Local Government Energy Audit:
Energy Audit Report

Bright Beginnings Learning Center

Educational Services Commission of New Jersey

1660 Stelton Road
Piscataway, NJ 08854

March 21, 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 Bright Beginnings Learning Center. The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

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

1.1 Facility Summary

Bright Beginnings Learning Center (BBLC) is a two (2) story, 50,900 square foot facility comprised of various space types. These spaces include classrooms, offices, gym, locker rooms, restrooms, break rooms, and mechanical spaces

Lighting consists mostly of aging and inefficient T8 linear fluorescent lamps and fixtures. Heating and cooling is supplied by five (5) air handling units served by one (1) chiller and two (2) hot water boilers. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated eight (8) measures which together represent an opportunity to reduce annual energy costs by $5,387 and annual greenhouse gas emissions by 37,018 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 17.3 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Bright Beginnings Learning Center's annual energy use by 4%.

Figure 1 – Previous 12 Month Utility Costs

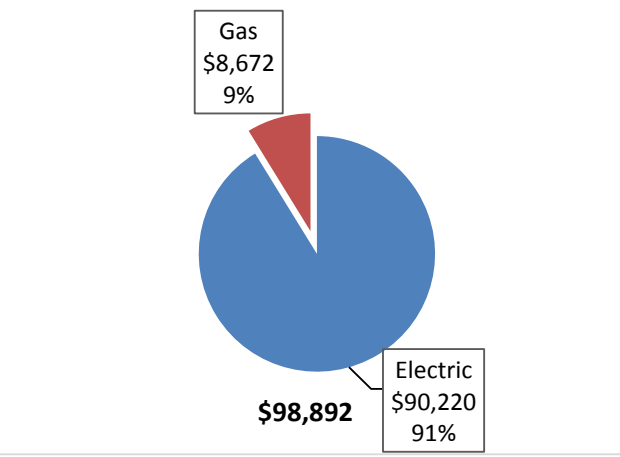
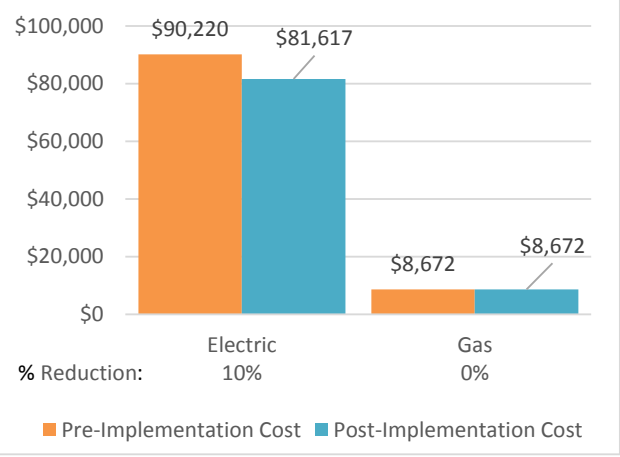


Figure 2 – Potential Post-Implementation Costs



A detailed description of 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			**29,060**	**6.6**	**0.0**	**$4,258.07**	**$76,158.82**	**$4,965.00**	**$71,193.82**	**16.7**	**29,263**
ECM 1	Install LED Fixtures	Yes	5,615	2.5	0.0	$822.79	$64,058.48	$3,600.00	$60,458.48	73.5	5,654
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	500	0.1	0.0	$73.33	$856.00	$80.00	$776.00	10.6	504
ECM 3	Retrofit Fixtures with LED Lamps	Yes	22,742	4.1	0.0	$3,332.42	$10,706.56	$1,285.00	$9,421.56	2.8	22,901
ECM 4	Install LED Exit Signs	Yes	201	0.0	0.0	$29.52	$537.78	$0.00	$537.78	18.2	203
Lighting Control Measures			**6,090**	**1.1**	**0.0**	**$892.31**	**$25,650.00**	**$3,325.00**	**$22,325.00**	**25.0**	**6,132**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	6,090	1.1	0.0	$892.31	$25,650.00	$3,325.00	$22,325.00	25.0	6,132
Variable Frequency Drive (VFD) Measures			**21,951**	**1.9**	**0.0**	**$3,216.48**	**$7,213.60**	**$0.00**	**$7,213.60**	**2.2**	**22,105**
ECM 6	Install VFDs on Chilled Water Pumps	Yes	21,951	1.9	0.0	$3,216.48	$7,213.60	$0.00	$7,213.60	2.2	22,105
Electric Chiller Replacement			**39,174**	**17.5**	**0.0**	**$5,740.14**	**$78,778.03**	**$7,200.00**	**$71,578.03**	**12.5**	**39,448**
ECM 7	Install High Efficiency Chillers	Yes	39,174	17.5	0.0	$5,740.14	$78,778.03	$7,200.00	$71,578.03	12.5	39,448
Plug Load Equipment Control - Vending Machine			**1,612**	**0.0**	**0.0**	**$236.18**	**$230.00**	**$0.00**	**$230.00**	**1.0**	**1,623**
ECM 8	Vending Machine Control	Yes	1,612	0.0	0.0	$236.18	$230.00	$0.00	$230.00	1.0	1,623
TOTALS			**97,886**	**27.1**	**0.0**	**$14,343.19**	**$188,030.45**	**$15,490.00**	**$172,540.45**	**12.0**	**98,571**

* - 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 measures save energy by reducing the power used by the lighting components due to improved electrical efficiency.

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

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 than usage of 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 Chiller measures generally involve replacing older inefficient hydronic chillers with modern energy efficient systems. New chillers can provide equivalent cooling compared to older chillers at a reduced energy cost. These measures save energy by reducing chiller energy usage, due to improved electrical and heat transfer efficiency.

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

Energy Efficient Practices

TRC also identified 12 low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Bright Beginnings Learning Center include:

- Close Doors and Windows
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Use Fans to Reduce Cooling Load
- Assess Chillers & Request Tune-Ups
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- 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 Bright Beginnings Learning Center. Based on the configuration of the site and its loads there is a high potential for installing PV at the site and a low potential for combined heat and power self-generation measures.

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Direct Install)
- 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.

This facility may also qualify for the Direct Install program which can provide turnkey installation of multiple measures, through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70% of the cost of selected measures, although measure eligibility will have to be assessed and be verified by the designated Direct Install contractor and, in most cases, they will perform the installation work.

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

Additional information on relevant incentive programs is located in Section 8. You may also check the following website for more details: www.njcleanenergy.com/ci

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Patrick M. Moran	Buisiness Manager	pmoran@escnj.k12.nj.us	732-777-9848
TRC Energy Services			
Moussa Traore	Auditor	MTraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On March 21, 2017, TRC performed an energy audit at Bright Beginnings Learning Center located in Piscataway, New Jersey. TRC's auditor met with Patrick Moran, Business Manager to review the facility operations and help focus our investigation on specific energy-using systems.

Bright Beginnings Learning Center (BBLC) is a two (2) story, 50,900 square foot facility comprised of various space types. These space types include classrooms, offices, gym, locker rooms, restrooms, break rooms, and mechanical spaces

2.3 Building Occupancy

The building is open Monday through Friday 12 months a year. The typical schedule is presented in the table below.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Bright Beginnings Learning Center	Weekday	7:30 am - 5:30 pm
Bright Beginnings Learning Center	Weekend	closed

2.4 Building Envelope

The building is constructed of concrete masonry with a brick façade and has a pitched roof covered with composite shingles. It has double pane windows that show little sign of excessive air infiltration. The exterior doors are constructed of aluminum and overall, the building envelope was found to be in good condition.

2.5 On-Site Generation

Bright Beginnings Learning Center does not have any 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

Lighting is provided mostly by 32-Watt, linear fluorescent T8 lamps with electronic ballasts as well as some U-tube T8s and compact fluorescent lamps (CFL). Most of the fixtures are 4-foot long troffers with diffusers containing 2 lamps or 3 lamps. Nearly all of the fixtures are manually controlled with wall switches.

Most of the building's exit signs have been converted to LED, though some fluorescent signs remain. Exterior lighting at the facility consists of fixtures with metal halide lamps with photocell controls.

Hot Water Heating System

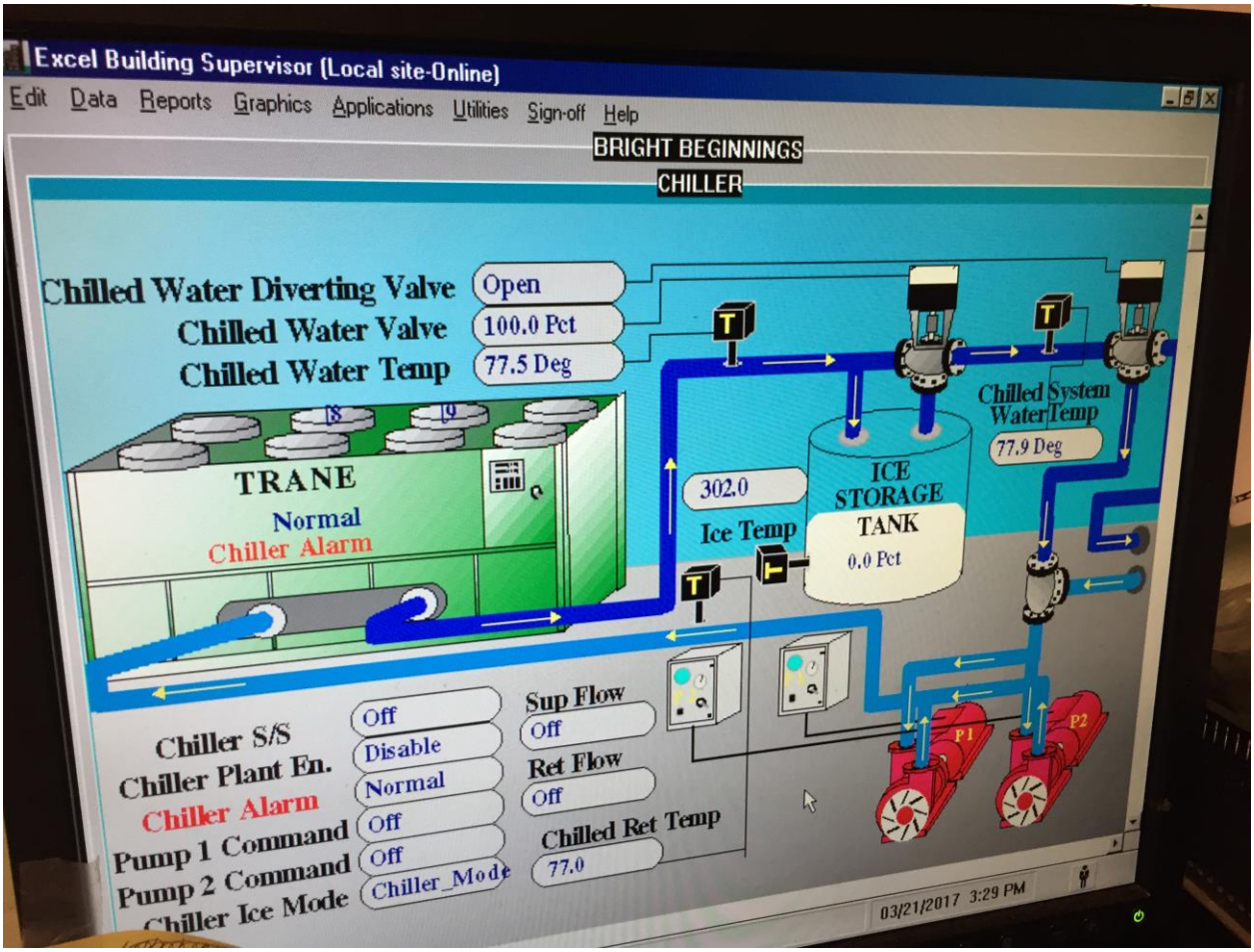
The heating hot water system consists of two (2) PK Mach 1,320 kBtu/hr output condensing boilers that operate in a lead lag configuration. The boilers have a nominal combustion efficiency of 88%. They are configured in a variable flow primary distribution with two (2) 7.5 horsepower hot water pumps (HHWP 1 & 2). Hot water is distributed throughout the building to various forced-air HVAC units via a closed-loop, two-pipe hot water distribution system. Overall, the boilers are in good condition and are well maintained.

The boilers operate ten (10) hours a day, Monday through Friday. The boilers are controlled by the building energy management system (BEMS), but it was noted that the system is problematic and there are no reset strategies currently in place.

Chilled Water System

The chilled water plant consists of one (1) Trane air-cooled screw chiller with an 80 ton capacity. The chiller is configured to operate in either a chilled glycol mode or an ice generation mode. The glycol is distributed by two (2) 7.5 horsepower (hp) variable speed pumps and is valved into three in-ground ice storage tanks as well as the main distribution system, depending on the mode of operation. The chillers are also controlled by the BEMS.

During ice generation, sub-freezing glycol is directed into an ice storage tank and back to the chiller. During ice discharge mode, the chiller remains off while glycol chilled water is directed through the ice storage tank and then out to the cooling coils in the air handling units. During chilled glycol mode, the glycol is directed to the cooling coils in the air handling units and bypassed around ice storage tank. The system is configured such that the ice storage tank can supplement the chiller when in chilled glycol mode. The typical temperature for the glycol chilled water supply temperature is 28°F during ice making at night. The kW demand is then reduced during peak periods when supplemented by melting the ice.



Air Handling Units (AHUs)

Conditioned air and ventilation is supplied by five (5) AHUs that have chilled glycol coils, hot water coils, and outside air economizers. Each unit has a 10 hp supply fan equipped with VFDs for variable flow. There are no return fans. The AHUs and terminal units are controlled by the BEMS.

The AHUs serve 25 VAV terminal units with reheat coils served by hot water from the boilers. There are 20 fan coils with both heating and cooling coils that serve spaces throughout the facility with ventilation air. This air is supplied by five (5) energy recovery units.

The data room is cooled by two (2) split systems, each less than 3 tons.

Building Energy Management System (BEMS)

The majority of the facility is controlled with a Honeywell Excel 5000 building energy management system (BEMS). BEMS screenshots show the HVAC system, but as noted from the site, it is not working at its fullest functionality.

Domestic Hot Water Heating System

Domestic hot water is provided by one (1) A.O Smith water heater with an input rating of 200 kBtu/hr and a thermal efficiency of 97% with a 100 gallon storage tank.

Food Service & Laundry Equipment

The kitchen has a half-size Garland electric high-efficiency convection oven and a Hotpoint electric range. There is medium temperature Victory freezer. There are five (5) non-commercial refrigerators of various brands as well.

Laundry equipment includes one (1) non-commercial GE washing machine and one (1) dryer.

Building Plug Load

There are 47 computer work stations throughout the facility. Ninety percent of the computers are desktop units with LCD monitors. There is no centralized PC power management software installed.

Other plug load equipment includes 28 printers, five (5) copy machines, 21 microwaves, two (2) water fountains, three (3) coffee machines, and a vending machine.

2.7 Water-Using Systems

There are 10 restrooms at this facility. A sampling of restrooms found that faucets are rated for 2.2 gallons per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush (gpf) and the urinals are rated at 2 gpf.

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

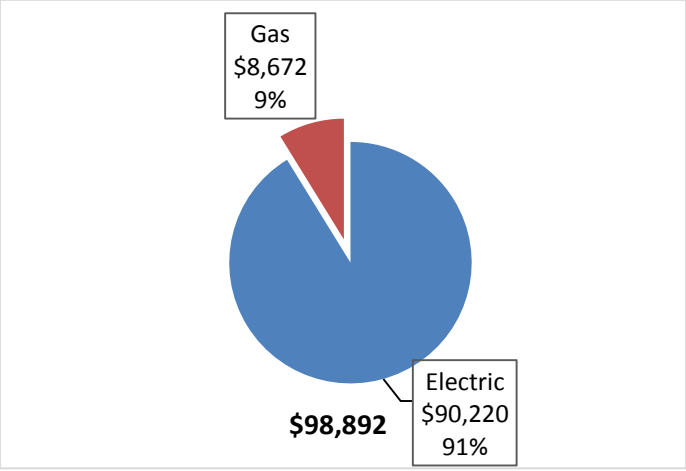
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Bright Beginnings Learning Center		
Fuel	**Usage**	**Cost**
Electricity	615,716 kWh	$90,220
Natural Gas	9,788 Therms	$8,672
Total		**$98,892**

The current annual energy cost for this facility is $98,892 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.147/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 8 - Electric Usage & Demand

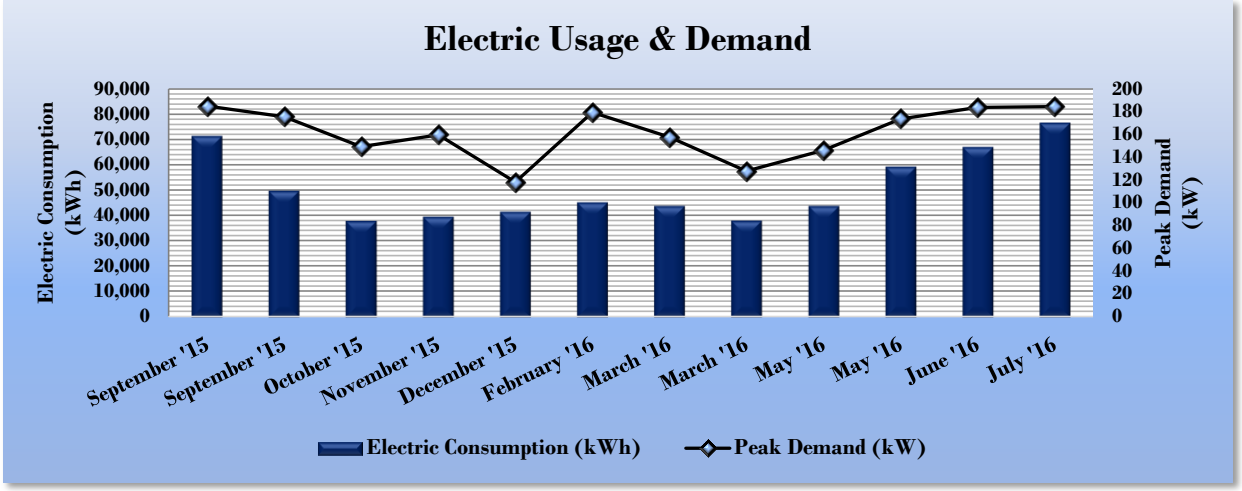


Figure 9 - Electric Usage & Demand

Electric Billing Data for Bright Beginnings Learning Center					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
9/16/15	29	71,148	185	$4,416	$15,163
10/14/15	28	49,637	176	$637	$6,785
11/12/15	29	37,840	149	$541	$5,293
12/15/15	33	39,424	160	$578	$5,375
1/15/16	31	41,422	118	$428	$5,288
2/16/16	32	45,106	179	$650	$5,931
3/16/16	29	43,741	158	$575	$5,655
4/15/16	30	37,964	128	$468	$4,926
5/18/16	33	43,756	146	$535	$5,617
6/15/16	28	59,086	174	$2,149	$8,883
7/15/16	30	66,869	184	$2,276	$9,885
8/15/16	31	76,349	185	$2,284	$10,924
Totals	**363**	**612,342**	**185**	**$15,538**	**$89,726**
Annual	**365**	**615,716**	**185**	**$15,623**	**$90,220**

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.886/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 10 - Natural Gas Usage

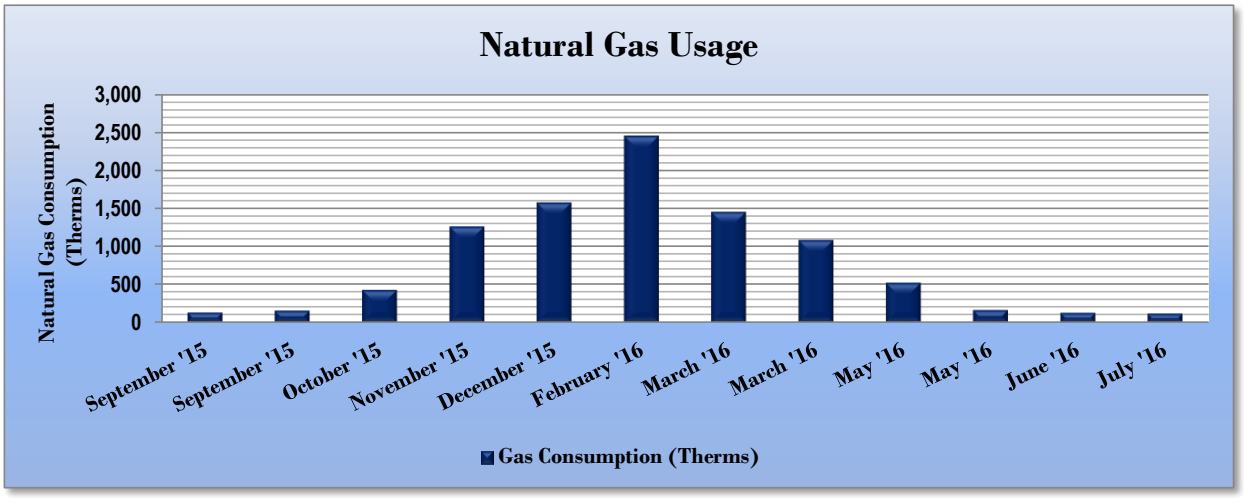


Figure 11 - Natural Gas Usage

Gas Billing Data for Bright Beginnings Learning Center			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
9/16/15	29	130	$94
10/14/15	27	154	$126
11/12/15	28	425	$346
12/15/15	32	1,259	$1,010
1/15/16	30	1,574	$1,281
2/16/16	31	2,447	$2,715
3/16/16	28	1,451	$1,204
4/15/16	29	1,080	$840
5/18/16	32	518	$406
6/15/16	27	161	$134
7/15/16	29	125	$107
8/15/16	30	115	$99
Totals	**352**	**9,439**	**$8,363**
Annual	**365**	**9,788**	**$8,672**

3.4 Benchmarking

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

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

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Bright Beginnings Learning Center	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	149.8	141.4
Site Energy Use Intensity (kBtu/ft^2)	60.5	58.2

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Bright Beginnings Learning Center	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	137.4	141.4
Site Energy Use Intensity (kBtu/ft^2)	56.6	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. Your building is not one of the building categories that are eligible to receive a score. This facility produced a score of 39 which seems low for a building of this type and age. This low score should be further investigated.

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

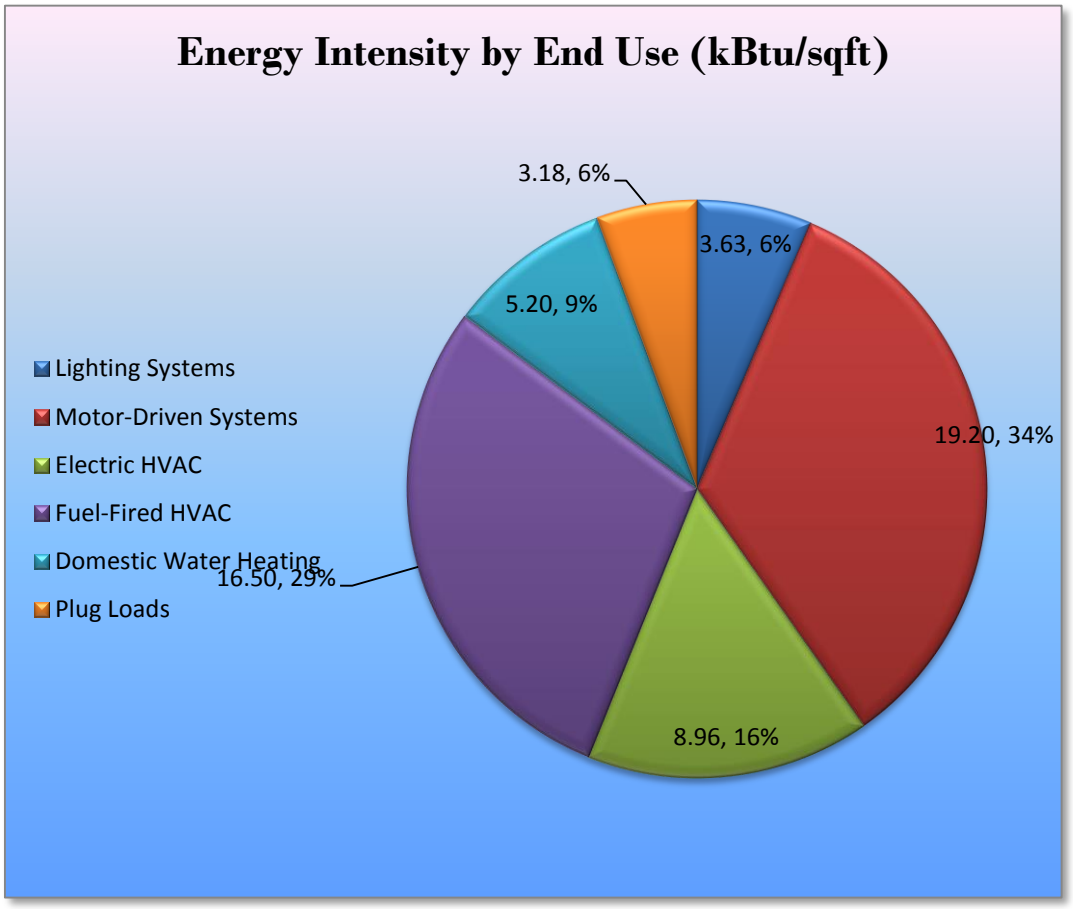
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.5 Energy End-Use Breakdown

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

Figure 14 - Energy Balance (kBtu/SF)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Bright Beginnings Learning Center 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 (P4P), or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

4.1 Recommended ECMs

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

Figure 15 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**29,060**	**6.6**	**0.0**	**$4,258.07**	**$76,158.82**	**$4,965.00**	**$71,193.82**	**16.7**	**29,263**
ECM 1	Install LED Fixtures	5,615	2.5	0.0	$822.79	$64,058.48	$3,600.00	$60,458.48	73.5	5,654
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	500	0.1	0.0	$73.33	$856.00	$80.00	$776.00	10.6	504
ECM 3	Retrofit Fixtures with LED Lamps	22,742	4.1	0.0	$3,332.42	$10,706.56	$1,285.00	$9,421.56	2.8	22,901
ECM 4	Install LED Exit Signs	201	0.0	0.0	$29.52	$537.78	$0.00	$537.78	18.2	203
Lighting Control Measures		**6,090**	**1.1**	**0.0**	**$892.31**	**$25,650.00**	**$3,325.00**	**$22,325.00**	**25.0**	**6,132**
ECM 5	Install Occupancy Sensor Lighting Controls	6,090	1.1	0.0	$892.31	$25,650.00	$3,325.00	$22,325.00	25.0	6,132
Variable Frequency Drive (VFD) Measures		**21,951**	**1.9**	**0.0**	**$3,216.48**	**$7,213.60**	**$0.00**	**$7,213.60**	**2.2**	**22,105**
ECM 6	Install VFDs on Chilled Water Pumps	21,951	1.9	0.0	$3,216.48	$7,213.60	$0.00	$7,213.60	2.2	22,105
Electric Chiller Replacement		**39,174**	**17.5**	**0.0**	**$5,740.14**	**$78,778.03**	**$7,200.00**	**$71,578.03**	**12.5**	**39,448**
ECM 7	Install High Efficiency Chillers	39,174	17.5	0.0	$5,740.14	$78,778.03	$7,200.00	$71,578.03	12.5	39,448
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$236.18**	**$230.00**	**$0.00**	**$230.00**	**1.0**	**1,623**
ECM 8	Vending Machine Control	1,612	0.0	0.0	$236.18	$230.00	$0.00	$230.00	1.0	1,623
TOTALS		**97,886**	**27.1**	**0.0**	**$14,343.19**	**$188,030.45**	**$15,490.00**	**$172,540.45**	**12.0**	**98,571**

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

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

4.1.1 Lighting Upgrades

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

Figure 16 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**29,060**	**6.6**	**0.0**	**$4,258.07**	**$75,688.42**	**$4,965.00**	**$70,723.42**	**16.6**	**29,263**
ECM 1	Install LED Fixtures	5,615	2.5	0.0	$822.79	$64,058.48	$3,600.00	$60,458.48	73.5	5,654
ECM 2	Retrofit Fixtures with LED Lamps	23,243	4.1	0.0	$3,405.75	$11,092.16	$1,365.00	$9,727.16	2.9	23,405
ECM 3	Install LED Exit Signs	201	0.0	0.0	$29.52	$537.78	$0.00	$537.78	18.2	203

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	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	5,615	2.5	0.0	$822.79	$64,058.48	$3,600.00	$60,458.48	73.5	5,654

Measure Description

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

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

Summary of Measure Economics

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps

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	23,243	4.1	0.0	$3,405.75	$11,092.16	$1,365.00	$9,727.16	2.9	23,405
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing fluorescent T5 fixtures by removing fluorescent tubes and replacing them with LEDs, which are designed to be used retrofitted fluorescent fixtures. The measure uses the existing fixture housing 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 and more than ten (10) times longer than many incandescent lamps.

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	22,742	4.1	0.0	$3,332.42	$10,706.56	$1,285.00	$9,421.56	2.8	22,901
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing linear fluorescent T8 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.

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	201	0.0	0.0	$29.52	$537.78	$0.00	$537.78	18.2	203
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

4.1.2 Lighting Control Measures

Figure 17 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**6,090**	**1.1**	**0.0**	**$892.31**	**$25,650.00**	**$3,325.00**	**$22,325.00**	**25.0**	**6,132**
ECM 5	Install Occupancy Sensor Lighting Controls	6,090	1.1	0.0	$892.31	$25,650.00	$3,325.00	$22,325.00	25.0	6,132

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)
6,090	1.1	0.0	$892.31	$25,650.00	$3,325.00	$22,325.00	25.0	6,132

Measure Description

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

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

4.1.3 Variable Frequency Drive Measures

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

Figure 18 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**21,951**	**1.9**	**0.0**	**$3,216.48**	**$7,213.60**	**$0.00**	**$7,213.60**	**2.2**	**22,105**
ECM 6	Install VFDs on Chilled Water Pumps	21,951	1.9	0.0	$3,216.48	$7,213.60	$0.00	$7,213.60	2.2	22,105

ECM 6: Install VFDs on Chilled Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
21,951	1.9	0.0	$3,216.48	$7,213.60	$0.00	$7,213.60	2.2	22,105

Measure Description

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

For systems with variable chilled water flow through the chiller, the minimum flow to prevent the chiller from tripping off will have to be determined during the final project design. The control system should be programmed to maintain the minimum flow through the chiller and to prevent pump cavitation.

4.1.4 Electric Chiller Replacement

ECM 7: Install High Efficiency Chillers

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)
39,174	17.5	0.0	$5,740.14	$78,778.03	$7,200.00	$71,578.03	12.5	39,448

Measure Description

We recommend replacing older inefficient electric chillers with new high efficiency chillers. The type of chiller to be installed depends on the magnitude of the cooling load and variability of the cooling load profile. Positive displacement chillers are usually under 600 tons of cooling capacity and centrifugal chillers generally start at 150 tons of cooling capacity. Constant speed chillers should be used to meet cooling loads with little or no variation while variable speed chillers are more efficient for variable cooling load profiles. Water-cooled chillers are more efficient than air-cooled chillers but require cooling towers and additional pumps to circulate the cooling water. In any given size range variable speed chillers tend to have better partial load efficiency, but worse full load efficiency, than constant speed chillers.

The savings result from the improvement in chiller efficiency and matching the right type of chiller to the cooling load. The energy savings associated with this measure is based on the cooling capacity of the new chiller, the improvement in efficiency compared with the base case equipment, the cooling load profile, and the estimated annual operating hours of the chiller before and after the upgrade. Energy savings are maximized by proper selection of new equipment based on the cooling load profile.

4.1.5 Plug Load Equipment Control - Vending Machines

ECM 8: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,612	0.0	0.0	$236.18	$230.00	$0.00	$230.00	1.0	1,623

Measure Description

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

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.

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.

Develop a Lighting Maintenance Schedule

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

Ensure Lighting Controls Are Operating Properly

Lighting controls are very cost-effective, energy-efficient devices, when installed and operating correctly. As part of a lighting maintenance schedule, lighting controls should be tested annually to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight sensors, maintenance involves cleaning of sensor lenses and confirming setpoints and sensitivity are appropriately configured.

Use Fans to Reduce Cooling Load

Utilizing ceiling fans to supplement cooling is a low cost strategy to reduce cooling load considerably. Thermostat settings can be increased by 4°F with no change in overall occupant comfort when the wind chill effect of moving air is employed for cooling.

Assess Chillers & Request Tune-Ups

Chillers are responsible for a substantial portion of a commercial building's overall energy usage. When components of a chiller are not optimized, this can quickly result in a noticeable increase in energy bills. Chiller diagnostics can produce a 5% to 10% cost avoidance potential from discovery and implementation of low/no cost optimization 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.

Check for and Seal Duct Leakage

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

Perform Proper Boiler Maintenance

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

Perform Proper Water Heater Maintenance

At least once a year, drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Once a year check for any leaks or heavy corrosion on the pipes and valves. For gas water heaters, check the draft hood and make sure it is placed properly, with a few inches of air space between the tank and where it connects to the vent. Look for any corrosion or wear on the gas line and on the piping. If you notice 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 (3) to four (4) years old have a technician inspect the sacrificial anode annually.

Plug Load Controls

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

Water Conservation

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

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

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.

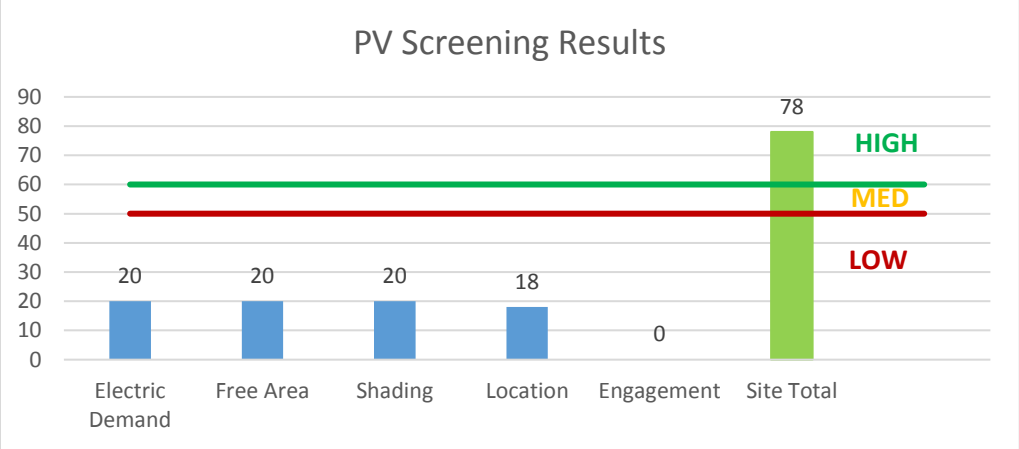
6.1 Photovoltaic

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 high potential for installing a PV array.

In order to be cost-effective, a solar PV array needs certain minimum criteria, such as flat or south-facing rooftop or other unshaded space on which to place the PV panels. In our opinion, the facility does appear to meet these minimum criteria for cost-effective PV installation.

Figure 19 - Photovoltaic Screening



Potential	High	
System Potential	160	kW DC STC
Electric Generation	190,619	kWh/yr
Displaced Cost	$16,580	/yr
Installed Cost	$416,000	

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

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

6.2 Combined Heat and Power

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

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

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

Low and infrequent thermal load are the most significant factors contributing to the potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

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

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.

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

Figure 20 - 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 VFDs on Chilled Water Pumps	x		x			
ECM 7	Install High Efficiency Chillers	x		x			
ECM 8	Vending Machine Control			x			

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

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Direct Install

Overview

Direct Install is a turnkey program available to existing small- to medium-sized facilities with a peak electric demand that does not exceed 200 kW for any recent 12-month period. You will work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and provide a clear scope of work for installation of selected measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives and controls.

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Direct Install participants will also be held to a fiscal year cap of $250,000 per entity.

How to Participate

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

Since Direct Install offers a free assessment of eligible measures, Direct Install is also available to small businesses and other commercial facilities that may not be eligible for the more detailed facility audits provided by LGEA.

Detailed program descriptions and applications can be found at: www.njcleanenergy.com/DI.

8.3 SREC Registration Program

The SREC 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 into 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 description 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
202, 220A, 216, 230, 223, 214, storage, Acct ofc, Bus. Ofc	95	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	62	3,200	Relamp	Yes	95	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,240	2.60	14,578	0.0	$2,136.14	$22,027.50	$3,085.00	8.87
220	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	None	93	3,200	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,240	0.49	2,762	0.0	$404.74	$6,032.40	$845.00	12.82
Acct. ofc	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	None	114	3,200	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,240	0.05	270	0.0	$39.58	$905.13	$125.00	19.71
Asst. ofc, 208, wmn restroom, men restroom, Bus. Ofc, 228, back stairwell	17	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	32	3,200	Relamp	Yes	17	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,240	0.24	1,367	0.0	$200.30	$880.30	$120.00	3.80
vestibule, stairwell, 205, 204, 219	20	U-Bend Fluorescent - T8: U T8 (32W) - 2L	None	62	3,200	Relamp	Yes	20	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,240	0.51	2,863	0.0	$419.52	$2,884.00	$210.00	6.37
232, 231, back stairwell	23	U-Bend Fluorescent - T8: U T8 (32W) - 3L	None	92	3,200	Relamp	Yes	23	LED - Linear Tubes: (3) U-Lamp	Occupancy Sensor	50	2,240	0.86	4,854	0.0	$711.27	$2,917.70	$140.00	3.91
2nd fl corr., 1st fl corr., wm restroom, men restroom	52	Compact Fluorescent: 4-pin 2L	None	26	3,200	None	No	52	Compact Fluorescent: 4-pin 2L	None	26	3,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
2nd fl corr., 1st fl corr., 200 coor., 400 corr., atrium, 300 corr.	12	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	12	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
corr., 200	5	Exit Signs: Fluorescent	None	10	8,760	Fixture Replacement	No	5	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$29.52	$537.78	$0.00	18.22
226, 225, 205	52	Compact Fluorescent: screw-in	None	23	3,200	None	No	52	Compact Fluorescent: screw-in	None	23	3,200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
220	8	Linear Fluorescent - T5: 2' T5 (14W) - 2L	None	34	3,200	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,240	0.12	651	0.0	$95.34	$1,126.00	$115.00	10.60
mezzanine	10	Incandescent: screw-in	None	60	3,200	Relamp	No	10	LED Screw-In Lamps: screws-in lamp	None	6	3,200	0.35	1,987	0.0	$291.18	$439.53	$50.00	1.34
perimeter, parking lot, front entrance	32	Metal Halide: (1) 100W Lamp	Daylight Dimming	128	1,300	Fixture Replacement	No	32	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	45	1,300	1.74	3,971	0.0	$581.83	$62,495.78	$3,200.00	101.91
wall pack	4	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	1,300	Fixture Replacement	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	20	1,300	0.72	1,645	0.0	$240.97	$1,562.71	$400.00	4.83

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
Room 202	Room 202	1	Other	25.0	75.5%	No	4,667	No	75.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Whole Building	2	Chilled Water Pump	7.5	88.5%	No	3,991	No	88.5%	Yes	2	1.91	21,951	0.0	$3,216.48	$7,213.60	$0.00	2.24
Boiler Room	Whole Building	2	Heating Hot Water Pump	7.5	89.5%	Yes	3,991	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Whole Building	2	Heating Hot Water Pump	0.0	78.2%	No	3,345	No	78.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic floor	Gym (AH3)	1	Supply Fan	10.0	89.5%	Yes	3,991	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler room	Lower level core (AH1)	1	Supply Fan	10.0	89.5%	Yes	3,991	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic floor	Lower level offices (AH2)	1	Supply Fan	10.0	89.5%	Yes	3,991	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic floor	Upper level offices (AH4)	1	Supply Fan	10.0	89.5%	Yes	3,991	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic floor	Upper level offices (AH5)	1	Supply Fan	10.0	89.5%	Yes	3,991	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Attic floor	Data room	1	Split-System AC	2.62		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic floor	Data room	1	Split-System AC	2.85		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric Chiller Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Rear building	Whole building	1	Air-Cooled Screw Chiller	80.00	Yes	1	Air-Cooled Screw Chiller	Variable	80.00	1.24	0.74	17.45	39,174	0.0	$5,740.14	$78,778.03	$7,200.00	12.47

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler room	Whole building	2	Condensing Hot Water Boiler	1,320.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

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

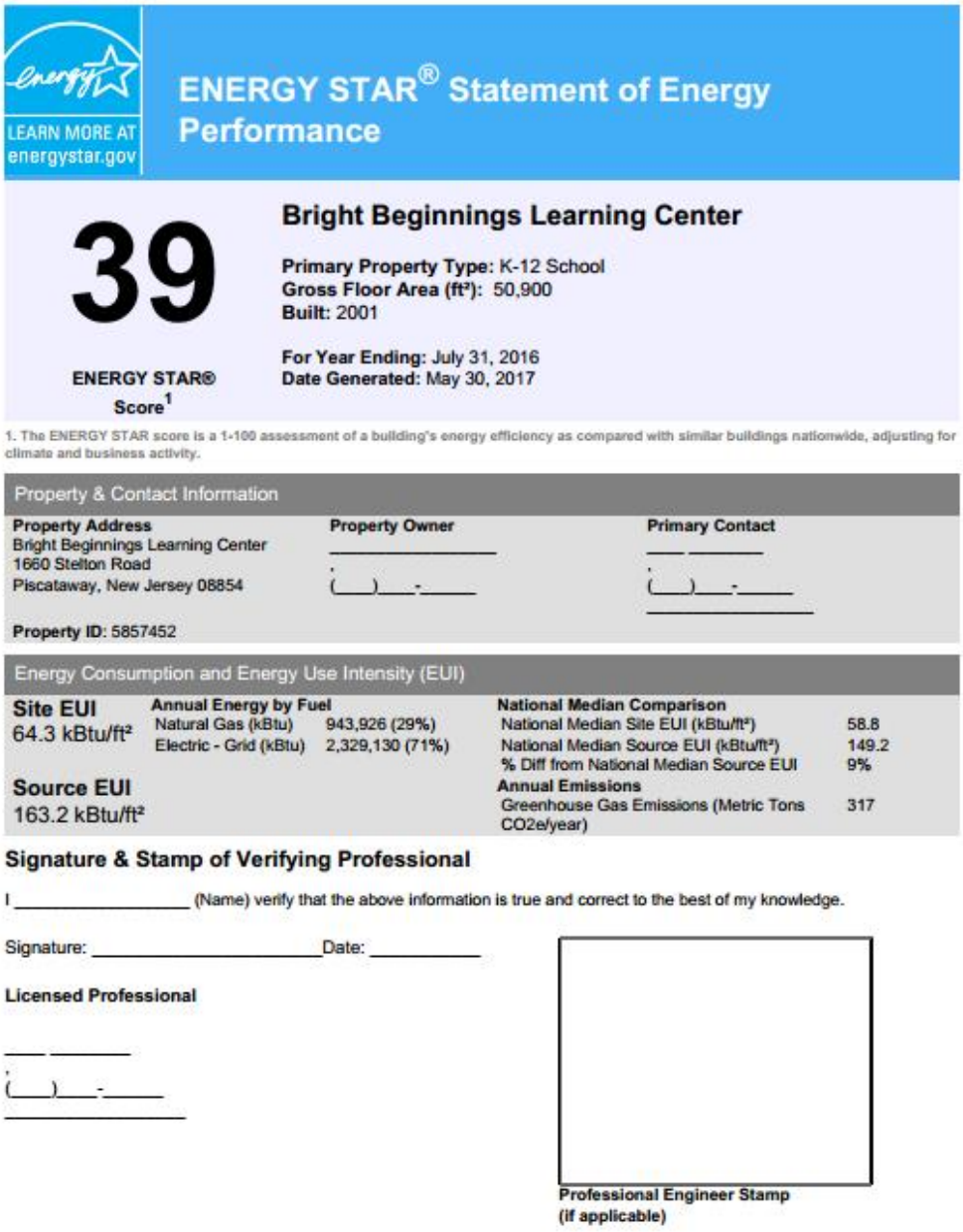
Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Kitchen	1	Medium Temp Freezer (0F to 30F)	920.0	Yes
Kitchen	1	Electric Convection Oven (Half Size)	17,600.0	Yes
Whole building	47	Desktop computer	110.0	Yes
Whole building	21	Microwave	850.0	No
Whole building	17	Small freezer	46.0	Yes
Whole building	5	Copy machines	1,400.0	Yes
Whole building	2	Water fountain	175.0	Yes
Whole building	3	Coffee machine	950.0	Yes
Whole building	5	Refrigerator	225.0	Yes
Whole building	1	Electric range	1,500.0	Yes
Whole building	1	Washing machine	1,400.0	Yes
Whole building	1	Dryer	1,500.0	Yes
Whole building	28	Printers	460.0	Yes

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room F15	1	Refrigerated	Yes	0.00	1,612	0.0	$236.18	$230.00	$0.00	0.97

Appendix B: ENERGY STAR® Statement of Energy Performance



LEARN MORE AT energystar.gov

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Bright Beginnings Learning Center

Primary Property Type: K-12 School
Gross Floor Area (ft²): 50,900
Built: 2001

For Year Ending: July 31, 2016
Date Generated: May 30, 2017

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Bright Beginnings Learning Center 1660 Stelton Road Piscataway, New Jersey 08854	_____ . (___)___-_____	___ _____ . (___)___-_____ _____

Property ID: 5857452

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
64.3 kBtu/ft²

Source EUI
163.2 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	943,926 (29%)
Electric - Grid (kBtu)	2,329,130 (71%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	58.8
National Median Source EUI (kBtu/ft²)	149.2
% Diff from National Median Source EUI	9%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	317

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)