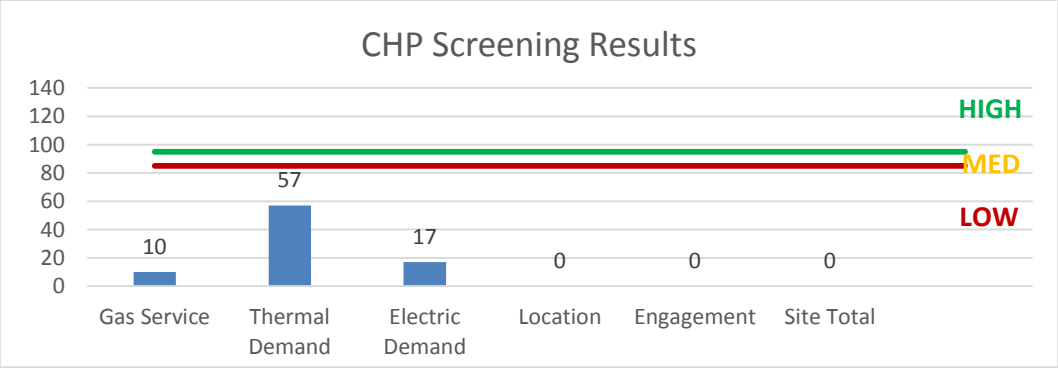
6.2 Combined Heat and Power

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.

Figure 31 - 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.

We believe there is a low opportunity for Demand Response at this site.

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 32 for a list of the eligible programs identified for each recommended ECM.

Figure 32 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	x			x		
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x			x		
ECM 3	Retrofit Fixtures with LED Lamps	x			x		
ECM 4	Install LED Exit Signs				x		
ECM 5	Install Occupancy Sensor Lighting Controls	x			x		
ECM 6	Install High/Low Lighitng Controls				x		
ECM 7	Premium Efficiency Motors				x		
ECM 8	Install VFDs on Constant Volume (CV) HVAC	x			x		
ECM 9	Install Low-Flow Domestic Hot Water Devices				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 incentives are 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
Boiler Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,205	0.09	364	0.0	$59.40	$292.50	$50.00	4.08
Basement Mechanical	1	Incandescent: Screw-in	Wall Switch	60	2,205	Relamp	No	1	LED Screw-In Lamps: LED screw-in	Wall Switch	9	2,205	0.03	129	0.0	$21.11	$53.75	$5.00	2.31
Basement Mechanical	1	LED Screw-In Lamps: Screw-in	Wall Switch	10	2,205	None	No	1	LED Screw-In Lamps: Screw-in	Wall Switch	10	2,205	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,205	0.04	167	0.0	$27.32	$117.00	$20.00	3.55
Upsatirs Mech AHU Room	8	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	2,205	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.36	1,373	0.0	$224.22	$1,206.00	$115.00	4.87
Upsatirs Mech AHU Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	19	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,205	Relamp	Yes	19	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,544	0.91	3,536	0.0	$577.37	$2,347.53	$450.00	3.29
Kitchen	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Exit Signs: Incandescent	None	15	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	91	0.0	$14.80	$107.56	$0.00	7.27
Kitchen	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,205	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,544	0.19	744	0.0	$121.55	$650.53	$115.00	4.41
Kitchen Hood	8	Compact Fluorescent: CFL pin base 20W bulbs	Wall Switch	20	2,205	Relamp	No	8	LED Screw-In Lamps: LED- 14W bulb	Wall Switch	14	2,205	0.03	122	0.0	$19.87	$430.02	$0.00	21.64
Café	12	Metal Halide: (1) 175W Lamp	Wall Switch	215	2,205	Fixture Replacement	Yes	12	LED - Fixtures: Low-Bay	Occupancy Sensor	65	1,544	1.34	5,168	0.0	$843.82	$17,307.30	$1,835.00	18.34
Café	2	Exit Signs: Fluorescent	None	13	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	141	0.0	$23.03	$215.11	$0.00	9.34
Café	6	Compact Fluorescent: CFL pin base 13W bulbs	Wall Switch	13	2,205	Relamp	Yes	6	LED Screw-In Lamps: LED- 9W bulb	Occupancy Sensor	9	1,544	0.03	101	0.0	$16.47	$438.52	$20.00	25.41
Art Room	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.74	2,855	0.0	$466.13	$1,623.60	$305.00	2.83
Art Room	2	Exit Signs: Fluorescent	None	13	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	141	0.0	$23.03	$215.11	$0.00	9.34
Art Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,205	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,544	0.19	744	0.0	$121.55	$650.53	$115.00	4.41
Gym 1	12	Metal Halide: (1) 250W Lamp	Wall Switch	295	2,205	Fixture Replacement	Yes	12	LED - Fixtures: High-Bay	Occupancy Sensor	89	1,544	1.83	7,091	0.0	$1,157.80	$34,862.40	$2,220.00	28.19
Gym 1	2	Exit Signs: Fluorescent	None	13	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	141	0.0	$23.03	$215.11	$0.00	9.34
Gym 1	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
GymOffice	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,205	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,544	0.19	744	0.0	$121.55	$650.53	$115.00	4.41
Boys Locker	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.16	634	0.0	$103.58	$621.00	$95.00	5.08
Gym 2	12	Metal Halide: (1) 250W Lamp	Wall Switch	295	2,205	Fixture Replacement	Yes	12	LED - Fixtures: High-Bay	Occupancy Sensor	89	1,544	1.83	7,091	0.0	$1,157.80	$34,862.40	$2,220.00	28.19
Gym 2 Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.11	423	0.0	$69.06	$350.00	$40.00	4.49
Girls Locker	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.16	634	0.0	$103.58	$621.00	$95.00	5.08

	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
Gym 2 Girls Locker	2	Exit Signs: Fluorescent	None	13	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	141	0.0	$23.03	$215.11	$0.00	9.34
Gym 2 Girls Locker	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,544	0.36	1,375	0.0	$224.43	$960.50	$130.00	3.70
Hallway	11	Compact Fluorescent: CFL pin base 13W bulbs	Wall Switch	13	2,205	Relamp	Yes	11	LED Screw-In Lamps: LED- 9W bulb	High/Low Control	9	1,544	0.05	185	0.0	$30.19	$791.28	$0.00	26.21
Hallway	2	Exit Signs: Fluorescent	None	13	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	141	0.0	$23.03	$215.11	$0.00	9.34
Boys Restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.14	529	0.0	$86.32	$562.50	$85.00	5.53
Ladies Restroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.14	529	0.0	$86.32	$562.50	$85.00	5.53
Mens Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,205	0.02	84	0.0	$13.66	$58.50	$10.00	3.55
Ladies Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,205	0.02	84	0.0	$13.66	$58.50	$10.00	3.55
Hallway	9	Compact Fluorescent: CFL pin base 13W bulbs	Wall Switch	13	2,205	Relamp	Yes	9	LED Screw-In Lamps: LED- 9W bulb	High/Low Control	9	1,544	0.04	151	0.0	$24.70	$683.78	$0.00	27.68
Teachers Lounge	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.25	952	0.0	$155.38	$721.20	$125.00	3.84
Staging Area	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.66	2,538	0.0	$414.34	$1,944.00	$310.00	3.94
Staging Area Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.25	952	0.0	$155.38	$567.20	$90.00	3.07
Staging Area Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.11	423	0.0	$69.06	$350.00	$40.00	4.49
Electrical Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,205	0.04	167	0.0	$27.32	$117.00	$20.00	3.55
Music Hallway	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,544	0.41	1,586	0.0	$258.96	$1,077.50	$150.00	3.58
Music Hallway	2	Exit Signs: Fluorescent	None	13	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	141	0.0	$23.03	$215.11	$0.00	9.34
Science Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,205	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,205	0.15	568	0.0	$92.74	$380.53	$80.00	3.24
Science Room	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.66	2,538	0.0	$414.34	$1,473.20	$275.00	2.89
Grade 7 (33)	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.49	1,903	0.0	$310.75	$1,172.40	$215.00	3.08
CR 31	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.49	1,903	0.0	$310.75	$1,172.40	$215.00	3.08
CR 30	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.49	1,903	0.0	$310.75	$1,172.40	$215.00	3.08
CR 28	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.25	952	0.0	$155.38	$721.20	$125.00	3.84
CR 29	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.25	952	0.0	$155.38	$721.20	$125.00	3.84
Hall	4	Exit Signs: Fluorescent	None	13	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	282	0.0	$46.05	$430.22	$0.00	9.34

	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
Hall	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Health Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,205	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,544	0.29	1,117	0.0	$182.33	$840.80	$155.00	3.76
Health Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,205	0.13	502	0.0	$81.97	$300.80	$60.00	2.94
Restroom Health Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,205	0.02	84	0.0	$13.66	$58.50	$10.00	3.55
Principal Hallway	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,544	0.19	740	0.0	$120.85	$609.50	$70.00	4.46
Principal Hallway	14	Compact Fluorescent: CFL pin base 13W bulbs- 2L	Wall Switch	26	2,205	Relamp	Yes	14	LED Screw-In Lamps: LED- 9W bulb	High/Low Control	18	1,544	0.12	471	0.0	$76.86	$1,705.08	$0.00	22.19
Principal Hallway	4	Compact Fluorescent: CFL pin base 13W bulbs- 2L	Wall Switch	26	2,205	Relamp	No	4	LED Screw-In Lamps: LED- 9W bulb	Wall Switch	18	2,205	0.02	79	0.0	$12.92	$430.02	$0.00	33.29
Pre-School CR	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.53	2,062	0.0	$336.65	$1,247.60	$230.00	3.02
Pre-School CR	1	Exit Signs: Fluorescent	None	13	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	71	0.0	$11.51	$107.56	$0.00	9.34
Pre-School Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.08	317	0.0	$51.79	$420.40	$65.00	6.86
Library	25	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,205	Relamp	Yes	25	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,544	1.20	4,653	0.0	$759.70	$2,918.33	$570.00	3.09
Library	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.14	529	0.0	$86.32	$562.50	$85.00	5.53
Library	5	Compact Fluorescent: CFL pin base 13W bulbs- 2L	Wall Switch	26	2,205	Relamp	Yes	5	LED Screw-In Lamps: LED- 9W bulb	Occupancy Sensor	18	1,544	0.04	168	0.0	$27.45	$653.53	$20.00	23.08
Library	6	Metal Halide: (1) 175W Lamp	Wall Switch	215	2,205	Fixture Replacement	Yes	6	LED - Fixtures: Low-Bay	Occupancy Sensor	65	1,544	0.67	2,584	0.0	$421.91	$8,788.65	$935.00	18.61
Library	15	Compact Fluorescent: CFL pin base 13W bulbs- 2L	Wall Switch	26	2,205	Relamp	Yes	15	LED Screw-In Lamps: LED- 9W bulb	Occupancy Sensor	18	1,544	0.13	504	0.0	$82.35	$1,882.59	$35.00	22.44
Library Breakroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.11	423	0.0	$69.06	$504.00	$75.00	6.21
Server Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,205	Relamp	No	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,205	0.11	426	0.0	$69.55	$285.40	$60.00	3.24
Pre-School (CR 26)	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.53	2,062	0.0	$336.65	$1,247.60	$230.00	3.02
CR 25	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.21	793	0.0	$129.48	$646.00	$110.00	4.14
Main Office	5	Compact Fluorescent: CFL pin base 13W bulbs- 2L	Wall Switch	26	2,205	Relamp	No	5	LED Screw-In Lamps: LED- 9W bulb	Wall Switch	18	2,205	0.03	99	0.0	$16.15	$537.53	$0.00	33.29
Main Office	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.53	2,062	0.0	$336.65	$1,247.60	$230.00	3.02
Main Office Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,205	0.02	84	0.0	$13.66	$58.50	$10.00	3.55
Main Office Administration	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.16	634	0.0	$103.58	$570.80	$95.00	4.59
Board Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.25	952	0.0	$155.38	$721.20	$125.00	3.84
Melanie Allen Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.12	476	0.0	$77.69	$495.60	$80.00	5.35

	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
Conference Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.25	952	0.0	$155.38	$721.20	$125.00	3.84
Conference Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,205	0.02	84	0.0	$13.66	$58.50	$10.00	3.55
CR 1	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.37	1,428	0.0	$233.06	$946.80	$170.00	3.33
CR 2	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.37	1,428	0.0	$233.06	$946.80	$170.00	3.33
CR 3	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.16	634	0.0	$103.58	$570.80	$95.00	4.59
CR 4	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.16	634	0.0	$103.58	$570.80	$95.00	4.59
CR 5	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.16	634	0.0	$103.58	$570.80	$95.00	4.59
CR 6	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.08	317	0.0	$51.79	$420.40	$65.00	6.86
CR 7	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.12	476	0.0	$77.69	$495.60	$80.00	5.35
Janitors	3	Compact Fluorescent: CFL pin base 13W bulbs- 2L	Wall Switch	26	2,205	Relamp	Yes	3	LED Screw-In Lamps: LED- 9W bulb	Occupancy Sensor	18	1,544	0.03	101	0.0	$16.47	$438.52	$0.00	26.63
Janitors	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,205	0.02	84	0.0	$13.66	$58.50	$10.00	3.55
Custodian	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.46	1,798	0.0	$293.49	$1,264.50	$205.00	3.61
Custodian	5	Compact Fluorescent: CFL pin base 13W bulbs- 2L	Wall Switch	26	2,205	Relamp	No	5	LED Screw-In Lamps: LED- 9W bulb	Wall Switch	18	2,205	0.03	99	0.0	$16.15	$537.53	$0.00	33.29
Restroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.11	423	0.0	$69.06	$504.00	$75.00	6.21
CR 8	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,205	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,544	0.29	1,117	0.0	$182.33	$840.80	$155.00	3.76
Story	3	Incandescent: Screw-in	Wall Switch	60	2,205	Relamp	Yes	3	LED Screw-In Lamps: LED screw-in	Occupancy Sensor	9	1,544	0.11	409	0.0	$66.70	$277.26	$35.00	3.63
Hallway	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,544	0.82	3,172	0.0	$517.92	$1,704.00	$300.00	2.71
Hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,205	0.06	251	0.0	$40.99	$175.50	$30.00	3.55
Hallway	5	Exit Signs: Fluorescent	None	13	8,760	Fixture Replacement	No	5	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	353	0.0	$57.57	$537.78	$0.00	9.34
CR 9	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.49	1,903	0.0	$310.75	$1,172.40	$215.00	3.08
CR Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,205	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,544	0.05	211	0.0	$34.53	$387.00	$55.00	9.62
CR 10	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.49	1,903	0.0	$310.75	$1,172.40	$215.00	3.08
CR 11	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.49	1,903	0.0	$310.75	$1,172.40	$215.00	3.08
CR 12	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.49	1,903	0.0	$310.75	$1,172.40	$215.00	3.08
Boys Restroom	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.25	952	0.0	$155.38	$721.20	$125.00	3.84

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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
Mens Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.08	317	0.0	$51.79	$420.40	$65.00	6.86
Hallway	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,544	0.25	952	0.0	$155.38	$651.20	$90.00	3.61
Hallway	3	Exit Signs: Fluorescent	None	13	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	212	0.0	$34.54	$322.67	$0.00	9.34
CR 13	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.37	1,428	0.0	$233.06	$946.80	$170.00	3.33
CR 14	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.37	1,428	0.0	$233.06	$946.80	$170.00	3.33
CR 15,16	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.37	1,428	0.0	$233.06	$946.80	$170.00	3.33
CR 17	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.74	2,855	0.0	$466.13	$1,623.60	$305.00	2.83
CR 18	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.37	1,428	0.0	$233.06	$946.80	$170.00	3.33
CR 19	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.37	1,428	0.0	$233.06	$946.80	$170.00	3.33
CR 20	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.37	1,428	0.0	$233.06	$946.80	$170.00	3.33
CR 21	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.37	1,428	0.0	$233.06	$946.80	$170.00	3.33
CR 22	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.37	1,428	0.0	$233.06	$946.80	$170.00	3.33
CR 23	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,205	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,544	0.16	634	0.0	$103.58	$570.80	$95.00	4.59
Main Entrance	6	Compact Fluorescent: CFL pin base 13W bulbs- 3L	Daylight Dimming	39	4,100	Relamp	No	6	LED Screw-In Lamps: LED- 9W bulb	Daylight Dimming	27	4,100	0.05	331	0.0	$54.04	$967.55	$0.00	17.90
Main Entrance	2	Compact Fluorescent: CFL pin base 13W bulbs- 2L	Daylight Dimming	26	4,100	Relamp	No	2	LED Screw-In Lamps: LED- 9W bulb	Daylight Dimming	18	4,100	0.01	74	0.0	$12.01	$215.01	$0.00	17.90
Flag Pole	1	Metal Halide: (1) 100W Lamp	Daylight Dimming	128	4,100	Fixture Replacement	No	1	LED - Fixtures: Other	Daylight Dimming	38	4,100	0.06	422	0.0	$68.97	$282.24	$5.00	4.02
Wall Pack	39	Metal Halide: (1) 100W Lamp	Daylight Dimming	128	4,100	Fixture Replacement	No	39	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	38	4,100	2.29	16,476	0.0	$2,690.00	$15,236.40	$3,900.00	4.21

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
Mechanical Room	School	4	Combustion Air Fan	0.3	65.0%	No	1,922	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	School	4	Heating Hot Water Pump	0.8	70.0%	No	1,922	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	School	1	Heating Hot Water Pump	5.0	87.5%	Yes	1,922	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	School	1	Heating Hot Water Pump	3.0	86.5%	Yes	1,922	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	School	1	Heating Hot Water Pump	5.0	87.5%	Yes	275	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	School	1	Ventilation Fan	0.2	65.0%	No	549	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	School	1	Supply Fan	0.8	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	School	2	Heating Hot Water Pump	0.1	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room and roof	School	3	Supply Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	School	2	Supply Fan	5.0	87.5%	No	2,745	Yes	89.5%	Yes	2	1.45	4,471	0.0	$730.04	$8,152.44	$800.00	10.07
Mechanical Room	School	1	Supply Fan	0.8	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	School	1	Heating Hot Water Pump	0.2	68.5%	No	2,745	No	68.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 8	1	Supply Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 1	1	Supply Fan	0.5	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 2	1	Supply Fan	0.8	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 9	1	Supply Fan	0.5	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 3,4	1	Supply Fan	0.5	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 5, 6, 7	1	Supply Fan	0.5	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 11	1	Supply Fan	0.8	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 12	1	Supply Fan	0.8	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Attic AHUs	CR 13, 14, 15, 16	1	Supply Fan	0.5	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 17	1	Supply Fan	0.8	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 24	1	Supply Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 18	1	Supply Fan	0.8	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 19	1	Supply Fan	0.5	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 20, 21	1	Supply Fan	0.5	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 22	1	Supply Fan	0.8	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic AHUs	CR 10	1	Supply Fan	0.5	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Various	4	Exhaust Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Stage	1	Supply Fan	1.5	84.0%	No	1,373	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Gym	2	Supply Fan	7.5	88.5%	No	1,373	Yes	91.0%	Yes	2	2.17	3,360	0.0	$548.53	$9,476.48	$1,200.00	15.09

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
Mechanical Room	Library	1	Packaged AC	13.00		Yes	1	Packaged AC	13.00		11.50		No	2.15	3,629	0.0	$592.55	$18,120.05	$1,027.00	28.85
Roof	Cafeteria	1	Split-System AC	20.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Gym	1	Split-System AC	30.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Teacher Lounge	1	Split-System AC	2.50		Yes	1	Split-System AC	2.50		14.00		No	0.57	737	0.0	$120.35	$3,740.55	$230.00	29.17
Roof	Science Room	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.92	1,179	0.0	$192.56	$5,984.88	$368.00	29.17
Roof	Staging Area	1	Split-System AC	6.00		Yes	1	Split-System AC	6.00		11.50		No	0.63	808	0.0	$131.86	$6,982.62	$438.00	49.63
Roof	Gym	1	Split-System AC	30.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Classrooms	4	Packaged AC	3.00		Yes	4	Packaged AC	3.00		14.00		No	2.76	4,653	0.0	$759.72	$27,227.52	$1,104.00	34.39
Roof	CR 26. 27	2	Packaged AC	4.00		Yes	2	Packaged AC	4.00		14.00		No	1.84	3,102	0.0	$506.48	$18,151.68	$736.00	34.39
Roof	CR 25	1	Packaged AC	2.00		Yes	1	Packaged AC	2.00		14.00		No	0.46	776	0.0	$126.62	$4,537.92	$184.00	34.39
Roof	Main	1	Packaged AC	2.50		Yes	1	Packaged AC	2.50		14.00		No	0.57	969	0.0	$158.28	$5,672.40	$230.00	34.39
Roof	Offices	1	Packaged AC	7.50		Yes	1	Packaged AC	7.50		11.50		No	0.79	1,328	0.0	$216.77	$13,365.79	$547.50	59.13
Roof	Computer room	1	Split-System Air-Source HP	2.00	27.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Nurse's Office	1	Packaged AC	1.50		Yes	1	Packaged AC	1.50		14.00		No	0.34	582	0.0	$94.97	$3,403.44	$138.00	34.39
Ground floor, Outdoors	CR 3, 4	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.38	491	0.0	$80.23	$5,984.88	$368.00	70.01
Ground floor, Outdoors	CR 5, 6, 7	1	Split-System AC	3.00		Yes	1	Split-System AC	3.00		14.00		No	0.29	369	0.0	$60.18	$4,488.66	$276.00	70.01
Ground floor, Outdoors	CR 2	1	Split-System AC	5.00		Yes	1	Split-System AC	5.00		14.00		No	0.48	614	0.0	$100.29	$7,481.10	$460.00	70.01
Ground floor, Outdoors	CR 1	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.38	491	0.0	$80.23	$5,984.88	$368.00	70.01
Ground floor, Outdoors	CR 10	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.38	491	0.0	$80.23	$5,984.88	$368.00	70.01
Ground floor, Outdoors	CR 9	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.38	491	0.0	$80.23	$5,984.88	$368.00	70.01

		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
Ground floor, Outdoors	Unknown	1	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground floor, Outdoors	CR 11	1	Split-System AC	5.00		Yes	1	Split-System AC	5.00		14.00		No	0.48	614	0.0	$100.29	$7,481.10	$460.00	70.01
Ground floor, Outdoors	CR 12	1	Split-System AC	5.00		Yes	1	Split-System AC	5.00		14.00		No	0.48	614	0.0	$100.29	$7,481.10	$460.00	70.01
Ground floor, Outdoors	CR 17	1	Split-System AC	5.00		Yes	1	Split-System AC	5.00		14.00		No	0.48	614	0.0	$100.29	$7,481.10	$460.00	70.01
Ground floor, Outdoors	CR 16	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.38	491	0.0	$80.23	$5,984.88	$368.00	70.01
Ground floor, Outdoors	CR 13	1	Split-System AC	5.00		Yes	1	Split-System AC	5.00		14.00		No	0.48	614	0.0	$100.29	$7,481.10	$460.00	70.01
Ground floor, Outdoors	CR 15	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.38	491	0.0	$80.23	$5,984.88	$368.00	70.01
Ground floor, Outdoors	CR 14	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.38	491	0.0	$80.23	$5,984.88	$368.00	70.01
Ground floor, Outdoors	CR 24	1	Split-System AC	2.00		Yes	1	Split-System AC	2.00		14.00		No	0.19	246	0.0	$40.12	$2,992.44	$184.00	70.01
Ground floor, Outdoors	CR 22	1	Split-System AC	5.00		Yes	1	Split-System AC	5.00		14.00		No	0.48	614	0.0	$100.29	$7,481.10	$460.00	70.01
Ground floor, Outdoors	CR 18	1	Split-System AC	5.00		Yes	1	Split-System AC	5.00		14.00		No	0.48	614	0.0	$100.29	$7,481.10	$460.00	70.01
Ground floor, Outdoors	CR 19	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.38	491	0.0	$80.23	$5,984.88	$368.00	70.01
Ground floor, Outdoors	CR 21	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.38	491	0.0	$80.23	$5,984.88	$368.00	70.01
Ground floor, Outdoors	CR 20	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.38	491	0.0	$80.23	$5,984.88	$368.00	70.01
Roof	Art Room	1	Split-System AC	2.50		Yes	1	Split-System AC	2.50		14.00		No	0.57	737	0.0	$120.35	$3,740.55	$230.00	29.17

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
Mechanical Room	School	4	Non-Condensing Hot Water Boiler	924.00	Yes	4	Condensing Hot Water Boiler	924.00	91.00%	Et	0.00	0	187.6	$2,150.89	$88,716.65	$8,131.20	37.47

DHW Inventory & Recommendations

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

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
School	58	Faucet Aerator (Kitchen)	2.50	2.20	0.00	0	17.1	$196.26	$415.86	$0.00	2.12

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
Kitchen	1	Medium Temp Freezer (0F to 30F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Conditi	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 (16 - 30 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Ice Maker Inventory & Recommendations

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

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Electric Convection Oven (Full Size)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Steamer	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	4	Insulated Food Holding Cabinet (Full Size)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Combination Oven/Steam Cooker (<15 Pans)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

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

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
School	81	Computer + Monitor	170.0	No
School	4	Printer (small)	20.0	No
School	1	Printer (medium)	267.5	No
School	4	Printer (large)	515.0	No
Classrooms	17	Projector	300.0	No
School	1	Refrigerator (small)	100.0	No
School	2	Refrigerator (medium)	300.0	No
School	2	Refrigerator (large)	600.0	No
School	1	Coffee Machine	400.0	No
School	2	Television (LCD 42")	150.0	No
School	189	laptops	40.0	no

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Deerfield Township Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 60,300
Built: 1958

For Year Ending: October 31, 2017
Date Generated: April 27, 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
Deerfield Township Elementary School 419 Morton Ave Rosenhayn, New Jersey 08352	Deerfield Township Elementary School 419 Morton Ave Rosenhayn, NJ 08352 (____)____-_____	Melanie Allen 419 Morton Ave Rosenhayn, NJ 08352 856-451-2804 pgoray@trcsolutions.com

Property ID: 6260411

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
69 kBtu/ft²

Source EUI
144.5 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	2,077,548 (50%)
Electric - Grid (kBtu)	2,080,246 (50%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	71.6
National Median Source EUI (kBtu/ft²)	150
% Diff from National Median Source EUI	-4%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	341

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)