Local Government Energy Audit:
Energy Audit Report

TRC
Results you can rely on

Hope Academy Charter School

601 Grand Ave
Asbury Park, NJ 07712

April 6, 2018

Final Report by:
TRC Energy Services

Disclaimer

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

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

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

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

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Hope Academy Charter School.

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

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist the Hope Academy Charter School in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Hope Academy Charter School is a 32,500 square foot facility comprised of five floors of classroom space, office areas, a lounge and a dining hall. The building was originally built in 1945 and was taken over by the Hope Academy Charter School seven years ago. The building is in operation year round. Typical Monday through Friday operation is between 7:30 AM and 5:30 PM with after-hours cleaning crew working until 7:30 PM. There is occasional use on Saturdays between 7:30 AM and 1:00 PM and no use on Sundays. The building is occupied by 207 students and about 35 staff members.

Per discussions with facility personnel, the exterior lighting, and heating/cooling distribution system balancing are the main maintenance concern. The building is also very drafty and there are currently flooding issues on the bottom floor around the windows. The heating and cooling equipment is seven years old, appears to be in good condition, however the performance of the system is poor. We assume this largely in part due to the air infiltration around window frames, the location of thermostats, the flex duct work and zone configuration and that the system was not properly balanced during commissioning after installation.

To address these issues we are recommending exterior lighting fixture replacements, building envelope air sealing and consulting a specialty HVAC contractor to perform a thorough retro-commissioning study of the heating/cooling systems and implementing HVAC improvement measures. 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 11 measures which together represent an opportunity for Hope Academy Charter School to reduce annual energy costs by $13,416 and annual greenhouse gas emissions by 100,714 lbs CO_2e. We estimate that if all measures were implemented (including installing a PV System and Energy Management System) the project would pay for itself in 10.5 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 Hope Academy Charter School's annual energy costs by 39%.

We estimate that if all measures were implemented, as recommended (excluding installing a PV System and Energy Management System), the project would pay for itself in 7.7 years and reduce the school's annual energy costs by 36%.

Figure 1 – Previous 12 Month Utility Costs

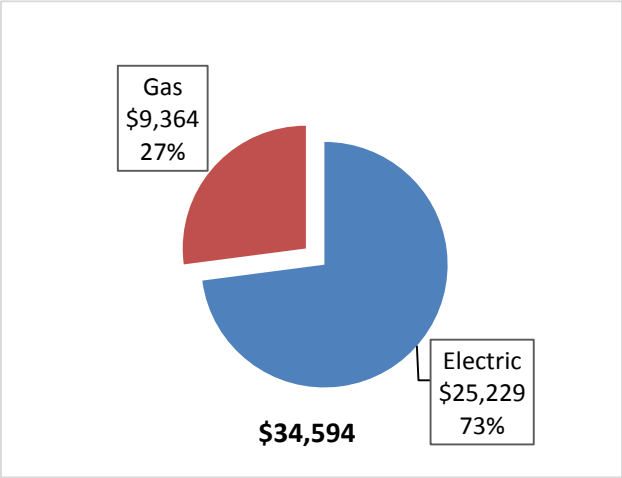


Figure 2 – Potential Post-Implementation Costs (All measures including those Not-Recommended)

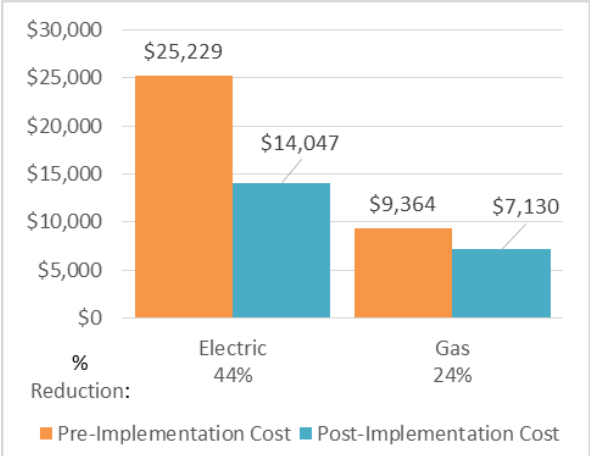
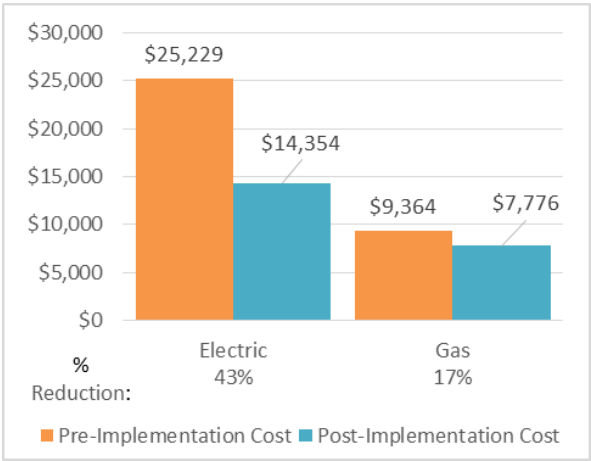


Figure 3 – Recommended Potential Post Implementation Costs -



A detailed description of Hope Academy Charter School's existing energy use can be found in Section 3.

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

Figure 4 – 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			**60,435**	**12.2**	**0.0**	**$8,039.90**	**$59,107.64**	**$5,855.00**	**$53,252.64**	**6.6**	**60,857**
ECM 1	Install LED Fixtures	Yes	9,650	0.1	0.0	$1,283.79	$13,038.36	$610.00	$12,428.36	9.7	9,718
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	49,970	12.0	0.0	$6,647.77	$45,599.67	$5,235.00	$40,364.67	6.1	50,320
ECM 3	Retrofit Fixtures with LED Lamps	Yes	814	0.2	0.0	$108.34	$469.62	$10.00	$459.62	4.2	820
Lighting Control Measures			**10,969**	**3.0**	**0.0**	**$1,459.25**	**$11,171.50**	**$1,320.00**	**$9,851.50**	**6.8**	**11,046**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	10,926	2.6	0.0	$1,453.56	$10,734.00	$1,005.00	$9,729.00	6.7	11,003
ECM 5	Install Photocell Controls	Yes	43	0.5	0.0	$5.70	$437.50	$315.00	$122.50	21.5	43
HVAC System Improvements			**0**	**0.0**	**3.5**	**$57.46**	**$87.00**	**$0.00**	**$87.00**	**1.5**	**413**
ECM 6	Install Pipe Insulation	Yes	0	0.0	3.5	$57.46	$87.00	$0.00	$87.00	1.5	413
Domestic Water Heating Upgrade			**0**	**0.0**	**31.7**	**$515.59**	**$179.25**	**$0.00**	**$179.25**	**0.3**	**3,709**
ECM 7	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	31.7	$515.59	$179.25	$0.00	$179.25	0.3	3,709
Food Service Equipment & Refrigeration Measures			**8,365**	**1.0**	**0.0**	**$1,112.84**	**$14,398.40**	**$0.00**	**$14,398.40**	**12.9**	**8,424**
ECM 8	Replace Refrigeration Equipment	Yes	8,365	1.0	0.0	$1,112.84	$14,398.40	$0.00	$14,398.40	12.9	8,424
Custom Measures			**4,285**	**0.0**	**102.1**	**$2,231.36**	**$62,605.00**	**$0.00**	**$62,605.00**	**28.1**	**16,265**
ECM 9	Retro-Commissioning Study & HVAC Improvements	Yes	1,648	0.0	28.4	$680.72	$8,775.00	$0.00	$8,775.00	12.9	4,979
ECM 10	Building Envelope Air Sealing	Yes	330	0.0	34.0	$597.63	$9,955.00	$0.00	$9,955.00	16.7	4,315
	Install an Energy Management System	No	2,307	0.0	39.7	$953.01	$43,875.00	$0.00	$43,875.00	46.0	6,971
TOTALS			**84,054**	**16.2**	**137.3**	**$13,416.42**	**$147,548.79**	**$7,175.00**	**$140,373.79**	**10.5**	**100,714**

* - 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). **

TOTALS (Recommended)	**81,747**	**16.2**	**97.6**	**$12,463.40**	**$103,673.79**	**$7,175.00**	**$96,498.79**	**7.7**	**93,743**

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.

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

Food Service Equipment & Refrigeration measures generally involve improvements in the efficiency of cooking, food service, dishwashing, and food storage equipment. These measures may include more efficient convection ovens, steamers, ice machines, or refrigeration. These measures save energy by reducing the energy usage with more energy efficient equipment.

Energy Efficient Practices

TRC also identified 13 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 Hope Academy Charter School include:

- Reduce Air Leakage
- Close Doors and Windows
- Use Window Treatments/Coverings
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Proper Furnace Maintenance
- Perform Proper Water Heater Maintenance

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 Hope Academy Charter School. Based on the configuration of the site and its loads there is a high potential for installing a photovoltaic (PV) array.

Figure 5 – Photovoltaic Potential

Potential	High	
System Potential	57	kW DC STC
Electric Generation	67,908	kWh/yr
Displaced Cost	$5,910	/yr
Installed Cost	$148,200	

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

1.3 Implementation Planning

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

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

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

- SmartStart
- 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 4 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 8.4 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability. By enabling grid operators to call upon commercial facilities to reduce their electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 8 for additional information on this program.

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 6 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Donna M. Torres	Buisness Administrator	dtorres@hopeacademycs.org	732-988-4227 ext. 512
Dennis Daniels	Facilities Supervisor	ddaniels@hopeacademycs.org	732-988-4227 ext. 114
TRC Energy Services			
Aimee Lalonde	Auditor	alalonde@trcoslutions.com	(732) 855-0033

2.2 General Site Information

On May 17, 2017, TRC performed an energy audit at Hope Academy Charter School located in Asbury Park, New Jersey. TRC's team met with Dennis Daniel, Facilities Supervisor to review the facility operations and help focus our investigation on specific energy-using systems.

Hope Academy Charter School is a 32,500 square foot facility comprised of five floors of classroom space, office areas, a lounge and a dining hall. About a third of the 5th floor is currently not used and is planned for remodeling and renovation to convert to a music room, classrooms and a restroom. This is said to be completed within the next year. We therefore recommend installing LED fixtures for lighting, high efficiency heating and cooling equipment with proper HVAC controls, insulating the ceiling and installing low flow water fixtures in the restroom. Please be sure to apply to one of the recommended Clean Energy Programs prior to beginning work on this space.

The building was originally built in 1945 and was taken over by the Hope Academy Charter School seven years ago. Per discussions with facility personnel, the exterior lighting, and heating/cooling distribution system balancing are the main maintenance concern. The building is also very drafty and there are currently flooding issues on the bottom floor around the windows.

The heating and cooling equipment are seven years old, appears to be in good condition, however the performance of the system is poor. Heating is provided by condensing forced air furnaces which are equipped with a cooling coil which are served by outdoor condensing units. There are about three zones per floor which each serve on average three rooms. Each of these are tied to a thermostat located in a middle room or the hallway. The room in which the thermostat is located is properly heated and cooled, however the rooms on either side which are served by the same unit is either extremely hot or cold. Based on feedback about which rooms are the best and worst for occupant comfort, it appears that the way the zones were originally designed plays a role in the performance.

The rooms on the corners of the building have the most issues in terms of heating and cooling. We assume this largely in part due to the air infiltration around window frames, solar heat gain through the windows, the location of thermostats, flex duct work and zone configuration and that the system was not properly balanced during commissioning after installation. In order to address these issues we are recommending exterior lighting fixture replacements, building envelope air sealing and consulting a specialty HVAC contractor to perform a thorough retro-commissioning study of the heating/cooling systems and implementing HVAC improvement measures.

2.3 Building Occupancy

The school building is in operation year round. Typical Monday through Friday operation is between 7:30 AM and 5:30 PM with after-hours cleaning crew working until 7:30 PM. There is occasional use on Saturdays between 7:30 AM and 1:00 PM and no use on Sundays. The building is occupied by 207 students and about 35 staff members. The typical schedule is presented in the table below.

Figure 7 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Hope Academy Charter School	Weekday	7:30AM to 5:30PM
Hope Academy Charter School	Weekend	Little to No Use

2.4 Building Envelope

The building has concrete masonry unit walls with a brick finish. The exterior doors are metal or metal/glass with metal frames. The windows are double pane and operable with metal frames. The building has a flat roof which is in good condition. The building exterior doors and windows are in fair to poor condition and show signs of excessive infiltration. There is an opportunity for energy savings by installing air sealing materials to mitigate air infiltration, thus reducing the load on the buildings HVAC systems and equipment.

2.5 On-Site Generation

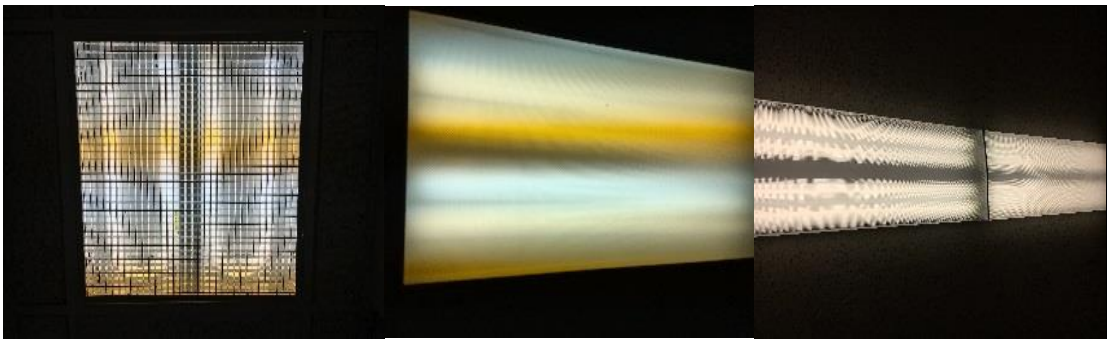
Hope Academy Charter School does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

Please see Appendix A: Equipment Inventory & Recommendations for a detailed list of the locations and recommended upgrades for each measure.

Lighting & Controls

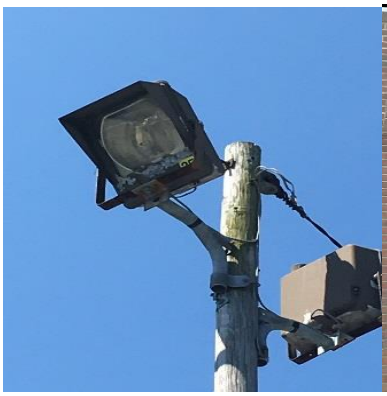
The building is primarily lit by linear fluorescent fixtures which contain a combination of 32-Watt T8 lamps and 40-Watt T12 lamps. The majority of fixtures are two to four lamp and some spaces are currently over lit. There are a few fixtures which are in poor condition and need replacement. In general purpose areas there are also screw in lamp incandescent and compact fluorescent fixtures. Interior lighting is manually controlled via wall switches.



There is an opportunity for energy savings by upgrading to LED technology throughout the interior, high bay and exterior applications. Fluorescent T12 lamps are virtually obsolete and LED has become the new standard for energy efficient lighting.



Exterior lighting includes recessed can fixtures, wall pack fixtures and pole mounted flood fixtures which contain incandescent lamps, compact fluorescent lamps, metal halide lamps or are LED. They appear to be controlled by a timeclock.



Motors

The HVAC systems that serve the building include blower motors which are generally in good condition and of standard efficiency. There are also exhaust fans that serve the restrooms and elevator machine motors.

Domestic Hot Water

Domestic hot water is provided by a gas-fired storage tank water heater located in the boiler room. This is a 75 gallon unit and is in good condition and standard efficiency.

Once the existing DHW heater reaches the end of its useful life, we recommend with a high efficiency gas-fired condensing hot water heater. There is also an opportunity for energy savings by installing pipe insulation on the uninsulated pipe in the boiler room.


HVAC Systems

The building is conditioned by gas-fired, condensing, forced air furnaces which are equipped with a cooling coil. Cooling is provided by outdoor condensing units that are located on the roof and exterior of the building. This equipment is in good condition and high efficiency. Each of these systems serves a few rooms and are tied to a programmable thermostat.




There are a few restrooms that are heated by electric resistance heaters. These are in fair condition.

The refrigerant piping is in poor condition with missing and worn pipe insulation. We recommend replacing with new insulation as part of general maintenance to reduce electric usage during the cooling season.

There are a few split-system AC systems which serve some offices and server rooms. The outdoor condensing units are located on the roof of the building and are in fair to poor condition and standard efficiency. There is an opportunity for energy savings by replacing these with high efficiency outdoor condensing units.

Building Management System

The HVAC systems and equipment are controlled by a building management system (BMS). All major mechanical equipment is tied into this. The rooms served by the self-contained unit ventilators have manual dial thermostat/temperature sensors. The air handling systems area equipped with CO2 sensors

and the amount of outdoor air controlled appropriately. The boilers operate with outdoor air reset controls.

Plug Load Equipment

There is general office and café equipment throughout the building. There are also gas-fired and electric meal prep equipment, a clothes washer and dryer as well as a number of refrigeration equipment in the kitchen. The computers throughout the building also provide a potential for implementing energy management software.

2.7 Water-Using Systems

There are many restrooms at this facility. A sampling of restrooms found that of the faucets are rated for 2.0 gallons per minute (gpm) or higher. There is an opportunity for energy savings by installing low flow (0.5 gpm) aerators on sinks throughout the building.

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

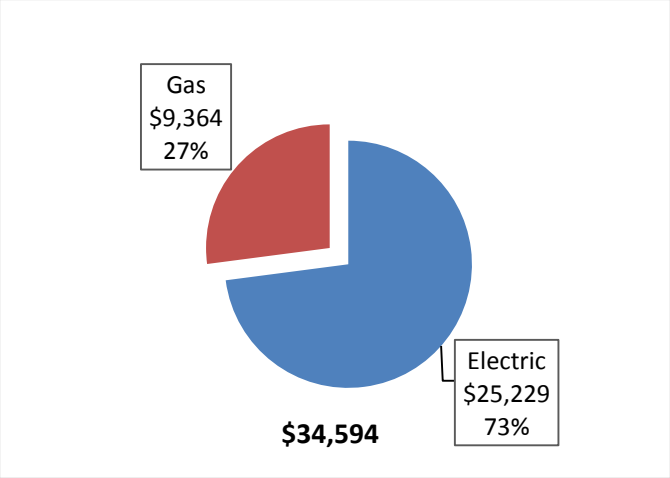
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 8 - Utility Summary

Utility Summary for Hope Academy Charter School		
Fuel	**Usage**	**Cost**
Electricity	189,644 kWh	$25,229
Natural Gas	5,753 Therms	$9,364
Total		**$34,594**

The current annual energy cost for this facility is $34,594 as shown in the chart below.

Figure 9 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was $0.133/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 facility pays electrical demand charges. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 10 - Electric Usage & Demand

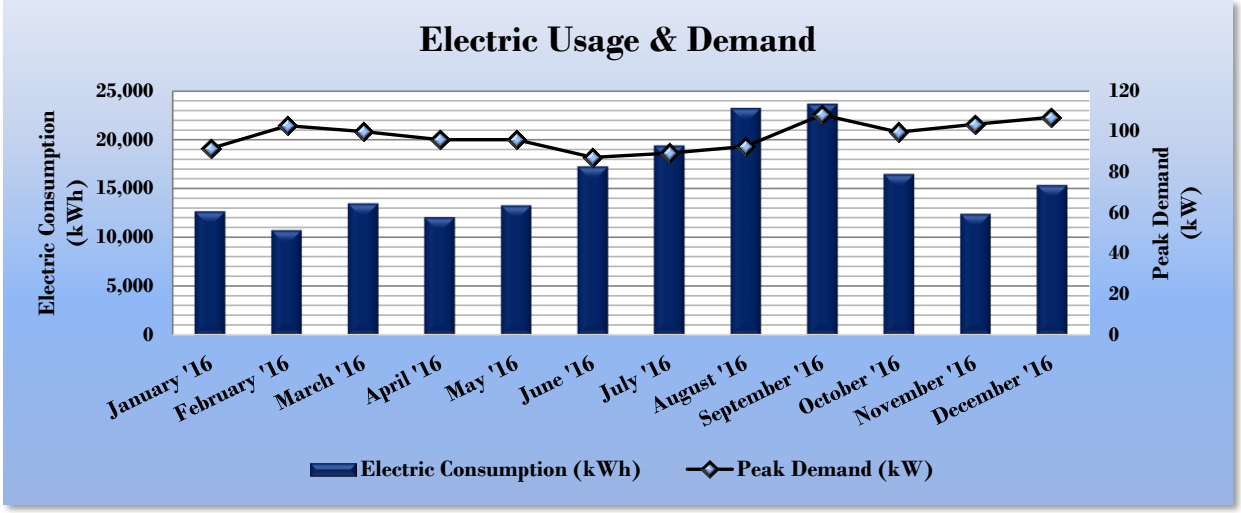


Figure 11 - Electric Usage & Demand

Electric Billing Data for Hope Academy Charter School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
1/27/16	30	12,645	92	$233	$1,694
2/25/16	29	10,722	103	$262	$1,472
3/25/16	29	13,459	100	$255	$1,780
4/22/16	28	12,042	96	$244	$1,710
5/24/16	32	13,257	96	$244	$1,779
6/23/16	30	17,220	87	$222	$2,214
7/25/16	32	19,355	89	$227	$2,515
8/24/16	30	23,188	93	$236	$2,917
9/23/16	30	23,596	108	$275	$3,102
10/25/16	32	16,452	100	$254	$2,226
11/22/16	28	12,387	104	$264	$1,757
12/27/16	35	15,321	107	$272	$2,061
Totals	**365**	**189,644**	**108.3**	**$2,989**	**$25,229**
Annual	**365**	**189,644**	**108.3**	**$2,989**	**$25,229**

3.3 Natural Gas Usage

Natural gas is provided by NJ Natural Gas. The average gas cost for the past 12 months is $1.628/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 12 - Natural Gas Usage

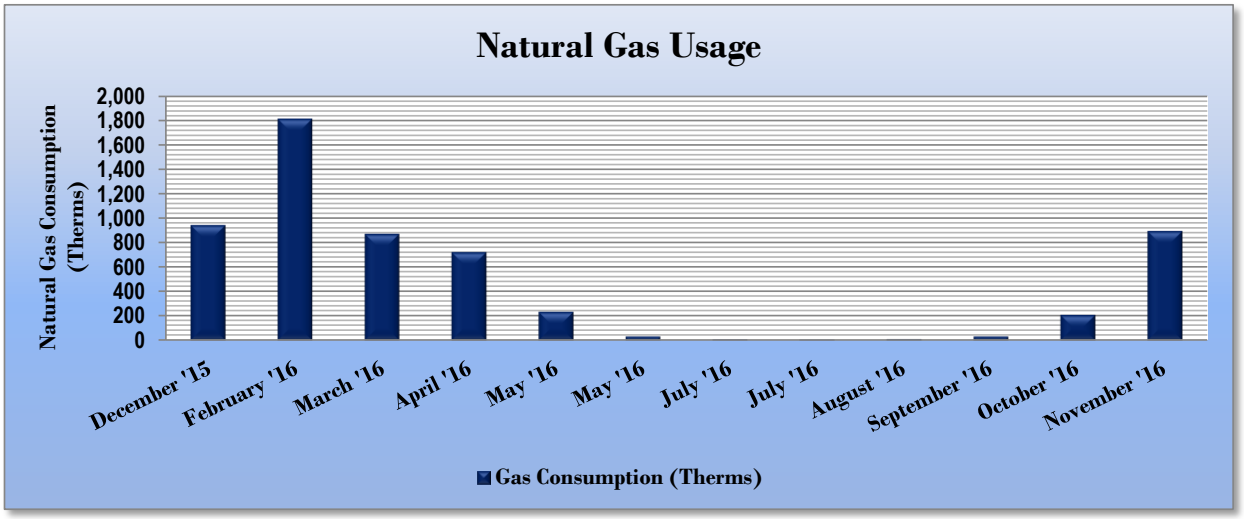


Figure 13 - Natural Gas Usage

Gas Billing Data for Hope Academy Charter School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
1/14/16	31	943	$1,153
2/17/16	34	1,813	$1,750
3/17/16	29	871	$1,126
4/18/16	32	721	$1,035
5/16/16	28	233	$668
6/15/16	30	31	$512
7/18/16	33	7	$495
8/15/16	28	6	$494
9/13/16	29	10	$496
10/13/16	30	31	$361
11/11/16	29	207	$357
12/14/16	33	894	$944
Totals	**366**	**5,769**	**$9,390**
Annual	**365**	**5,753**	**$9,364**

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 14 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Hope Academy Charter School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	81.1	141.4
Site Energy Use Intensity (kBtu/ft^2)	37.6	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 15 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Hope Academy Charter School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	50.0	141.4
Site Energy Use Intensity (kBtu/ft^2)	25.8	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 90.

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

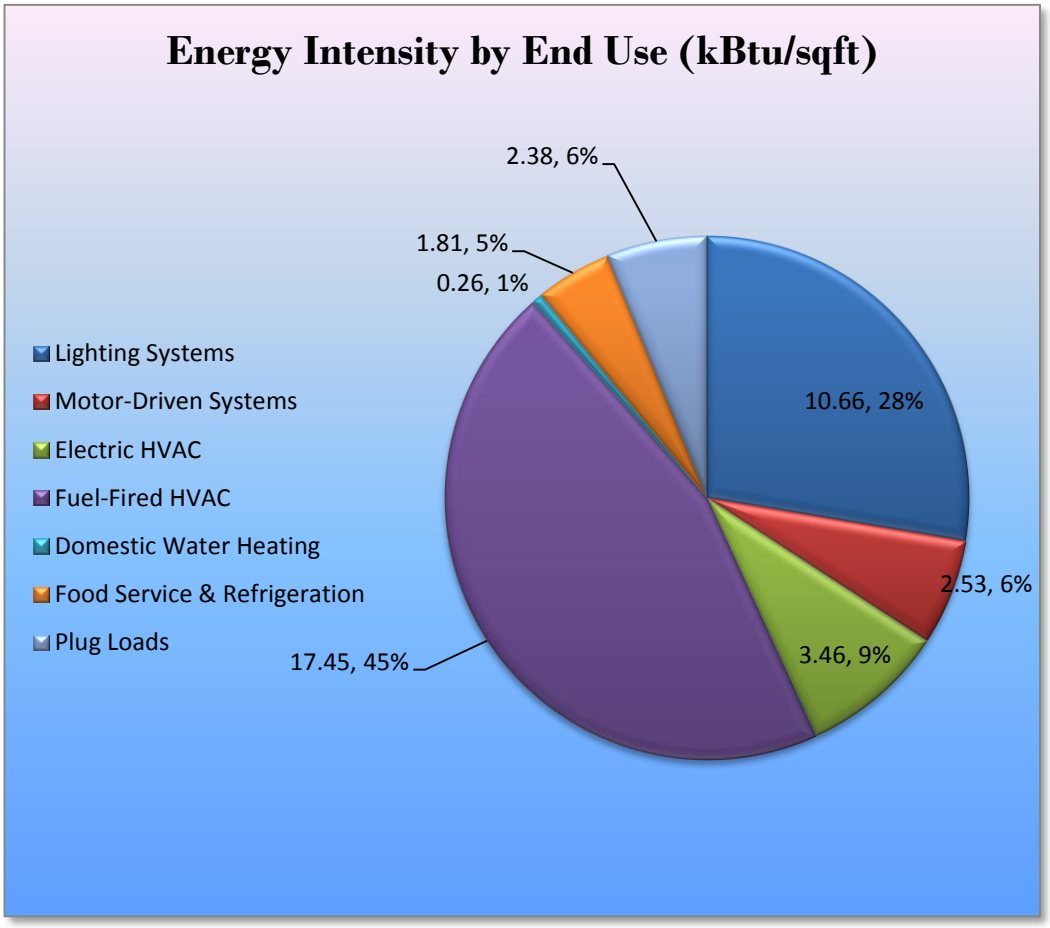
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 16 - Energy Balance (kBtu/SF)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

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

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 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		**60,435**	**12.2**	**0.0**	**$8,039.90**	**$59,107.64**	**$5,855.00**	**$53,252.64**	**6.6**	**60,857**
ECM 1	Install LED Fixtures	9,650	0.1	0.0	$1,283.79	$13,038.36	$610.00	$12,428.36	9.7	9,718
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	49,970	12.0	0.0	$6,647.77	$45,599.67	$5,235.00	$40,364.67	6.1	50,320
ECM 3	Retrofit Fixtures with LED Lamps	814	0.2	0.0	$108.34	$469.62	$10.00	$459.62	4.2	820
Lighting Control Measures		**10,969**	**3.0**	**0.0**	**$1,459.25**	**$11,171.50**	**$1,320.00**	**$9,851.50**	**6.8**	**11,046**
ECM 4	Install Occupancy Sensor Lighting Controls	10,926	2.6	0.0	$1,453.56	$10,734.00	$1,005.00	$9,729.00	6.7	11,003
ECM 5	Install Daylight Dimming Controls	43	0.5	0.0	$5.70	$437.50	$315.00	$122.50	21.5	43
HVAC System Improvements		**0**	**0.0**	**3.5**	**$57.46**	**$87.00**	**$0.00**	**$87.00**	**1.5**	**413**
ECM 6	Install Pipe Insulation	0	0.0	3.5	$57.46	$87.00	$0.00	$87.00	1.5	413
Domestic Water Heating Upgrade		**0**	**0.0**	**31.7**	**$515.59**	**$179.25**	**$0.00**	**$179.25**	**0.3**	**3,709**
ECM 7	Install Low-Flow Domestic Hot Water Devices	0	0.0	31.7	$515.59	$179.25	$0.00	$179.25	0.3	3,709
Food Service Equipment & Refrigeration Measures		**8,365**	**1.0**	**0.0**	**$1,112.84**	**$14,398.40**	**$0.00**	**$14,398.40**	**12.9**	**8,424**
ECM 8	Replace Refrigeration Equipment	8,365	1.0	0.0	$1,112.84	$14,398.40	$0.00	$14,398.40	12.9	8,424
Custom Measures		**1,978**	**0.0**	**62.4**	**$1,278.35**	**$18,730.00**	**$0.00**	**$18,730.00**	**14.7**	**9,294**
ECM 9	Retro-Commissioning Study & HVAC Improvements	1,648	0.0	28.4	$680.72	$8,775.00	$0.00	$8,775.00	12.9	4,979
ECM 10	Building Envelope Air Sealing	330	0.0	34.0	$597.63	$9,955.00	$0.00	$9,955.00	16.7	4,315
TOTALS		**81,747**	**16.2**	**97.6**	**$12,463.40**	**$103,673.79**	**$7,175.00**	**$96,498.79**	**7.7**	**93,743**

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

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

4.1.1 Lighting Upgrades

Recommended upgrades to existing lighting fixtures are summarized in Figure 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		**60,435**	**12.2**	**0.0**	**$8,039.90**	**$59,107.64**	**$5,855.00**	**$53,252.64**	**6.6**	**60,857**
ECM 1	Install LED Fixtures	9,650	0.1	0.0	$1,283.79	$13,038.36	$610.00	$12,428.36	9.7	9,718
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	49,970	12.0	0.0	$6,647.77	$45,599.67	$5,235.00	$40,364.67	6.1	50,320
ECM 3	Retrofit Fixtures with LED Lamps	814	0.2	0.0	$108.34	$469.62	$10.00	$459.62	4.2	820

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.

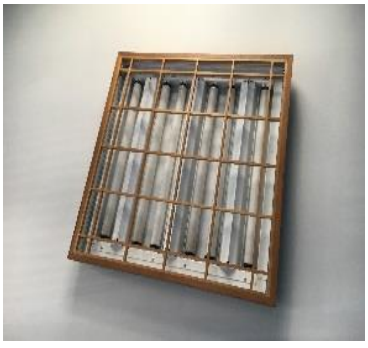
ECM 1: Install LED Fixtures

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	262	0.1	0.0	$34.87	$1,771.06	$65.00	$1,706.06	48.9	264
Exterior	9,388	0.0	0.0	$1,248.93	$11,267.31	$545.00	$10,722.31	8.6	9,454

Measure Description

We recommend replacing existing fixtures that are in poor condition with new energy efficient LED fixtures. These were noted to be in private office rooms on the 5th floor of the building. These fixtures were noted to have missing, broken or yellowed lenses. We also recommend replacing the exterior fixtures containing fluorescent, incandescent and metal halide lamps with new high performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output. Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tubes and more than 10 times longer than many incandescent lamps.



ECM 2: Retrofit 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	49,970	12.0	0.0	$6,647.77	$45,599.67	$5,235.00	$40,364.67	6.1	50,320
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

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

ECM 3: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	65	0.1	0.0	$8.63	$215.01	$10.00	$205.01	23.8	65
Exterior	749	0.1	0.0	$99.71	$254.60	$0.00	$254.60	2.6	755

Measure Description

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

For the purpose of this report, we recommend retrofitting the existing fixtures rather than just replacing the lamps. It should be noted that the existing T8 electronic ballasts may be compatible with turn-key LED lamp replacements which would reduce the estimated installation costs and provide comparable energy savings.

4.1.2 Lighting Control Measures

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		**10,969**	**3.0**	**0.0**	**$1,459.25**	**$11,171.50**	**$1,320.00**	**$9,851.50**	**6.8**	**11,046**
ECM 4	Install Occupancy Sensor Lighting Controls	10,926	2.6	0.0	$1,453.56	$10,734.00	$1,005.00	$9,729.00	6.7	11,003
ECM 5	Install Daylight Dimming Controls	43	0.5	0.0	$5.70	$437.50	$315.00	$122.50	21.5	43

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)
10,926	2.6	0.0	$1,453.56	$10,734.00	$1,005.00	$9,729.00	6.7	11,003

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in beneficial locations such as restrooms, storage rooms, classrooms, offices areas, and hallways. 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 Photocell 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)
43	0.5	0.0	$5.70	$437.50	$315.00	$122.50	21.5	43

Measure Description

We recommend installing photocell controls that use photosensors to reduce electric lighting for exterior fixtures during the daylight hours. At the time of the audit, a recessed can fixture at the building overhang was on during the day. Additionally, one of the metal halide pole mounted flood fixtures in the parking lot was on and another was said to be broken and inoperable.

4.1.3 HVAC System Upgrades

Our recommendation for HVAC system improvement are summarized in Figure 20 below.

Figure 20 - Summary of HVAC System Improvement 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)
HVAC System Improvements		**0**	**0.0**	**3.5**	**$57.46**	**$87.00**	**$0.00**	**$87.00**	**1.5**	**413**
ECM 6	Install Pipe Insulation	0	0.0	3.5	$57.46	$87.00	$0.00	$87.00	1.5	413

ECM 6: Install Pipe Insulation

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	3.5	$57.46	$87.00	$0.00	$87.00	1.5	413

Measure Description

We recommend installing insulation on the domestic water heating system piping. Distribution system losses are dependent on heating water system temperature, the size of the distribution system, and the level of insulation of the piping. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is exposed to water, when the insulation has been removed from some areas of the pipe, or when valves have not been properly insulated system efficiency can be significantly reduced.

This measure saves energy by reducing heat losses from the heating distribution system.

4.1.4 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 21 below.

Figure 21 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	*Annual Natural Gas Savings (MMBtu)*	*Annual N/A Savings (MMBtu)*	*Annual N/A Savings (MMBtu)*	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade			**0**	**0.0**	**31.7**	**0.0**	**0.0**	**31.7**	**$515.59**	**$179.25**	**$0.00**	**$179.25**	**0.3**	**3,709**
ECM 7	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	31.7	0.0	0.0	31.7	$515.59	$179.25	$0.00	$179.25	0.3	3,709

ECM 7: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	31.7	$515.59	$179.25	$0.00	$179.25	0.3	3,709

Measure Description

We recommend installing low-flow domestic hot water devices to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators can reduce hot water usage, relative to standard and high flow aerators, which saves energy. Low-flow devices reduce the overall water flow from the fixture, while still adequate pressure for washing. This reduces the amount of water used per day resulting in energy and water savings. Installing low-flow aerators is a cost-effective way to reduce natural gas usage.

4.1.5 Food Service Equipment & Refrigeration Measures

Food service and refrigeration measures recommendations are summarized in Figure 22 below.

Figure 22 - Summary of Food Service Equipment & Refrigeration ECMs

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	*Annual Natural Gas Savings (MMBtu)*	*Annual N/A Savings (MMBtu)*	*Annual N/A Savings (MMBtu)*	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)
Food Service Equipment & Refrigeration Measures			**8,365**	**1.0**	**0.0**	**0.0**	**0.0**	**0.0**	**$1,112.84**	**$14,398.40**	**$0.00**	**$14,398.40**	**12.9**	**8,424**
ECM 8	Replace Refrigeration Equipment	Yes	8,365	1.0	0.0	0.0	0.0	0.0	$1,112.84	$14,398.40	$0.00	$14,398.40	12.9	8,424

ECM 8: Replace Refrigeration Equipment

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)
8,365	1.0	0.0	$1,112.84	$14,398.40	$0.00	$14,398.40	12.9	8,424

Measure Description

We recommend replacing existing refrigerator and freezer chests with new Energy Star® high efficiency equipment. There have been many improvements in refrigeration system equipment, operation, and insulation. The energy savings associated with this measure come from reduced energy usage, due to more efficient technology, and reduced run times.

4.1.6 Custom Measures

Additional custom measure energy saving opportunities are addressed in this section. Recommended custom measures are summarized in Figure 23 below.

Figure 23 - Summary of Custom ECMs

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Natural Gas Savings (MMBtu)	Annual N/A Savings (MMBtu)	Annual N/A Savings (MMBtu)	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)
Custom Measures			**72,193**	**57.0**	**102.1**	**0.0**	**0.0**	**102.1**	**$8,141.36**	**$210,805.00**	**$0.00**	**$210,805.00**	**25.9**	**84,648**
ECM 9	Retro-Commissioning Study & HVAC Improvements	Yes	1,648	0.0	28.4	0.0	0.0	28.4	$680.72	$8,775.00	$0.00	$8,775.00	12.9	4,979
ECM 10	Building Envelope Air Sealing	Yes	330	0.0	34.0	0.0	0.0	34.0	$597.63	$9,955.00	$0.00	$9,955.00	16.7	4,315

ECM 9: Retro-Commissioning Study & HVAC Improvements

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)
1,648	0.0	28.4	$680.72	$9,750.00	$0.00	$9,750.00	14.3	4,979

Measure Description

Due to the complexity of today's HVAC systems and controls, it is likely for systems to be operating incorrectly or not as efficiently as they could be. Retro-commissioning studies reveal hidden deficiencies and highlights operational & maintenance (O&M) issues that could have been avoided as well as exposes hidden control system problems. There are valuable benefits to retro-commissioning in existing buildings. It is a detailed and specialized process that reviews how an HVAC system is controlled and designed to operate. Applying retro-commissioning to existing facilities includes planning, discovering root causes of inefficiencies, development of a cost-effective project delivery and a focus on optimizing value to the building owner. The study includes functional system testing under various modes, such as heating or cooling loads, occupied and unoccupied modes, varying outside air temperature and space temperatures. This is a systematic process to ensure that the building energy systems perform interactively according to the original design intent and the current operational needs of the facility. Retro-commissioning is a common practice recommended by the American Society of Heating Refrigeration and Energy (ASHRAE) to be revisited every couple of years. We recommend that an engineering firm who specializes in energy control systems and retro-commissioning be contacted for a detailed evaluation and implementation costs. Facility operations personnel would work with the engineers to develop goals and objectives. During on site testing, the qualified personnel conducting the study would immediately make any no/low-cost improvements as identified. Furthermore, any suggested corrective actions which require the purchase of material, a contractor who specializes in that scope of work would be contacted to implement the remaining improvements.

ECM 10: Building Envelope Air Sealing

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)
330	0.0	34.0	$597.63	$9,955.00	$0.00	$9,955.00	16.7	4,315

Measure Description

There is an energy savings opportunity by reducing the uncontrolled air exchange between the outside and inside of the building. Building air sealing will reduce the amount of air exchange which will in turn reduce the load on the buildings heating and cooling equipment and thus providing energy savings and increased occupant comfort. During the energy assessment, many sources of air leaks were observed. This is typical in a building of this age with original construction including cracks/gaps around windows/doors, ceiling paneling and exterior wall surfaces/joints. The existing building is extremely leaky and would greatly benefit from whole building air sealing. Building envelope air sealing is a cost effective approach to identify and prioritize areas of highest leakage to be sealed. We recommend weather-stripping all exterior doors and caulking the perimeter of all windows. All doors, including those that lead to the fire escape were noted to have worn or missing weather-stripping with clear air gaps. The windows were also noted to have clear gaps. Exterior doors should be properly weather-stripped which may include the installation of a bottom sweep, center sweep and weather-stripping around the perimeter of the door. Other sealing materials may include caulk and polyurethane foam.

4.2 ECMs Evaluated But Not Recommended

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

Figure 24 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Custom Measures	**2,307**	**0.0**	**39.7**	**$953.01**	**$43,875.00**	**$0.00**	**$43,875.00**	**46.0**	**6,971**
Install an Energy Management System	2,307	0.0	39.7	$953.01	$43,875.00	$0.00	$43,875.00	46.0	6,971
TOTALS	**2,307**	**0.0**	**39.7**	**$953.01**	**$43,875.00**	**$0.00**	**$43,875.00**	**46.0**	**6,971**

* - 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 an Energy Management System

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)
2,307	0.0	39.7	$953.01	$48,750.00	$0.00	$48,750.00	51.2	6,971

Measure Description

The installation of an Energy Management System (EMS) increases the efficiency of the building HVAC system operation. Upgrade of controls to optimize the start/stop of all key HVAC equipment, tying in all space temperature controls will minimize the amount of waste energy. Schedules may be put in place to limit system operation when the building is closed. Temperature set back controls may be applied to operate systems only to the point necessary. Programming would allow HVAC units to operate according to room schedules, occupancy and ensure proper temperature setbacks. This measure is not recommended based on the energy and economic results, however it should be considered as a capital improvement measure for future implementation. As such, it would be recommend that an HVAC contractor who specializes in energy management systems be contacted for a detailed evaluation and implementation costs. For the purposes of this report, the potential energy savings and measure costs were estimated based on industry standards and previous project experience.

Reasons for not Recommending

This measure is not recommended based on the economic results.

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

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

Close Doors and Windows

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

Use Window Treatments/Coverings

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

Perform 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.

Ensure Lighting Controls Are Operating Properly

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

Perform Routine Motor Maintenance

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

Practice Proper Use of Thermostat Schedules and Temperature Resets

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

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Check for and Seal Duct Leakage

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

Perform Proper Furnace Maintenance

Preventative furnace maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should include tasks such as checking for gas / carbon monoxide leaks; changing the air and fuel filters; checking components for cracks, corrosion, dirt, or debris build-up; ensuring the ignition system is working properly; testing and adjusting operation and safety controls; inspecting the electrical connections; and ensuring proper lubrication for motors and bearings.

Perform Proper Water Heater Maintenance

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

6 On-Site Generation Measures

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

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

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

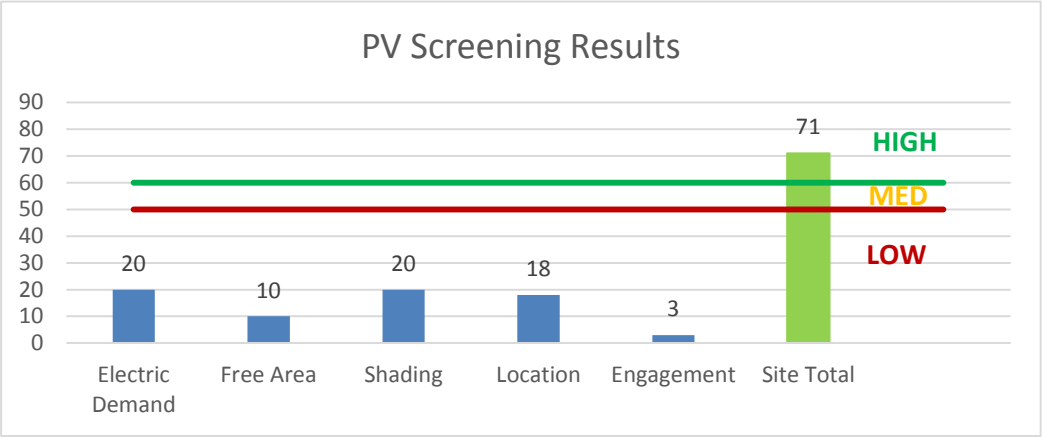
6.1 Photovoltaic

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

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

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the high potential for PV at the site. A PV array located on the roof of the main building may be feasible. If Hope Academy Charter School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted. In order to be cost-effective, a solar PV array needs certain minimum criteria, such as flat or south-facing rooftop or other unshaded space on which to place the PV panels. In our opinion, the facility does appear not meet these minimum criteria for cost-effective PV installation.

Figure 25 - Photovoltaic Screening



Potential	High	
System Potential	57	kW DC STC
Electric Generation	67,908	kWh/yr
Displaced Cost	$5,910	/yr
Installed Cost	$148,200	

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

For more information on solar PV technology and commercial solar markets in New Jersey, or to find a qualified solar installer, who can provide a more detailed assessment of the specific costs and benefits of solar 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

7 DEMAND RESPONSE

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

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

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

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

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

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

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

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 26 for a list of the eligible programs identified for each recommended ECM.

Figure 26 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	x		x			
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		x			
ECM 3	Retrofit Fixtures with LED Lamps	x		x			
ECM 4	Install Occupancy Sensor Lighting Controls	x		x			
ECM 5	Install Photocell Controls						
ECM 6	Install Pipe Insulation	x		x			
ECM 7	Install Low-Flow Domestic Hot Water Devices			x			
ECM 8	Replace Refrigeration Equipment						
ECM 9	Retro-Commissioning Study & HVAC Improvements						
ECM 10	Building Envelope Air Sealing						

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 SREC Registration Program

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

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

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

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

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

8.4 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. An ESIP is a type of "performance contract," whereby school districts, counties, municipalities, housing authorities and other public and state entities enter 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.

8.5 Demand Response Energy Aggregator

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 the program rules and requirements for metering and controls, a facility's ability to temporarily reduce electric load, as well as the payments involved in participating in the program. Also, these providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment to help ensure compliance of all terms and conditions of a DR contract.

See Section 7 for additional information.

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
5th Floor Hallway	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,600	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	0.12	542	0.0	$72.12	$1,125.00	$50.00	14.91
Teacher's Lounge 503	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,820	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,274	0.18	588	0.0	$78.27	$467.00	$50.00	5.33
Hallway	2	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	72	2,600	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,820	0.06	292	0.0	$38.90	$504.00	$0.00	12.96
Storage/Office	2	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	72	1,040	Relamp & Reballast	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,040	0.05	93	0.0	$12.41	$234.00	$0.00	18.86
Storage/Office	2	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	72	1,040	Relamp & Reballast	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,040	0.05	93	0.0	$12.41	$234.00	$0.00	18.86
Hallway	1	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	13	2,600	None	No	1	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	13	2,600	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	3	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,600	Relamp & Reballast	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.27	1,215	0.0	$161.58	$755.50	$60.00	4.30
Girl's Restroom	1	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	13	2,600	None	No	1	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	13	2,600	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Closets	2	Incandescent: <Enter Fixture Description>	Wall Switch	60	200	Relamp	No	2	LED Screw-In Lamps: <Enter Fixture Description>	Wall Switch	7	200	0.07	24	0.0	$3.24	$107.51	$10.00	30.06
Private Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,820	Fixture Replacement	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	44	1,820	0.03	92	0.0	$12.25	$609.02	$25.00	47.67
Private Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,820	Fixture Replacement	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	44	1,820	0.03	92	0.0	$12.25	$609.02	$25.00	47.67
Private Office	1	Linear Fluorescent - T12: 2' T12 (20W) - 4L	Wall Switch	100	1,820	Fixture Replacement	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	44	1,820	0.04	117	0.0	$15.59	$553.01	$15.00	34.50
Storage	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,040	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	728	0.09	162	0.0	$21.54	$350.00	$40.00	14.39
Storage	2	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	1,040	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	728	0.18	324	0.0	$43.09	$439.67	$60.00	8.81
Conference Room	2	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	1,040	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	728	0.18	324	0.0	$43.09	$439.67	$60.00	8.81
Boy's Restroom	1	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	26	1,820	Relamp	No	1	LED Screw-In Lamps: <Enter Fixture Description>	Wall Switch	14	1,820	0.01	25	0.0	$3.34	$53.75	$0.00	16.09
Staff Bathroom	1	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	26	1,820	Relamp	No	1	LED Screw-In Lamps: <Enter Fixture Description>	Wall Switch	14	1,820	0.01	25	0.0	$3.34	$53.75	$0.00	16.09
Open Office	7	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,600	Relamp & Reballast	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.62	2,834	0.0	$377.01	$1,248.83	$160.00	2.89
Buisness Admin Office	7	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	1,820	Relamp & Reballast	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,274	0.62	1,984	0.0	$263.91	$1,248.83	$160.00	4.13
Storage	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,040	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	728	0.09	162	0.0	$21.54	$350.00	$40.00	14.39
Office	5	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	1,820	Relamp & Reballast	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,274	0.44	1,417	0.0	$188.50	$925.17	$120.00	4.27
Stairs	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,600	Relamp & Reballast	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	0.27	1,247	0.0	$165.87	$2,250.00	$100.00	12.96
4th Floor Hallway	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,600	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	0.14	623	0.0	$82.94	$855.00	$50.00	9.71
Office Area	4	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,600	Relamp & Reballast	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.36	1,619	0.0	$215.43	$763.33	$100.00	3.08
Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	1,820	Relamp & Reballast	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,274	0.09	283	0.0	$37.70	$277.83	$20.00	6.84

	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
Office	2	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	1,820	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,274	0.18	567	0.0	$75.40	$439.67	$60.00	5.04
Office	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	1,820	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,274	0.18	567	0.0	$75.40	$584.00	$60.00	6.95
Classroom 402	9	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,600	Relamp & Reballast	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.80	3,644	0.0	$484.73	$1,572.50	$200.00	2.83
Classroom 403	9	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,600	Relamp & Reballast	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.80	3,644	0.0	$484.73	$1,572.50	$200.00	2.83
Classroom 404	10	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,600	Relamp & Reballast	Yes	10	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.89	4,048	0.0	$538.58	$1,734.33	$220.00	2.81
Staff Bathroom	2	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	22	1,040	None	No	2	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	22	1,040	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classroom 405	9	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,600	Relamp & Reballast	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.80	3,644	0.0	$484.73	$1,572.50	$200.00	2.83
Closets	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	200	None	No	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Girl's Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,040	Relamp & Reballast	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,040	0.02	35	0.0	$4.61	$117.00	$0.00	25.36
Boy's Restroom	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,040	Relamp & Reballast	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,040	0.04	69	0.0	$9.23	$234.00	$0.00	25.36
Dining Room	12	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	2,600	Relamp & Reballast	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	1.07	4,858	0.0	$646.30	$2,212.00	$275.00	3.00
3rd Floor Hallway	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.29	1,317	0.0	$175.18	$1,241.00	$120.00	6.40
Classroom 301	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.29	1,317	0.0	$175.18	$1,087.00	$140.00	5.41
Classroom 302	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.19	878	0.0	$116.79	$763.33	$100.00	5.68
Classroom 303	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.24	1,097	0.0	$145.98	$925.17	$120.00	5.52
Classroom 304	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.38	1,756	0.0	$233.57	$1,410.67	$180.00	5.27
Storage 305	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,040	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	728	0.10	176	0.0	$23.36	$439.67	$60.00	16.25
Office 306	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,820	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,274	0.10	307	0.0	$40.88	$439.67	$60.00	9.29
Science Classroom 307	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.38	1,756	0.0	$233.57	$1,410.67	$180.00	5.27
Arts Classroom 308	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.24	1,097	0.0	$145.98	$925.17	$120.00	5.52
Storage Closet 310	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,000	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	700	0.10	169	0.0	$22.46	$439.67	$60.00	16.90
Boy's Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,820	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,274	0.10	307	0.0	$40.88	$593.67	$75.00	12.69
Girl's Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,820	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,274	0.10	307	0.0	$40.88	$593.67	$75.00	12.69
Classroom 309	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.10	439	0.0	$58.39	$439.67	$60.00	6.50
2nd Floor Hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.14	658	0.0	$87.59	$755.50	$60.00	7.94

	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
Classroom 201	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.38	1,756	0.0	$233.57	$1,410.67	$180.00	5.27
Classroom 202	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.24	1,097	0.0	$145.98	$925.17	$120.00	5.52
Classroom 203	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.24	1,097	0.0	$145.98	$925.17	$120.00	5.52
Classroom 204	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.29	1,317	0.0	$175.18	$1,087.00	$140.00	5.41
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,820	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,274	0.12	392	0.0	$52.18	$430.00	$40.00	7.47
Open Hallway	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.19	878	0.0	$116.79	$917.33	$80.00	7.17
2nd Floor Hallway	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.19	878	0.0	$116.79	$917.33	$80.00	7.17
Classroom 206	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.29	1,317	0.0	$175.18	$1,087.00	$140.00	5.41
Classroom 208	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.29	1,317	0.0	$175.18	$1,087.00	$140.00	5.41
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,560	Relamp & Reballast	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,560	0.02	52	0.0	$6.92	$117.00	$0.00	16.90
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,560	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,560	0.01	31	0.0	$4.18	$98.00	$5.00	22.27
Closet	1	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	13	100	None	No	1	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	13	100	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Closet	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	100	None	No	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	100	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,560	Relamp & Reballast	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,560	0.04	100	0.0	$13.37	$161.83	$20.00	10.61
Boy's Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,560	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,092	0.10	263	0.0	$35.04	$593.67	$75.00	14.80
Girl's Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,560	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,092	0.10	263	0.0	$35.04	$593.67	$75.00	14.80
Kitchenette 209	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,820	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,274	0.10	307	0.0	$40.88	$439.67	$60.00	9.29
1st Floor Vestibule	3	LED Screw-In Lamps: <Enter Fixture Description>	Wall Switch	7	2,600	None	No	3	LED Screw-In Lamps: <Enter Fixture Description>	Wall Switch	7	2,600	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lobby	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,600	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	0.16	748	0.0	$99.52	$972.00	$60.00	9.16
Main Office	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.24	1,097	0.0	$145.98	$925.17	$120.00	5.52
Boiler Room	4	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	13	200	None	No	4	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	13	200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.10	439	0.0	$58.39	$593.67	$40.00	9.48
Hallway	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,600	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,600	0.00	12	0.0	$1.59	$117.00	$10.00	67.25
Dining Hall	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.72	3,292	0.0	$437.95	$2,967.50	$370.00	5.93
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.02	38	0.0	$5.05	$117.00	$10.00	21.19

	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
Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	200	None	No	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
1st Floor Hallway	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	0.25	1,121	0.0	$149.09	$898.00	$40.00	5.76
Classroom 101	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.29	1,317	0.0	$175.18	$1,087.00	$140.00	5.41
Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.38	1,756	0.0	$233.57	$1,410.67	$180.00	5.27
Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,600	Relamp & Reballast	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,820	0.38	1,756	0.0	$233.57	$1,410.67	$180.00	5.27
Nurse's Office 105	4	Compact Fluorescent: <Enter Fixture Description>	Wall Switch	72	2,600	Relamp & Reballast	Yes	4	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,820	0.14	648	0.0	$86.16	$750.00	$80.00	7.78
Boy's Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,560	Relamp & Reballast	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,560	0.04	100	0.0	$13.37	$161.83	$20.00	10.61
Girl's Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,560	Relamp & Reballast	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,560	0.04	100	0.0	$13.37	$161.83	$20.00	10.61
Exterior	2	Incandescent: <Enter Fixture Description>	None	100	4,000	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	12	4,000	0.12	810	0.0	$107.70	$781.35	$200.00	5.40
Exterior	2	Compact Fluorescent: <Enter Fixture Description>	None	32	4,000	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	12	4,000	0.03	184	0.0	$24.48	$781.35	$200.00	23.75
Exterior	1	Metal Halide: (1) 70W Lamp	None	95	4,000	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	25	4,000	0.05	322	0.0	$42.84	$390.68	$100.00	6.79
Exterior	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	12	4,000	None	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	12	4,000	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Parking Lot	4	Metal Halide: (1) 400W Lamp	None	458	4,000	Fixture Replacement	Yes	4	LED - Fixtures: Other	Daylight Dimming	130	4,000	1.03	6,035	0.0	$802.89	$5,894.80	$200.00	7.09
Playground	2	Metal Halide: (1) 400W Lamp	None	458	4,000	Fixture Replacement	Yes	2	LED - Fixtures: Other	Daylight Dimming	130	4,000	0.52	3,018	0.0	$401.44	$2,947.40	$100.00	7.09
Exterior	3	Metal Halide: (1) 32W Lamp	None	43	4,000	Fixture Replacement	No	3	LED - Fixtures: Other	None	12	4,000	0.06	428	0.0	$56.91	$846.72	$15.00	14.61
Lobby Overhang	1	Compact Fluorescent: <Enter Fixture Description>	None	32	8,760	Relamp	Yes	1	LED Screw-In Lamps: <Enter Fixture Description>	Daylight Dimming	9	4,000	0.02	281	0.0	$37.38	$126.15	$45.00	2.17
Lobby Overhang	1	Halogen Incandescent: <Enter Fixture Description>	None	100	4,000	Relamp	Yes	1	LED Screw-In Lamps: <Enter Fixture Description>	Daylight Dimming	9	4,000	0.06	419	0.0	$55.69	$63.65	$45.00	0.33
Lobby Overhang	2	Compact Fluorescent: <Enter Fixture Description>	None	32	4,000	Relamp	Yes	2	LED Screw-In Lamps: <Enter Fixture Description>	Daylight Dimming	9	4,000	0.04	212	0.0	$28.15	$127.30	$90.00	1.33

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Rooms	H/C Units	7	Supply Fan	0.8	60.0%	No	1,922	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Rooms	H/C Units	2	Supply Fan	0.3	60.0%	No	1,922	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cabinet Heater	Cabinet Heater	1	Supply Fan	0.1	60.0%	No	1,922	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator	Machine Room	2	Other	15.0	90.0%	No	360	No	90.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
H/C Units	Condensate Pumps	5	Condenser Water Pump	0.2	60.0%	No	1,922	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exhaust Fans	Exhaust Fans	10	Exhaust Fan	0.1	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Exterior	H/C Units	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	H/C Units	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	H/C Units	1	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	H/C Units	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	H/C Units	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	H/C Units	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	H/C Units	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	H/C Units	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	H/C Units	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
Mechanical Rooms	H/C Units	1	Furnace	74.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Rooms	H/C Units	1	Furnace	74.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Rooms	H/C Units	1	Furnace	97.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Rooms	H/C Units	1	Furnace	97.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Rooms	H/C Units	1	Furnace	74.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Rooms	H/C Units	1	Furnace	74.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Rooms	H/C Units	1	Furnace	74.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Rooms	H/C Units	1	Furnace	74.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Rooms	H/C Units	1	Furnace	74.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Pipe Insulation Recommendations

		Recommendation Inputs		Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	Length of Uninsulated Pipe (ft)	Pipe Diameter (in)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Domestic Hot Water Systme	20	1.25	0.00	0	3.5	$57.46	$87.00	$0.00	1.51

DHW Inventory & Recommendations

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

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
5th Floor Restrooms	2	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	2.9	$47.59	$14.34	$0.00	0.30
4th Floor Restrooms	2	Faucet Aerator (Lavatory)	2.00	1.00	0.00	0	2.4	$39.66	$14.34	$0.00	0.36
4th Floor Restrooms	3	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	4.4	$71.39	$21.51	$0.00	0.30
3rd Floor Restrooms	6	Faucet Aerator (Lavatory)	2.00	1.00	0.00	0	7.3	$118.98	$43.02	$0.00	0.36
2nd Floor Restrooms	10	Faucet Aerator (Lavatory)	2.00	1.00	0.00	0	12.2	$198.31	$71.70	$0.00	0.36
1st Floor Restrooms	2	Faucet Aerator (Lavatory)	2.00	1.00	0.00	0	2.4	$39.66	$14.34	$0.00	0.36

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Dining Room	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Dining Room	1	Freezer Chest	No	Yes	0.27	2,325	0.0	$309.31	$1,700.00	$0.00	5.50
Dining Room	2	Refrigerator Chest	No	Yes	0.23	2,013	0.0	$267.84	$4,232.80	$0.00	15.80
Dining Hall	4	Refrigerator Chest	No	Yes	0.46	4,027	0.0	$535.69	$8,465.60	$0.00	15.80

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Various	20	Computers	120.0	
Various	125	Laptops	85.0	
Various	12	Printers	500.0	
Various	6	Microwave	1,200.0	
Various	1	Toaster	1,100.0	
Various	2	Coffee Maker	900.0	
Various	2	Mini Fridge	260.0	
Various	2	Water Coolers	260.0	
Various	14	Projectors	350.0	
Various	1	Smart Boards	500.0	

Building Envelope Cost Estimates

		qty	LF	$/unit	est. costs
	Doors	11		$ 125	$ 1,375
South	Windows	48	624	$ 4	$ 2,496
East	Windows	40	520	$ 4	$ 2,080
North	Windows	40	520	$ 4	$ 2,080
West	Windows	37	481	$ 4	$ 1,924
					$ 9,955
	Typical Window LF				
	13				
	Recommendations:				
	Caulk Perimeter of Window Frames				
	Weather-strip Exterior Doors				

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Hope Academy Charter School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 32,500
Built: 1945

For Year Ending: December 31, 2016
Date Generated: May 25, 2017

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Hope Academy Charter School 601 Grand Ave Asbury Park, New Jersey 07712	Hope Academy Charter School 601 Grand Ave Asbury Park, NJ 07712 (____)____-_____	Donna Torres 601 Grand Ave Asbury Park, NJ 07712 7329884227 ext 512 dtorres@hopeacademycs.org

Property ID: 5895557

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
37.2 kBtu/ft²

Source EUI
80.8 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	649,381 (54%)
Natural Gas (kBtu)	558,496 (46%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	60.4
National Median Source EUI (kBtu/ft²)	131.3
% Diff from National Median Source EUI	-38%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	104

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

Aimee Lalonde
601 Grand Ave
Asbury Park, NJ 07712
3479132422
alalonde@trcsolutions.com

Professional Engineer Stamp (if applicable)

ENERGY STAR® Scorecard

LEARN MORE AT energystar.gov

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ENERGY STAR® Score

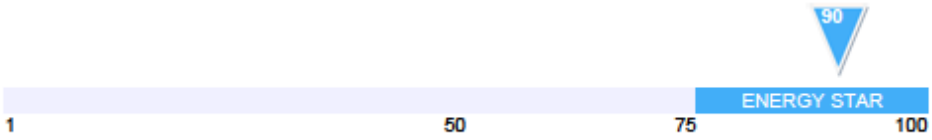
Hope Academy Charter School

Primary Function: K-12 School
Gross Floor Area (ft²): 32,500
Built: 1945

For Year Ending: December 31, 2016
Date Generated: May 25, 2017

Property Address:
Hope Academy Charter School
601 Grand Ave
Asbury Park, New Jersey 07712

For the year ending in December 2016, this building used 80.8 (kBtu/ft²) on a source energy basis. The Environmental Protection Agency's (EPA's) 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.



Buildings with a score of 75 or higher may qualify for EPA's ENERGY STAR.

Signature of Verifying Professional

I _____ (Name) verify that the information regarding energy use and property use details is true and correct to the best of my knowledge.

Signature: _____Date: _____

ENERGY STAR® Data Verification Checklist

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ENERGY STAR ® Score[1]

Hope Academy Charter School

Registry Name: Hope Academy Charter School
Property Type: K-12 School
Gross Floor Area (ft²): 32,500
Built: 1945

For Year Ending: 12/31/2016
Date Generated: 05/25/2017

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Hope Academy Charter School 601 Grand Ave Asbury Park, New Jersey 07712 **Property ID:** 5895557	Hope Academy Charter School 601 Grand Ave Asbury Park, NJ 07712 (____)____-_____	Donna Torres 601 Grand Ave Asbury Park, NJ 07712 7329884227 ext 512 dtorres@hopeacademycs.org

1. Review of Whole Property Characteristics

Basic Property Information

1) **Property Name:** Hope Academy Charter School
Is this the official name of the property? ☐ Yes ☐ No

If "No", please specify: _____

2) **Property Type:** K-12 School
Is this an accurate description of the primary use of this property? ☐ Yes ☐ No

3) **Location:**
601 Grand Ave
Asbury Park, New Jersey 07712

Is this correct and complete? ☐ Yes ☐ No

4) **Gross Floor Area:** 32,500 ft²
☐ Yes ☐ No