# Local Government Energy Audit:
## Energy Audit Report

## *Gilbert Avenue School*

151 Gilbert Ave

Elmwood Park, New Jersey 07407

Elmwood Park Board of Education

December 5, 2018

Final Report by:

**TRC Energy Services**

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# Disclaimer

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

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

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

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

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# 1 EXECUTIVE SUMMARY

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

## 1.1 Facility Summary

The Gilbert Avenue School is a 28,061 square foot facility comprised of various space types within a single building. The school is three floors and includes a multipurpose/gym/cafeteria area with a stage, classrooms, offices, restrooms, a kitchen, and mechanical and electrical spaces.

Interior lighting at the Gilbert Avenue School primarily consists of T8 linear fluorescent lighting and compact fluorescent lamps. Exterior lighting is mostly compact fluorescent and high-pressure sodium lamp fixtures. Rooftop package and split-system air-conditioning units provide cooling to the facility. Air-conditioning equipment is over ten years old, but in good condition. Heating is supplied by steam and hot water, where steam is provided directly to terminal units and to a hot water heat exchanger by two aging steam boilers. A thorough description of the facility and our observations are located in Section 2.

## 1.2 Your Cost Reduction Opportunities

### Energy Conservation Measures

TRC evaluated nine measures and recommends seven measures which together represent an opportunity for the Gilbert Avenue School to reduce annual energy costs by roughly $7,154 and annual greenhouse gas emissions by 50,050 lbs $CO_2e$. We estimate that if all measures were implemented as recommended, the project would pay for itself in 6.7 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce the Gilbert Avenue School's annual energy use by 8%.

*Figure 1 – Previous 12 Month Utility Costs*

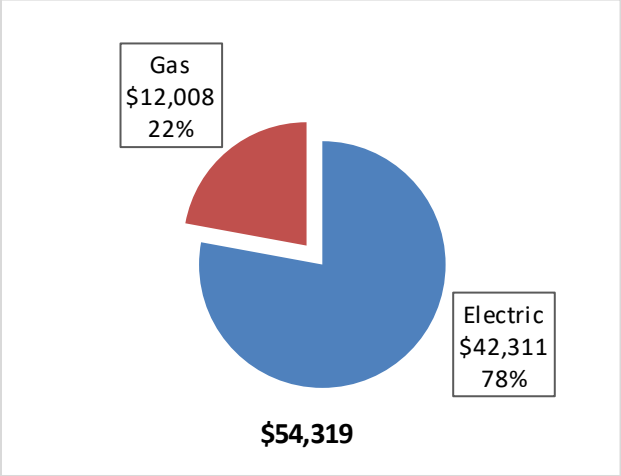
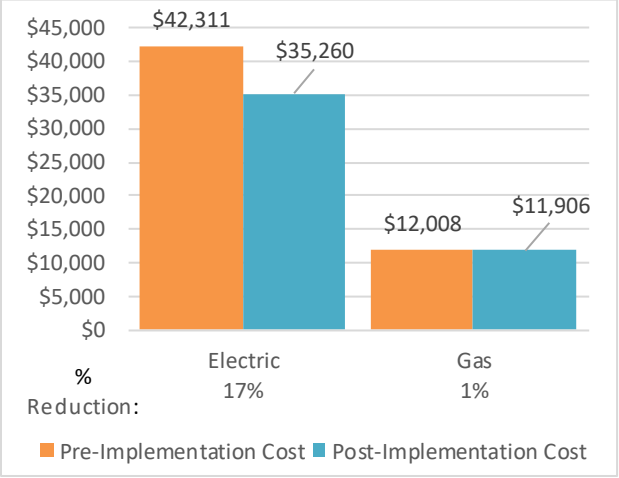



*Figure 2 – Potential Post-Implementation Costs*




A detailed description of the Gilbert Avenue 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)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Upgrades** | | | **41,601** | **17.2** | **0.0** | **$6,044.94** | **$49,395.80** | **$10,930.00** | **$38,465.80** | **6.4** | **41,892** |
| ECM 1 | Install LED Fixtures | Yes | 4,389 | 1.1 | 0.0 | $637.75 | $13,951.41 | $2,200.00 | $11,751.41 | 18.4 | 4,420 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | Yes | 2,819 | 1.1 | 0.0 | $409.56 | $2,099.23 | $320.00 | $1,779.23 | 4.3 | 2,838 |
| ECM 3 | Retrofit Fixtures with LED Lamps | Yes | 34,393 | 15.0 | 0.0 | $4,997.62 | $33,345.16 | $8,410.00 | $24,935.16 | 5.0 | 34,634 |
| **Lighting Control Measures** | | | **5,139** | **1.8** | **0.0** | **$746.75** | **$9,212.00** | **$1,230.00** | **$7,982.00** | **10.7** | **5,175** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | Yes | 4,871 | 1.7 | 0.0 | $707.76 | $8,812.00 | $1,230.00 | $7,582.00 | 10.7 | 4,905 |
| ECM 5 | Install High/Low Lighitng Controls | Yes | 268 | 0.1 | 0.0 | $38.99 | $400.00 | $0.00 | $400.00 | 10.3 | 270 |
| **Electric Unitary HVAC Measures** | | | **6,487** | **3.8** | **0.0** | **$942.62** | **$99,659.29** | **$4,750.00** | **$94,909.29** | **100.7** | **6,532** |
| | Install High Efficiency Electric AC | No | 6,487 | 3.8 | 0.0 | $942.62 | $99,659.29 | $4,750.00 | $94,909.29 | 100.7 | 6,532 |
| **Gas Heating (HVAC/Process) Replacement** | | | **0** | **0.0** | **1.7** | **$16.76** | **$60,810.24** | **$3,612.00** | **$57,198.24** | **3413.5** | **194** |
| | Install High Efficiency Steam Boilers | No | 0 | 0.0 | 1.7 | $16.76 | $60,810.24 | $3,612.00 | $57,198.24 | 3413.5 | 194 |
| **HVAC System Improvements** | | | **1,786** | **0.0** | **0.0** | **$259.49** | **$1,359.42** | **$0.00** | **$1,359.42** | **5.2** | **1,798** |
| ECM 6 | Implement Demand Control Ventilation | Yes | 1,786 | 0.0 | 0.0 | $259.49 | $1,359.42 | $0.00 | $1,359.42 | 5.2 | 1,798 |
| **Domestic Water Heating Upgrade** | | | **0** | **0.0** | **10.1** | **$102.43** | **$64.53** | **$0.00** | **$64.53** | **0.6** | **1,185** |
| ECM 7 | Install Low-Flow Domestic Hot Water Devices | Yes | 0 | 0.0 | 10.1 | $102.43 | $64.53 | $0.00 | $64.53 | 0.6 | 1,185 |
| **TOTALS FOR HIGH PRIORITY MEASURES** | | | **48,526** | **19.0** | **10.1** | **$7,153.61** | **$60,031.75** | **$12,160.00** | **$47,871.75** | **6.7** | **50,050** |
| **TOTALS FOR ALL EVALUATED MEASURES** | | | **55,013** | **22.9** | **11.8** | **$8,112.98** | **$220,501.27** | **$20,522.00** | **$199,979.27** | **24.6** | **56,776** |

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

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

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

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

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

**Gas Heating** (HVAC/Process) measures generally involve replacing older inefficient hydronic heating systems with modern energy efficient systems. Gas heating systems can provide equivalent heating compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel demands for heating, due to improved combustion and heat transfer efficiency.

**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.

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

## Energy Efficient Practices

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

- Develop a Lighting Maintenance Schedule
- Clean Evaporator/Condenser Coils on AC Systems
- Repair/Replace Steam Traps
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Water Conservation

For details on these energy efficient practices, please refer to Section 5.

## On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for the Gilbert Avenue 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** | 90 | kW DC STC |
| **Electric Generation** | 107,224 | kWh/yr |
| **Displaced Cost** | $9,330 | /yr |
| **Installed Cost** | $234,000 | |

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

## 1.3 Implementation Planning

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

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

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

- SmartStart
- Direct Install
- 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.

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

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

# 2 FACILITY INFORMATION AND EXISTING CONDITIONS

## 2.1 Project Contacts

*Figure 5 – Project Contacts*

| Name | Role | E-Mail | Phone # |
|---|---|---|---|
| **Customer** | | | |
| John DiPaola | Business Administrator | jdipaola@epps.org | 201-796-8700 ext #3175 |
| **Designated Representative** | | | |
| Vincent Benanati | Administrator | vbenanati@epps.org | 201-796-8700 |
| **TRC Energy Services** | | | |
| Alex Klieverik | Auditor | AKlieverik@trcsolutions.com | 732-855-0033 |

## 2.2 General Site Information

On May 31, 2018, TRC performed an energy audit at Gilbert Avenue School located in Elmwood Park, New Jersey. TRC's team met with Vincent Benanati to review the facility operations and help focus our investigation on specific energy-using systems.

The Gilbert Avenue School is a 28,061 square foot facility comprised of various space types within a single building. The school is three floors and includes a multipurpose/gym/cafeteria area with a stage, classrooms, offices, restrooms, a kitchen, and mechanical and electrical spaces.

Interior lighting at the Gilbert Avenue School primarily consists of T8 linear fluorescent lighting and compact fluorescent lamps. Exterior lighting is mostly compact fluorescent and high-pressure sodium lamp fixtures. Roof top package and split-system air-conditioning units provide cooling to the facility. Air-conditioning equipment is over ten years old, but in good condition. Heating is supplied by steam and hot water, where steam is provided directly to terminal units and to a hot water heat exchanger by two aging steam boilers.

The building was constructed in 1920. The facility underwent a major renovation in 2007, which included upgrading most of the lighting to T8s and replacing rooftop HVAC equipment.

## 2.3 Building Envelope

The building is constructed of brick masonry, and structural steel. The building has flat roof sections covered with either white or black membrane that is in good condition. The building has double pane windows which are in good condition and show little sign of excessive infiltration. The exterior doors are constructed of aluminum and glass and in good condition.

*Figure 6 – Building Exterior*

## 2.4 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), a few T12 lamps and LED lamps. Most of the fixtures are 2-lamp or 3-lamp, 4-foot long troffers with diffusers. The facility went through a major renovation in 2007 which involved replacing the lighting.

Lighting control in most spaces is provided by occupancy sensors. The occupancy sensors are either wall or ceiling mounted depending on the space layout. Stairwells, hallways, the media center as well as some classrooms and restrooms do not contain any occupancy sensors and are on during occupied ours each day throughout the school year.

The building's exterior lighting is minimal and consists primarily of efficient high-pressure sodium (HPS) fixtures and CFLs.

*Figure 7 – Lighting System Technologies*



## Steam to Hot Water Heating System

The steam system consists of two Smith 1,505 kBtu/hr output, forced draft boilers. The boilers have a nominal combustion efficiency of 80%. Steam is supplied at 15 psig to the facility and to a hot water heat exchanger. The heating system has two 5 hp heating hot water pumps that distribute the hot water to roof top HVAC equipment.

The boilers operate in a lead/lag configuration. Only a single boiler is usually required to meet the facility heating demand, but both may be required at peak winter conditions. Boiler operation is rotated weekly. Steam is supplied directly to terminal heaters and radiators throughout the facility. The boilers are very old and at the end of their useful life.

*Figure 8 – Boiler and Heating System Equipment*



## Direct Expansion Air Conditioning System (DX)

Three AAON package units, at 8, 10 and 15 tons, provide air conditioning to most of the building. A 25 ton Lennox package unit provides air conditioning to the gym area. The remaining air conditioning is provided by a 3 ton Lennox split system and a couple window air conditioners. The AAON units have 3 hp and 7.5 hp supply fans and 1 hp and 3 hp exhaust fans. The Lennox unit has a 10 hp supply fan, and is paired with an energy recovery unit which has a 2 hp supply fan and 3 hp exhaust fan.

The units are controlled by individual thermostats located in zones and operate based on scheduled building occupancy to maintain the zone space temperature setpoint. The units operate between 7:30 AM and 4:00 PM Monday through Friday.

*Figure 9 – Rooftop HVAC Equipment*

## Building Energy Management System (BEMS)

The boiler system of the facility is controlled with a ATC central control system. The system is capable of providing occupied and unoccupied schedules which allows the boiler to setback supply temperature based on occupancy or outside air temperature.

## Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of an A.O. Smith gas fired 71 gallon tank hot water heater with an input rating of 120,000 kBtu/hr at a nominal efficiency of 80%. Recirculation pumps distribute water to the entire site.

*Figure 10 – Domestic Hot Water System Equipment*

## Food Service Equipment

The school has a kitchen that is used to prepare lunches each day for the students and staff. Most of the cooking is done using a double full-size gas convection oven. Prepared food is kept warm in an insulated warming cabinet.

*Figure 11 – Food Service Equipment*



## Refrigeration

The kitchen has a double-door full size reach-in refrigerator that is used to store food prepared for school lunches, and a full size solid door reach-in freezer. There is also a milk cooler which holds dairy products for meals.

*Figure 12 – Refrigeration Equipment*



## Building Plug Load

There are roughly 47 computer work stations and 25 laptops throughout the facility. The computers are desktop units with LCD monitors. There is no centralized PC power management software installed.

There are 24 overhead projectors and six printers and copiers scattered throughout the facility. There are also portable fans and space heaters in the facility as well.

*Figure 13 – Plug Load Equipment*

## 2.5 Water-Using Systems

There are 14 restrooms. A sampling of restrooms found that the faucets are rated for 2 gallons per minute (gpm) or higher.

*Figure 14 – Water Fixtures*

# 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

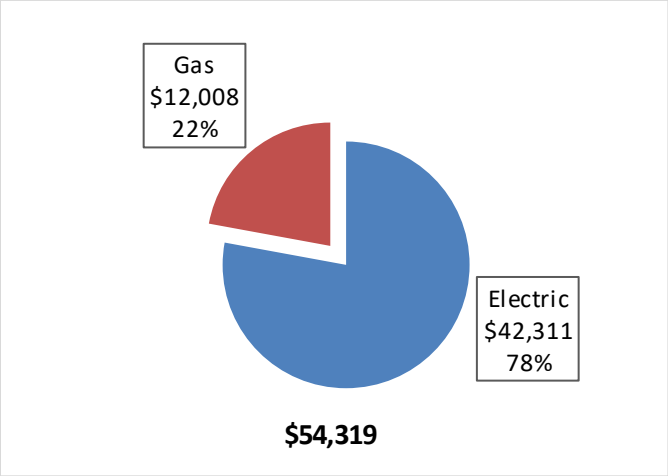
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

*Figure 15 - Utility Summary*

| Utility Summary for Gilbert Avenue School | | |
|---|---|---|
| **Fuel** | **Usage** | **Cost** |
| Electricity | 291,180 kWh | $42,311 |
| Natural Gas | 11,865 Therms | $12,008 |
| **Total** | | **$54,319** |

The current annual energy cost for this facility is $54,319 as shown in the chart below.

*Figure 16 - Energy Cost Breakdown*



## 3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.145/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. Demand peaks in September as cooling needs for the facility at their greatest, and dips in the spring months or March to May as less cooling necessary. While demand is also high in the winter months of November to February, no electric resistance heating was found at the facility. The monthly electricity consumption and peak demand are shown in the chart below.

*Figure 17 - Electric Usage & Demand*

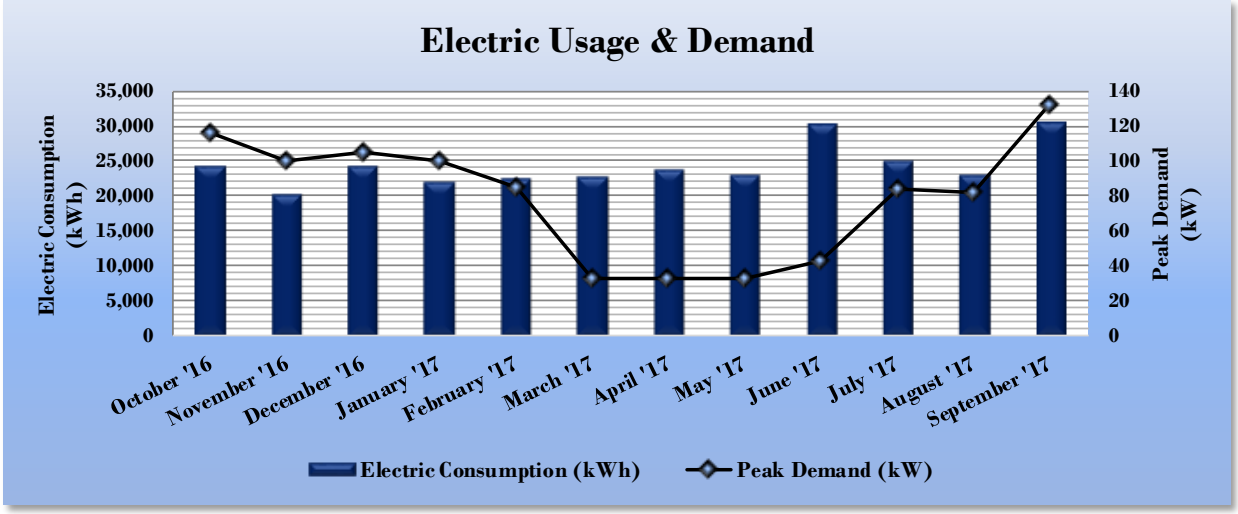



*Figure 18 - Electric Usage & Demand*

| Electric Billing Data for Gilbert Avenue School | | | | | |
|---|---|---|---|---|---|
| Period Ending | Days in Period | Electric Usage (kWh) | Demand (kW) | Demand Cost | Total Electric Cost |
| 10/26/16 | 30 | 24,263 | 116 | $565 | $3,831 |
| 11/22/16 | 27 | 20,165 | 100 | $417 | $2,586 |
| 12/27/16 | 35 | 24,138 | 105 | $470 | $3,046 |
| 1/26/17 | 30 | 21,905 | 100 | $448 | $2,947 |
| 2/27/17 | 32 | 22,356 | 85 | $164 | $3,007 |
| 3/28/17 | 29 | 22,826 | 32 | $146 | $2,845 |
| 4/27/17 | 30 | 23,747 | 32 | $146 | $2,940 |
| 5/26/17 | 29 | 23,079 | 32 | $146 | $3,045 |
| 6/27/17 | 32 | 30,158 | 42 | $186 | $4,301 |
| 7/27/17 | 30 | 24,964 | 84 | $379 | $4,206 |
| 8/25/17 | 29 | 22,990 | 82 | $370 | $3,911 |
| 9/26/17 | 32 | 30,589 | 132 | $644 | $5,646 |
| **Totals** | **365** | **291,180** | **132.3** | **$4,081** | **$42,311** |
| **Annual** | **365** | **291,180** | **132.3** | **$4,081** | **$42,311** |

## 3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $1.012/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below, and is indicative of a gas heating profile with small water heating and cooking loads.

*Figure 19 - Natural Gas Usage*

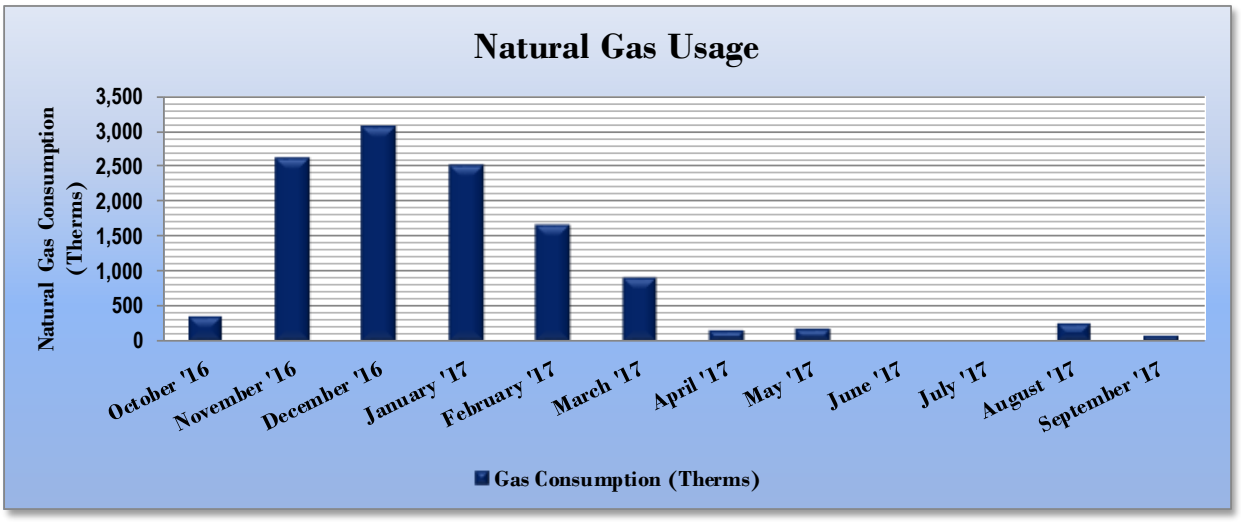



*Figure 20 - Natural Gas Usage*

| Gas Billing Data for Gilbert Avenue School | | | |
|---|---|---|---|
| Period Ending | Days in Period | Natural Gas Usage (Therms) | Natural Gas Cost |
| 10/26/16 | 30 | 369 | $373 |
| 11/22/16 | 27 | 2,625 | $2,342 |
| 12/27/16 | 35 | 3,089 | $2,825 |
| 1/26/17 | 30 | 2,531 | $2,599 |
| 2/27/17 | 32 | 1,658 | $1,812 |
| 3/28/17 | 29 | 906 | $989 |
| 4/27/17 | 30 | 153 | $206 |
| 5/26/17 | 29 | 185 | $225 |
| 6/27/17 | 32 | 0 | $107 |
| 7/27/17 | 30 | 0 | $107 |
| 8/25/17 | 29 | 254 | $309 |
| 9/26/17 | 32 | 94 | $114 |
| **Totals** | **365** | **11,865** | **$12,008** |
| **Annual** | **365** | **11,865** | **$12,008** |

## 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.

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 21 - Energy Use Intensity Comparison – Existing Conditions*

| Energy Use Intensity Comparison - Existing Conditions | | |
|---|---|---|
| | Gilbert Avenue School | National Median Building Type: School (K-12) |
| Source Energy Use Intensity (kBtu/ft$^2$) | 155.6 | 141.4 |
| Site Energy Use Intensity (kBtu/ft$^2$) | 77.7 | 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 22 - Energy Use Intensity Comparison – Following Installation of Recommended Measures*

| Energy Use Intensity Comparison - Following Installation of Recommended Measures | | |
|---|---|---|
| | Gilbert Avenue School | National Median Building Type: School (K-12) |
| Source Energy Use Intensity (kBtu/ft$^2$) | 136.7 | 141.4 |
| Site Energy Use Intensity (kBtu/ft$^2$) | 71.4 | 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 50.

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

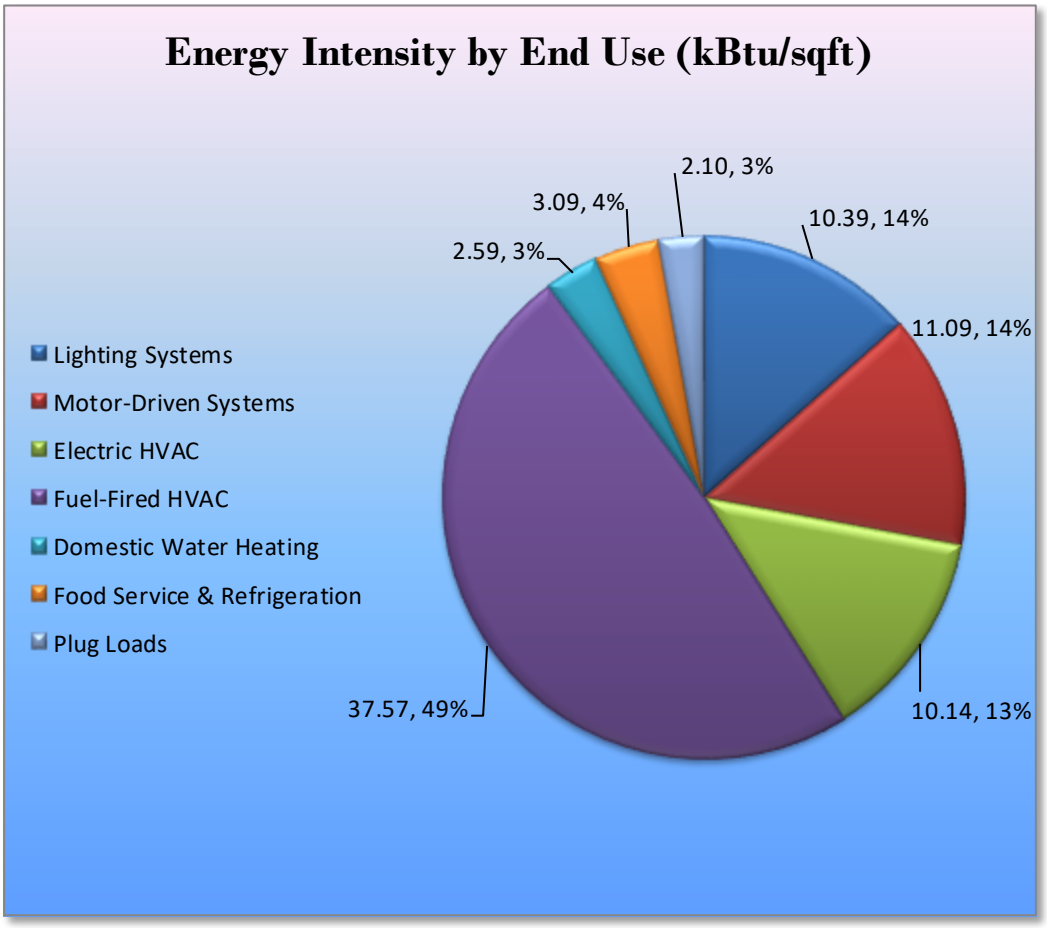
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 23 - 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 Gilbert Avenue 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 24 – Summary of Recommended ECMs***

| Energy Conservation Measure | | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Upgrades** | | **41,601** | **17.2** | **0.0** | **$6,044.94** | **$49,395.80** | **$10,930.00** | **$38,465.80** | **6.4** | **41,892** |
| ECM 1 | Install LED Fixtures | 4,389 | 1.1 | 0.0 | $637.75 | $13,951.41 | $2,200.00 | $11,751.41 | 18.4 | 4,420 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 2,819 | 1.1 | 0.0 | $409.56 | $2,099.23 | $320.00 | $1,779.23 | 4.3 | 2,838 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 34,393 | 15.0 | 0.0 | $4,997.62 | $33,345.16 | $8,410.00 | $24,935.16 | 5.0 | 34,634 |
| **Lighting Control Measures** | | **5,139** | **1.8** | **0.0** | **$746.75** | **$9,212.00** | **$1,230.00** | **$7,982.00** | **10.7** | **5,175** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | 4,871 | 1.7 | 0.0 | $707.76 | $8,812.00 | $1,230.00 | $7,582.00 | 10.7 | 4,905 |
| ECM 5 | Install High/Low Lighitng Controls | 268 | 0.1 | 0.0 | $38.99 | $400.00 | $0.00 | $400.00 | 10.3 | 270 |
| **HVAC System Improvements** | | **1,786** | **0.0** | **0.0** | **$259.49** | **$1,359.42** | **$0.00** | **$1,359.42** | **5.2** | **1,798** |
| ECM 6 | Implement Demand Control Ventilation | 1,786 | 0.0 | 0.0 | $259.49 | $1,359.42 | $0.00 | $1,359.42 | 5.2 | 1,798 |
| **Domestic Water Heating Upgrade** | | **0** | **0.0** | **10.1** | **$102.43** | **$64.53** | **$0.00** | **$64.53** | **0.6** | **1,185** |
| ECM 7 | Install Low-Flow Domestic Hot Water Devices | 0 | 0.0 | 10.1 | $102.43 | $64.53 | $0.00 | $64.53 | 0.6 | 1,185 |
| **TOTALS** | | **48,526** | **19.0** | **10.1** | **$7,153.61** | **$60,031.75** | **$12,160.00** | **$47,871.75** | **6.7** | **50,050** |

* - 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 25 below.

*Figure 25 – Summary of Lighting Upgrade ECMs*

| Energy Conservation Measure | | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($) | Estimated Net Cost ($) | Simple Payback Period (yrs) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Upgrades** | | **41,601** | **17.2** | **0.0** | **$6,044.94** | **$49,395.80** | **$10,930.00** | **$38,465.80** | **6.4** | **41,892** |
| ECM 1 | Install LED Fixtures | 4,389 | 1.1 | 0.0 | $637.75 | $13,951.41 | $2,200.00 | $11,751.41 | 18.4 | 4,420 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 2,819 | 1.1 | 0.0 | $409.56 | $2,099.23 | $320.00 | $1,779.23 | 4.3 | 2,838 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 34,393 | 15.0 | 0.0 | $4,997.62 | $33,345.16 | $8,410.00 | $24,935.16 | 5.0 | 34,634 |

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

### ECM 1: Install LED Fixtures

*Summary of Measure Economics*

| Interior/ Exterior | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($) | Estimated Net Cost ($) | Simple Payback Period (yrs) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| Interior | 1,935 | 0.7 | 0.0 | $281.22 | $9,298.59 | $1,800.00 | $7,498.59 | 26.7 | 1,949 |
| Exterior | 2,454 | 0.4 | 0.0 | $356.53 | $4,652.82 | $400.00 | $4,252.82 | 11.9 | 2,471 |

*Measure Description*

We recommend replacing interior fixtures in the gym/multipurpose area containing compact fluorescent lamps (CFLs) and exterior high pressure sodium fixtures with new high-performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of fluorescent or high pressure sodium lighting technologies.

## ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

*Summary of Measure Economics*

| Interior/ Exterior | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($) | Estimated Net Cost ($) | Simple Payback Period (yrs) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| Interior | 2,819 | 1.1 | 0.0 | $409.56 | $2,099.23 | $320.00 | $1,779.23 | 4.3 | 2,838 |
| Exterior | 0 | 0.0 | 0.0 | $0.00 | $0.00 | $0.00 | $0.00 | 0.0 | 0 |

*Measure Description*

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

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

## ECM 3: Retrofit Fixtures with LED Lamps

*Summary of Measure Economics*

| Interior/ Exterior | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($) | Estimated Net Cost ($) | Simple Payback Period (yrs) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| Interior | 33,984 | 14.9 | 0.0 | $4,938.17 | $32,966.69 | $8,410.00 | $24,556.69 | 5.0 | 34,222 |
| Exterior | 409 | 0.1 | 0.0 | $59.45 | $378.48 | $0.00 | $378.48 | 6.4 | 412 |

*Measure Description*

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

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

## 4.1.2 Lighting Control Measures

Our recommendations for lighting control measures are summarized in Figure 26 below.

***Figure 26 – Summary of Lighting Control ECMs***

| Energy Conservation Measure | | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($) | Estimated Net Cost ($) | Simple Payback Period (yrs) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Control Measures** | | **5,139** | **1.8** | **0.0** | **$746.75** | **$9,212.00** | **$1,230.00** | **$7,982.00** | **10.7** | **5,175** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | 4,871 | 1.7 | 0.0 | $707.76 | $8,812.00 | $1,230.00 | $7,582.00 | 10.7 | 4,905 |
| ECM 5 | Install High/Low Lighitng Controls | 268 | 0.1 | 0.0 | $38.99 | $400.00 | $0.00 | $400.00 | 10.3 | 270 |

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

### ECM 4: Install Occupancy Sensor Lighting Controls

*Summary of Measure Economics*

| Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($) | Estimated Net Cost ($) | Simple Payback Period (yrs) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|
| 4,871 | 1.7 | 0.0 | $707.76 | $8,812.00 | $1,230.00 | $7,582.00 | 10.7 | 4,905 |

*Measure Description*

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

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

## ECM 5: Install High/Low Lighting Controls

*Summary of Measure Economics*

| Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($) | Estimated Net Cost ($) | Simple Payback Period (yrs) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|
| 268 | 0.1 | 0.0 | $38.99 | $400.00 | $0.00 | $400.00 | 10.3 | 270 |

*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. Recommended areas for such lighting control are interior corridors ad hallways.

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 improvements are summarized in Figure 27 below.

*Figure 27 - Summary of HVAC System Improvement ECMs*

| Energy Conservation Measure | | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($) | Estimated Net Cost ($) | Simple Payback Period (yrs) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **HVAC System Improvements** | | **1,786** | **0.0** | **0.0** | **$259.49** | **$1,359.42** | **$0.00** | **$1,359.42** | **5.2** | **1,798** |
| ECM 6 | Implement Demand Control Ventilation | 1,786 | 0.0 | 0.0 | $259.49 | $1,359.42 | $0.00 | $1,359.42 | 5.2 | 1,798 |

### 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) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|
| 1,786 | 0.0 | 0.0 | $259.49 | $1,359.42 | $0.00 | $1,359.42 | 5.2 | 1,798 |

*Measure Description*

Demand control ventilation (DCV) monitors indoor air $CO_2$ content to measure room occupancy. This data is used to regulate the amount of outdoor air 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 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 where occupancy levels vary significantly hour to hour and day to day. In this case, the target area for DCV is in the gym/multipurpose area.

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 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 28 below.

*Figure 28 - Summary of Domestic Water Heating ECMs*

| Energy Conservation Measure | | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($) | Estimated Net Cost ($) | Simple Payback Period (yrs) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Domestic Water Heating Upgrade** | | **0** | **0.0** | **10.1** | **$102.43** | **$64.53** | **$0.00** | **$64.53** | **0.6** | **1,185** |
| ECM 7 | Install Low-Flow Domestic Hot Water Devices | 0 | 0.0 | 10.1 | $102.43 | $64.53 | $0.00 | $64.53 | 0.6 | 1,185 |

## ECM 7: Install Low-Flow DHW Devices

*Summary of Measure Economics*

| Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($) | Estimated Net Cost ($) | Simple Payback Period (yrs) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 | 10.1 | $102.43 | $64.53 | $0.00 | $64.53 | 0.6 | 1,185 |

*Measure Description*

We recommend installing low-flow domestic hot water devices to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators can reduce hot water usage, relative to standard aerators, which saves energy.

Low-flow devices reduce the overall water flow from the fixture, while still adequate pressure for washing. This reduces the amount of water used per day resulting in energy and water savings.

## 4.2 ECMs Evaluated But Not Recommended

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

*Figure 29 – Summary of Measures Evaluated, But Not Recommended*

| Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| **Electric Unitary HVAC Measures** | **6,487** | **3.8** | **0.0** | **$942.62** | **$99,659.29** | **$4,750.00** | **$94,909.29** | **100.7** | **6,532** |
| Install High Efficiency Electric AC | 6,487 | 3.8 | 0.0 | $942.62 | $99,659.29 | $4,750.00 | $94,909.29 | 100.7 | 6,532 |
| **Gas Heating (HVAC/Process) Replacement** | **0** | **0.0** | **1.7** | **$16.76** | **$60,810.24** | **$3,612.00** | **$57,198.24** | **3413.5** | **194** |
| Install High Efficiency Steam Boilers | 0 | 0.0 | 1.7 | $16.76 | $60,810.24 | $3,612.00 | $57,198.24 | 3413.5 | 194 |
| **TOTALS** | **6,487** | **3.8** | **1.7** | **$959.38** | **$160,469.53** | **$8,362.00** | **$152,107.53** | **158.5** | **6,726** |

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

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

### Install High Efficiency Air Conditioning Units

*Summary of Measure Economics*

| Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($) | Estimated Net Cost ($) | Simple Payback Period (yrs) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|
| 6,487 | 3.8 | 0.0 | $942.62 | $99,659.29 | $4,750.00 | $94,909.29 | 100.7 | 6,532 |

*Measure Description*

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

*Reasons for not Recommending*

As the figure above indicates, the simple payback for this measure was well beyond the expected useful life of the equipment, and currently there are no maintenance or other operational issues with the equipment, so it is not an appropriate measure to recommend at this time.

## Install High Efficiency Steam Boilers

*Summary of Measure Economics*

| Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($) | Estimated Net Cost ($) | Simple Payback Period (yrs) | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 | 1.7 | $16.76 | $60,810.24 | $3,612.00 | $57,198.24 | 3413.5 | 194 |

*Measure Description*

We typically recommend replacing older inefficient steam boilers with high efficiency steam boilers when cost effective. Significant improvements have been made in combustion technology resulting in increases in overall boiler efficiency. Energy savings results from improved combustion efficiency and reduced standby losses at low loads.

*Reasons for not Recommending*

While the boilers are very old and likely at the end of their useful life, the payback is well beyond the useful life of any replacement equipment. The opportunity to replace these units with high efficiency boilers will be available when the current boilers cease operation, or are set to be replaced anyway.

# 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.

## Develop a Lighting Maintenance Schedule

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

## Clean Evaporator/Condenser Coils on AC Systems

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

## Repair/Replace Steam Traps

Properly functioning steam traps ensure that all latent heat in the steam is delivered to the end use by preventing pressurized steam from leaking. Steam traps should be inspected as part of the regular steam system maintenance. Traps that are blocked, venting, or allowing steam to leak through should be repaired or replaced. Repairing or replacing existing steam traps will reduce steam losses.

## Perform Proper Boiler Maintenance

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

## Perform Proper Water Heater Maintenance

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

## Water Conservation

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

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

Refer to Section 4.1.4 for any low-flow ECM recommendations.

# 6 On-Site Generation Measures

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

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

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

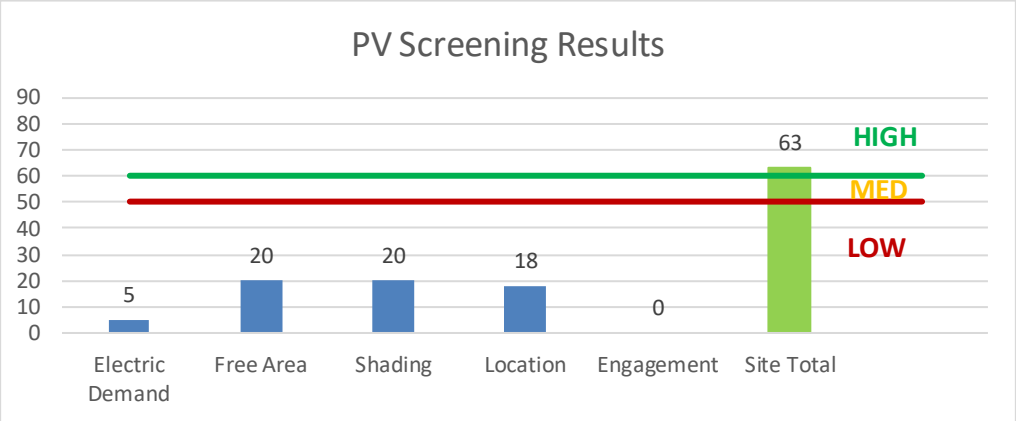
## 6.1 Photovoltaic

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

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

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the high potential for PV at the site. A PV array located on the roof of the main building may be feasible. If Gilbert Avenue School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

*Figure 30 - 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 and 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 (www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR program information.

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

# 8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 31 for a list of the eligible programs identified for each recommended ECM.

*Figure 31 - ECM Incentive Program Eligibility*

| Energy Conservation Measure | | SmartStart Prescriptive | SmartStart Custom | Direct Install | Pay For Performance Existing Buildings | Large Energy Users Program | Combined Heat & Power and Fuel Cell |
|---|---|---|---|---|---|---|---|
| ECM 1 | Install LED Fixtures | X | | X | | | |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | X | | X | | | |
| ECM 3 | Retrofit Fixtures with LED Lamps | X | | X | | | |
| ECM 4 | Install Occupancy Sensor Lighting Controls | X | | X | | | |
| ECM 5 | Install High/Low Lighitng Controls | | | X | | | |
| ECM 6 | Implement Demand Control Ventilation | | | X | | | |
| ECM 7 | Install Low-Flow Domestic Hot Water Devices | | | X | | | |

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

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

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

## 8.1 SmartStart

**Overview**

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

**Equipment with Prescriptive Incentives Currently Available:**

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

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

**Incentives**

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

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

**How to Participate**

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

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

## 8.2 Direct Install

**Overview**

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

**Incentives**

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

**How to Participate**

To participate in the Direct Install program you will need to contact the participating contractor assigned to 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

| | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Boiler Room | 6 | LED Screw-In Lamps: 1 Lamp Screw-in LED | Wall Switch | 9 | 1,600 | None | No | 6 | LED Screw-In Lamps: 1 Lamp Screw-in LED | Wall Switch | 9 | 1,600 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| electric Room | 1 | Linear Fluorescent - T12: 8' T12 (75W) - 2L | Wall Switch | 158 | 1,600 | Relamp & Reballast | No | 1 | LED - Linear Tubes: (2) 8' Lamps | Wall Switch | 72 | 1,600 | 0.06 | 158 | 0.0 | $22.99 | $128.69 | $0.00 | 5.60 |
| CR A114 | 10 | LED - Fixtures: Ambient - 4' - Direct/Indirect Fixture | Occupancy Sensor | 46 | 1,120 | None | No | 10 | LED - Fixtures: Ambient - 4' - Direct/Indirect Fixture | Occupancy Sensor | 46 | 1,120 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| CR A114 | 2 | LED - Fixtures: Ambient 2x2 Fixture | Occupancy Sensor | 34 | 1,120 | None | No | 2 | LED - Fixtures: Ambient 2x2 Fixture | Occupancy Sensor | 34 | 1,120 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| CR A112 | 10 | LED - Fixtures: Ambient - 4' - Direct/Indirect Fixture | Occupancy Sensor | 46 | 1,120 | None | No | 10 | LED - Fixtures: Ambient - 4' - Direct/Indirect Fixture | Occupancy Sensor | 46 | 1,120 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| CR A112 | 2 | LED - Fixtures: Ambient 2x2 Fixture | Occupancy Sensor | 34 | 1,120 | None | No | 2 | LED - Fixtures: Ambient 2x2 Fixture | Occupancy Sensor | 34 | 1,120 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Faculty Room A113 | 9 | LED - Fixtures: Ambient 2x2 Fixture | Occupancy Sensor | 34 | 1,120 | None | No | 9 | LED - Fixtures: Ambient 2x2 Fixture | Occupancy Sensor | 34 | 1,120 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| CR 432 | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | Yes | 6 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.29 | 810 | 0.0 | $117.75 | $708.18 | $155.00 | 4.70 |
| CR 505 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 16 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.35 | 680 | 0.0 | $98.82 | $584.24 | $160.00 | 4.29 |
| CR 505 Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.02 | 43 | 0.0 | $6.18 | $36.52 | $10.00 | 4.29 |
| Copy Room | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.06 | 128 | 0.0 | $18.53 | $109.55 | $30.00 | 4.29 |
| CST | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 6 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.19 | 383 | 0.0 | $55.59 | $328.64 | $90.00 | 4.29 |
| Main Office | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 10 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.32 | 638 | 0.0 | $92.64 | $547.73 | $150.00 | 4.29 |
| Main Office Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.02 | 61 | 0.0 | $8.82 | $36.52 | $10.00 | 3.01 |
| Principals Office | 6 | U-Bend Fluorescent - T8: U T8 (32W) - 3L | Occupancy Sensor | 92 | 1,120 | Relamp | No | 6 | LED - Linear Tubes: (3) U-Lamp | Occupancy Sensor | 50 | 1,120 | 0.17 | 328 | 0.0 | $47.72 | $652.14 | $0.00 | 13.66 |
| Conf. Room | 9 | U-Bend Fluorescent - T8: U T8 (32W) - 3L | Occupancy Sensor | 92 | 1,120 | Relamp | No | 9 | LED - Linear Tubes: (3) U-Lamp | Occupancy Sensor | 50 | 1,120 | 0.25 | 493 | 0.0 | $71.59 | $978.21 | $0.00 | 13.66 |
| Boys Restroom | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.06 | 128 | 0.0 | $18.53 | $109.55 | $30.00 | 4.29 |
| Girls Restroom | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.06 | 128 | 0.0 | $18.53 | $109.55 | $30.00 | 4.29 |
| Custodian Closet | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.02 | 43 | 0.0 | $6.18 | $36.52 | $10.00 | 4.29 |
| electric Room | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.04 | 85 | 0.0 | $12.35 | $73.03 | $20.00 | 4.29 |
| Storage 1 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.04 | 85 | 0.0 | $12.35 | $73.03 | $20.00 | 4.29 |
| Storage 2 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.04 | 121 | 0.0 | $17.65 | $73.03 | $20.00 | 3.01 |
| Nurses Office | 7 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 7 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.23 | 446 | 0.0 | $64.85 | $383.41 | $105.00 | 4.29 |
| Nurses Office | 3 | U-Bend Fluorescent - T8: U T8 (32W) - 3L | Occupancy Sensor | 92 | 1,120 | Relamp | No | 3 | LED - Linear Tubes: (3) U-Lamp | Occupancy Sensor | 50 | 1,120 | 0.08 | 164 | 0.0 | $23.86 | $326.07 | $0.00 | 13.66 |
| Nurses Office | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |

| | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Nurses Office Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.02 | 61 | 0.0 | $8.82 | $36.52 | $10.00 | 3.01 |
| Elevator Room | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.04 | 121 | 0.0 | $17.65 | $73.03 | $20.00 | 3.01 |
| Kitchen | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.38 | 1,080 | 0.0 | $157.00 | $854.24 | $195.00 | 4.20 |
| Kitchen Storage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.04 | 121 | 0.0 | $17.65 | $73.03 | $20.00 | 3.01 |
| Kitchen | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Multpurpose Room | 12 | Compact Fluorescent: Sportlite (252W) | Wall Switch | 336 | 1,600 | Fixture Replacement | Yes | 12 | LED - Fixtures: High-Bay | Occupancy Sensor | 235 | 1,120 | 1.35 | 3,784 | 0.0 | $549.79 | $11,938.59 | $2,220.00 | 17.68 |
| Multpurpose Room | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Book Room | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.08 | 230 | 0.0 | $33.45 | $225.55 | $50.00 | 5.25 |
| Gym Office | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.06 | 128 | 0.0 | $18.53 | $109.55 | $30.00 | 4.29 |
| Multipurpose Room | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 1,600 | Relamp | Yes | 1 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.04 | 115 | 0.0 | $16.72 | $54.77 | $50.00 | 0.29 |
| Stage | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | Yes | 10 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.27 | 767 | 0.0 | $111.49 | $905.15 | $170.00 | 6.59 |
| Stage | 3 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 3 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Kitchen Custodial | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.02 | 43 | 0.0 | $6.18 | $36.52 | $10.00 | 4.29 |
| Locker Room | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.02 | 61 | 0.0 | $8.82 | $36.52 | $10.00 | 3.01 |
| Locker Restrom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.02 | 43 | 0.0 | $6.18 | $36.52 | $10.00 | 4.29 |
| Basement Hall | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.17 | 340 | 0.0 | $49.41 | $292.12 | $80.00 | 4.29 |
| MPR/Nurses Office | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| MPR to Councilors | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.09 | 170 | 0.0 | $24.70 | $146.06 | $40.00 | 4.29 |
| MPR to Councilors | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Main Office Hall | 7 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 7 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.15 | 298 | 0.0 | $43.23 | $255.61 | $70.00 | 4.29 |
| Main Office Hall | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Main Office Hall | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 9 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.19 | 383 | 0.0 | $55.59 | $328.64 | $90.00 | 4.29 |
| Main Office Hall | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Occupancy Sensor | 114 | 1,120 | Relamp | No | 10 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.37 | 721 | 0.0 | $104.81 | $730.30 | $200.00 | 5.06 |
| Main Office Hall | 2 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.02 | 41 | 0.0 | $5.99 | $65.03 | $20.00 | 7.52 |
| Media Center | 42 | Linear Fluorescent - T8: 2' T8 (17W) - 3L | Occupancy Sensor | 53 | 1,120 | Relamp | No | 42 | LED - Linear Tubes: (3) 2' Lamps | Occupancy Sensor | 26 | 1,120 | 0.76 | 1,488 | 0.0 | $216.17 | $2,048.45 | $630.00 | 6.56 |

| | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Media Center | 14 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 14 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.30 | 595 | 0.0 | $86.47 | $511.21 | $140.00 | 4.29 |
| Media Center | 7 | Compact Fluorescent: 1 lamp CFL screw-in fixture | Occupancy Sensor | 13 | 1,120 | Relamp | No | 7 | LED Screw-In Lamps: 1 lamp LED screw-in | Occupancy Sensor | 9 | 1,120 | 0.02 | 36 | 0.0 | $5.24 | $120.58 | $0.00 | 23.01 |
| Media Center | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Media Center | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.02 | 61 | 0.0 | $8.82 | $36.52 | $10.00 | 3.01 |
| Electrical Room | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.04 | 85 | 0.0 | $12.35 | $73.03 | $20.00 | 4.29 |
| RDF | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.04 | 85 | 0.0 | $12.35 | $73.03 | $20.00 | 4.29 |
| Custodial | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.04 | 85 | 0.0 | $12.35 | $73.03 | $20.00 | 4.29 |
| Room 20 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 16 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.52 | 1,020 | 0.0 | $148.23 | $876.36 | $240.00 | 4.29 |
| Room 20 | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Room 20 Stroage 1 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.04 | 85 | 0.0 | $12.35 | $73.03 | $20.00 | 4.29 |
| Room 20 Storage 2 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.02 | 43 | 0.0 | $6.18 | $36.52 | $10.00 | 4.29 |
| Boys Restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.04 | 85 | 0.0 | $12.35 | $73.03 | $20.00 | 4.29 |
| Boys Restroom | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.01 | 21 | 0.0 | $2.99 | $32.52 | $10.00 | 7.52 |
| Girls Restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.04 | 85 | 0.0 | $12.35 | $73.03 | $20.00 | 4.29 |
| Girls Restroom | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.01 | 21 | 0.0 | $2.99 | $32.52 | $10.00 | 7.52 |
| Room 29 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 16 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.52 | 1,020 | 0.0 | $148.23 | $876.36 | $240.00 | 4.29 |
| Room 22 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 16 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.52 | 1,020 | 0.0 | $148.23 | $876.36 | $240.00 | 4.29 |
| Room 23 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 16 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.52 | 1,020 | 0.0 | $148.23 | $876.36 | $240.00 | 4.29 |
| Room 23 Storage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | No | 2 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,600 | 0.07 | 206 | 0.0 | $29.95 | $146.06 | $40.00 | 3.54 |
| Room 28 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Occupancy Sensor | 114 | 1,120 | Relamp | No | 12 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.44 | 866 | 0.0 | $125.77 | $876.36 | $240.00 | 5.06 |
| Room 28 Storage | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,600 | 0.04 | 103 | 0.0 | $14.97 | $73.03 | $20.00 | 3.54 |
| Faculty Room 2 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.10 | 270 | 0.0 | $39.25 | $262.06 | $60.00 | 5.15 |
| Faculty Restroom | 1 | U-Bend Fluorescent - T8: U T8 (32W) - 1L | Wall Switch | 39 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (1) U-Lamp | Wall Switch | 17 | 1,600 | 0.01 | 41 | 0.0 | $6.02 | $36.23 | $0.00 | 6.02 |
| Custodial Room access | 1 | Incandescent: 1 lamp incan screw-in | Wall Switch | 60 | 1,600 | Relamp | No | 1 | LED Screw-In Lamps: 1 lamp LED screw-in | Wall Switch | 9 | 1,600 | 0.03 | 94 | 0.0 | $13.64 | $17.23 | $5.00 | 0.90 |
| Room 24 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | Yes | 12 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.58 | 1,621 | 0.0 | $235.50 | $1,416.36 | $310.00 | 4.70 |

| | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Room 24 Storage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 1,600 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Wall Switch | 44 | 1,600 | 0.06 | 182 | 0.0 | $26.47 | $109.55 | $30.00 | 3.01 |
| Room 27 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | Yes | 12 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.58 | 1,621 | 0.0 | $235.50 | $1,416.36 | $310.00 | 4.70 |
| Room 27 Storage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 1,600 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Wall Switch | 44 | 1,600 | 0.06 | 182 | 0.0 | $26.47 | $109.55 | $30.00 | 3.01 |
| Room 26 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | Yes | 12 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.58 | 1,621 | 0.0 | $235.50 | $1,416.36 | $310.00 | 4.70 |
| Room 26 Storage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 1,600 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Wall Switch | 44 | 1,600 | 0.06 | 182 | 0.0 | $26.47 | $109.55 | $30.00 | 3.01 |
| Room 25 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | Yes | 12 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.58 | 1,621 | 0.0 | $235.50 | $1,416.36 | $310.00 | 4.70 |
| Room 25 Storage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 1,600 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Wall Switch | 44 | 1,600 | 0.06 | 182 | 0.0 | $26.47 | $109.55 | $30.00 | 3.01 |
| 3rd Floor Hallway | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | Yes | 10 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 1,120 | 0.27 | 767 | 0.0 | $111.49 | $565.15 | $100.00 | 4.17 |
| 3rd Floor Hallway | 3 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 3 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Display Cabinet | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 1,600 | 0.01 | 32 | 0.0 | $4.68 | $18.26 | $5.00 | 2.83 |
| 3rd Floor Hallway | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | High/Low Control | 33 | 1,120 | 0.05 | 143 | 0.0 | $20.80 | $144.92 | $0.00 | 6.97 |
| 3rd Floor Hallway | 7 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | 88 | 1,600 | Relamp & Reballast | Yes | 7 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 1,120 | 0.31 | 872 | 0.0 | $126.71 | $681.41 | $70.00 | 4.83 |
| B2 Stairroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.02 | 61 | 0.0 | $8.82 | $36.52 | $10.00 | 3.01 |
| B1 Stairroom | 1 | Linear Fluorescent - T12: 4' T12 (40W) - 4L | Wall Switch | 176 | 1,600 | Relamp & Reballast | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,600 | 0.08 | 217 | 0.0 | $31.55 | $118.36 | $20.00 | 3.12 |
| B1 Stairwell | 4 | Linear Fluorescent - T12: 4' T12 (40W) - 4L | Wall Switch | 176 | 1,600 | Relamp & Reballast | No | 4 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,600 | 0.31 | 868 | 0.0 | $126.20 | $473.45 | $80.00 | 3.12 |
| B1 Stairwell | 1 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | 88 | 1,600 | Relamp & Reballast | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.04 | 109 | 0.0 | $15.77 | $68.77 | $10.00 | 3.73 |
| Room 10 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | Yes | 12 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.58 | 1,621 | 0.0 | $235.50 | $1,416.36 | $310.00 | 4.70 |
| Room 10 Storage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | No | 2 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,600 | 0.07 | 206 | 0.0 | $29.95 | $146.06 | $40.00 | 3.54 |
| Room 9 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | Yes | 12 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.58 | 1,621 | 0.0 | $235.50 | $1,416.36 | $310.00 | 4.70 |
| Room 9 Storage | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,600 | 0.04 | 103 | 0.0 | $14.97 | $73.03 | $20.00 | 3.54 |
| Room 8 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 1,600 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.37 | 1,036 | 0.0 | $150.51 | $762.95 | $170.00 | 3.94 |
| Room 8 | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 1,600 | Relamp | Yes | 1 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.01 | 39 | 0.0 | $5.64 | $302.52 | $45.00 | 45.65 |
| Room 11 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | Yes | 12 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.58 | 1,621 | 0.0 | $235.50 | $1,416.36 | $310.00 | 4.70 |
| Room 11 Storage | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,600 | 0.04 | 103 | 0.0 | $14.97 | $73.03 | $20.00 | 3.54 |
| Room 7 | 7 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 7 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.23 | 446 | 0.0 | $64.85 | $383.41 | $105.00 | 4.29 |

| | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Room 7 | 2 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.02 | 41 | 0.0 | $5.99 | $65.03 | $20.00 | 7.52 |
| Custodial Office | 1 | Linear Fluorescent - T12: 4' T12 (40W) - 4L | Wall Switch | 176 | 1,600 | Relamp & Reballast | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,600 | 0.08 | 217 | 0.0 | $31.55 | $118.36 | $20.00 | 3.12 |
| Custodial Restroom | 1 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (2) U-Lamp | Wall Switch | 33 | 1,600 | 0.02 | 53 | 0.0 | $7.75 | $72.46 | $0.00 | 9.35 |
| Old Main Entrance | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,600 | 0.04 | 103 | 0.0 | $14.97 | $73.03 | $20.00 | 3.54 |
| Room 12 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | Yes | 12 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.58 | 1,621 | 0.0 | $235.50 | $1,416.36 | $310.00 | 4.70 |
| Room 12 Storage | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.02 | 61 | 0.0 | $8.82 | $36.52 | $10.00 | 3.01 |
| Room 6 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.39 | 765 | 0.0 | $111.17 | $657.27 | $180.00 | 4.29 |
| Room 6 | 2 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.02 | 41 | 0.0 | $5.99 | $65.03 | $20.00 | 7.52 |
| Room 6 Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.02 | 43 | 0.0 | $6.18 | $36.52 | $10.00 | 4.29 |
| Room 13 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.39 | 765 | 0.0 | $111.17 | $657.27 | $180.00 | 4.29 |
| Room 13 Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.02 | 43 | 0.0 | $6.18 | $36.52 | $10.00 | 4.29 |
| Room 13 Storage | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.02 | 61 | 0.0 | $8.82 | $36.52 | $10.00 | 3.01 |
| Room 13 | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.01 | 21 | 0.0 | $2.99 | $32.52 | $10.00 | 7.52 |
| Room 5 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.39 | 765 | 0.0 | $111.17 | $657.27 | $180.00 | 4.29 |
| Room 5 | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.01 | 21 | 0.0 | $2.99 | $32.52 | $10.00 | 7.52 |
| Room 5 Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.02 | 61 | 0.0 | $8.82 | $36.52 | $10.00 | 3.01 |
| Room 5 Storage | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.02 | 61 | 0.0 | $8.82 | $36.52 | $10.00 | 3.01 |
| Room 4 | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 15 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.49 | 956 | 0.0 | $138.96 | $821.59 | $225.00 | 4.29 |
| Room 4 Storage | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.02 | 43 | 0.0 | $6.18 | $36.52 | $10.00 | 4.29 |
| Room 4 Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.02 | 43 | 0.0 | $6.18 | $36.52 | $10.00 | 4.29 |
| 2nd Flr Boys Restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.04 | 85 | 0.0 | $12.35 | $73.03 | $20.00 | 4.29 |
| 2nd Flr Boys Restroom | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.01 | 21 | 0.0 | $2.99 | $32.52 | $10.00 | 7.52 |
| 2nd Flr Girls Restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.04 | 85 | 0.0 | $12.35 | $73.03 | $20.00 | 4.29 |
| 2nd Flr Girls Restroom | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.01 | 21 | 0.0 | $2.99 | $32.52 | $10.00 | 7.52 |
| Room 3 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.29 | 574 | 0.0 | $83.38 | $492.95 | $135.00 | 4.29 |

| | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Room 3 | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.01 | 21 | 0.0 | $2.99 | $32.52 | $10.00 | 7.52 |
| Room 2 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.29 | 574 | 0.0 | $83.38 | $492.95 | $135.00 | 4.29 |
| Room 2 | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.01 | 21 | 0.0 | $2.99 | $32.52 | $10.00 | 7.52 |
| Room 1 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.29 | 574 | 0.0 | $83.38 | $492.95 | $135.00 | 4.29 |
| Room 1 | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.01 | 21 | 0.0 | $2.99 | $32.52 | $10.00 | 7.52 |
| 2nd Flr Display Cabinet | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 1,600 | 0.01 | 32 | 0.0 | $4.68 | $18.26 | $5.00 | 2.83 |
| 2nd Flr Custodial | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.02 | 43 | 0.0 | $6.18 | $36.52 | $10.00 | 4.29 |
| Storage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.04 | 85 | 0.0 | $12.35 | $73.03 | $20.00 | 4.29 |
| Electrical Room | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.04 | 85 | 0.0 | $12.35 | $73.03 | $20.00 | 4.29 |
| Display Cabinet 1st Flr | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 1,600 | 0.01 | 32 | 0.0 | $4.68 | $18.26 | $5.00 | 2.83 |
| 2nd Flr Hallway | 18 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 18 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.39 | 765 | 0.0 | $111.17 | $657.27 | $180.00 | 4.29 |
| 2nd Flr Hallway | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| 2nd Flr Hallway | 3 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 1,120 | Relamp | No | 3 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,120 | 0.03 | 62 | 0.0 | $8.98 | $97.55 | $30.00 | 7.52 |
| 2nd Flr Hallway | 2 | Compact Fluorescent: 2 lamp pin CFL | Occupancy Sensor | 84 | 1,120 | Relamp | No | 2 | LED Screw-In Lamps: 2 lamp LED pin | Occupancy Sensor | 58 | 1,120 | 0.03 | 67 | 0.0 | $9.73 | $64.00 | $0.00 | 6.58 |
| 2nd Flr Hallway | 6 | Linear Fluorescent - T12: 4' T12 (40W) - 4L | Occupancy Sensor | 176 | 1,120 | Relamp & Reballast | No | 6 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,120 | 0.46 | 912 | 0.0 | $132.51 | $710.18 | $120.00 | 4.45 |
| B2 Stairwell | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 1,600 | Relamp | No | 4 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,600 | 0.15 | 412 | 0.0 | $59.89 | $292.12 | $80.00 | 3.54 |
| B2 Stairwell | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.02 | 61 | 0.0 | $8.82 | $36.52 | $10.00 | 3.01 |
| B3 Stairwell | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 5 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.11 | 304 | 0.0 | $44.12 | $182.58 | $50.00 | 3.01 |
| B3 Stairwell | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| F Stairwell | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 1,600 | Relamp | No | 5 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,600 | 0.11 | 304 | 0.0 | $44.12 | $182.58 | $50.00 | 3.01 |
| F Stairwell | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Coucelor Room | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,120 | Relamp | No | 4 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,120 | 0.13 | 255 | 0.0 | $37.06 | $219.09 | $60.00 | 4.29 |
| Sprinkler Room | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,120 | Relamp | No | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,120 | 0.06 | 128 | 0.0 | $18.53 | $109.55 | $30.00 | 4.29 |
| Main Entry | 6 | Compact Fluorescent: 2 lamp CFL fixture | Occupancy Sensor | 84 | 1,120 | Relamp | No | 6 | LED Screw-In Lamps: 2 lamp LED | Occupancy Sensor | 58 | 1,120 | 0.10 | 201 | 0.0 | $29.20 | $192.00 | $0.00 | 6.58 |
| Main Entrance | 1 | Compact Fluorescent: T9 Lamp fixture | None | 22 | 3,276 | Relamp | No | 1 | LED Screw-In Lamps: 1 lamp T9 LED | None | 15 | 3,276 | 0.00 | 26 | 0.0 | $3.83 | $27.00 | $0.00 | 7.05 |

| | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Main Entrance | 11 | Compact Fluorescent: 1 lamp recessed can | None | 18 | 4,380 | Relamp | No | 11 | LED Screw-In Lamps: 1 lamp LED screw-in | None | 13 | 4,380 | 0.04 | 277 | 0.0 | $40.26 | $189.48 | $0.00 | 4.71 |
| Building Lights | 5 | Compact Fluorescent: T9 Lamp fixture | None | 22 | 3,276 | Relamp | No | 5 | LED Screw-In Lamps: 1 lamp T9 LED | None | 15 | 3,276 | 0.02 | 132 | 0.0 | $19.16 | $135.00 | $0.00 | 7.05 |
| Building Lights | 1 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | None | 45 | 3,276 | None | No | 1 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | None | 45 | 3,276 | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Pole Lights | 3 | High-Pressure Sodium: (1) 150W Lamp | None | 188 | 3,276 | Fixture Replacement | No | 3 | LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture | None | 56 | 3,276 | 0.26 | 1,492 | 0.0 | $216.78 | $2,791.69 | $300.00 | 11.49 |
| Secondary Entry | 1 | Compact Fluorescent: T9 Lamp fixture | None | 22 | 4,380 | Relamp | No | 1 | LED Screw-In Lamps: 1 lamp T9 LED | None | 15 | 4,380 | 0.00 | 35 | 0.0 | $5.12 | $27.00 | $0.00 | 5.27 |
| Post Mount | 2 | High-Pressure Sodium: (1) 150W Lamp | None | 188 | 4,380 | Fixture Replacement | No | 2 | LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture | None | 56 | 4,380 | 0.17 | 1,330 | 0.0 | $193.23 | $1,861.13 | $100.00 | 9.11 |

## Motor Inventory & Recommendations

| | | Existing Conditions | | | | | | Proposed Conditions | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | Motor Quantity | Motor Application | HP Per Motor | Full Load Efficiency | VFD Control? | Annual Operating Hours | Install High Efficiency Motors? | Full Load Efficiency | Install VFDs? | Number of VFDs | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Roof | Aaon RM-010 | 1 | Supply Fan | 3.0 | 87.5% | Yes | 2,745 | No | 87.5% | No | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Roof | Aaon RM-015 | 1 | Supply Fan | 7.5 | 89.5% | Yes | 3,391 | No | 89.5% | No | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Roof | Aaon RM-008 | 1 | Supply Fan | 3.0 | 87.5% | Yes | 2,745 | No | 87.5% | No | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Roof | Lennox LGC300 | 1 | Supply Fan | 10.0 | 89.5% | No | 3,391 | No | 89.5% | No | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Roof | Lennox LAERS18/24 ERU | 1 | Supply Fan | 2.0 | 84.0% | No | 2,745 | No | 84.0% | No | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Roof | Lennox LAERS18/24 ERU | 1 | Exhaust 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 |
| Ceiling | Paired Air Handler for Split AC | 1 | Supply Fan | 1.0 | 82.5% | No | 2,745 | No | 82.5% | No | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Elevator Room | Elevator | 1 | Other | 25.0 | 75.5% | No | 200 | No | 75.5% | No | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Boiler Room | Steam Boiler | 2 | Heating Hot Water Pump | 5.0 | 87.5% | No | 2,745 | No | 87.5% | No | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Roof | Aaon RM-010 | 1 | Exhaust Fan | 1.0 | 82.5% | Yes | 2,745 | No | 82.5% | No | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Roof | Aaon RM-015 | 1 | Exhaust Fan | 3.0 | 86.5% | Yes | 2,745 | No | 86.5% | No | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Roof | Aaon RM-008 | 1 | Exhaust Fan | 1.0 | 82.5% | Yes | 2,745 | No | 82.5% | No | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |
| Boiler Room | Condensate Return | 2 | Other | 0.3 | 58.6% | No | 2,745 | No | 58.6% | No | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |

## Electric HVAC Inventory & Recommendations

| | | Existing Conditions | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | System Quantity | System Type | Cooling Capacity per Unit (Tons) | Heating Capacity per Unit (kBtu/hr) | Install High Efficiency System? | System Quantity | System Type | Cooling Capacity per Unit (Tons) | Heating Capacity per Unit (kBtu/hr) | Cooling Mode Efficiency (SEER/EER) | Heating Mode Efficiency (COP) | Install Dual Enthalpy Economizer? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Roof | Main Office | 1 | Split-System AC | 3.00 | | Yes | 1 | Split-System AC | 3.00 | | 14.00 | | No | 0.47 | 793 | 0.0 | $115.25 | $4,488.66 | $276.00 | 36.55 |
| Roof | Media Center | 1 | Packaged AC | 10.00 | | Yes | 1 | Packaged AC | 10.00 | | 11.50 | | No | 0.32 | 536 | 0.0 | $77.95 | $17,821.06 | $730.00 | 219.26 |
| Roof | 2nd Floor | 1 | Packaged AC | 15.00 | | Yes | 1 | Packaged AC | 15.00 | | 11.50 | | No | 0.89 | 1,503 | 0.0 | $218.41 | $20,907.75 | $1,185.00 | 90.30 |
| Roof | 1st Floor | 1 | Packaged AC | 8.00 | | Yes | 1 | Packaged AC | 8.00 | | 11.50 | | No | 0.15 | 253 | 0.0 | $36.75 | $14,256.85 | $584.00 | 372.07 |
| Roof | Gym | 1 | Packaged AC | 25.00 | | Yes | 1 | Packaged AC | 25.00 | | 10.50 | | No | 2.02 | 3,402 | 0.0 | $494.27 | $42,184.98 | $1,975.00 | 81.35 |
| Multiple | Classrooms | 2 | Window AC | 1.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |

## Fuel Heating Inventory & Recommendations

| | | Existing Conditions | | | Proposed Conditions | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | System Quantity | System Type | Output Capacity per Unit (MBh) | Install High Efficiency System? | System Quantity | System Type | Output Capacity per Unit (MBh) | Heating Efficiency | Heating Efficiency Units | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Boiler Room | Whole Facility | 2 | Forced Draft Steam Boiler | 1,505.00 | Yes | 2 | Forced Draft Steam Boiler | 1,505.00 | 81.00% | Et | 0.00 | 0 | 1.7 | $16.76 | $60,810.24 | $3,612.00 | 3413.47 |
| Roof | Lennox unit serving Gym | 1 | Furnace | 384.00 | No | | | | | | 0.00 | 0 | 0.0 | $0.00 | $0.00 | $0.00 | 0.00 |

## Demand Control Ventilation Recommendations

| | | Recommendation Inputs | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Affected | 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 |
| Roof | Gym | 1 | 25.00 | | | 0.00 | 1,786 | 0.0 | $259.49 | $1,359.42 | $0.00 | 5.24 |

## DHW Inventory & Recommendations

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

## Low-Flow Device Recommendations

| | Recommedation Inputs | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Device Quantity | Device Type | Existing Flow Rate (gpm) | Proposed Flow Rate (gpm) | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Restrooms | 9 | Faucet Aerator (Lavatory) | 2.20 | 1.00 | 0.00 | 0 | 10.1 | $102.43 | $64.53 | $0.00 | 0.63 |

## Commercial Refrigerator/Freezer Inventory & Recommendations

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

## Cooking Equipment Inventory & Recommendations

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

## Plug Load Inventory

| | Existing Conditions | | | |
|---|---|---|---|---|
| Location | Quantity | Equipment Description | Energy Rate (W) | ENERGY STAR Qualified? |
| Multiple | 47 | Desktop Stations | 75.0 | Yes |
| Multiple | 25 | Laptops | 40.0 | Yes |
| Multiple | 24 | Overhead Projectors | 200.0 | Yes |
| Multiple | 5 | AV cart | 50.0 | No |
| Multiple | 2 | refrigerator | 600.0 | Yes |
| Multiple | 3 | microwave | 1,000.0 | No |
| Faculty Room | 1 | toaster oven | 1,200.0 | No |
| Multiple | 3 | CRT TV | 120.0 | No |
| Multiple | 1 | copier | 515.0 | Yes |
| Multiple | 5 | Printer | 20.0 | Yes |
| Faculty Room | 1 | Minifridge | 27.5 | No |
| CST | 1 | Small space heater | 1,500.0 | No |
| Room 26 | 1 | portable fan | 100.0 | No |

# *Appendix B: ENERGY STAR® Statement of Energy Performance*

## ENERGY STAR® Statement of Energy Performance

**50**

ENERGY STAR® Score[1]

### Gilbert Avenue Elementary School

**Primary Property Type:** K-12 School
**Gross Floor Area (ft²):** 38,150
**Built:** 1920

**For Year Ending:** August 31, 2017
**Date Generated:** October 31, 2018

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

### Property & Contact Information

| Property Address | Property Owner | Primary Contact |
|---|---|---|
| Gilbert Avenue Elementary School<br>151 Gilbert Avenue<br>Elmwood Park, New Jersey 07407 | Elmwood Park BOE<br>60 East 53rd Street<br>Elmwood Park, NJ 07407<br>(201) 796-8700 | John DiPaola<br>60 East 53rd Street<br>Elmwood Park, NJ 07407<br>(201) 796-8700 ext #3175<br>jdipaola@epps.org |

**Property ID:** 6382899

### Energy Consumption and Energy Use Intensity (EUI)

**Site EUI**
56.7 kBtu/ft²

**Source EUI**
104.4 kBtu/ft²

| Annual Energy by Fuel | |
|---|---|
| Natural Gas (kBtu) | 1,186,482 (55%) |
| Electric - Grid (kBtu) | 977,640 (45%) |

| National Median Comparison | |
|---|---|
| National Median Site EUI (kBtu/ft²) | 56.9 |
| National Median Source EUI (kBtu/ft²) | 104.6 |
| % Diff from National Median Source EUI | -0% |
| **Annual Emissions** | |
| Greenhouse Gas Emissions (Metric Tons CO2e/year) | 162 |

### 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)**