Local Government Energy Audit:
Energy Audit Report

Administrative Office &

Building and Grounds Annex

Marlboro Township Board of Education

1980 Township Drive

Marlboro, New Jersey 07746

October 23, 2018

Final Report by:

TRC Energy Services

Disclaimer

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

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

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

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

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for the Marlboro Township Board of Education Administrative Office & Building and Grounds Annex.

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

The Board of Education Administrative Office was built in 1980 and is a 7,900 square foot single story building comprised of open offices, private offices, faculty lounge, and conference rooms. The Building and Grounds Annex was originally constructed in 1917 and is a 958 square foot building consisting of an open office, a mechanical room, and a kitchenette.

Lighting at the Board of Education Administrative Office & Building and Grounds Annex consists primarily of aging and inefficient 4-foot T8 linear fluorescent lighting. HVAC equipment at the Administrative Office, which for the most part is approaching the end of its useful life, is all electric with the majority of the heating being supplied by electric resistance heaters and a few heat pumps. The HVAC equipment at the Annex was replaced approximately five years ago and consists of an air handler with a gas furnace and direct expansion (DX) split system for cooling. 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 six measures and recommends five measures which together represent an opportunity for the Board of Education Administrative Office & Building and Grounds Annex to reduce annual energy costs by roughly $3,310 and annual greenhouse gas emissions by 23,814 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in roughly 8.4 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 the Board of Education Administrative Office & Building and Grounds Annex's annual energy use by 11%.

Figure 1 – Previous 12 Month Utility Costs

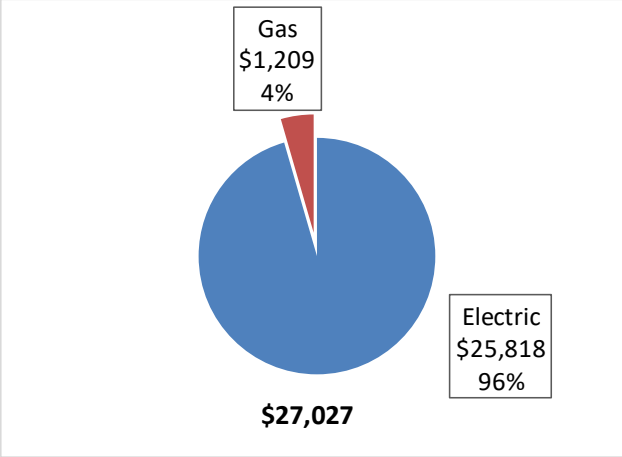
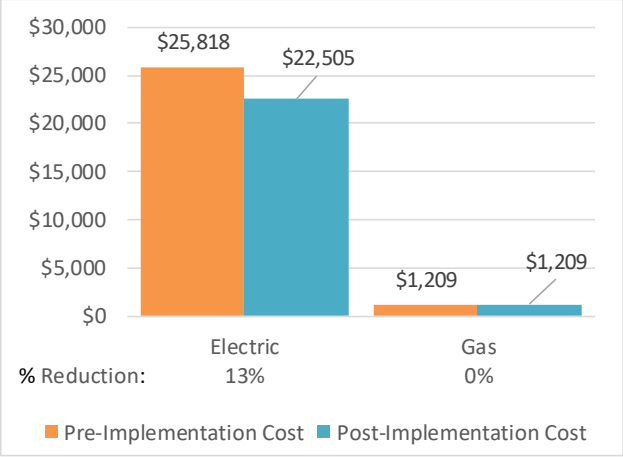


Figure 2 – Potential Post-Implementation Costs



A detailed description of the Board of Education Administrative Office & Building and Grounds Annex'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			**18,612**	**4.8**	**0.0**	**$2,605.40**	**$25,105.57**	**$3,070.00**	**$22,035.57**	**8.5**	**18,742**
ECM 1	Install LED Fixtures	Yes	5,261	0.8	0.0	$736.49	$13,432.22	$910.00	$12,522.22	17.0	5,298
	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	No	16	0.0	0.0	$2.29	$196.00	$10.00	$186.00	81.1	16
ECM 2	Retrofit Fixtures with LED Lamps	Yes	12,599	3.8	0.0	$1,763.61	$10,724.47	$2,150.00	$8,574.46	4.9	12,687
ECM 3	Install LED Exit Signs	Yes	736	0.1	0.0	$103.01	$752.89	$0.00	$752.89	7.3	741
Lighting Control Measures			**3,441**	**1.0**	**0.0**	**$481.61**	**$6,712.00**	**$880.00**	**$5,832.00**	**12.1**	**3,465**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	3,441	1.0	0.0	$481.61	$6,712.00	$880.00	$5,832.00	12.1	3,465
Plug Load Equipment Control - Vending Machine			**1,612**	**0.0**	**0.0**	**$225.63**	**$230.00**	**$0.00**	**$230.00**	**1.0**	**1,623**
ECM 5	Vending Machine Control	Yes	1,612	0.0	0.0	$225.63	$230.00	$0.00	$230.00	1.0	1,623
TOTALS			**23,665**	**5.8**	**0.0**	**$ 3,312.64**	**$ 32,047.57**	**$ 3,950.00**	**$ 28,097.57**	**8.5**	**23,830**
TOTAL OF RECOMMENDED MEASURES			**23,648**	**6**	**0**	**$ 3,310.35**	**$ 31,851.57**	**$ 3,940.00**	**$ 27,911.57**	**8.4**	**23,814**

* - 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.

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 six 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 The Board of Education Administrative Office & Building and Grounds Annex include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean and/or Replace HVAC Filters
- 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 The Board of Education Administrative Office & Building and Grounds Annex. Based on the configuration of the site and its loads there is a low potential for installing any PV and 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 that 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 8.3 for additional information on the ESIP Program.

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

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Cindy Barr-Rague	Business Administration/Board Secretary	cbarr-rague@mtps.org	(732) 972-2000 Ext 2010
Michael Crivelli	Supervisor of Building & Grounds	mcrivelli@mtps.org	(732) 972-2122
TRC Energy Services			
Smruti Srinivasan	Auditor	Ssrinivasan@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On February 28, 2018, TRC performed an energy audit at The Board of Education Administrative Office & Building and Grounds Annex located in Marlboro, New Jersey. TRC's team met with Adam Brown to review the facility operations and help focus our investigation on specific energy-using systems.

The Board of Education Administrative Office was built in 1980 and is a 7,900 square foot single story building comprised of open offices, private offices, faculty lounge, and conference rooms. The Building and Grounds Annex was originally constructed in 1917 and is a 958 square foot building consisting of an open office, mechanical room, and a kitchenette.

Lighting at the Board of Education Administrative Office & Building and Grounds Annex consists primarily of aging and inefficient 4-foot T8 linear fluorescent lighting. HVAC equipment at the Administrative Office, which for the most part is approaching the end of its useful life, is all electric with the majority of the heating being supplied by electric resistance heaters and a few heat pumps. The HVAC equipment at the Annex was replaced approximately 5 years ago and consists of an air handler with a gas furnace and direct expansion (DX) split system for cooling. A thorough description of the facility and our observations are located in Section 2.

2.3 Building Occupancy

Both the office building and annex are open Monday through Friday and closed on the weekends. The typical schedules are presented in the table below. During a typical day, the Administrative Office is occupied by approximately 25 staff members and the Annex has three full time staff members.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Administrative Office	Weekday	8:00 AM - 5:00 PM
Administrative Office	Weekend	Closed
Annex - Buildings & Grounds	Weekday	7:30 AM - 4:30 PM
Annex - Buildings & Grounds	Weekend	Closed

2.4 Building Envelope

The Administrative Office is constructed of concrete block and structural steel with a concrete facade. The Annex is a combination of wood framing and concrete block exterior walls with vinyl siding. Both buildings have pitched roofs with asphalt shingles. The Administrative Office has single pane windows, while the Annex has a mix of both single pane and double pane windows. In general, the windows are in good condition and show little sign of excessive infiltration. However, some of the windows in the Annex appear not to be well-sealed, resulting in some infiltration. The exterior doors are constructed of aluminum and appear in good.

Image 1 – Administrative Office building envelope

Image 2 – Annex building envelope

2.5 On-Site Generation

The Board of Education Administrative Office & Building and Grounds Annex do 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

Interior lighting at the facilities are provided mostly by linear 32-Watt fluorescent T8 lamps with electronic ballasts as well as some compact fluorescent lamps (CFL) and incandescent lamps. Most of the fixtures in the Administrative Office are 4-lamp, 4-foot long troffers with diffusers. The majority of the fixtures at the Annex are 2-Lamp, 4-foot long troffers with diffusers.

Lighting was observed to be all manually controlled with wall switches.

The exterior lighting is minimal and consists primarily of high pressure sodium (HPS) fixtures that are controlled with a timer or manually switched.

Image 3 – General Lighting (Annex)

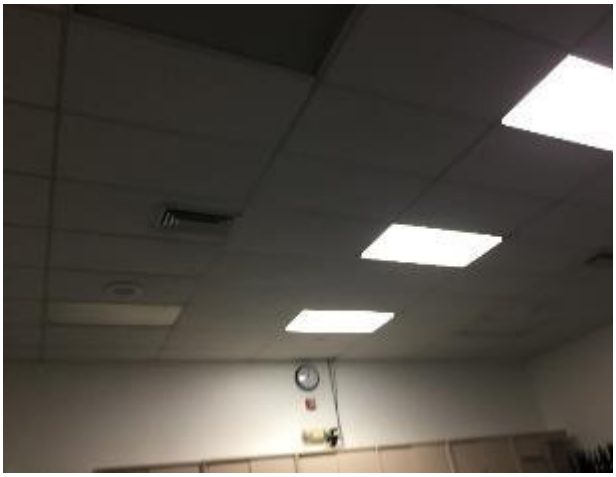


Image 4 – General Lighting (Admin)

Direct Expansion Air Conditioning System (DX)

There are 17 McQuay through-the-wall air conditioners (AC) with 3.2 kW electric resistance heat serving the exterior offices and conference rooms of the Administrative Office. Each through-the-wall AC has on board controls with only "heat" or "cool" options, no temperature settings. The interior of the Administrative Office is conditioned by three 5-ton split-system air-source heat pumps serving three air handling units (AHU) located in the building's attic. These are controlled with programmable thermostats

Image 5 – Heat Pumps (Admin)

Image 6 – Through-Wall AC (Admin)

The Annex is conditioned by a single 3-ton split-system AC serving an AHU with a 100,000 Btuh natural gas condensing furnace. This unit is controlled by an individual programmable thermostat with a heating setpoint of 68°F and a cooling setpoint of 72°F for both occupied and unoccupied periods.

Image 7 – AHU w/Gas Furnace (Annex)

Image 8 – Programmable Thermostat & Split System Condenser (Annex)

Domestic Hot Water Heating System

The domestic hot water heating system for the Administrative Office consists of two electric domestic water heaters, a 30-gallon 7 kW water heater and a 50-gallon 8 kW water heater.

The Annex is served by a single 12-gallon 1.5 kW electric water heater.

Building Plug Load

Between the two buildings there are a total of 38 computer work stations consisting of desktop units with LCD monitors. Neither building has centralized PC power management software installed.

The Administrative Office has a single refrigerated beverage vending machine.

2.7 Water-Using Systems

There are five restrooms between the two buildings, four in the Administrative Office and one in the Annex. A sampling of restrooms and breakroom/kitchenette areas found that the faucets to either be rated for 2.0 gallons per minute (gpm) or 2.2 gpm, the toilets are rated at 1.6 gallons per flush (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

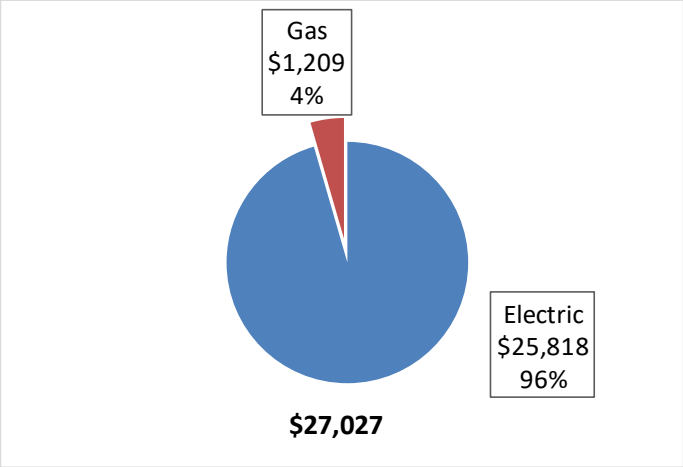
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

nary for Board of Education Administrative Office & Building and Gro		
Fuel	**Usage**	**Cost**
Electricity	184,434 kWh	$25,818
Natural Gas	1,029 Therms	$1,209
Total		**$27,027**

The current annual energy cost for this facility is $27,027 as shown in the chart below.

Figure 7 - Energy Cost Breakdown

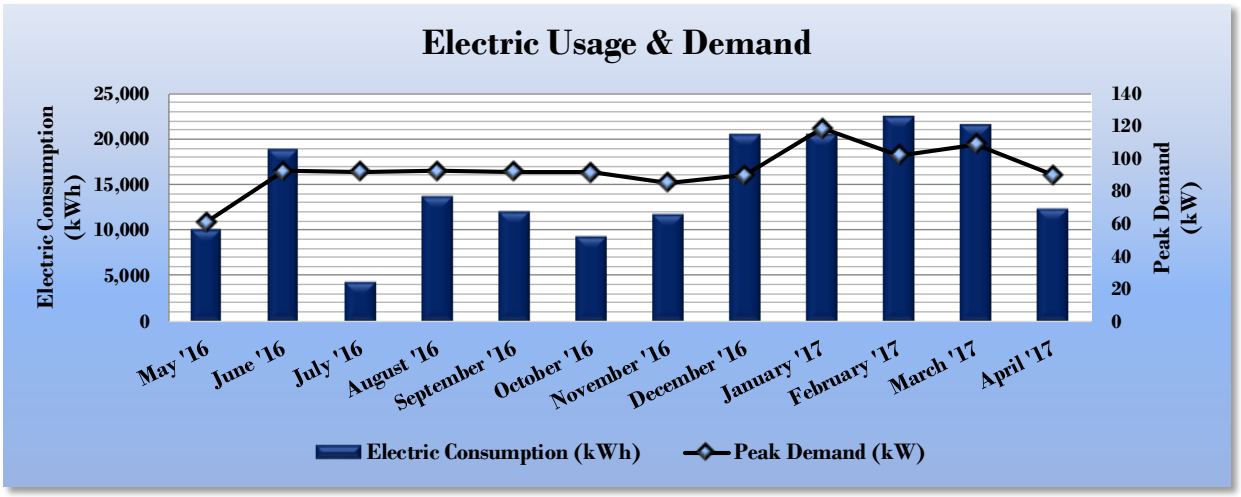


3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was $0.140/kWh, which is the blended rate that includes energy supply, distribution, and other charges, including demand. This rate is used throughout the analyses in this report to assess energy costs and savings. Electric use tends to remain high in the winter. This is likely partially due to the presence of electrical resistance heat. The monthly electricity consumption and peak demand are shown in the three charts below.

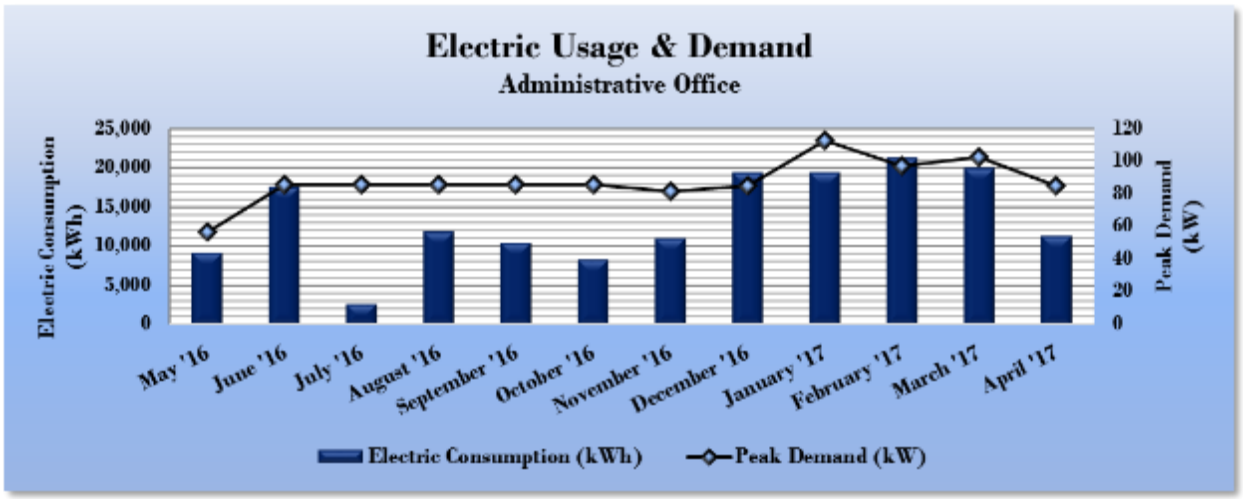
The first chart includes the combined usage for both buildings.

Figure 8 - Electric Usage & Demand both buildings



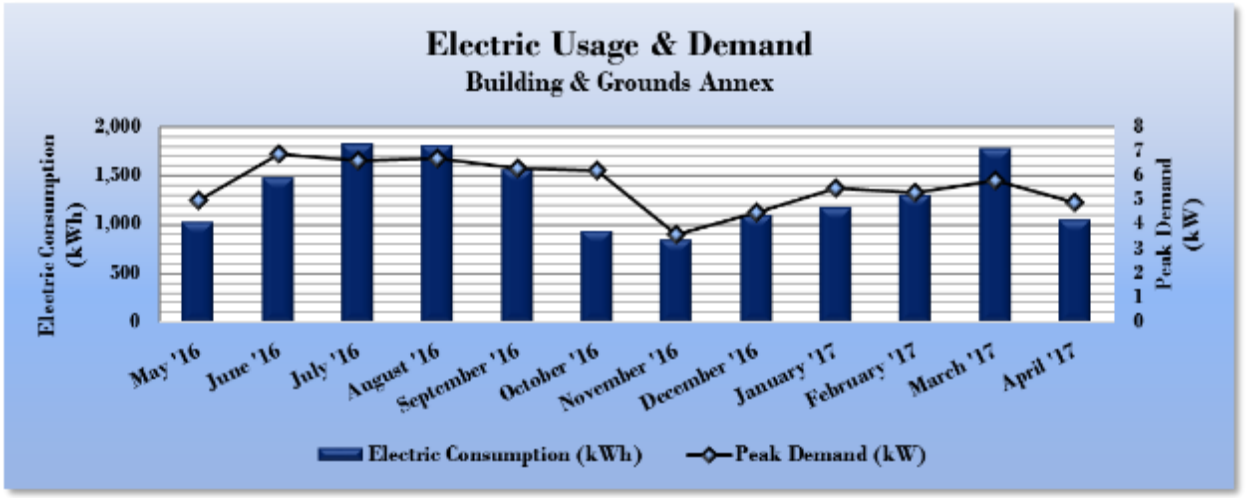
The following chart is for the Administrative Office.

Figure 9-Electric Usage & Demand Administrative Office



The chart below reflects usage by the Buildings & Grounds Annex.

Figure 10-Electric Usage & Demand Building & Grounds Annex



The following chart illustrates the combined utilities for both facilities.

Figure 11 - Electric Usage & Demand for both buildings

Electric Billing Data for Board of Education Administrative Office & Building and Grounds Annex					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
5/24/16	27	10,148	61		$1,405
6/23/16	41	18,918	92		$2,285
7/26/16	20	4,457	92		$828
8/24/16	40	13,726	92		$1,774
9/23/16	20	12,033	92		$1,622
10/25/16	28	9,337	92		$1,335
11/22/16	40	11,804	85		$1,788
12/23/16	20	20,451	90		$2,712
1/25/17	29	20,536	119		$2,966
2/24/17	32	22,502	102		$3,131
3/24/17	27	21,618	109		$3,075
4/24/17	28	12,335	90		$1,977
Totals	**352**	**177,865**	**118.5**	**$0**	**$24,898**
Annual	**365**	**184,434**	**118.5**	**$0**	**$25,818**

3.3 Natural Gas Usage

The Board of Education Administrative Office does not have natural gas service. Natural gas is provided to the Building and Grounds Annex by NJ Natural Gas. The average gas cost for the past 12 months is $1.175/therm, which is the blended rate used throughout the analyses in this report. The gas use profile is consistent with sites where heating energy is the dominant factor in gas consumption. The monthly gas consumption is shown in the chart below.

Figure 12 - Natural Gas Usage

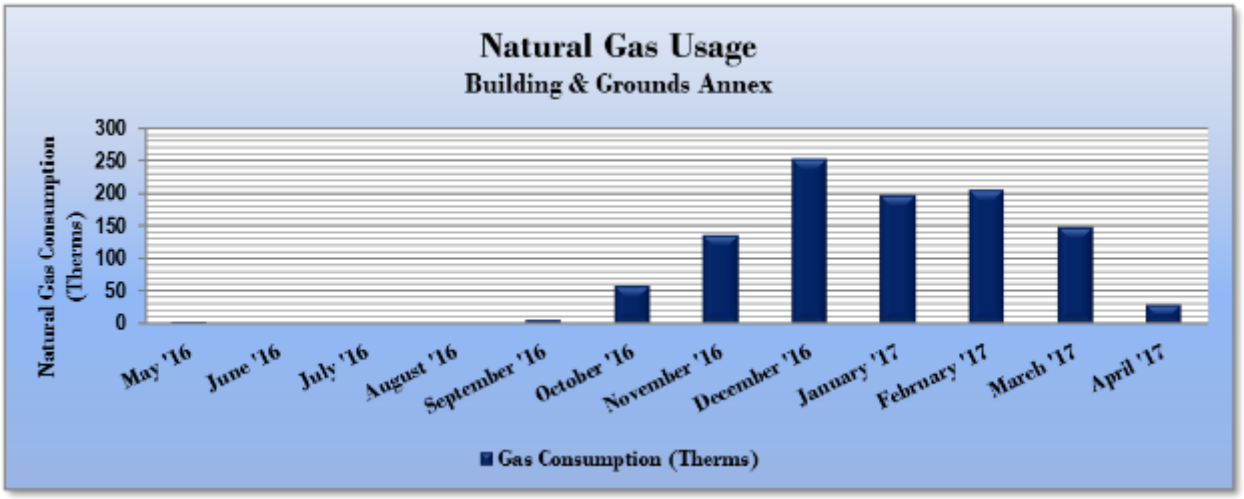


Figure 13 - Natural Gas Usage

Data for Board of Education Administrative Office & Building and Grou			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
6/10/16	30	3	$28
7/13/16	33	0	$25
8/10/16	28	0	$25
9/8/16	29	0	$25
10/7/16	29	5	$30
11/8/16	32	58	$81
12/9/16	31	136	$138
1/11/17	33	251	$231
2/10/17	30	195	$186
3/15/17	33	205	$216
4/11/17	27	147	$171
5/11/17	30	28	$54
Totals	**365**	**1,029**	**$1,209**
Annual	**365**	**1,029**	**$1,209**

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.

The EUI comparison below is based on the combined utilities and reflects both facilities in aggregate.

Figure 14 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Board of Education Administrative Office & Building and Grounds Annex	National Median Building Type: Office
Source Energy Use Intensity (kBtu/ft^2)	235.3	148.1
Site Energy Use Intensity (kBtu/ft^2)	82.7	67.3

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

Figure 15 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Board of Education Administrative Office & Building and Grounds Annex	National Median Building Type: Office
Source Energy Use Intensity (kBtu/ft^2)	206.7	148.1
Site Energy Use Intensity (kBtu/ft^2)	73.6	67.3

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. Based on utilities for the Administrative Office only, the Administrative Office has a current score of 32. The Annex's building type does not currently qualify to receive a score.

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

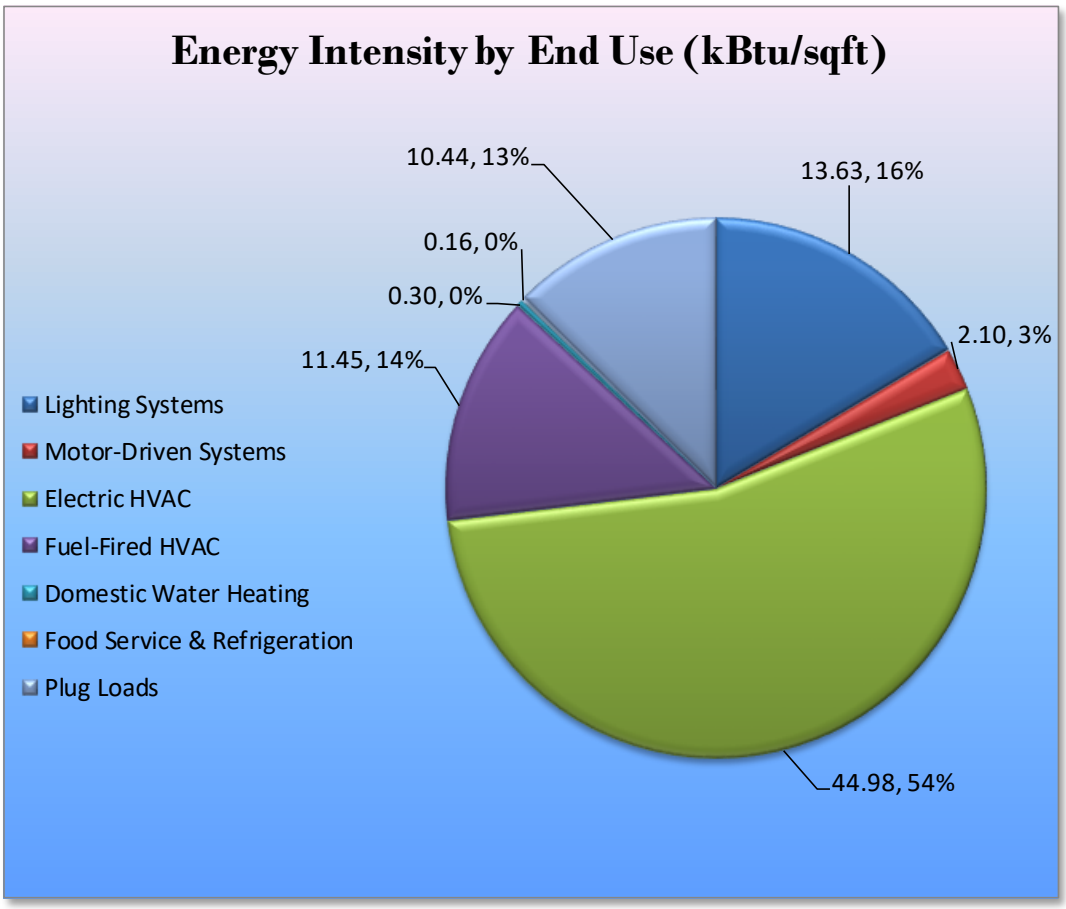
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 for these combined facilities. 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 16 - Energy Balance (% and kBtu/SF)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

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

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 17 – 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		**18,612**	**4.8**	**0.0**	**$2,605.40**	**$25,105.57**	**$3,070.00**	**$22,035.57**	**8.5**	**18,742**
ECM 1	Install LED Fixtures	5,261	0.8	0.0	$736.49	$13,432.22	$910.00	$12,522.22	17.0	5,298
ECM 2	Retrofit Fixtures with LED Lamps	12,599	3.8	0.0	$1,763.61	$10,724.47	$2,150.00	$8,574.46	4.9	12,687
ECM 3	Install LED Exit Signs	736	0.1	0.0	$103.01	$752.89	$0.00	$752.89	7.3	741
Lighting Control Measures		**3,441**	**1.0**	**0.0**	**$481.61**	**$6,712.00**	**$880.00**	**$5,832.00**	**12.1**	**3,465**
ECM 4	Install Occupancy Sensor Lighting Controls	3,441	1.0	0.0	$481.61	$6,712.00	$880.00	$5,832.00	12.1	3,465
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$225.63**	**$230.00**	**$0.00**	**$230.00**	**1.0**	**1,623**
ECM 5	Vending Machine Control	1,612	0.0	0.0	$225.63	$230.00	$0.00	$230.00	1.0	1,623
TOTAL OF RECOMMENDED MEASURES		**23,648**	**6**	**0**	**$ 3,310.35**	**$ 31,851.57**	**$ 3,940.00**	**$ 27,911.57**	**8.4**	**23,814**

* - 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 18 below.

Figure 18 – 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		**18,612**	**4.8**	**0.0**	**$2,605.40**	**$25,105.57**	**$3,070.00**	**$22,035.57**	**8.5**	**18,742**
ECM 1	Install LED Fixtures	5,261	0.8	0.0	$736.49	$13,432.22	$910.00	$12,522.22	17.0	5,298
ECM 2	Retrofit Fixtures with LED Lamps	12,599	3.8	0.0	$1,763.61	$10,724.47	$2,150.00	$8,574.46	4.9	12,687
ECM 3	Install LED Exit Signs	736	0.1	0.0	$103.01	$752.89	$0.00	$752.89	7.3	741

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	5,261	0.8	0.0	$736.49	$13,432.22	$910.00	$12,522.22	17.0	5,298

Measure Description

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

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of HID sources, including high pressure sodium.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	12,599	3.8	0.0	$1,763.61	$10,724.47	$2,150.00	$8,574.46	4.9	12,687
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

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

ECM 3: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	736	0.1	0.0	$103.01	$752.89	$0.00	$752.89	7.3	741
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend replacing all 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 measures are summarized in Figure 19 below.

Figure 19 – 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		**3,441**	**1.0**	**0.0**	**$481.61**	**$6,712.00**	**$880.00**	**$5,832.00**	**12.1**	**3,465**
ECM 5	Install Occupancy Sensor Lighting Controls	3,441	1.0	0.0	$481.61	$6,712.00	$880.00	$5,832.00	12.1	3,465

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

ECM 4: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
3,441	1.0	0.0	$481.61	$6,712.00	$880.00	$5,832.00	12.1	3,465

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in restrooms, storage rooms, offices areas, and conference rooms. 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 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment control measures are summarized in Figure 20 below.

Figure 20-Summary of Plug Load Equipment 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)
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$225.63**	**$230.00**	**$0.00**	**$230.00**	**1.0**	**1,623**
ECM 5	Vending Machine Control	1,612	0.0	0.0	$225.63	$230.00	$0.00	$230.00	1.0	1,623

ECM 5: 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	$225.63	$230.00	$0.00	$230.00	1.0	1,623

Measure Description

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

4.2 ECMs Evaluated But Not Recommended

Measures that were evaluated but not recommended are summarized in Figure 21 below.

Figure 21 Non-Recommended Measures

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		**18,612**	**4.8**	**0.0**	**$2,605.40**	**$25,105.57**	**$3,070.00**	**$22,035.57**	**8.5**	**18,742**
Retrofit Fluorescent Fixtures with LED Lamps and Drivers	No	16	0.0	0.0	$2.29	$196.00	$10.00	$186.00	81.1	16
TOTAL OF NON-RECOMMENDED MEASURES		**16**	**0**	**0**	**$ 2.29**	**$ 196.00**	**$ 10.00**	**$ 186.00**	**81.1**	**16**

* - 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).

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	16	0.0	0.0	$2.29	$196.00	$10.00	$186.00	81.1	16
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 in 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 fluorescent tubes.

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.

Perform Proper Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

Practice Proper Use of Thermostat Schedules and Temperature Resets

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

Clean 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.

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 to "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.

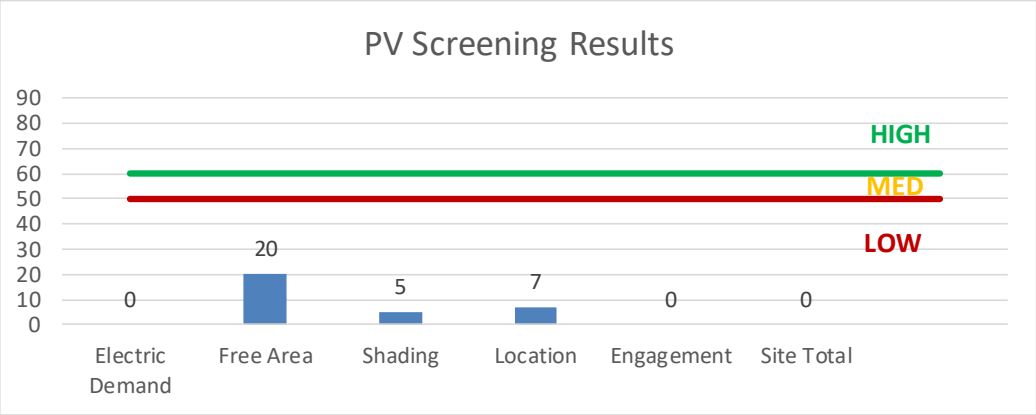
6.1 Photovoltaic

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 a **Low** 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 not appear meet these minimum criteria for cost-effective PV installation.

Figure 22 - Photovoltaic Screening



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

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

6.2 Combined Heat and Power

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

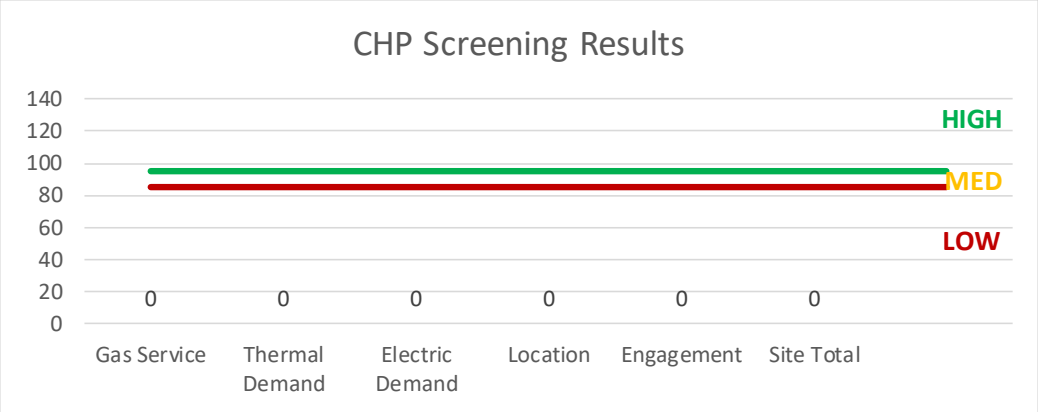
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

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

Low or infrequent thermal loads 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/.

Figure 23 - Combined Heat and Power Screening



7 DEMAND RESPONSE

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

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

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

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

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

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

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

In our opinion, this site is not a good candidate for DR.

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

Figure 24 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	Direct Install
ECM 1	Install LED Fixtures	X	X
ECM 2	Retrofit Fixtures with LED Lamps	X	X
ECM 3	Install LED Exit Signs		X
ECM 4	Install Occupancy Sensor Lighting Controls	X	X
ECM 5	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 Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption. LEUP applicants can use in-house staff or a preferred contractor.

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 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 who 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 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 too 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 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
Wall packs	3	High-Pressure Sodium: (1) 50W Lamp	Wall Switch	66	4,380	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	20	4,380	0.09	607	0.0	$84.98	$1,172.03	$300.00	10.26
Pole fixtures	6	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	4,380	Fixture Replacement	No	6	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	56	4,380	0.63	4,046	0.0	$566.43	$11,717.96	$600.00	19.63
Entrance	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,340	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.01	22	0.0	$3.07	$117.00	$20.00	31.64
Hallway	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,340	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.01	22	0.0	$3.07	$117.00	$20.00	31.64
MRR	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,340	0.04	153	0.0	$21.46	$95.13	$20.00	3.50
WRR	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,340	0.04	153	0.0	$21.46	$95.13	$20.00	3.50
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	260	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	260	0.01	5	0.0	$0.75	$35.90	$5.00	41.47
Curriculum office small	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.23	804	0.0	$112.52	$650.53	$115.00	4.76
Curriculum storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	260	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	260	0.04	17	0.0	$2.38	$95.13	$20.00	31.51
Curriculum office	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.18	603	0.0	$84.39	$555.40	$95.00	5.46
hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.18	603	0.0	$84.39	$555.40	$95.00	5.46
Curriculum office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.12	402	0.0	$56.26	$460.27	$75.00	6.85
Curriculum office comp	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.29	1,005	0.0	$140.65	$745.67	$135.00	4.34
closet	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	260	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	260	0.03	10	0.0	$1.34	$98.00	$5.00	69.33
restrooms staff	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.03	90	0.0	$12.65	$58.50	$10.00	3.83
restrooms staff	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.03	90	0.0	$12.65	$58.50	$10.00	3.83
Curr office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.23	804	0.0	$112.52	$650.53	$115.00	4.76
hallway kitchen	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.18	603	0.0	$84.39	$555.40	$95.00	5.46
Kitchenette	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.23	804	0.0	$112.52	$650.53	$115.00	4.76
Board room	14	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	14	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.82	2,813	0.0	$393.82	$1,871.87	$350.00	3.86
Conference center	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.23	804	0.0	$112.52	$650.53	$115.00	4.76
security room	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.18	603	0.0	$84.39	$555.40	$95.00	5.46
business office suite	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.23	804	0.0	$112.52	$650.53	$115.00	4.76
business office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.12	402	0.0	$56.26	$460.27	$75.00	6.85
business office	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.18	603	0.0	$84.39	$555.40	$95.00	5.46

	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
business office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.23	804	0.0	$112.52	$650.53	$115.00	4.76
business office	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.18	603	0.0	$84.39	$555.40	$95.00	5.46
business office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.12	402	0.0	$56.26	$460.27	$75.00	6.85
tech closet	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	260	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	260	0.03	10	0.0	$1.41	$58.50	$10.00	34.51
personeel	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.12	402	0.0	$56.26	$460.27	$75.00	6.85
HR office suite	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.12	402	0.0	$56.26	$460.27	$75.00	6.85
HR office	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.18	603	0.0	$84.39	$555.40	$95.00	5.46
Copy room	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.18	603	0.0	$84.39	$555.40	$95.00	5.46
Copy room closet	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	260	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	260	0.03	10	0.0	$1.34	$98.00	$5.00	69.33
Superintendent office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.12	402	0.0	$56.26	$460.27	$75.00	6.85
Superintendent office	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,340	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,638	0.18	603	0.0	$84.39	$555.40	$95.00	5.46
Main entrance	8	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Wall Switch	63	2,340	Relamp	No	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,340	0.03	110	0.0	$15.33	$761.07	$160.00	39.21
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	260	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	260	0.04	17	0.0	$2.38	$95.13	$20.00	31.51
Elec. Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	260	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	260	0.09	34	0.0	$4.77	$190.27	$40.00	31.51
Boiler Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.05	181	0.0	$25.29	$117.00	$20.00	3.83
Back Entrance	1	High-Pressure Sodium: (1) 70W Lamp	Wall Switch	95	4,380	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	29	4,380	0.05	341	0.0	$47.70	$271.12	$5.00	5.58
Back entrance hallway	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.03	90	0.0	$12.65	$58.50	$10.00	3.83
Back entrance hallway	3	Compact Fluorescent: CFL (26W) - 1L	Wall Switch	26	2,340	Relamp	No	3	LED Screw-In Lamps: (18W) - 1L	Wall Switch	18	2,340	0.02	64	0.0	$8.97	$161.26	$0.00	17.98
Kitchenette	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.03	90	0.0	$12.65	$58.50	$10.00	3.83
Restroom	1	Compact Fluorescent: CFL (18W) - 1L	Wall Switch	18	2,340	Relamp	No	1	LED Screw-In Lamps: (13W) - 1L	Wall Switch	13	2,340	0.00	15	0.0	$2.07	$53.75	$0.00	25.97
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.03	90	0.0	$12.65	$58.50	$10.00	3.83
Printer office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,638	0.07	228	0.0	$31.96	$233.00	$40.00	6.04
Main office suite	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,638	0.10	342	0.0	$47.94	$291.50	$50.00	5.04
Small office near main suite	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.03	90	0.0	$12.65	$58.50	$10.00	3.83
Janitor closet	1	Incandescent: Incandescent (40W) - 1L	Wall Switch	40	260	Relamp	No	1	LED Screw-In Lamps: Screw-in LED	Wall Switch	6	260	0.03	10	0.0	$1.45	$53.75	$5.00	33.67

	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
Supervisor bldg and grounds	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.11	361	0.0	$50.59	$234.00	$40.00	3.83
Front entrance	1	High-Pressure Sodium: (1) 250W Lamp	Wall Switch	295	4,380	Fixture Replacement	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	89	4,380	0.16	1,058	0.0	$148.13	$271.12	$5.00	1.80
Building	7	Exit Signs: Fluorescent	None	18	8,760	Fixture Replacement	No	7	LED Exit Signs: 2 W Lamp	None	6	8,760	0.07	861	0.0	$120.52	$752.89	$0.00	6.25

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
Attic	building	1	Supply Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	building	2	Supply Fan	1.0	85.5%	No	2,745	No	85.5%	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
Grounds	Interior areas	1	Split-System Air-Source HP	5.00	57.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Grounds	Interior areas	1	Split-System Air-Source HP	5.00	57.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Grounds	Interior areas	1	Split-System Air-Source HP	5.00	57.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Curriculum Office	Curriculum Office Suite	2	Through-The-Wall AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Curriculum Office	Curriculum Office Suite	2	Electric Resistance Heat		10.92	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Curriculum Office	Curriculum Office	2	Through-The-Wall AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Curriculum Office	Curriculum Office	2	Electric Resistance Heat		10.92	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Curriculum Office	Curriculum Office	1	Through-The-Wall AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Curriculum Office	Curriculum Office	1	Electric Resistance Heat		10.92	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Business Office	Bussiness Office Suite	1	Through-The-Wall AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Business Office	Business Office	1	Electric Resistance Heat		10.92	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Business Office	Business Office	1	Through-The-Wall AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Business Office	Business Office	1	Electric Resistance Heat		10.92	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Business Office	Business Office	2	Through-The-Wall AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Business Office	Business Office	2	Electric Resistance Heat		10.92	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Personnel Office	Personnel Office	1	Through-The-Wall AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Personnel Office	Personnel Office	1	Electric Resistance Heat		10.92	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
HR Office	HR Office & Suite	2	Through-The-Wall AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
HR Office	HR Office & Suite	2	Electric Resistance Heat		10.92	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Superintendent Suite & Offices	Superintendent Suite & Offices	3	Through-The-Wall AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Superintendent Suite & Offices	Superintendent Suite & Offices	3	Electric Resistance Heat		10.92	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Entrance Area	Main Entrance Area	2	Through-The-Wall AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Entrance Area	Main Entrance Area	2	Electric Resistance Heat		10.92	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	Building	1	Packaged AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	Building	1	Electric Resistance Heat		61.42	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	Building	2	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	Building	2	Electric Resistance Heat		51.18	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Annex Grounds	Annex Building	1	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

	Existing Conditions				Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Annex Building	Annex Building	1	Furnace	94.00	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
Attic	Entrance Restrooms	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	Staff Lounge & Back Restrooms	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Annex Bldg	Building	1	Storage Tank Water Heater (≤ 50 Gal)	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
Annex - Kitchenette	1	Gas Convection Oven (Half Size)	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?
Offices	35	Desktop PC	270.0	
Offices	7	small - Printer/Copier	50.0	
Offices	12	medium - Printer/Copier	100.0	
Printing Room	2	large - Printer/Copier	150.0	
Conference rms	4	Projector	350.0	
Lounge	1	Microwave	1,500.0	
Lounge	1	small - Refrigerator	126.0	
Lounge	1	medium - Refrigerator	226.0	
Lounge	1	large - Refrigerator	509.0	
Lounge	2	Coffee Machine	900.0	
Lounge	1	Toaster Oven	1,500.0	
Conference / Lounge	2	42" LCD TV	185.0	
Conference rms	2	50" LED TV	85.0	
Offices	2	standing fans	200.0	
Annex Office	3	Desktop PC	270.0	
Annex Office	1	medium - Printer/Copier	100.0	
Annex Office	2	large - Printer/Copier	150.0	
Annex Office	2	paper shredders	146.0	
Annex Breakroom	1	Microwave	1,500.0	
Annex Breakroom	1	large - Refrigerator	509.0	
Annex Breakroom	1	coffee machine	1,500.0	
Annex Breakroom	1	coffee machine	900.0	
Annex Breakroom	1	Toaster Oven	1,500.0	
Annex Breakroom	1	Hot/Cold water dispenser	85.0	

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Hallway	1	Refrigerated	Yes	0.00	1,612	0.0	$225.63	$230.00	$0.00	1.02

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Administration Building

Primary Property Type: Office
Gross Floor Area (ft²): 7,900
Built: 1980

For Year Ending: April 30, 2017
Date Generated: April 04, 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
Administration Building 1980 Township Drive Marlboro, New Jersey 07746	Marlboro Township Board of Education 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000	Cindy Barr-Rague 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org

Property ID: 6275398

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
70 kBtu/ft²

Source EUI
219.9 kBtu/ft²

Annual Energy by Fuel		
Electric - Grid (kBtu)	553,234	(100%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	58
National Median Source EUI (kBtu/ft²)	182.3
% Diff from National Median Source EUI	21%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	61

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)

ENERGY STAR® Statement of Energy Performance

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Building and Grounds Annex

N/A

ENERGY STAR® Score[1]

Primary Property Type: Office
Gross Floor Area (ft²): 958
Built: 1917

For Year Ending: March 31, 2017
Date Generated: April 06, 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
Building and Grounds Annex 48 Menzel Lane Morganville, New Jersey 07751	Marlboro Township Board of Education 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000	Cindy Barr-Rague 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org

Property ID: 6287192

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
162.1 kBtu/ft²

Source EUI
288.6 kBtu/ft²

Annual Energy by Fuel		
Electric - Grid (kBtu)	54,248 (35%)
Natural Gas (kBtu)	101,052 (65%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	83.2
National Median Source EUI (kBtu/ft²)	148.1
% Diff from National Median Source EUI	95%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	11

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)