



Local Government Energy Audit: Energy Audit Report



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Asher Holmes Elementary School

48 Menzel Lane

Morganville, New Jersey 07751

Marlboro Township BoE

October 23, 2018

Final Report by:

TRC Energy Services

Disclaimer

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

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

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

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

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I EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Asher Holmes Elementary School.

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

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

I.1 Facility Summary

Asher Holmes Elementary School is a 70,825 square foot facility comprised of various space types within a single building. The building consists mainly of classrooms but also has a gymnasium, cafeteria, kitchen, and offices in a single story building.

Lighting at Asher Holmes Elementary School consists of mainly of aging and inefficient T8 fluorescent lighting and HVAC equipment which is approaching the end of its useful life. Heating is supplied by natural gas fired boilers as well as electric resistance heaters. Cooling is provided by a combination of package, split system, and window air conditioning (AC) units. A thorough description of the facility and our observations are located in Section 2.

I.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated and recommends seven measures which together represent an opportunity for Asher Holmes Elementary School to reduce annual energy costs by roughly \$14,179 and annual greenhouse gas emissions by 109,450 lbs CO₂e. We estimate that if all measures were implemented as recommended, the project would pay for itself in roughly 11.9 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Asher Holmes Elementary School’s annual energy use by 7%.

Figure 1 – Previous 12 Month Utility Costs

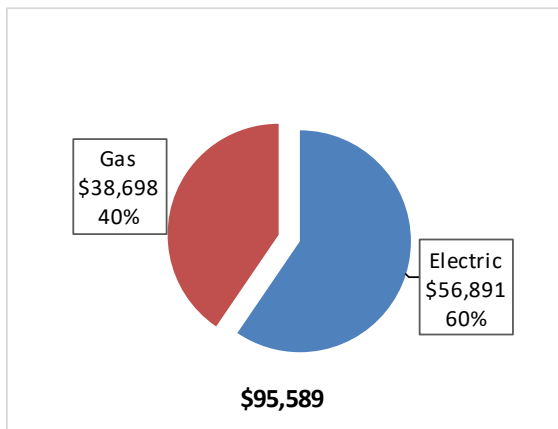
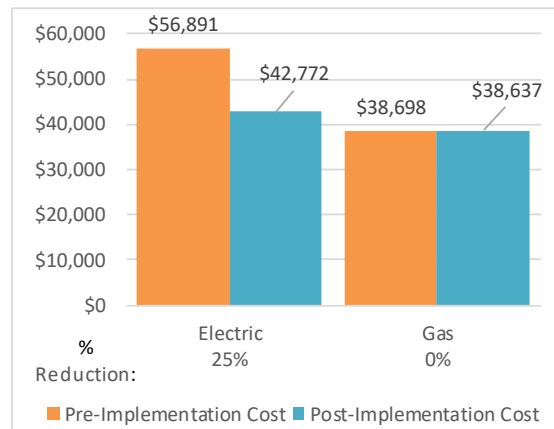


Figure 2 – Potential Post-Implementation Costs



A detailed description of Asher Holmes Elementary School’s existing energy use can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. A brief description of each category can be found below and a description of savings opportunities can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure	Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		87,938	26.4	0.0	\$11,491.64	\$155,441.21	\$14,940.00	\$140,501.21	12.2	88,553
ECM 1 Install LED Fixtures	Yes	23,393	5.3	0.0	\$3,057.02	\$66,594.77	\$4,700.00	\$61,894.77	20.2	23,557
ECM 2 Retrofit Fixtures with LED Lamps	Yes	63,396	21.0	0.0	\$8,284.55	\$86,802.89	\$10,240.00	\$76,562.89	9.2	63,839
ECM 3 Install LED Exit Signs	Yes	1,148	0.1	0.0	\$150.08	\$2,043.55	\$0.00	\$2,043.55	13.6	1,156
Lighting Control Measures		17,435	5.8	0.0	\$2,278.41	\$28,856.00	\$2,780.00	\$26,076.00	11.4	17,557
ECM 4 Install Occupancy Sensor Lighting Controls	Yes	15,910	5.3	0.0	\$2,079.06	\$24,304.00	\$2,740.00	\$21,564.00	10.4	16,021
ECM 5 Install High/Low Lighting Controls	Yes	1,526	0.5	0.0	\$199.35	\$4,320.00	\$0.00	\$4,320.00	21.7	1,536
HVAC System Improvements		709	0.0	5.6	\$153.77	\$1,359.42	\$0.00	\$1,359.42	8.8	1,372
ECM 6 Implement Demand Control Ventilation	Yes	709	0.0	5.6	\$153.77	\$1,359.42	\$0.00	\$1,359.42	8.8	1,372
Plug Load Equipment Control - Vending Machine		1,954	0.0	0.0	\$255.39	\$460.00	\$0.00	\$460.00	1.8	1,968
ECM 7 Vending Machine Control	Yes	1,954	0.0	0.0	\$255.39	\$460.00	\$0.00	\$460.00	1.8	1,968
TOTALS		108,036	32.3	5.6	\$14,179.22	\$186,116.63	\$17,720.00	\$168,396.63	11.9	109,450

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

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

Lighting Upgrades generally involve the replacement of existing lighting components such as lamps and ballasts (or the entire fixture) with higher efficiency lighting components. These measures save energy by reducing the power used by the lighting components due to improved electrical efficiency.

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

HVAC System Improvements generally involve the installation of automated controls to reduce heating and cooling demand during periods of reduced demand. These measures could encompass changing temperature setpoints, using outside air for free cooling, or limiting excessive outside air during extreme outdoor air temperature conditions. These measures save energy by reducing the demand on HVAC systems and the amount of time systems operate.

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

Energy Efficient Practices

TRC also identified four 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 Asher Holmes Elementary School include:

- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- Perform Proper Boiler Maintenance
- Install Plug Load Controls

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 Asher Holmes Elementary School. Based on the configuration of the site and its loads there is a high potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	140	kW DC STC
Electric Generation	166,792	kWh/yr
Displaced Cost	\$14,510	/yr
Installed Cost	\$364,000	

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

I.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
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 are based on the SmartStart program. More details on this program and others are available in Section 8.

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

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

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

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

2.2 General Site Information

On March 5, 2018, TRC performed an energy audit at Asher Holmes Elementary School located in Morganville, New Jersey. TRC’s team met with Frank Collins to review the facility operations and help focus our investigation on specific energy-using systems.

Asher Holmes Elementary School is a 70,825 square foot facility comprised mainly of classrooms with a gymnasium, cafeteria, kitchen, and offices in a single story building.

The building was constructed in 1974 and has had three additions since then. In 1997 the cafeteria was added followed by the addition of four new classrooms in 2008. A new main office and security area was added in 2015.

2.3 Building Occupancy

The school is open Monday through Friday 10 months a year, September through June. The typical schedule is presented in the table below. There are limited occasional sports activities in the gymnasium on Saturdays and during the summer, but for the majority of the summer period and weekends the building is closed. During a typical day, the facility is occupied by approximately 90 staff and 575 students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Asher Holmes ES	Weekday	8:30AM - 3PM
Asher Holmes ES	Weekend	Closed

2.4 Building Envelope

The building is constructed of concrete block, and structural steel with a brick facade. The building has a flat roof covered with light colored membrane. The building's three additions have double pane windows which are in good condition and show little sign of excessive infiltration. The original building still has single pane windows. The exterior doors for the three additions are constructed of aluminum with double pane windows while the exterior doors on the original building are aluminum with single pane fenestration.



Image 1 Building Envelope

2.5 On-Site Generation

Asher Holmes Elementary School does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Lighting at the facility is provided mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as some compact fluorescent lamps (CFL) and a few linear LED tube lights. The fixtures are a mix of 2-lamp, 3-lamp, or 4-lamp, 4-foot long troffers with diffusers. The majority of the fixtures contain 4-lamps. The cafeteria is lit with a mix of U-bend fluorescent fixtures and CFL lamps that are located in recessed can fixtures. The gymnasium is lit with 8-lamp CLF fixtures. Exit signs contain fluorescent lamps.



Image 2 General Lighting



Image 3 Gym Lighting

Lighting control in most spaces is provided by manual wall switches. The main office and security area addition's lighting is controlled with occupancy sensors that are either wall or ceiling mounted depending on the space layout.

The building's exterior lighting consists of a mix of fixtures including CFLs, linear fluorescent T8s, high pressure sodium (HPS), metal halide (MH) and incandescent fixtures. Fixtures are controlled by either photocells or time clocks.

Direct Expansion Air Conditioning System (DX)

Asher Holmes Elementary School is served by a variety of direct-expansion (DX) units including ductless split systems, window AC units, in room packaged AC units, and roof top packaged units. The majority of the split system AC units and packaged AC units are located on the roof and serve the second addition (four classrooms), faculty lounge, media center, tech coset, and the main office. These units range in size from 0.75 tons to 15 tons. The 8-ton AAON packaged AC unit serving the main office also has 15 kW of electric resistance heating. The two 15-ton Trane packaged AC units serving the cafeteria and the two 3-ton Airedale in-room packaged AC units serving classrooms 1A & 1B are equipped with hot water coils that are served by the boilers. Classrooms 2, 3, & 12 each have two 1-ton window AC units for cooling.

The unit is manually controlled by a thermostat located in zone. The units operate on demand to maintain a space temperature setpoint of 72°F when occupied and 81°F when unoccupied.



Image 5 Split System indoor (evaporator)



Image 6 Split System outdoor (condenser)



Image 7 DX w/HW coil serving Cafeteria



Image 8 In-classroom package unit w/HW coil

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of two Lochinvar gas fired condensing hot water heaters with an input rating of 285 MBH each and a rated thermal efficiency of 96%. Each water heater has a 116 gallon storage tank.

Food Service & Laundry Equipment

The school has a kitchen that is used to prepare lunches daily for the students and staff. The kitchen equipment consists of an Ice cream novelty freezer, three single door commercial refrigerators, a double door commercial refrigerator, counter top steamer, convection oven, warmer, warming table, cool table, walk-in freezer, and a dishwasher. The kitchen is in operation Monday through Friday from 7:30 AM to 1:40 PM September through June.

Building Plug Load

There are roughly 46 desktop computer work stations throughout the facility and 33 laptops. There is no centralized PC power management software installed. There is a single tech closet that has cooling provided a by dedicated split system.

General office equipment and break room amenities contribute to the plug load. Classrooms are outfitted with projectors, smartboards, and other audio visual aids.

The facility has one refrigerated beverage vending machine and one non-refrigerated vending machine.

2.7 Water-Using Systems

There are 19 restrooms at this facility a faculty lounge with a dishwasher, and the kitchen. A sampling of restrooms found that most of the fixtures were fitted with low flow controls.

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

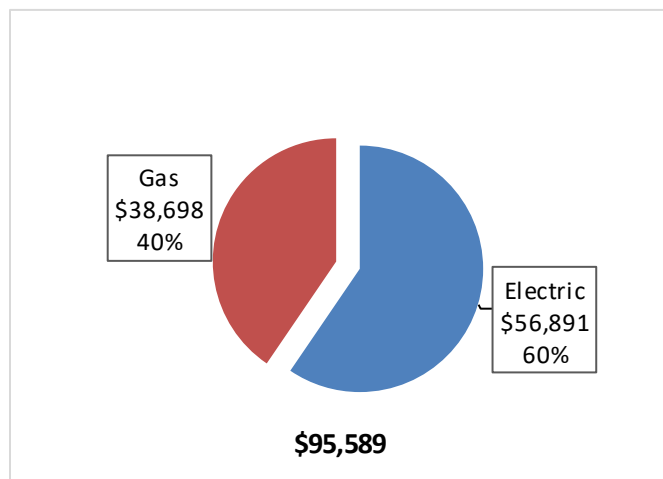
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Asher Holmes Elementary School		
Fuel	Usage	Cost
Electricity	435,345 kWh	\$56,891
Natural Gas	35,590 Therms	\$38,698
Total		\$95,589

The current annual energy cost for this facility is \$95,589 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was \$0.131/kWh, which is the blended rate that includes energy supply, distribution, and other charges, including demand. This rate is used throughout the analyses in this report to assess energy costs and savings. Electric use tends to remain high in the winter. This is likely partially due to the presence of electrical resistance heat. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

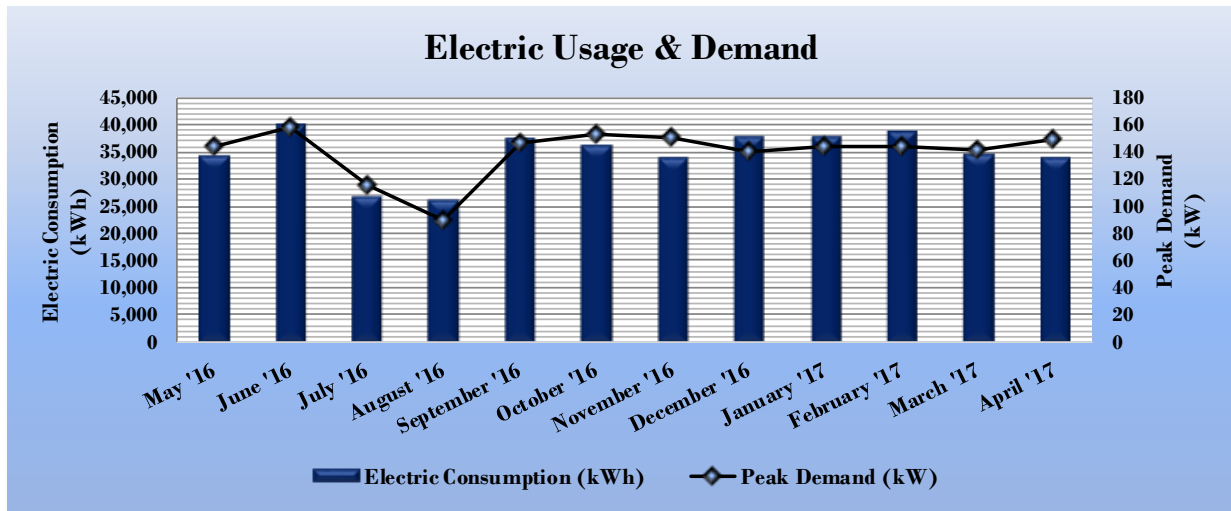


Figure 10 - Electric Usage & Demand

Electric Billing Data for Asher Holmes Elementary School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
5/24/16	28	34,400	144		\$4,318
6/23/16	29	40,160	159		\$5,118
7/26/16	32	26,880	115		\$3,535
8/31/16	35	26,240	90		\$3,310
9/23/16	22	37,760	147		\$4,903
10/31/16	37	36,480	154		\$4,770
11/30/16	29	34,080	151		\$4,490
12/31/16	30	38,080	141		\$4,858
1/31/17	30	38,080	144		\$5,011
2/24/17	23	38,880	144		\$5,156
3/24/17	27	34,880	142		\$4,720
4/24/17	30	33,920	149		\$4,676
Totals	352	419,840	158.9	\$0	\$54,864
Annual	365	435,345	158.9	\$0	\$56,891

3.3 Natural Gas Usage

Natural gas is provided by NJ Natural Gas. The average gas cost for the past 12 months is \$1.087/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below. The gas use profile is consistent with sites where heating energy is the dominant factor in gas consumption.

Figure 11 - Natural Gas Usage

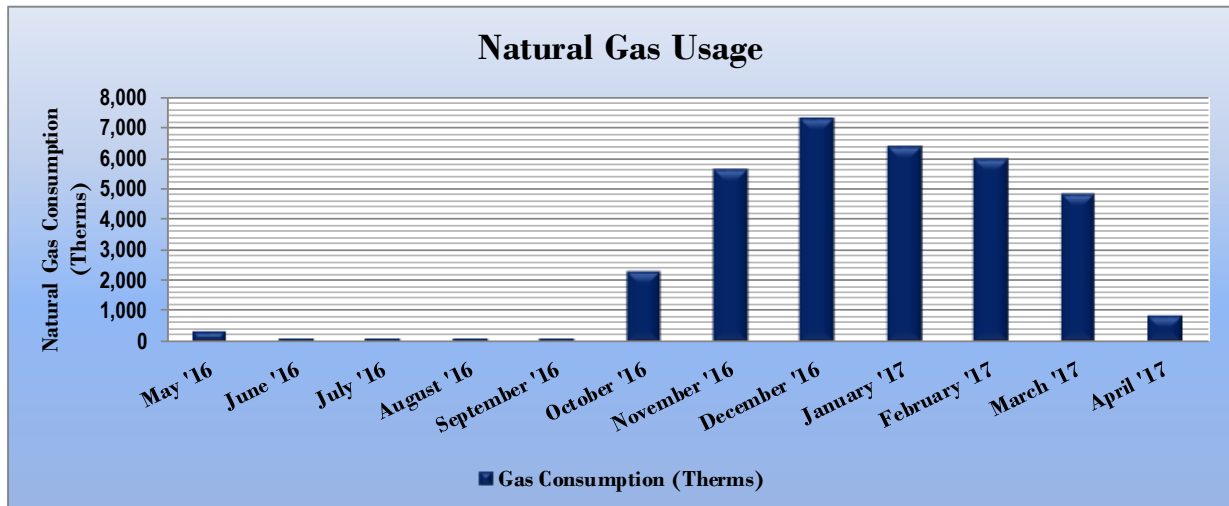


Figure 12 - Natural Gas Usage

Gas Billing Data for Asher Holmes Elementary School				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
6/10/16	29	339	\$672	No
7/13/16	32	155	\$520	No
8/10/16	27	141	\$473	Yes
9/8/16	28	127	\$496	No
10/7/16	28	154	\$542	No
11/8/16	31	2,340	\$2,689	No
12/9/16	30	5,681	\$5,762	No
1/11/17	32	7,343	\$7,289	No
2/10/17	29	6,375	\$6,393	No
3/15/17	32	6,023	\$6,241	Yes
4/11/17	26	4,860	\$5,037	No
5/11/17	29	882	\$1,312	No
Totals	353	34,420	\$37,426	2
Annual	365	35,590	\$38,698	

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 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Asher Holmes Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft ²)	118.6	141.4
Site Energy Use Intensity (kBtu/ft ²)	71.2	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 14 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Asher Holmes Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft ²)	102.2	141.4
Site Energy Use Intensity (kBtu/ft ²)	65.9	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building’s energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 45.

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

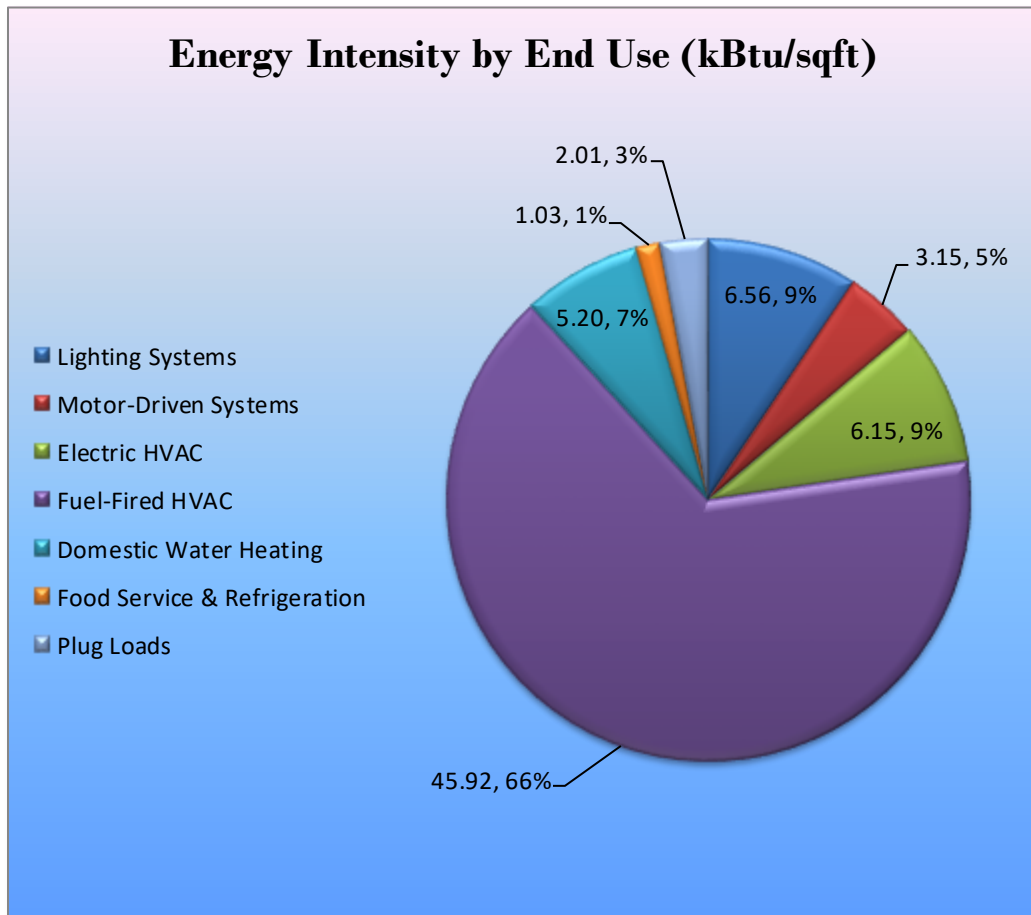
For more information on ENERGY STAR® certification go to: <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1>.

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 15 - Energy Balance (% and kBtu/SF)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

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

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 16 – 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 ₂ e Emissions Reduction (lbs)
Lighting Upgrades		87,938	26.4	0.0	\$11,491.64	\$155,441.21	\$14,940.00	\$140,501.21	12.2	88,553
ECM 1	Install LED Fixtures	23,393	5.3	0.0	\$3,057.02	\$66,594.77	\$4,700.00	\$61,894.77	20.2	23,557
ECM 2	Retrofit Fixtures with LED Lamps	63,396	21.0	0.0	\$8,284.55	\$86,802.89	\$10,240.00	\$76,562.89	9.2	63,839
ECM 3	Install LED Exit Signs	1,148	0.1	0.0	\$150.08	\$2,043.55	\$0.00	\$2,043.55	13.6	1,156
Lighting Control Measures		17,435	5.8	0.0	\$2,278.41	\$28,856.00	\$2,780.00	\$26,076.00	11.4	17,557
ECM 4	Install Occupancy Sensor Lighting Controls	15,910	5.3	0.0	\$2,079.06	\$24,304.00	\$2,740.00	\$21,564.00	10.4	16,021
ECM 5	Install High/Low Lighting Controls	1,526	0.5	0.0	\$199.35	\$4,320.00	\$0.00	\$4,320.00	21.7	1,536
HVAC System Improvements		709	0.0	5.6	\$153.77	\$1,359.42	\$0.00	\$1,359.42	8.8	1,372
ECM 6	Implement Demand Control Ventilation	709	0.0	5.6	\$153.77	\$1,359.42	\$0.00	\$1,359.42	8.8	1,372
Plug Load Equipment Control - Vending Machine		1,954	0.0	0.0	\$255.39	\$460.00	\$0.00	\$460.00	1.8	1,968
ECM 7	Vending Machine Control	1,954	0.0	0.0	\$255.39	\$460.00	\$0.00	\$460.00	1.8	1,968
TOTALS		108,036	32.3	5.6	\$14,179.22	\$186,116.63	\$17,720.00	\$168,396.63	11.9	109,450

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

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

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 17 below.

Figure 17 – 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 ₂ e Emissions Reduction (lbs)
Lighting Upgrades		87,938	26.4	0.0	\$11,491.64	\$155,441.21	\$14,940.00	\$140,501.21	12.2	88,553
ECM 1	Install LED Fixtures	23,393	5.3	0.0	\$3,057.02	\$66,594.77	\$4,700.00	\$61,894.77	20.2	23,557
ECM 2	Retrofit Fixtures with LED Lamps	63,396	21.0	0.0	\$8,284.55	\$86,802.89	\$10,240.00	\$76,562.89	9.2	63,839
ECM 3	Install LED Exit Signs	1,148	0.1	0.0	\$150.08	\$2,043.55	\$0.00	\$2,043.55	13.6	1,156

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 ₂ e Emissions Reduction (lbs)
Interior	11,012	3.7	0.0	\$1,439.09	\$53,704.00	\$3,000.00	\$50,704.00	35.2	11,089
Exterior	12,381	1.6	0.0	\$1,617.93	\$12,890.77	\$1,700.00	\$11,190.77	6.9	12,468

Measure Description

We recommend replacing existing fixtures containing fluorescent and HID lamps with new high performance LED light fixtures. We recommend gym lighting and exterior wall packs and pole mounted fixtures be considered for replacement. 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 fluorescent tubes or HID lighting.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
Interior	61,497	20.8	0.0	\$8,036.39	\$85,677.23	\$10,190.00	\$75,487.23	9.4	61,927
Exterior	1,899	0.2	0.0	\$248.15	\$1,125.66	\$50.00	\$1,075.66	4.3	1,912

Measure Description

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

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

ECM 3: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
Interior	1,148	0.1	0.0	\$150.08	\$2,043.55	\$0.00	\$2,043.55	13.6	1,156
Exterior	0	0.0	0.0	\$0.00	\$0.00	\$0.00	\$0.00	0.0	0

Measure Description

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

4.1.2 Lighting Control Measures

Our recommendations for lighting control measures are summarized in Figure 18 below.

Figure 18 – 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 ₂ e Emissions Reduction (lbs)
Lighting Control Measures		17,435	5.8	0.0	\$2,278.41	\$28,856.00	\$2,780.00	\$26,076.00	11.4	17,557
ECM 4	Install Occupancy Sensor Lighting Controls	15,910	5.3	0.0	\$2,079.06	\$24,304.00	\$2,740.00	\$21,564.00	10.4	16,021
ECM 5	Install High/Low Lighting Controls	1,526	0.5	0.0	\$199.35	\$4,320.00	\$0.00	\$4,320.00	21.7	1,536

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 ₂ e Emissions Reduction (lbs)
15,910	5.3	0.0	\$2,079.06	\$24,304.00	\$2,740.00	\$21,564.00	10.4	16,021

Measure Description

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

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

ECM 5: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
1,526	0.5	0.0	\$199.35	\$4,320.00	\$0.00	\$4,320.00	21.7	1,536

Measure Description

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

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

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

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

4.1.3 HVAC System Upgrades

Our recommendation for HVAC system improvement are summarized in Figure 19 below.

Figure 19 - 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 ₂ e Emissions Reduction (lbs)
HVAC System Improvements	709	0.0	5.6	\$153.77	\$1,359.42	\$0.00	\$1,359.42	8.8	1,372
ECM 6 Implement Demand Control Ventilation	709	0.0	5.6	\$153.77	\$1,359.42	\$0.00	\$1,359.42	8.8	1,372

ECM 6: Implement Demand Control Ventilation (DCV)

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 ₂ e Emissions Reduction (lbs)
709	0.0	5.6	\$153.77	\$1,359.42	\$0.00	\$1,359.42	8.8	1,372

Measure Description

Demand control ventilation (DCV) monitors indoor air CO₂ content to measure room occupancy. This data is used to regulate the amount of outdoor provided to the space for ventilation. In order to ensure adequate air quality, standard ventilation systems often provide outside air based on a space’s estimated maximum occupancy. However, during low occupancy periods, the space may be over ventilated. This wastes energy through excessive fan more usage and additional cost to heat and cool the excessive air flow. DCV reduces unnecessary outdoor air intake by regulating ventilation based on actual occupancy levels, saving significant amounts of energy. DCV is most suited for facilities or areas where occupancy levels vary significantly hour to hour and day to day. We recommend DCV at this site as a means of controlling the dedicated package units serving the cafeteria.

Energy savings associated with DCV are based on hours of operation, space occupancy, system air flow, outside air reduction, and other factors. Energy savings results from eliminating unnecessary ventilation and space conditioning.

4.1.4 Plug Load Equipment Control - Vending Machines

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

Figure 20-Summary of Plug Load Equipment Control ECMs

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine	1,954	0.0	0.0	\$255.39	\$460.00	\$0.00	\$460.00	1.8	1,968
ECM 7 Vending Machine Control	1,954	0.0	0.0	\$255.39	\$460.00	\$0.00	\$460.00	1.8	1,968

ECM 7: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)	Estimated Net Cost (\$)	Simple Payback Period (yrs)	CO ₂ e Emissions Reduction (lbs)
1,954	0.0	0.0	\$255.39	\$460.00	\$0.00	\$460.00	1.8	1,968

Measure Description

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

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.

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.

Perform Proper Boiler Maintenance

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

Plug Load Controls

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

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.

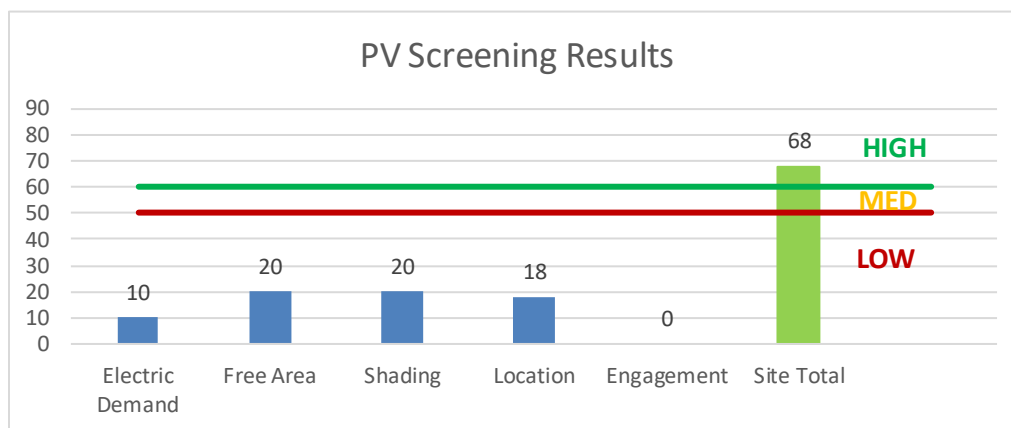
6.1 Photovoltaic

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/ground next to the building/over the main parking lot may be feasible. If Asher Holmes Elementary School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 21 - Photovoltaic Screening



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

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

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

6.2 Combined Heat and Power

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

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

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

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

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

7 DEMAND RESPONSE

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

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

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

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

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

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

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

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

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey’s Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 22 for a list of the eligible programs identified for each recommended ECM.

Figure 22 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	Direct Install
ECM 1	Install LED Fixtures	x	x
ECM 2	Retrofit Fixtures with LED Lamps	x	x
ECM 3	Install LED Exit Signs	x	x
ECM 4	Install Occupancy Sensor Lighting Controls	x	x
ECM 5	Install High/Low Lighting Controls		
ECM 6	Implement Demand Control Ventilation		
ECM 7	Vending Machine Control		

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

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

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

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

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

8.4 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. An ESIP is a type of "performance contract," whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. This is done in a manner that ensures that annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive in year one, and every year thereafter. ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs can be leveraged to help further reduce the total project cost of eligible measures.

This LGEA report is the first step to participating in ESIP. Next, you will need to select an approach for implementing the desired ECMs:

- (1) Use an Energy Services Company or "ESCO."
- (2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.
- (3) Use a hybrid approach of the two options described above where the ESCO is utilized for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

After adopting a resolution with a chosen implementation approach, the development of the Energy Savings Plan (ESP) can begin. The ESP demonstrates that the total project costs of the ECMs are offset by the energy savings over the financing term, not to exceed 15 years. The verified savings will then be used to pay for the financing.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Entities should carefully consider all alternatives to develop an approach that best meets their needs. A detailed program descriptions and application can be found at: www.njcleanenergy.com/ESIP.

Please note that ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you may utilize NJCEP incentive programs to help further reduce costs when developing the ESP. You should refer to the ESIP guidelines at the link above for further information and guidance on next steps.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third-party (i.e. non-utility) energy supplier.

Energy deregulation in New Jersey has increased energy buyers' options by separating the function of electricity distribution from that of electricity supply. So, though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

If your facility is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third-party electric suppliers. If your facility is purchasing electricity from a third-party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third-party electric suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

9.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey has also been deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate on a monthly basis. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a third-party supplier for natural gas commodity.

A customer's decision about whether to buy natural gas from a retail supplier is typically dependent upon whether a customer seeks budget certainty and/or longer-term rate stability. Customers can secure longer-term fixed prices by signing up for service through a third-party retail natural gas supplier. Many larger natural gas customers may seek the assistance of a professional consultant to assist in their procurement process.

If your facility is not purchasing natural gas from a third-party supplier, consider shopping for a reduced rate from third-party natural gas suppliers. If your facility is purchasing natural gas from a third-party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third-party natural gas suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
Security Entrance	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,680	0.04	128	0.0	\$16.66	\$117.00	\$20.00	5.82
Boiler Room	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,680	0.24	701	0.0	\$91.65	\$643.50	\$110.00	5.82
Boiler Room Switching Panel	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,680	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,680	0.02	68	0.0	\$8.84	\$71.80	\$10.00	6.99
Receiving/Cust Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,680	0.06	191	0.0	\$24.99	\$175.50	\$30.00	5.82
Receiving/Restroom	1	Incandescent 2L	Wall Switch	80	1,680	Relamp	No	1	LED Screw-In Lamps: 2 Lamp	Wall Switch	6	1,680	0.05	143	0.0	\$18.68	\$87.91	\$10.00	4.17
Receiving Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.04	38	0.0	\$4.96	\$117.00	\$20.00	19.56
Gym	20	Compact Fluorescent 8 Lamp	Wall Switch	336	1,680	Fixture Replacement	Yes	20	LED - Fixtures: High-Bay	Occupancy Sensor	51	1,176	3.94	11,604	0.0	\$1,516.35	\$58,104.00	\$3,700.00	35.88
Gym Hallway	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,176	0.41	1,208	0.0	\$157.92	\$1,687.50	\$150.00	9.74
Main Office Hallway	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,176	0.19	564	0.0	\$73.70	\$949.50	\$70.00	11.93
Music Room	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.72	2,127	0.0	\$277.97	\$1,697.00	\$335.00	4.90
Music Room Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	350	0.11	96	0.0	\$12.53	\$504.00	\$40.00	37.02
Girls Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.05	142	0.0	\$18.53	\$365.13	\$20.00	18.62
Boys Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.05	142	0.0	\$18.53	\$365.13	\$20.00	18.62
Classroom 34 - Art Room	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,176	0.41	1,208	0.0	\$157.92	\$1,147.50	\$185.00	6.09
Classroom 34 Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	350	0.05	48	0.0	\$6.27	\$387.00	\$55.00	52.98
Room 35	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.24	709	0.0	\$92.66	\$745.67	\$135.00	6.59
Room 35 Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 4L	Wall Switch	63	1,680	Relamp	No	1	LED - Linear Tubes: (4) 2' Lamps	Wall Switch	34	1,680	0.02	56	0.0	\$7.32	\$76.53	\$20.00	7.72
Room 35 Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	350	0.08	72	0.0	\$9.40	\$445.50	\$30.00	44.20
Classroom 23 Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,176	0.38	1,128	0.0	\$147.39	\$1,089.00	\$140.00	6.44
Classroom 23	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 24	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 25	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 26	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 27	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 28	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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 29	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 31	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 32	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Janitor	1	Incandescent: 1 Lamp	Wall Switch	40	1,680	Relamp	No	1	LED Screw-In Lamps: 1 Lamp	Wall Switch	6	1,680	0.02	66	0.0	\$8.58	\$43.95	\$5.00	4.54
Cafeteria	40	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	40	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,176	1.31	3,872	0.0	\$505.95	\$2,738.00	\$505.00	4.41
Cafeteria Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	500	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	500	0.03	28	0.0	\$3.72	\$75.20	\$15.00	16.19
Cafeteria	28	Compact Fluorescent: 2L recessed can	Wall Switch	52	1,680	Relamp	Yes	28	LED Screw-In Lamps: 2 Lamp pin based	Occupancy Sensor	37	1,176	0.48	1,412	0.0	\$184.51	\$34,999.15	\$70.00	189.31
Stage	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,176	0.25	725	0.0	\$94.75	\$796.50	\$125.00	7.09
Cafeteria Janitor Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,680	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,680	0.03	96	0.0	\$12.50	\$75.20	\$15.00	4.82
Kitchen	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,680	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,176	0.45	1,329	0.0	\$173.71	\$1,097.20	\$200.00	5.16
Kitchen Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,680	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,176	0.04	121	0.0	\$15.79	\$191.20	\$35.00	9.89
Kitchen Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.05	142	0.0	\$18.53	\$365.13	\$20.00	18.62
Media Center	24	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	1.15	3,403	0.0	\$444.75	\$2,823.20	\$550.00	5.11
Media Center Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	350	0.11	96	0.0	\$12.53	\$504.00	\$40.00	37.02
Classroom 43	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,680	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,176	0.33	967	0.0	\$126.34	\$871.60	\$155.00	5.67
Classroom 43 Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,176	0.38	1,128	0.0	\$147.39	\$1,089.00	\$140.00	6.44
Classroom 40	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,680	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,176	0.62	1,813	0.0	\$236.88	\$1,398.00	\$260.00	4.80
Classroom 41	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,680	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,176	0.62	1,813	0.0	\$236.88	\$1,398.00	\$260.00	4.80
Classroom 42	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,680	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,176	0.62	1,813	0.0	\$236.88	\$1,398.00	\$260.00	4.80
Classroom 39	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,680	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,176	0.37	1,088	0.0	\$142.13	\$946.80	\$170.00	5.47
Girls Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,176	0.08	242	0.0	\$31.58	\$445.50	\$65.00	12.05
Boys Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,176	0.08	242	0.0	\$31.58	\$445.50	\$65.00	12.05
Room 37	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.24	709	0.0	\$92.66	\$745.67	\$135.00	6.59
Room 37	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,176	0.05	161	0.0	\$21.06	\$387.00	\$20.00	17.43
Room 37 Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,176	0.03	97	0.0	\$12.65	\$318.20	\$10.00	24.37

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
Room 37 Storage	2	Incandescent 2 Lamp	Wall Switch	80	500	Relamp	No	2	LED Screw-In Lamps: 2 Lamp	Wall Switch	12	500	0.09	78	0.0	\$10.22	\$175.81	\$20.00	15.25
Gym Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,680	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,680	0.03	96	0.0	\$12.50	\$75.20	\$15.00	4.82
Gym Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	500	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	350	0.08	72	0.0	\$9.40	\$445.50	\$30.00	44.20
Girls Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,176	0.03	97	0.0	\$12.65	\$318.20	\$10.00	24.37
Boys Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,176	0.03	97	0.0	\$12.65	\$318.20	\$10.00	24.37
Girls Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.10	284	0.0	\$37.06	\$460.27	\$75.00	10.39
Boys Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.10	284	0.0	\$37.06	\$460.27	\$75.00	10.39
Copy Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,176	0.08	242	0.0	\$31.58	\$291.50	\$50.00	7.65
Copy Room Hallway	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,176	0.44	1,289	0.0	\$168.45	\$1,746.00	\$160.00	9.42
Tech Closet	8	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,680	None	Yes	8	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,176	0.03	79	0.0	\$10.30	\$116.00	\$20.00	9.32
Nurses Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,680	0.09	255	0.0	\$33.33	\$350.00	\$60.00	8.70
Nurses Office Restroom	1	Incandescent 1 Lamp	Wall Switch	40	1,680	Relamp	No	1	LED Screw-In Lamps: 1 Lamp	Wall Switch	6	1,680	0.02	66	0.0	\$8.58	\$43.95	\$5.00	4.54
Nurses Office Exam	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,680	0.04	128	0.0	\$16.66	\$233.00	\$40.00	11.58
Nurses Office Restroom	1	Incandescent 1 Lamp	Wall Switch	40	1,680	Relamp	No	1	LED Screw-In Lamps: 1 Lamp	Wall Switch	6	1,680	0.02	66	0.0	\$8.58	\$43.95	\$5.00	4.54
Classroom 1A & 1B	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,176	0.25	725	0.0	\$94.75	\$796.50	\$125.00	7.09
Classroom 2	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 3	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 4	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 5	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 9	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 11	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 12	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 13	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 17	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46
Classroom 18	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.43	1,276	0.0	\$166.78	\$1,126.20	\$215.00	5.46

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
Addition Hallway	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,176	0.22	645	0.0	\$84.22	\$1,008.00	\$80.00	11.02
Classroom 20	10	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	10	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.48	1,418	0.0	\$185.31	\$1,221.33	\$235.00	5.32
Classroom 6	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,680	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,176	0.57	1,692	0.0	\$221.09	\$1,322.80	\$245.00	4.87
Classroom 9	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,680	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,176	0.33	967	0.0	\$126.34	\$871.60	\$155.00	5.67
Classroom 8A	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.14	425	0.0	\$55.59	\$555.40	\$95.00	8.28
Classroom 7	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,680	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,176	0.66	1,934	0.0	\$252.67	\$1,473.20	\$275.00	4.74
Boys Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,176	0.03	97	0.0	\$12.65	\$318.20	\$10.00	24.37
Boys Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.10	284	0.0	\$37.06	\$460.27	\$75.00	10.39
Girls Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,176	0.03	97	0.0	\$12.65	\$318.20	\$10.00	24.37
Girls Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.10	284	0.0	\$37.06	\$460.27	\$75.00	10.39
Custodian Closet	1	Incandescent: 1L	Wall Switch	60	1,680	Relamp	No	1	LED Screw-In Lamps: 1 Lamp	Wall Switch	9	1,680	0.03	99	0.0	\$12.88	\$43.95	\$5.00	3.03
Faculty Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.05	142	0.0	\$18.53	\$365.13	\$20.00	18.62
Faculty Hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,176	0.27	806	0.0	\$105.28	\$1,125.00	\$100.00	9.74
Classroom 16	14	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	14	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.67	1,985	0.0	\$259.44	\$1,601.87	\$315.00	4.96
Classroom 16 Restroom	1	Incandescent: 1L	Wall Switch	40	1,680	Relamp	No	1	LED Screw-In Lamps: 1 Lamp	Wall Switch	6	1,680	0.02	66	0.0	\$8.58	\$43.95	\$5.00	4.54
Classroom 14	14	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	14	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.67	1,985	0.0	\$259.44	\$1,601.87	\$315.00	4.96
Classroom 14 Restroom	1	Incandescent: 1L	Wall Switch	40	1,680	Relamp	No	1	LED Screw-In Lamps: 1 Lamp	Wall Switch	6	1,680	0.02	66	0.0	\$8.58	\$43.95	\$5.00	4.54
Classroom 15	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	13	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.63	1,844	0.0	\$240.91	\$1,506.73	\$295.00	5.03
Classroom 15 Restroom	1	Incandescent: 1L	Wall Switch	40	1,680	Relamp	No	1	LED Screw-In Lamps: 1 Lamp	Wall Switch	6	1,680	0.02	66	0.0	\$8.58	\$43.95	\$5.00	4.54
Classroom 16 Hallway	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,176	0.14	403	0.0	\$52.64	\$562.50	\$50.00	9.74
Main Office	12	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,147	None	No	12	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,147	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Main Office Kitchenette	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.19	567	0.0	\$74.13	\$650.53	\$115.00	7.22
Main Office Restroom	1	Incandescent: 1L	Wall Switch	40	1,680	Relamp	No	1	LED Screw-In Lamps: 1 Lamp	Wall Switch	6	1,680	0.02	66	0.0	\$8.58	\$43.95	\$5.00	4.54
Vice Principal Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,680	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,176	0.19	567	0.0	\$74.13	\$650.53	\$115.00	7.22
Vice Principal Office Hallway	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,680	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	1,176	0.04	122	0.0	\$15.98	\$414.60	\$30.00	24.07

Location	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
	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
Vice Principal Office Conf AH105	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,147	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,147	0.04	84	0.0	\$11.03	\$192.80	\$40.00	13.86
Principal Office	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,147	Relamp	No	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,147	0.05	105	0.0	\$13.78	\$241.00	\$50.00	13.86
Principal Office Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,680	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,176	0.03	81	0.0	\$10.53	\$328.50	\$10.00	30.25
Service Entrance	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,147	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,147	0.04	87	0.0	\$11.37	\$117.00	\$20.00	8.53
Vestibule	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	62	1,680	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,176	0.03	81	0.0	\$10.53	\$328.50	\$10.00	30.25
Gym Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,380	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,066	0.03	210	0.0	\$27.45	\$174.50	\$30.00	5.26
Faculty Room	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,380	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,066	0.37	2,836	0.0	\$370.55	\$946.80	\$170.00	2.10
Exit Signs	19	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	19	LED Exit Signs: 2 W Lamp	None	6	8,760	0.07	1,148	0.0	\$150.08	\$2,043.55	\$0.00	13.62
Canopy	4	Compact Fluorescent 2L	Daylight Dimming	84	4,380	Relamp	No	4	LED Screw-In Lamps: 2 Lamp pin based	Daylight Dimming	59	4,380	0.07	504	0.0	\$65.82	\$703.25	\$0.00	10.68
Parking lot	4	High-Pressure Sodium: (1) 400W Lamp	Daylight Dimming	465	4,380	Fixture Replacement	No	4	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	140	4,380	0.85	6,548	0.0	\$855.70	\$7,811.97	\$400.00	8.66
New Entrance	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Daylight Dimming	32	4,380	Relamp	No	4	LED - Linear Tubes: (1) 4' Lamp	Daylight Dimming	15	4,380	0.05	353	0.0	\$46.08	\$143.60	\$20.00	2.68
New Entrance	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Daylight Dimming	22	4,380	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Daylight Dimming	9	4,380	0.02	136	0.0	\$17.77	\$63.80	\$10.00	3.03
Wall Packs	10	High-Pressure Sodium: (1) 100W Lamp	Daylight Dimming	138	4,380	Fixture Replacement	No	10	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	42	4,380	0.63	4,836	0.0	\$631.90	\$3,906.77	\$1,000.00	4.60
Wall Packs	4	Incandescent: 1L wallpack	Daylight Dimming	60	4,380	Relamp	No	4	LED Screw-In Lamps: 1 Lamp wallpack	Daylight Dimming	15	4,380	0.12	907	0.0	\$118.48	\$215.01	\$20.00	1.65
Wall Packs	3	Metal Halide: (1) 70W Lamp	Daylight Dimming	95	4,380	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	29	4,380	0.13	997	0.0	\$130.33	\$1,172.03	\$300.00	6.69

Motor Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
		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
Boiler Room	Boilers	2	Heating Hot Water Pump	2.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Boiler Room	Boilers	2	Combustion Air Fan	0.5	77.0%	No	2,745	No	77.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Roof	Cafeteria	2	Supply Fan	3.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Classrooms	Unit Ventilators	45	Ventilation Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Hallways	Hallway fan coil units	15	Supply Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Roof	Media Center	2	Supply Fan	0.5	76.0%	No	2,745	No	76.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Roof	2nd Addition	1	Supply Fan	0.2	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Roof	Faculty Lounge	1	Supply Fan	0.3	72.0%	No	2,745	No	72.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Roof	Main Office	1	Supply Fan	2.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Roof	Main Office	1	Return Fan	2.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Electric HVAC Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions		Proposed Conditions									Energy Impact & Financial Analysis							
		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
Room 35	Room 35	2	Split-System AC	0.75		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Roof	2nd Addition	1	Split-System AC	2.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Roof	Faculty Lounge	1	Split-System AC	3.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Roof	Media Center	2	Packaged AC	3.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Roof	Tech Closet	1	Split-System AC	2.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Roof	Cafeteria	2	Packaged AC	15.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Roof	Main Office	1	Packaged AC	8.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Main Office	Main Office	1	Electric Resistance Heat		51.18	No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Classrooms 2, 3, & 12	Classrooms 2, 3, & 12	6	Window AC	1.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Classrooms 1A & 1B	Classrooms 1A & 1B	2	Packaged AC	3.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Restrooms	Restrooms	8	Electric Resistance Heat		6.80	No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Fuel Heating Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions		Proposed Conditions							Energy Impact & Financial Analysis									
		System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years			
Boiler Room	original building & cafeteria	2	Non-Condensing Hot Water Boiler	2,601.60	No									0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Demand Control Ventilation Recommendations

Location	Area(s)/System(s) Affected	Recommendation Inputs				Energy Impact & Financial Analysis						
		Number of Zones	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	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
Cafeteria	Cafeteria/Packaged Acs	1	30.00		100.00	0.00	709	5.6	\$153.77	\$1,359.42	\$0.00	8.84

DHW Inventory & Recommendations

Location	Area(s)/System(s) Served	Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
		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	Entire building	2	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

Commercial Refrigerator/Freezer Inventory & Recommendations

Location	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis							
	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years	
Kitchen	1	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00	
Kitchen	2	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00	
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00	
Kitchen	1	Freezer Chest	No	No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00	

Cooking Equipment Inventory & Recommendations

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

Dishwasher Inventory & Recommendations

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


Plug Load Inventory


Location	Existing Conditions			
	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Classrooms	46	Desktop Computer	270.0	
Classrooms	33	Laptops	75.0	
Office	3	Small Printer	60.0	
Office	5	Medium Printer	120.0	
Office	4	Large Printer	180.0	
Classrooms	34	Projectors	400.0	
Faculty Lounge	3	Microwaves	1,500.0	
Faculty Lounge	3	Refrigerators	700.0	
Faculty Lounge	3	Coffee Machine	999.0	
Faculty Lounge	1	Toaster Oven	1,500.0	
Faculty Lounge	1	Dishwasher	1,000.0	
Classrooms	58	Standing Fans	200.0	
Classrooms	1	Smart Board	300.0	

Vending Machine Inventory & Recommendations

Location	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Hallway	1	Non-Refrigerated	Yes	0.00	343	0.0	\$44.76	\$230.00	\$0.00	5.14
Hallway	1	Refrigerated	Yes	0.00	1,612	0.0	\$210.63	\$230.00	\$0.00	1.09

Appendix B: ENERGY STAR® Statement of Energy Performance


ENERGY STAR® Statement of Energy Performance



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**ENERGY STAR®
Score¹**

Asher Holmes Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 70,825
Built: 1974

For Year Ending: March 31, 2017
Date Generated: April 04, 2018

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

Property & Contact Information			
Property Address Asher Holmes Elementary School 48 Menzel Lane Morganville, New Jersey 07751	Property Owner Marlboro Township Board of Education 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000	Primary Contact Cindy Barr-Rague 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org	
Property ID: 6275413			
Energy Consumption and Energy Use Intensity (EUI)			
Site EUI 70.2 kBtu/ft²	Annual Energy by Fuel	National Median Comparison	
	Electric - Grid (kBtu) 1,448,665 (29%)	National Median Site EUI (kBtu/ft²)	67.5
	Natural Gas (kBtu) 3,523,304 (71%)	National Median Source EUI (kBtu/ft²)	112
Source EUI 116.5 kBtu/ft²		% Diff from National Median Source EUI	4%
		Annual Emissions	
		Greenhouse Gas Emissions (Metric Tons CO2e/year)	348

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

Signature: _____ Date: _____

Licensed Professional

() - _____



Professional Engineer Stamp
(if applicable)