Local Government Energy Audit:
Energy Audit Report

Administration Building

Montclair Board of Education

22 Valley Road

Montclair, New Jersey 07042

January 3, 2019

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.

Table of Contents

1 Executive Summary 1

1.1 Facility Summary 1
1.2 Your Cost Reduction Opportunities 2

Energy Conservation Measures 2
Energy Efficient Practices 3
On-Site Generation Measures 4

1.3 Implementation Planning 4

2 Facility Information and Existing Conditions 5

2.1 Project Contacts 5
2.2 General Site Information 5
2.3 Building Occupancy 5
2.4 Building Envelope 5
2.5 On-Site Generation 6
2.6 Energy-Using Systems 6

Lighting System 6
Heating System 7
Direct Expansion Air Conditioning System (DX) 7
Domestic Hot Water Heating System 7
Building Plug Load 7

3 Site Energy Use and Costs 8

3.1 Total Cost of Energy 8
3.2 Electricity Usage 9
3.3 Natural Gas Usage 11
3.4 Benchmarking 13
3.5 Energy End-Use Breakdown 14

4 Energy Conservation Measures 15

4.1 High Priority ECMs 15
4.1.1 Lighting Upgrades 16

ECM 1: Install LED Fixtures 16
ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers 17
ECM 3: Retrofit Fixtures with LED Lamps 17

4.1.2 Lighting Control Measures 18

ECM 4: Install Occupancy Sensor Lighting Controls 18
ECM 5: Install High/Low Lighting Controls 19

4.2 Other Evaluated ECM 20

Install High Efficiency Air Conditioning Units 20

5 Energy Efficient Practices 21

Perform Proper Lighting Maintenance 21
Develop a Lighting Maintenance Schedule 21

Clean Evaporator/Condenser Coils on AC Systems 21
Plug Load Controls 21
Water Conservation 22
6 On-Site Generation Measures 23
6.1 Photovoltaic 23
6.2 Combined Heat and Power 24
7 Demand Response 25
8 Project Funding / Incentives 26
8.1 SmartStart 27
8.2 Energy Savings Improvement Program 28
9 Energy Purchasing and Procurement Strategies 29
9.1 Retail Electric Supply Options 29
9.2 Retail Natural Gas Supply Options 29

Appendix A: Equipment Inventory & Recommendations

Appendix B: ENERGY STAR® Statement of Energy Performance

Table of Figures

Figure 1 – Previous 12 Month Utility Costs 2
Figure 2 – Potential Post-Implementation Costs 2
Figure 3 – Summary of Energy Reduction Opportunities 3
Figure 4 – Project Contacts 5
Figure 5 - Building Schedule 5
Figure 6 – Building Façade 5
Figure 7 - Building Lighting Systems 6
Figure 8 – Heating System 7
Figure 9 – DX Air Conditioning System 7
Figure 10 - Utility Summary 8
Figure 11 - Energy Cost Breakdown 8
Figure 12 - Electric Usage & Demand 9
Figure 13 - Electric Usage & Demand 10
Figure 14 - Natural Gas Usage 11
Figure 15 - Natural Gas Usage 12
Figure 16 - Energy Use Intensity Comparison – Existing Conditions 13
Figure 17 - Energy Use Intensity Comparison – Following Installation of Recommended Measures 13
Figure 18 - Energy Balance (% and kBtu/SF) 14
Figure 19 – Summary of High Priority ECMs 15
Figure 20 – Summary of Lighting Upgrade ECMs 16
Figure 21 – Summary of Lighting Control ECMs 18
Figure 22 – Summary of Other Evaluated ECM 20
Figure 23 - ECM Incentive Program Eligibility 26

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for the Administration Building.

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 educational facilities in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

The Administration Building is a 15,714 square foot facility founded in 1879. The building is a three-story educational support facility including but not limited to offices, hallways, restrooms, and conference areas.

Lighting at the facility consists mainly of 32-Watt T8 fluorescent fixtures with a few 40-Watt and 75-Watt T12 fluorescent fixtures; all of which are inefficient in performance when compared to the latest lighting technology available in the market. In addition to linear fluorescent technology, the facility also has several incandescent and compact fluorescent lamps. Exterior lighting is provided by a combination of 100-Watt and 150-Watt high pressure sodium and 200-Watt incandescent lamps. Interior lighting control is provided by a combination of manual switches and occupancy sensors.

Cooling and ventilation is primarily provided by window AC units. Heating is provided by the Central Heating Plant.

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 recommended five measures which together represent an opportunity for the Administration Building to reduce annual energy costs by roughly $3,219 and annual greenhouse gas emissions by 21,260 lbs CO_2e. We estimate that if all high priority measures are implemented as recommended, the project will pay for itself in roughly 4.8 years. TRC has defined high priority measures as the evaluated measures that have a simple payback less than the typical equipment life of the proposed equipment. 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 Administration Building's annual energy use by 10%.

Figure 1 – Previous 12 Month Utility Costs

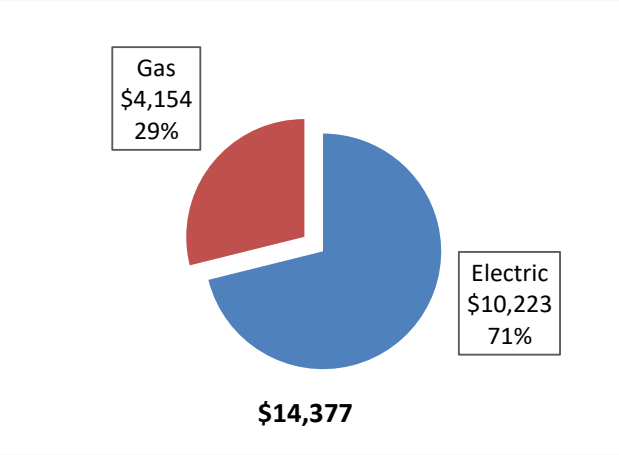
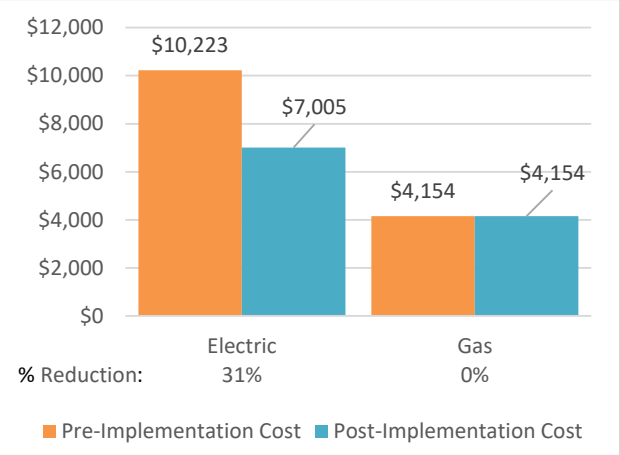


Figure 2 – Potential Post-Implementation Costs



A detailed description of the Administration Building's existing energy use can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the evaluated 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		High Priority?	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			**19,051**	**4.8**	**0.0**	**$2,904.34**	**$15,256.16**	**$2,565.00**	**$12,691.16**	**4.4**	**19,184**
ECM 1	Install LED Fixtures	Yes	2,165	0.3	0.0	$329.99	$1,562.71	$400.00	$1,162.71	3.5	2,180
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	1,461	0.3	0.0	$222.73	$1,758.00	$5.00	$1,753.00	7.9	1,471
ECM 3	Retrofit Fixtures with LED Lamps	Yes	15,425	4.2	0.0	$2,351.62	$11,935.45	$2,160.00	$9,775.45	4.2	15,533
Lighting Control Measures			**2,061**	**0.5**	**0.0**	**$314.21**	**$3,030.00**	**$280.00**	**$2,750.00**	**8.8**	**2,076**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	1,846	0.4	0.0	$281.45	$2,430.00	$280.00	$2,150.00	7.6	1,859
ECM 5	Install High/Low Lighitng Controls	Yes	215	0.0	0.0	$32.76	$600.00	$0.00	$600.00	18.3	216
Electric Unitary HVAC Measures			**5,213**	**4.1**	**0.0**	**$794.78**	**$33,388.64**	**$0.00**	**$33,388.64**	**42.0**	**5,250**
	Install High Efficiency Electric AC	No	5,213	4.1	0.0	$794.78	$33,388.64	$0.00	$33,388.64	42.0	5,250
TOTALS FOR HIGH PRIORITY MEASURES			**21,112**	**5.3**	**0.0**	**$3,218.56**	**$18,286.16**	**$2,845.00**	**$15,441.16**	**4.8**	**21,260**
TOTALS FOR ALL EVALUATED MEASURES			**26,325**	**9.4**	**0.0**	**$4,013.33**	**$51,674.80**	**$2,845.00**	**$48,829.80**	**12.2**	**26,510**

* - 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.

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

Energy Efficient Practices

TRC also identified five 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 Administration Building include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Clean Evaporator/Condenser Coils on AC Systems
- 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 Administration Building. 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
- 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.

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 8.2 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			
Emidio D'Andrea	Business Administrator	edandrea@montclair.k12.nj.us	(973) 509-4050
John Eschmann	Director of Facilities	jeschmann@montclair.k12.nj.us	(973) 509-4044
Designated Representative			
Matthew Wolchko	Project Architect	mwolchko@planetpsa.com	(973) 586-2400
TRC Energy Services			
Thomas Page	Auditor	MTraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On November 09, 2016, TRC performed an energy audit at the Administration Building located in Montclair, New Jersey. TRC's team met with John Eschmann to review the facility operations and help focus our investigation on specific energy-using systems.

The Administration Building is a 15,714 square foot facility founded in 1879. The building is a three-story educational support facility including but not limited to offices, hallways, restrooms, and conference areas.

2.3 Building Occupancy

The typical schedule is presented in the table below.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Administration Building	Weekday	8:00 AM - 6:00 PM
Administration Building	Weekend	unoccupied

2.4 Building Envelope

The Administration Building is a three-story building. The construction is of concrete masonry block with brick exterior and double pane clear windows with operable frames. The slanted roof is constructed of tile roofing material.

Figure 6 – Building Façade

2.5 On-Site Generation

The Administration Building does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

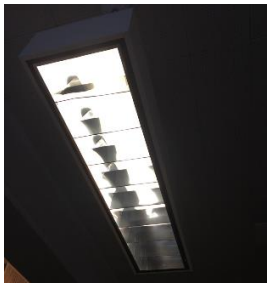
Please see Appendix A: Equipment Inventory & Recommendations for an inventory of the facility's equipment.

Lighting System

Lighting at the Administration Building consists mainly of 32-Watt T8 linear fluorescent fixtures with a few 40-Watt and 75-Watt T12 linear fluorescent fixtures. These sources are inefficient in performance when compared to the latest lighting technology available in the market. The linear fluorescent fixtures are 4-foot or 8-foot long, mainly troffers with diffusers having 1, 2, 3, or 4-lamp configurations. In addition to the fluorescent fixtures, the facility is also served by 17-Watt compact fluorescent lamps and 60-Watt incandescent lamps. All the exit signs are LED fixtures.

Interior lighting control in the building is provided by a combination of manual switches and occupancy sensors.

Figure 7 - Building Lighting Systems

Linear Fluorescent Fixture	*Exterior Fixture*
	

Exterior lighting is provided by a combination of 100-Watt and 150-Watt high pressure sodium fixtures, and 200-Watt incandescent fixtures.

Heating System

The Central Heating Plant has two natural gas fired Weil McLain steam boilers with an input rating of 7,938 MBh each and a nominal efficiency of 80%. These boilers provide space heating for the Hillside School, the Montclair Community Pre-K, and the district Administration Building.

Figure 8 – Heating System

Steam Boiler

Direct Expansion Air Conditioning System (DX)

Air conditioning (AC) at the facility is primarily provided by window AC units with capacities ranging between 0.42 ton and 2 tons and with efficiencies of around 10.0 EER.

Figure 9 – DX Air Conditioning System

Domestic Hot Water Heating System

The domestic hot water heating system for the facility is provided by the Central Heating Plant.

Building Plug Load

The facility contains several plug-load systems which contribute to plug load electric use including but not limited to printers, copiers and microwave.

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

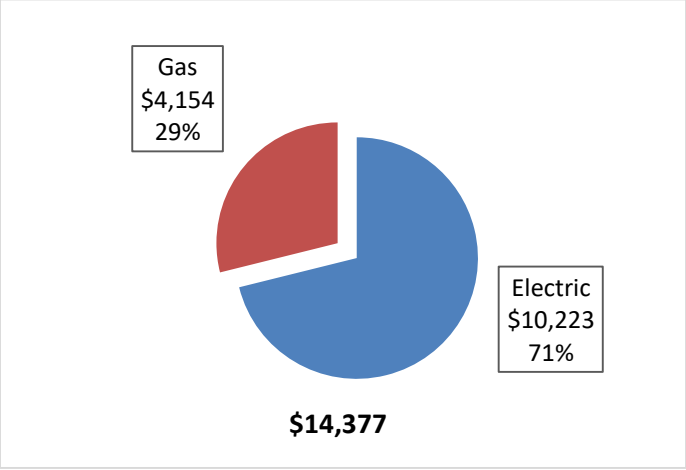
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 10 - Utility Summary

Utility Summary for Administration Building		
Fuel	**Usage**	**Cost**
Electricity	67,061 kWh	$10,223
Natural Gas	5,180 Therms	$4,154
Total		**$14,377**

The current annual energy cost for this facility is $14,377 as shown in the chart below.

Figure 11 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.152/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Electric usage estimation and calibration methodology:

1. The Montclair BOE buildings Hillside School, Administration, Montclair Community Pre-K, and Central Heating Plant are served by three electric meters 65 795 083 02, 67 125 896 06, and 42 007 763 08. There is not a clear delineation of loads served by the meters, therefore demand (kW) was not prorated.
2. Total energy use from all the meters combined is around 638,475 kWh for a 12-month period.
3. Monthly "calculated" energy use from the LGEA analysis tools were used to calculate the percentage contribution of each building. The percentages are:
    a. Hillside School – 70%
    b. Administration Building – 11%
    c. Montclair Community Pre-K – 18%
    d. Central Heating Plant – 1%

The above percentages were applied to the "actual" total monthly energy use from bills to estimate monthly utility energy use to which all the tools were then calibrated.

Figure 12 - Electric Usage & Demand

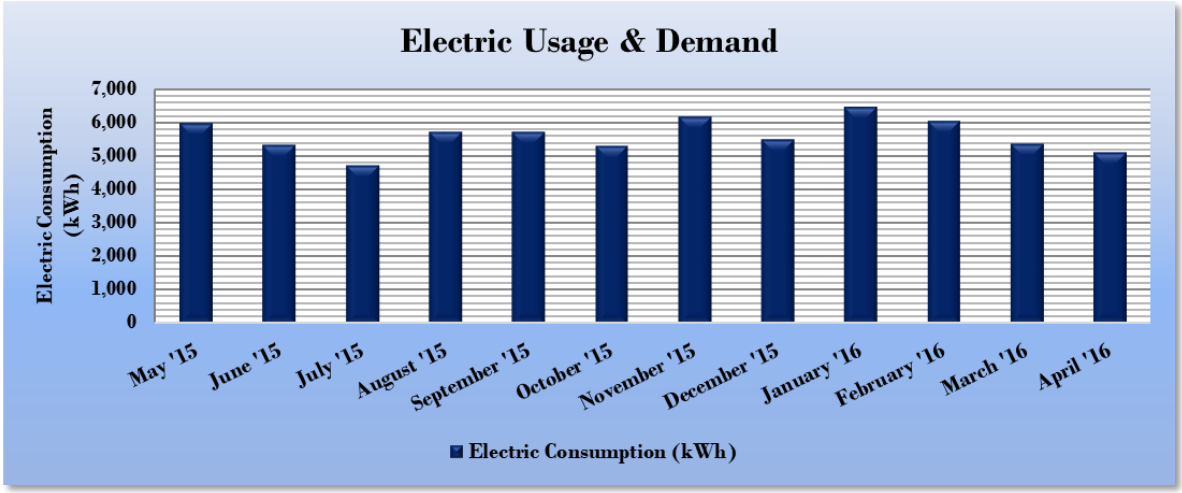


Figure 13 - Electric Usage & Demand

Electric Billing Data for Administration Building				
Period Ending	Days in Period	Electric Usage (kWh)	Total Electric Cost	TRC Estimated Usage?
6/15/15	33	5,955	$1,158	Yes
7/14/15	29	5,311	$1,021	Yes
8/12/15	29	4,697	$897	Yes
9/14/15	33	5,710	$1,048	Yes
10/13/15	29	5,700	$841	Yes
11/10/15	28	5,290	$744	Yes
12/11/15	31	6,172	$846	Yes
1/13/16	33	5,471	$714	Yes
2/11/16	29	6,445	$828	Yes
3/14/16	32	6,026	$774	Yes
4/13/16	30	5,367	$722	Yes
5/13/16	30	5,100	$659	Yes
Totals	**366**	**67,245**	**$10,251**	12
Annual	**365**	**67,061**	**$10,223**	

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.802/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Natural gas use was allocated to the sites served by the Central Heating Plant using the following method:

1. The Administration Building, Hillside School, Montclair Community Pre-K, and Central Heating Plant are served by two gas meters: 65 795 083 02 and 67 125 896 06. There is not a clear delineation of which buildings and equipment are served by each meter.
2. Total annual gas use for both of the meters combined is 59,235 therms.
3. The calculated gas use from the LGEA analysis for each building was used to determine the percentage of the total historical gas use to be assigned to each building. Total gas use was allocated to the three buildings served by the Central Heating Plant as follows:
    a. Hillside School - 75%
    b. Administration Building - 9%
    c. Montclair Community Pre-K - 16%
4. The above percentages were applied to the total monthly gas use from the utility bills to estimate the monthly gas use for the individual buildings. This estimated monthly gas use is what is provided in each of the reports.

Figure 14 - Natural Gas Usage

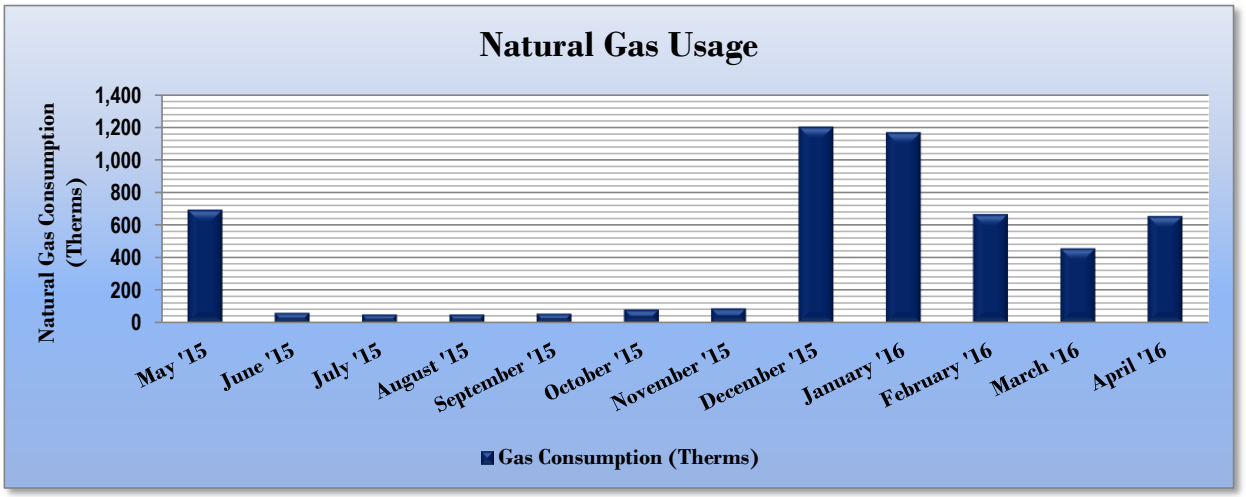


Figure 15 - Natural Gas Usage

Gas Billing Data for Administration Building				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
6/15/15	33	691	$373	Yes
7/14/15	29	58	$117	Yes
8/12/15	29	49	$49	Yes
9/14/15	33	49	$121	Yes
10/13/15	29	54	$75	Yes
11/10/15	28	79	$84	Yes
12/11/15	31	85	$109	Yes
1/13/16	33	1,198	$1,122	Yes
2/11/16	29	1,165	$1,068	Yes
3/14/16	32	663	$452	Yes
4/13/16	30	454	$247	Yes
5/13/16	30	651	$349	Yes
Totals	**366**	**5,194**	**$4,165**	12
Annual	**365**	**5,180**	**$4,154**	

3.4 Benchmarking

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

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

Figure 16 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Administration Building	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	80.3	141.4
Site Energy Use Intensity (kBtu/ft^2)	47.5	58.2

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

Figure 17 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Administration Building	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	65.9	141.4
Site Energy Use Intensity (kBtu/ft^2)	42.9	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. The Central Heating Plant and the three buildings served by it have a combined score of 74.

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

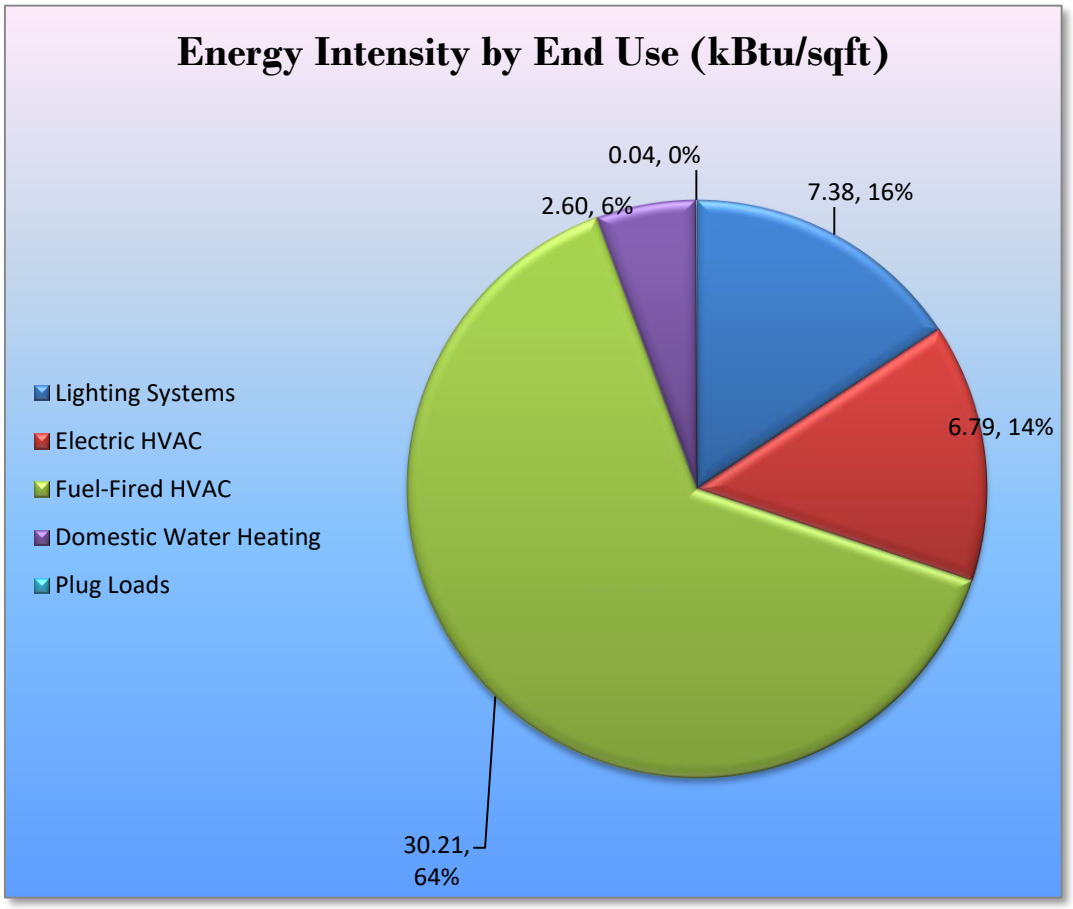
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.5 Energy End-Use Breakdown

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

Figure 18 - 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 Administration Building 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 High Priority ECMs

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

Figure 19 – Summary of High Priority 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		**19,051**	**4.8**	**0.0**	**$2,904.34**	**$15,256.16**	**$2,565.00**	**$12,691.16**	**4.4**	**19,184**
ECM 1	Install LED Fixtures	2,165	0.3	0.0	$329.99	$1,562.71	$400.00	$1,162.71	3.5	2,180
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,461	0.3	0.0	$222.73	$1,758.00	$5.00	$1,753.00	7.9	1,471
ECM 3	Retrofit Fixtures with LED Lamps	15,425	4.2	0.0	$2,351.62	$11,935.45	$2,160.00	$9,775.45	4.2	15,533
Lighting Control Measures		**2,061**	**0.5**	**0.0**	**$314.21**	**$3,030.00**	**$280.00**	**$2,750.00**	**8.8**	**2,076**
ECM 4	Install Occupancy Sensor Lighting Controls	1,846	0.4	0.0	$281.45	$2,430.00	$280.00	$2,150.00	7.6	1,859
ECM 5	Install High/Low Lighitng Controls	215	0.0	0.0	$32.76	$600.00	$0.00	$600.00	18.3	216
TOTALS		**21,112**	**5.3**	**0.0**	**$3,218.56**	**$18,286.16**	**$2,845.00**	**$15,441.16**	**4.8**	**21,260**

* - 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 20 below.

Figure 20 – 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		**19,051**	**4.8**	**0.0**	**$2,904.34**	**$15,256.16**	**$2,565.00**	**$12,691.16**	**4.4**	**19,184**
ECM 1	Install LED Fixtures	2,165	0.3	0.0	$329.99	$1,562.71	$400.00	$1,162.71	3.5	2,180
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,461	0.3	0.0	$222.73	$1,758.00	$5.00	$1,753.00	7.9	1,471
ECM 3	Retrofit Fixtures with LED Lamps	15,425	4.2	0.0	$2,351.62	$11,935.45	$2,160.00	$9,775.45	4.2	15,533

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)	Annual Electric Savings (kWh)	Chilled Water Savings (Ton-Hr)	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)
Exterior	2,165	2,165	0	0.3	0.0	$329.99	$1,562.71	$400.00	$1,162.71	3.5	2,180

Measure Description

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

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a high-pressure sodium fixture.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Annual Electric Savings (kWh)	Chilled Water Savings (Ton-Hr)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	1,461	1,461	0	0.3	0.0	$222.73	$1,758.00	$5.00	$1,753.00	7.9	1,471

Measure Description

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

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

ECM 3: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	14,681	4.1	0.0	$2,238.10	$11,881.70	$2,155.00	$9,726.70	4.3	14,783
Exterior	745	0.1	0.0	$113.51	$53.75	$5.00	$48.75	0.4	750

Measure Description

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

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

4.1.2 Lighting Control Measures

Our recommendations for lighting control measures are summarized in Figure 21 below.

Figure 21 – 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		**2,061**	**0.5**	**0.0**	**$314.21**	**$3,030.00**	**$280.00**	**$2,750.00**	**8.8**	**2,076**
ECM 4	Install Occupancy Sensor Lighting Controls	1,846	0.4	0.0	$281.45	$2,430.00	$280.00	$2,150.00	7.6	1,859
ECM 5	Install High/Low Lighitng Controls	215	0.0	0.0	$32.76	$600.00	$0.00	$600.00	18.3	216

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)
1,846	0.4	0.0	$281.45	$2,430.00	$280.00	$2,150.00	7.6	1,859

Measure Description

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

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

ECM 5: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
215	0.0	0.0	$32.76	$600.00	$0.00	$600.00	18.3	216

Measure Description

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

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

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

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

4.2 Other Evaluated ECM

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

Figure 22 – Summary of Other Evaluated ECM

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures	**5,213**	**4.1**	**0.0**	**$794.78**	**$33,388.64**	**$0.00**	**$33,388.64**	**42.0**	**5,250**
Install High Efficiency Electric AC	5,213	4.1	0.0	$794.78	$33,388.64	$0.00	$33,388.64	42.0	5,250
TOTALS	**5,213**	**4.1**	**0.0**	**$794.78**	**$33,388.64**	**$0.00**	**$33,388.64**	**42.0**	**5,250**

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

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

Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
5,213	4.1	0.0	$794.78	$33,388.64	$0.00	$33,388.64	42.0	5,250

Measure Description

We recommend replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units when cost effective. There have been significant improvements in both compressor and fan motor efficiencies over the past several years. Therefore, electricity savings can be achieved by replacing older units with new high efficiency units. A higher EER or SEER rating indicates a more efficient cooling system. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

Reasons for not Recommending

This measure has a long payback, more than the rated useful life of the replacement equipment. The measure is not recommended for implementation on the basis of energy savings alone.

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.

Clean Evaporator/Condenser Coils on AC Systems

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

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 gallons per minute (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 gallons per flush (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

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 does not have a potential for installing a PV array.

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 does not have a potential for installing a cost-effective CHP system.

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 building is not is 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 23 for a list of the eligible programs identified for each recommended ECM.

Figure 23 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	x					
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x					
ECM 3	Retrofit Fixtures with LED Lamps	x					
ECM 4	Install Occupancy Sensor Lighting Controls	x					
ECM 5	Install High/Low Lighitng Controls						

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 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
exterior	2	High-Pressure Sodium: (1) 100W Lamp	Wall Switch	138	4,380	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	41	4,380	0.11	846	0.0	$129.01	$781.35	$200.00	4.51
exterior	1	Incandescent: INC-200W	Wall Switch	200	4,380	Relamp	No	1	LED Screw-In Lamps: LED-30W	Wall Switch	30	4,380	0.11	856	0.0	$130.54	$53.75	$5.00	0.37
exterior	2	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	215	4,380	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	65	4,380	0.20	1,516	0.0	$231.14	$781.35	$200.00	2.52
Main office	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,729	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.26	787	0.0	$120.04	$702.00	$120.00	4.85
personnel	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,729	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.39	1,181	0.0	$180.06	$1,053.00	$180.00	4.85
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,729	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.09	262	0.0	$40.01	$234.00	$40.00	4.85
Registration	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,470	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.11	474	0.0	$72.23	$504.00	$75.00	5.94
Vault Storage	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	2,470	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,470	0.02	89	0.0	$13.64	$98.00	$5.00	6.82
Director of operations	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,729	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.13	394	0.0	$60.02	$351.00	$60.00	4.85
Small Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,729	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.09	262	0.0	$40.01	$234.00	$40.00	4.85
Small Office	2	Incandescent: INC-60W	Occupancy Sensor	60	1,729	Relamp	No	1	LED Screw-In Lamps: LED-9W	Occupancy Sensor	9	1,729	0.07	221	0.0	$33.65	$53.75	$5.00	1.45
Pupil Services	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,470	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.11	474	0.0	$72.23	$504.00	$75.00	5.94
Sm. Conf Rm	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,470	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.11	474	0.0	$72.23	$504.00	$75.00	5.94
Sm. Conf Rm	2	Incandescent: INC-60W	Wall Switch	60	2,470	Relamp	No	1	LED Screw-In Lamps: LED-9W	Wall Switch	9	2,470	0.07	315	0.0	$48.07	$53.75	$5.00	1.01
Sm Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,729	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.09	262	0.0	$40.01	$234.00	$40.00	4.85
Hallway	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,470	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,729	0.11	474	0.0	$72.23	$434.00	$40.00	5.45
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,470	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,470	0.04	159	0.0	$24.25	$95.13	$20.00	3.10
Front Hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,470	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,729	0.08	355	0.0	$54.17	$375.50	$30.00	6.38
Superintendent Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	1,729	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,729	0.15	445	0.0	$67.90	$380.53	$80.00	4.43
Superintendent Office	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,729	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,729	0.29	886	0.0	$135.04	$676.80	$135.00	4.01
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,470	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,470	0.02	94	0.0	$14.29	$58.50	$10.00	3.39
Basement	3	Incandescent: INC-60W	Wall Switch	60	2,470	Relamp	No	1	LED Screw-In Lamps: LED-9W	Wall Switch	9	2,470	0.11	486	0.0	$74.05	$53.75	$5.00	0.66
Basement	10	Linear Fluorescent - T12: 8' T12 (75W) - 1L	Wall Switch	92	2,470	Relamp & Reballast	Yes	10	LED - Linear Tubes: (1) 8' Lamp	Occupancy Sensor	36	1,729	0.44	1,897	0.0	$289.27	$1,930.00	$35.00	6.55
2nd Floor Landing	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,470	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,729	0.08	355	0.0	$54.17	$375.50	$30.00	6.38
2nd Floor Landing	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	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
2nd Floor Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,729	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.13	394	0.0	$60.02	$351.00	$60.00	4.85
DB1 Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,729	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.09	262	0.0	$40.01	$234.00	$40.00	4.85
Sm Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,729	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,729	0.06	197	0.0	$30.01	$150.40	$30.00	4.01
Open Office	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,729	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.15	459	0.0	$70.02	$409.50	$70.00	4.85
Sm Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,729	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.04	131	0.0	$20.01	$117.00	$20.00	4.85
Sm Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,729	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.06	197	0.0	$30.01	$175.50	$30.00	4.85
2nd Floor Transportation Office	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,729	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.28	853	0.0	$130.04	$760.50	$130.00	4.85
2nd Floor Transportation Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Occupancy Sensor	32	1,729	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,729	0.02	70	0.0	$10.61	$71.80	$10.00	5.83
Payroll 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,729	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,729	0.06	197	0.0	$30.01	$150.40	$30.00	4.01
Payroll 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,729	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,729	0.06	197	0.0	$30.01	$150.40	$30.00	4.01
Sm Office 1	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,470	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,729	0.12	533	0.0	$81.26	$495.60	$80.00	5.11
Sm Office 2	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,729	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,729	0.10	295	0.0	$45.01	$225.60	$45.00	4.01
Sm Office 3	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,729	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,729	0.10	295	0.0	$45.01	$225.60	$45.00	4.01
Copy Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,470	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,470	0.03	141	0.0	$21.44	$75.20	$15.00	2.81
Open Office Back	11	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,470	Relamp	Yes	11	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,729	0.53	2,293	0.0	$349.63	$1,316.47	$255.00	3.04
Open Office Front	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,470	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,729	0.58	2,502	0.0	$381.42	$1,411.60	$275.00	2.98
Open Office Front	1	Compact Fluorescent: CFL-2L-17W	Wall Switch	34	2,470	Relamp	No	1	LED Screw-In Lamps: LED-24W	Wall Switch	24	2,470	0.01	29	0.0	$4.42	$107.51	$0.00	24.34
3rd Floor Hall	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,470	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,470	0.02	94	0.0	$14.29	$58.50	$10.00	3.39
3rd Floor Hall	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
3rd Floor Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,470	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,470	0.02	94	0.0	$14.29	$58.50	$10.00	3.39
3rd Floor Back Office	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,470	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.14	592	0.0	$90.29	$562.50	$85.00	5.29
3rd Floor Back Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,470	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,470	0.01	50	0.0	$7.58	$35.90	$5.00	4.08
Attic Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,470	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,729	0.16	711	0.0	$108.35	$621.00	$60.00	5.18

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
2nf Flr Tec Off	2nf Flr Tec Off	1	Window AC	1.00		Yes	1	Window AC	1.00		12.00		No	0.13	170	0.0	$25.92	$1,088.76	$0.00	42.01
2nfd Flr Brd Rm	2nfd Flr Brd Rm	1	Window AC	1.67		Yes	1	Window AC	1.67		12.00		No	0.22	283	0.0	$43.19	$1,814.60	$0.00	42.01
2nfd Flr Brd Rm	2nfd Flr Brd Rm	1	Window AC	1.25		Yes	1	Window AC	1.25		12.00		No	0.17	213	0.0	$32.40	$1,360.95	$0.00	42.01
2nfd Flr Brd Rm	2nfd Flr Brd Rm	1	Window AC	1.25		Yes	1	Window AC	1.25		12.00		No	0.17	213	0.0	$32.40	$1,360.95	$0.00	42.01
2nfd Flr Brd Rm	2nfd Flr Brd Rm	1	Window AC	1.25		Yes	1	Window AC	1.25		12.00		No	0.17	213	0.0	$32.40	$1,360.95	$0.00	42.01
2nfd Flr Brd Rm	2nfd Flr Brd Rm	1	Window AC	1.00		Yes	1	Window AC	1.00		12.00		No	0.13	170	0.0	$25.92	$1,088.76	$0.00	42.01
2nd Flr Office Closet	2nd Flr Office Closet	1	Window AC	2.08		Yes	1	Window AC	2.08		12.00		No	0.28	354	0.0	$53.99	$2,268.25	$0.00	42.01
A DelGurcio Off 2nd Flr	A DelGurcio Off 2nd Flr	1	Window AC	0.83		Yes	1	Window AC	0.83		12.00		No	0.11	142	0.0	$21.60	$907.30	$0.00	42.01
Bookkeeping 2nd Flr	Bookkeeping 2nd Flr	1	Window AC	0.67		Yes	1	Window AC	0.67		12.00		No	0.09	113	0.0	$17.28	$725.84	$0.00	42.01
Comm Relations 1st Flr	Comm Relations 1st Flr	1	Window AC	0.83		Yes	1	Window AC	0.83		12.00		No	0.11	142	0.0	$21.60	$907.30	$0.00	42.01
D Sullivan Off 2nd Flr	D Sullivan Off 2nd Flr	1	Window AC	0.67		Yes	1	Window AC	0.67		12.00		No	0.09	113	0.0	$17.28	$725.84	$0.00	42.01
DOI 2nd Flr	DOI 2nd Flr	1	Window AC	1.67		Yes	1	Window AC	1.67		12.00		No	0.22	283	0.0	$43.19	$1,814.60	$0.00	42.01
DOI 2nd Flr	DOI 2nd Flr	1	Window AC	1.67		Yes	1	Window AC	1.67		12.00		No	0.22	283	0.0	$43.19	$1,814.60	$0.00	42.01
Dr. Patterson Off 1st Flr	Dr. Patterson Off 1st Flr	1	Window AC	0.67		Yes	1	Window AC	0.67		12.00		No	0.09	113	0.0	$17.28	$725.84	$0.00	42.01
Guy Whtilock 2nd Flr	Guy Whtilock 2nd Flr	1	Window AC	0.58		Yes	1	Window AC	0.58		12.00		No	0.08	99	0.0	$15.12	$635.11	$0.00	42.01
Hallway 1st Flr	Hallway 1st Flr	1	Window AC	1.25		Yes	1	Window AC	1.25		12.00		No	0.17	213	0.0	$32.40	$1,360.95	$0.00	42.01
Hallway 2nd Flr	Hallway 2nd Flr	1	Window AC	1.67		Yes	1	Window AC	1.67		12.00		No	0.22	283	0.0	$43.19	$1,814.60	$0.00	42.01
Jean Wuensch Off 2nd Flr	Jean Wuensch Off 2nd Flr	1	Window AC	0.58		Yes	1	Window AC	0.58		12.00		No	0.08	99	0.0	$15.12	$635.11	$0.00	42.01
Payroll Off 2nd Flr	Payroll Off 2nd Flr	1	Window AC	0.58		Yes	1	Window AC	0.58		12.00		No	0.08	99	0.0	$15.12	$635.11	$0.00	42.01
Payroll Spvsr 2nd Flr	Payroll Spvsr 2nd Flr	1	Window AC	0.58		Yes	1	Window AC	0.58		12.00		No	0.08	99	0.0	$15.12	$635.11	$0.00	42.01

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Personnel Off 1st Flr	Personnel Off 1st Flr	1	Window AC	1.25		Yes	1	Window AC	1.25		12.00		No	0.17	213	0.0	$32.40	$1,360.95	$0.00	42.01
Pupil Svc 1st Flr	Pupil Svc 1st Flr	1	Window AC	0.67		Yes	1	Window AC	0.67		12.00		No	0.09	113	0.0	$17.28	$725.84	$0.00	42.01
Rebecca Roth 1st Flr	Rebecca Roth 1st Flr	1	Window AC	0.67		Yes	1	Window AC	0.67		12.00		No	0.09	113	0.0	$17.28	$725.84	$0.00	42.01
Registration 1st Flr	Registration 1st Flr	1	Window AC	0.58		Yes	1	Window AC	0.58		12.00		No	0.08	99	0.0	$15.12	$635.11	$0.00	42.01
Superintendent Off 1st Flr	Superintendent Off 1st Flr	1	Window AC	1.00		Yes	1	Window AC	1.00		12.00		No	0.13	170	0.0	$25.92	$1,088.76	$0.00	42.01
Supt Board Rm 1st Flr	Supt Board Rm 1st Flr	1	Window AC	1.25		Yes	1	Window AC	1.25		12.00		No	0.17	213	0.0	$32.40	$1,360.95	$0.00	42.01
Supt Board Rm 1st Flr	Supt Board Rm 1st Flr	1	Window AC	1.25		Yes	1	Window AC	1.25		12.00		No	0.17	213	0.0	$32.40	$1,360.95	$0.00	42.01
Supt. Secretary 1st Flr	Supt. Secretary 1st Flr	1	Window AC	0.67		Yes	1	Window AC	0.67		12.00		No	0.09	113	0.0	$17.28	$725.84	$0.00	42.01
Sylvia Bryant 2nd Flr	Sylvia Bryant 2nd Flr	1	Window AC	0.42		Yes	1	Window AC	0.42		12.00		No	0.06	71	0.0	$10.80	$453.65	$0.00	42.01
Terry Scales Off 2nd Flr	Terry Scales Off 2nd Flr	1	Window AC	0.58		Yes	1	Window AC	0.58		12.00		No	0.08	99	0.0	$15.12	$635.11	$0.00	42.01
Terry Scales Off 2nd Flr	Terry Scales Off 2nd Flr	1	Window AC	0.58		Yes	1	Window AC	0.58		12.00		No	0.08	99	0.0	$15.12	$635.11	$0.00	42.01

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Administration	1	Natural Draft Steam Boiler	290.00	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
Mechanical Room	Administration	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Admin	1	Small Printer	20.0	No
Admin	1	Small Copier	20.0	No
Admin	1	Microwave	1,000.0	No
Admin	1	Large Copier	515.0	No

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

74

ENERGY STAR® Score[1]

Montclair Valley Road Campus (4 Buildings)

Primary Property Type: K-12 School
Gross Floor Area (ft²): 172,102
Built: 1879

For Year Ending: April 30, 2016
Date Generated: June 20, 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
Montclair Valley Road Campus (4 Buildings) 22 Valley Road Montclair, New Jersey 07042	Montclair Board of Education 22 Valley Road Montclair, NJ 07042 (973) 509-4050	Steve DiGeronimo 22 Valley Road Montclair, NJ 07042 (973) 509-4050 bfleischer@montclair.k12.nj.us

Property ID: 6364554

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
47.1 kBtu/ft²

Source EUI
76 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	5,917,390 (73%)
Electric - Grid (kBtu)	2,187,666 (27%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	60.1
National Median Source EUI (kBtu/ft²)	97
% Diff from National Median Source EUI	-22%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	557

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)