# Local Government Energy Audit Report

Kushchick Pavilion and Offices

July 13, 2020

*Prepared for:*

Manapalan Township

120 Route 522

Manalapan Township, New Jersey 07726

*Prepared by:*

TRC

900 Route 9 North

Woodbridge, New Jersey 07095

# Disclaimer

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information about financial incentives that may be available. Most energy conservation measures (ECMs) have received preliminary analysis of feasibility that identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to establish a basis for further discussion and to help prioritize energy measures.

TRC reviewed the ECMs and estimates of energy savings for technical accuracy. Actual, achieved energy savings depend on behavioral factors and other uncontrollable variables and, therefore, estimates of final energy savings are not guaranteed. TRC and the New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. Cost estimates include material and labor pricing associated with installation of primary recommended equipment only. Cost estimates do not include demolition or removal of hazardous waste. We encourage the owner of the facility to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on individual 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. Please review all available program incentives and eligibility requirements prior to selecting and installing any ECMs.

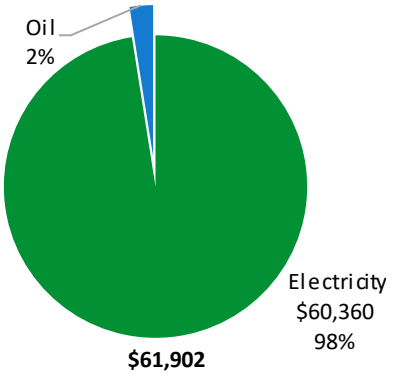
The customer and their respective contractor(s) are responsible to implement ECMs in complete conformance with all applicable local, state and federal requirements.

# Table of Contents

# 1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Kushchick Pavilion and Offices. This report provides you with information about your facility's energy use, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help make changes in your facility. TRC conducted this study as part of a comprehensive effort to assist New Jersey school districts and local governments in controlling their energy costs and to help protect our environment by reducing statewide energy consumption.

## BUILDING PERFORMANCE REPORT

| | | |
|---|---|---|
| Annual Utilities | Costs: $61,902<br>Electricity:<br>329,659 kWh<br>No. 2 Fuel Oil:<br>706 Gallons |  |
| ENERGY STAR® Benchmarking Score | N/A<br>*(1-100 scale)* | A standard energy use benchmark is not available for this facility type. This report contains suggestions about how to improve building performance and reduce energy costs. |



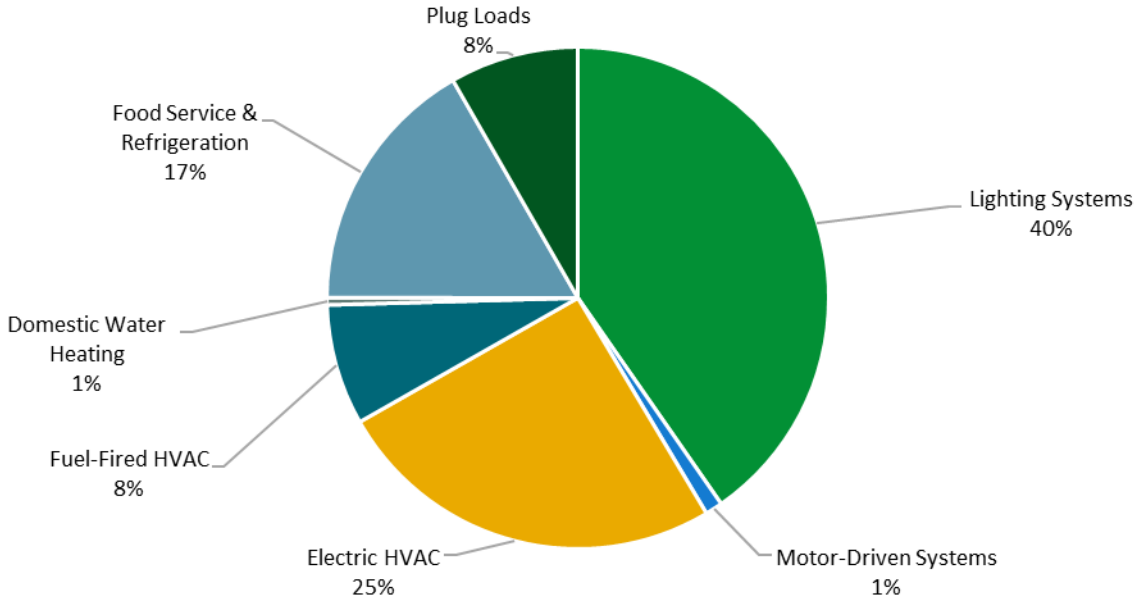


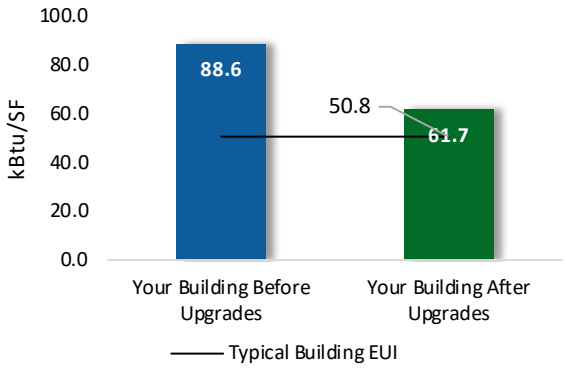

*Figure 1 - Energy Use by System*

## POTENTIAL IMPROVEMENTS

This energy audit considered a range of potential energy improvements in your building. Costs and savings will vary between improvements. Presented below are two potential scopes of work for your consideration.

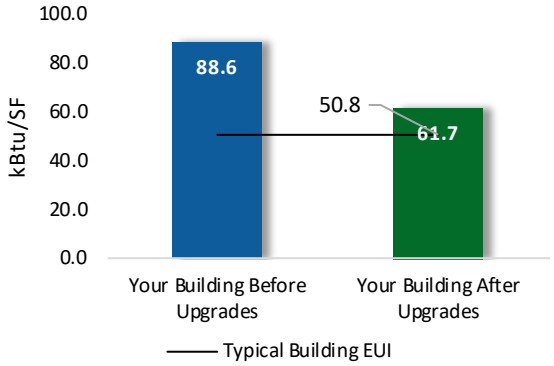
### Scenario 1: Full Package (all evaluated measures)

| | |
|---|---|
| Installation Cost | $108,499 |
| Potential Rebates & Incentives[1] | $12,182 |
| Annual Cost Savings | $20,045 |
| Annual Energy Savings | Electricity: 109,814 kWh |
| Greenhouse Gas Emission Savings | 55 Tons |
| Simple Payback | 4.8 Years |
| Site Energy Savings (all utilities) | 30% |




### Scenario 2: Cost Effective Package[2]

| | |
|---|---|
| Installation Cost | $108,499 |
| Potential Rebates & Incentives | $12,182 |
| Annual Cost Savings | $20,045 |
| Annual Energy Savings | Electricity: 109,814 kWh |
| Greenhouse Gas Emission Savings | 55 Tons |
| Simple Payback | 4.8 Years |
| Site Energy Savings (all utilities) | 30% |




### On-site Generation Potential

| | |
|---|---|
| Photovoltaic | Medium |
| Combined Heat and Power | None |

[1] Incentives are based on current SmartStart Prescriptive incentives. Other program incentives may apply.

[2] A cost-effective measure is defined as one where the simple payback does not exceed two-thirds of the expected proposed equipment useful life. Simple payback is based on the net measure cost after potential incentives.

| # | Energy Conservation Measure | Cost Effective? | 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** | | | **100,736** | **2.8** | **-3** | **$18,390** | **$105,189** | **$11,192** | **$93,997** | **5.1** | **100,870** |
| ECM 1 | Install LED Fixtures | Yes | 90,066 | 0.0 | 0 | $16,491 | $101,150 | $9,400 | $91,750 | 5.6 | 90,695 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | Yes | 127 | 0.2 | 0 | $22 | $275 | $80 | $195 | 8.7 | 119 |
| ECM 3 | Retrofit Fixtures with LED Lamps | Yes | 10,543 | 2.5 | -3 | $1,876 | $3,764 | $1,712 | $2,052 | 1.1 | 10,056 |
| **Lighting Control Measures** | | | **1,019** | **0.3** | **0** | **$180** | **$2,160** | **$490** | **$1,670** | **9.3** | **955** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | Yes | 1,019 | 0.3 | 0 | $180 | $2,160 | $490 | $1,670 | 9.3 | 955 |
| **Food Service & Refrigeration Measures** | | | **8,059** | **0.9** | **0** | **$1,476** | **$1,150** | **$500** | **$650** | **0.4** | **8,116** |
| ECM 5 | Vending Machine Control | Yes | 8,059 | 0.9 | 0 | $1,476 | $1,150 | $500 | $650 | 0.4 | 8,116 |
| **TOTALS (COST EFFECTIVE MEASURES)** | | | **109,814** | **3.9** | **-4** | **$20,045** | **$108,499** | **$12,182** | **$96,317** | **4.8** | **109,941** |
| **TOTALS (ALL MEASURES)** | | | **109,814** | **3.9** | **-4** | **$20,045** | **$108,499** | **$12,182** | **$96,317** | **4.8** | **109,941** |

* - All incentives presented in this table are based on NJ SmartStart 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).

*Figure 2 – Evaluated Energy Improvements*

For more detail on each evaluated energy improvement and a break out of cost-effective improvements, see **Section 4: Energy Conservation Measures**.

## 1.1 Planning Your Project

Careful planning makes for a successful energy project. When considering this scope of work, you will have some decisions to make, such as:

- How will the project be funded and/or financed?
- Is it best to pursue individual ECMs, groups of ECMs, or use a comprehensive approach where all ECMs are installed together?
- Are there other facility improvements that should happen at the same time?

### Pick Your Installation Approach

New Jersey's Clean Energy Programs give you the flexibility to do a little or a lot. Rebates, incentives, and financing are available to help reduce both your installation costs and your energy bills. If you are planning to take advantage of these programs, make sure to review incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives before purchasing materials or starting installation.

The potential ECMs identified for this building likely qualify for multiple incentive and funding programs. Based on current program rules and requirements, your measures are likely to qualify for the following programs:

| Energy Conservation Measure | | SmartStart | Direct Install | Pay For Performance |
|---|---|---|---|---|
| ECM 1 | Install LED Fixtures | X | | |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | X | | |
| ECM 3 | Retrofit Fixtures with LED Lamps | X | | |
| ECM 4 | Install Occupancy Sensor Lighting Controls | X | | |
| ECM 5 | Vending Machine Control | X | | |

*Figure 3 – Funding Options*

## New Jersey's Clean Energy Programs At-A-Glance

| | **SmartStart**<br>Flexibility to install at your own pace | **Direct Install**<br>Turnkey installation | **Pay for Performance**<br>Whole building upgrades |
|---|---|---|---|
| **Who should use it?** | Buildings installing individual measures or small group of measures. | Small to mid-size facilities that can bundle multiple measures together.<br>Average peak demand should be below 200 kW.<br>Not suitable for significant building shell issues. | Mid to large size facilities looking to implement as many measures as possible at one time.<br>Peak demand should be over 200 kW. |
| **How does it work?** | Use in-house staff or your preferred contractor. | Pre-approved contractors pass savings along to you via reduced material and labor costs. | Whole-building approach to energy upgrades designed to reduce energy use by at least 15%. The more you save, the higher the incentives. |
| **What are the Incentives?** | Fixed incentives for specific energy efficiency measures. | Incentives pay up to 70% of eligible costs, up to $125,000 per project.<br>You pay the remaining 30% directly to the contractor. | Up to 25% of installation cost, calculated based on level of energy savings per square foot. |
| **How do I participate?** | Submit an application for the specific equipment to be installed. | Contact a participating contractor in your region. | Contact a pre-qualified Partner to develop your Energy Reduction Plan and set your energy savings targets. |

Take the next step by visiting **www.njcleanenergy.com** for program details, applications, and to contact a qualified contractor.

*Individual Measures with SmartStart*

For facilities wishing 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, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation.

*Turnkey Installation with Direct Install*

The Direct Install program provides 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. Direct Install contractors will assess and verify individual measure eligibility and, in most cases, they perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

*Whole Building Approach with Pay for Performance*

Pay for Performance can be a good option for medium to large sized facilities to achieve deep energy savings. Pay for Performance allows you to install as many measures as possible under a single project as well as address measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also use this program. Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures resulting in at least 15% energy savings, where lighting cannot make up the majority of the savings.

## More Options from Around the State

*Financing and Planning Support with the Energy Savings Improvement Program (ESIP)*

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the 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. You have already taken the first step as an LGEA customer, because this report is required to participate in ESIP.

*Resiliency with Return on Investment through Combined Heat & Power (CHP)*

The CHP program provides incentives for combined heat and power (aka cogeneration) and waste heat to power projects. Combined heat and power systems generate power on-site and recover heat from the generation system to meet on-site thermal loads. Waste heat to power systems use waste heat to generate power. You will work with a qualified developer who will design a system that meets your building's heating and cooling needs.

*Ongoing Electric Savings with Demand Response*

The Demand Response Energy Aggregator program reduces 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. By enabling commercial facilities to reduce electric demand 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 demand response (DR) programs. Program participation is voluntary, and facilities receive payments regardless of whether they are called upon to curtail their load during times of peak demand.

# 2 Existing Conditions

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Kushchick Pavilion and Offices. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs. This report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

TRC conducted this study as part of a comprehensive effort to assist New Jersey educational and local government facilities in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

## 2.1 Site Overview

On December 18, 2019, TRC performed an energy audit at the Kushchick Pavilion and Offices building and associated recreation and service areas located in Manapalan Township, New Jersey. TRC met with Tim Kurczeski to review the facility operations and help focus our investigation on specific energy-using systems.

The sites audited at this address are as follows:

| **Building Name** | **Size of Building (Sq. ft.)** |
|---|---|
| Kuschick Pavilions and Offices | 9,600 |
| Recreation Maintenance Garage | 1,925 |
| Recreation Maintenance Garage Storage | 1,225 |
| Dreyer Snack Bar | 1,050 |

The Kuschick Pavilion and Offices is a multi-use building, 9,600 square foot area built in 1984. Spaces include offices, corridors, rest rooms, and pavilions.

The Recreation Maintenance Garage and Recreation Maintenance Storage are both used for mechanical repairs and associated storage. The Garage is a 1,925 square foot facility built in 1984 and the Storage is a 1,225 square footage facility built in 1992.

Dreyer Snack Bar was built in 1995 and is a 1,050 square-foot facility, used seasonally.

All of the buildings are mostly heated. There is a substantial amount of exterior lighting associated with recreational baseball, volleyball, tennis, and basketball. Facility staff is interested in lighting upgrades and controls.

For a detailed list of the locations and recommended ECMs for all inventoried equipment, see **Appendix A: Equipment Inventory & Recommendations.**

## 2.2 Building Occupancy

The facility is occupied year-round and varies in occupancy and usage. The figure below shows the facility's general occupancy schedule.

| Building Name | Weekday/Weekend | Operating Schedule |
|---|---|---|
| Kuschick Pavilion and Offices | Weekday | 7:00AM - 9:00PM |
| | Weekend | 7:00AM - 9:00PM |
| Field Lights | Weekday | Varies |
| | Weekend | Varies |
| Dreyer Snack Bar | Weekday | 12:PM AM - 4:00PM |
| | Weekend | Closed |

*Figure 4 - Building Occupancy Schedule*

## 2.3 Building Envelope

The Kuschick Pavilion and Office exterior building walls are of wooden framed construction. The roof is pitched with asphalt shingles. The Recreation Maintenance Garage and Storage exterior walls are made from concrete masonry units (CMUs) with vinyl siding. The Dreyer Snack Bar walls are concrete block with a stone facade. The roof is pitched with asphalt shingles and is in good condition.

Most of the windows are double paned with aluminum frames. The windows are operable. The glass-to-frame seals are in fair condition. The operable window weather seals are in fair condition, showing little evidence of excessive wear. Exterior doors have a mixture of aluminum and wooden frames and are in good condition with undamaged door seals. Degraded window and door seals increase drafts and outside air infiltration.

*Kuschick Pavilion and Office*

*Recreation Maintenance Garage*

*Recreation Maintenance Storage*

*Dreyer Snack Bar*

## 2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several 40-Watt T12 fixtures. Additionally, there are some compact fluorescent lamps (CFL), incandescent, and LED general purpose lamps. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts.

Fixture types include 2- or 3-lamp, 4-foot long surface-mounted fixtures and 2-foot fixtures.

Most fixtures are in good condition. Interior lighting levels were generally sufficient.

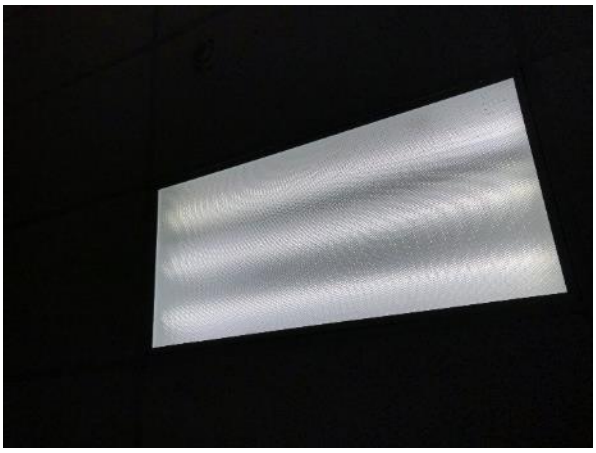
Storage areas and supply closets are equipped with incandescent bulb fixtures. These fixtures are used infrequently. Some of the pavilion rest rooms are equipped with LED A21 bulb fixtures. Fixtures are generally in good condition.

Most of the interior lighting fixtures are controlled manually by wall switches, the remainder by wall-mounted occupancy sensors. All exit signs are LED and are in good condition.

*T8 2-Lamp Fixtures*

*Recreation Garage Fixtures*

*Dreyer Bar Fixtures*



*T8 3-Lamp Fixtures*

*Rest Room Fixtures*

*Storage Fixtures*

*Occupancy Sensors*


*Exit Signs*

Exterior fixtures include wall-mounted fixtures, ceiling-mounted fixtures, and pendant-mounted fixtures. These fixtures vary in type and include high intensity discharge (HID) lamps, CFL lamps, and halogen incandescent sources.

The Kuschick Pavilion is equipped with 150-Watt CFL pendant-mounted lamps and 75-Watt halogen incandescent lamps. Some of the pavilions are equipped with metal halide wallpacks. Recreation garage and storage are equipped with metal halide wallpacks that vary in wattages from 100- to 150-Watt. The Dreyer Snack Bar is also equipped with metal halide wallpacks.

High wattage, stadium light sports fixtures comprised of 1500-Watt metal halide bulbs are used throughout the year for recreation events, primarily at the ball fields. These fixtures represent more than 40% of the site's total billing demand. All the exterior fixtures are controlled through time clocks, in fair operating condition. While timeclock adjustments could be made, or interlocking photocells installed, it is unlikely that the site can eliminate the high billing demand associated with the exterior lighting because the utility rate tariff calculates the peak period to last through 8:00 PM annually. Exterior lighting is typically needed during this period. Key or coin operated manual switches could be considered as a way of restricting lighting to operate on an as-needed basis.

*Pavilion Fixtures*

*Recreation Garage Fixtures*

*Outdoor Wallpack*

*Timeclock*

## 2.5 Air Handling Systems

**Unit Heaters**

The Recreation Maintenance Garage is equipped with three-unit heaters with hot water coils that serve the building space. They are tied to the boiler loop heating system and appear to be in fair condition. There is also an electric unit heater that serves the Dreyer Snack Bar.

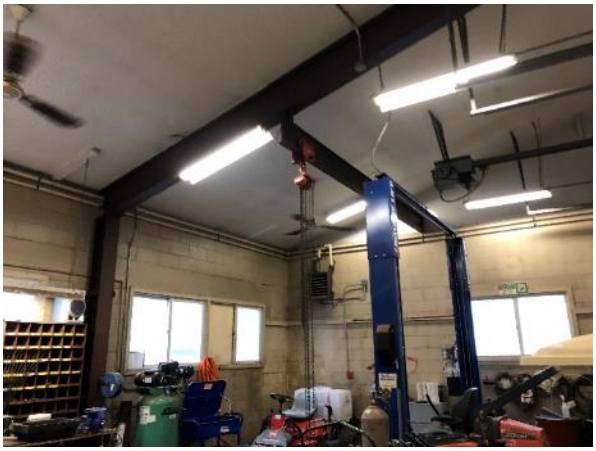
**Electric Resistance Heaters**

Throughout the pavilions, electric resistance heaters are used to condition the indoor restroom areas. They are estimated to each have a heating capacity of 17 MBh. These units appeared to be operating in fair condition.

**Air Conditioners**

The Kuschick Office is served by a Carrier split system AC. It is a 5-ton unit with 16 SEER efficiency and in good condition.

*Electric Resistance Heater*



*Fan Coil Unit*

*Split System AC*

*Unit Heater*

## 2.6 Heating Hot Water Systems

A Crown 179 MBh hot water boiler serves the Recreation Maintenance Garage and its building heating load. The boiler uses fuel oil #2 as its source to provide hot water heating to the building. Installed in 2016, the boiler is in good condition.

The boiler is equipped with an estimated 1.0 heating hot water pump that circulates water to the garage unit heaters. The Kuschick Office has switched over to natural gas-heated hot water boilers during the last couple months. Due to insufficient amount of utility data, we have decided to exclude the newly added natural gas equipment on site.

*Crown Boiler*

*Hot Water Baseboard Heating*


*Fuel Oil#2 Tank*

## 2.7 Domestic Hot Water

Hot water is produced in the Kuschick Office with a 40-gallon 4.5 kW electric storage water heater. The recreation garage and storage are served by a 38-gallon 4.5 kW electric heater while the Dreyer Snack Bar is served by 30-gallon 4.5 kW electric heater.

There is also a 40-gallon 9.5 kW electric water heater that serves the pavilions. Most of the units are operating in fair condition.

*Electric Water Heater- Office*


*Electric Water Heater- Recreation Garage*

*Electric Water Heater- Dreyer Snack Bar*

## 2.8 Food Service Equipment

The kitchen has all electric equipment that is used to serve meals and snacks during the season. There are fryers as well as buffet tables used to provide and store meals.

Our analysis determined that this building's food service equipment accounts for a relatively high proportion of overall energy use. While cost-effective opportunities to replace equipment are limited at this time, we recommend that you work with your food service equipment suppliers to maintain equipment in a way that minimizes energy use. This may include cleaning air intakes and exhausts or other methods of keeping your existing equipment operating in top shape. When food service equipment is eventually replaced, consider installing high-efficiency or ENERGY STAR® labeled equipment.

Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high-efficiency food service equipment.

*Food Service Equipment*

*Food Service Equipment*

*Food Service Equipment*

*Food Service Equipment*

## 2.9 Refrigeration

The area has several stand-up refrigerators with either solid or glass doors. There are also multiple refrigerator and freezer chests. They are used seasonally and appear to be in good condition.

Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high-efficiency food service equipment.


*Two Door Refrigerator*

*One Door Freezer*

*Refrigerator Chest*

*Freezer Chest*

## 2.10 Plug Load & Vending Machines

You may wish to consider paying particular attention to minimizing your plug load usage. This report makes suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are approximately two computers workstations throughout the facility. Plug loads throughout the building include general café and office equipment. There are also miscellaneous garage equipment plug loads. There are five refrigerated beverage vending machines found at the site. Vending machines are not equipped with occupancy-based controls.


*Vending Machine - Pavilion*


*Vending Machine – Dreyer Snack Bar*

## 2.11 Water-Using Systems

There are multiple restrooms in the pavilions and offices area. They are all equipped with low-faucet aerators and are served by the domestic hot water tanks mentioned above.

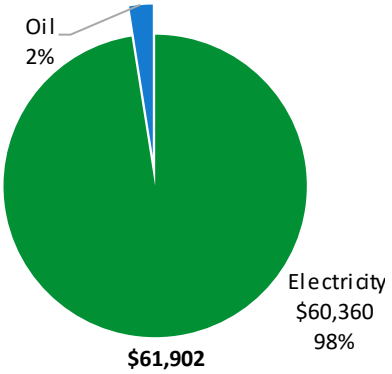
*Faucet Aerators*

*Faucet Aerators*

# 3 Energy Use and Costs

Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

| Utility Summary | | |
|---|---|---|
| **Fuel** | **Usage** | **Cost** |
| Electricity | 329,659 kWh | $60,360 |
| No. 2 Fuel Oil | 706 Gallons | $1,542 |
| **Total** | | **$61,902** |




An energy balance identifies and quantifies energy use in your various building systems. This can highlight areas with the most potential for improvement. This energy balance was developed using calculated energy use for each of the end uses noted in the figure.

The energy auditor collects information regarding equipment operating hours, capacity, efficiency, and other operational parameters from facility staff, drawings, and on-site observations. This information is used as the inputs to calculate the existing conditions energy use for the site. The calculated energy use is then compared to the historical energy use and the initial inputs are revised, as necessary, to balance the calculated energy use to the historical energy use.

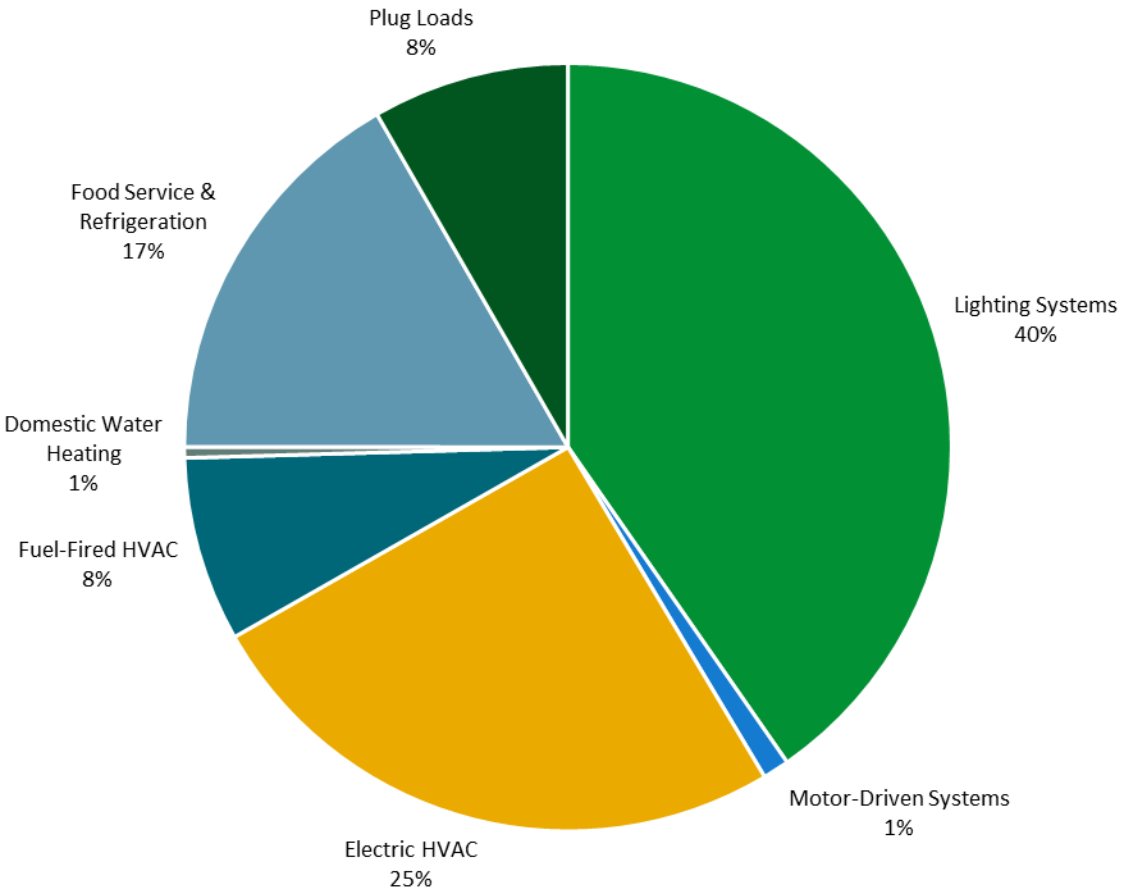
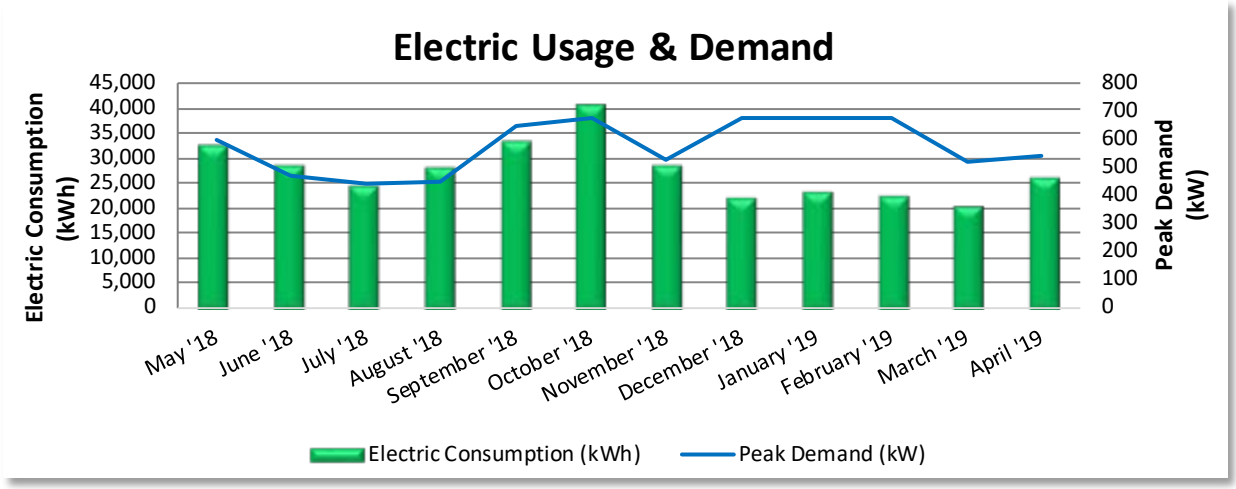



*Figure 5 - Energy Balance*

## 3.1 Electricity

JCP&L delivers electricity under rate class General Service Primary.



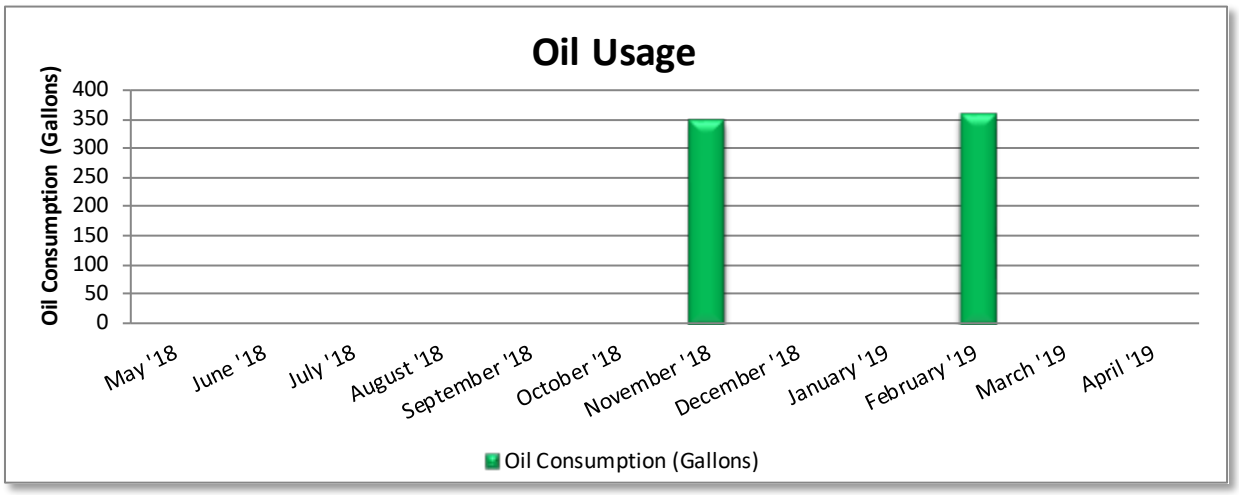

| Electric Billing Data | | | | | |
|---|---|---|---|---|---|
| **Period Ending** | **Days in Period** | **Electric Usage (kWh)** | **Demand (kW)** | **Demand Cost** | **Total Electric Cost** |
| 6/12/18 | 30 | 32,343 | 601 | 3,434 | 5,955 |
| 7/12/18 | 31 | 28,249 | 469 | 2,793 | 5,152 |
| 8/10/18 | 31 | 24,578 | 439 | 2,596 | 4,627 |
| 9/12/18 | 30 | 28,215 | 450 | 2,587 | 4,877 |
| 10/11/18 | 31 | 33,219 | 646 | 3,616 | 6,489 |
| 11/9/18 | 30 | 40,592 | 675 | 3,659 | 7,303 |
| 12/11/18 | 31 | 28,358 | 528 | 2,894 | 5,629 |
| 1/11/19 | 31 | 22,155 | 676 | 1,524 | 3,576 |
| 2/11/19 | 28 | 23,305 | 676 | 1,524 | 3,787 |
| 3/12/19 | 31 | 22,271 | 676 | 1,524 | 3,589 |
| 4/10/19 | 30 | 20,250 | 522 | 2,247 | 4,188 |
| 5/10/19 | 31 | 26,124 | 539 | 2,903 | 5,186 |
| **Totals** | **365** | **329,659** | **676** | **$31,300** | **$60,360** |
| **Annual** | **365** | **329,659** | **676** | **$31,300** | **$60,360** |

Notes:

- The provided graph combines accounts served by meter numbers L013639735 and S322340300
- Combined meter peak demand of 676 kW occurred in December '18.
- Average demand over the past 12 months was 575 kW.
- The average electric cost over the past 12 months was $0.183/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.
- The Kuschick pavilion meter (L013639735) provides service to the field lighting as well, therefore accounting for a high peak demand. The Dreyer snack bar, although seasonal, shares its electrical meter (S322340300) with its parking lot.

## 3.2 No. 2 Fuel Oil

Taylor Oil delivers No. 2 Fuel Oil to the project site.




| No. 2 Fuel Oil Billing Data | | | |
|---|---|---|---|
| **Period Ending** | **Days in Period** | **Oil Usage (Gallons)** | **Fuel Cost** |
| 6/1/18 | 31 | 0 | $0 |
| 7/1/18 | 30 | 0 | $0 |
| 8/1/18 | 31 | 0 | $0 |
| 9/1/18 | 31 | 0 | $0 |
| 10/1/18 | 30 | 0 | $0 |
| 11/1/18 | 31 | 0 | $0 |
| 12/1/18 | 30 | 347 | $740 |
| 1/1/19 | 31 | 0 | $0 |
| 2/1/19 | 31 | 0 | $0 |
| 3/1/19 | 28 | 358 | $802 |
| 4/1/19 | 31 | 0 | $0 |
| 5/1/19 | 30 | 0 | $0 |
| **Totals** | **365** | **706** | **$1,542** |
| **Annual** | **365** | **706** | **$1,542** |

Notes:

- The average No. 2 Fuel Oil cost for the past 12 months is $2.185/Gallon, which is the blended rate used throughout the analysis.
- Only the Recreation garage and storage is served by the Fuel oil #2 boiler.

## 3.3 Benchmarking

Your building was benchmarked using the United States Environmental Protection Agency's (EPA) *Portfolio Manager®* software. Benchmarking compares your building's energy use to that of similar buildings across the country, while neutralizing variations due to location, occupancy and operating hours. Some building types can be scored with a 1-100 ranking of a building's energy performance relative to the national building market. A score of 50 represents the national average and a score of 100 is best.

This ENERGY STAR® benchmarking score provides a comprehensive snapshot of your building's energy performance. It assesses the building's physical assets, operations, and occupant behavior, which is compiled into a quick and easy-to-understand score.

| Benchmarking Score | N/A |
|---|---|

Due to its unique characteristics, this building type is not able to receive a benchmarking score. This report contains suggestions about how to improve building performance and reduce energy costs.

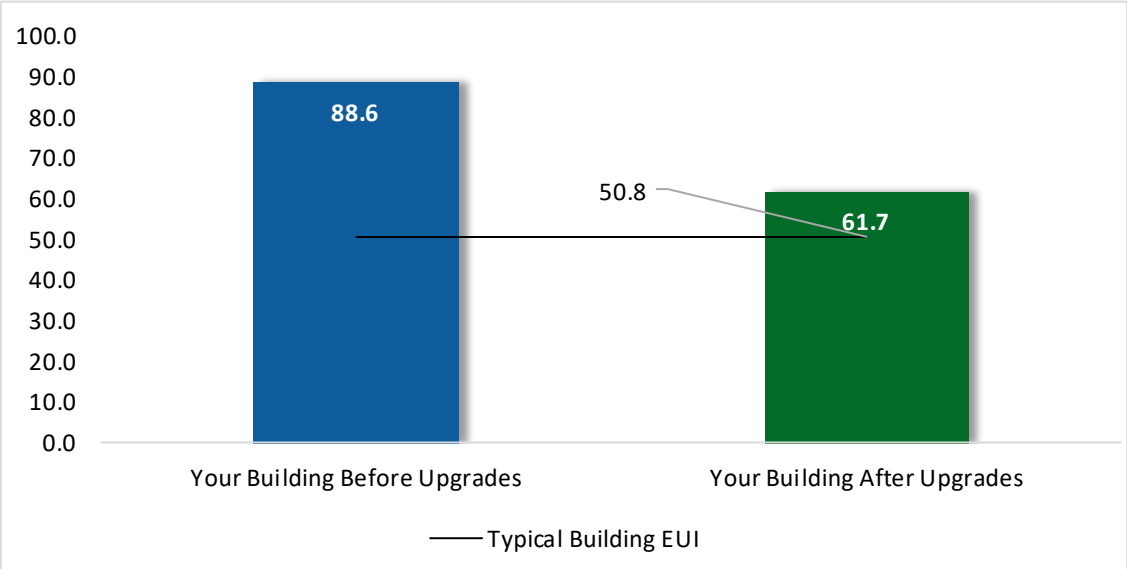



*Figure 6 - Energy Use Intensity Comparison*[3]

Energy use intensity (EUI) measures energy consumption per square foot and is the standard metric for comparing buildings' energy performance. A lower EUI means better performance and less energy consumed. A number of factors can cause a building to vary from the "typical" energy usage. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and occupant behavior all contribute to a building's energy use and the benchmarking score.

For wastewater treatment plants the energy use intensity is the total source energy use of the property divided by the average influent flow (in gallons per day).

[3] Based on all evaluated ECMs

## Tracking Your Energy Performance

Keeping track of your energy use on a monthly basis is one of the best ways to keep energy costs in check. Update your utility information in Portfolio Manager® regularly, so that you can keep track of your building's performance.

**We have created a Portfolio Manager® account for your facility and we have already entered the monthly utility data shown above for you. Account login information for your account will be sent via email.**

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.

For more information on ENERGY STAR® and Portfolio Manager®, visit their website[4].

[4] https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

# 4 ENERGY CONSERVATION MEASURES

The goal of this audit report is to identify and evaluate potential energy efficiency improvements, provide information about the cost effectiveness of those improvements, and recognize potential financial incentives from NJBPU. Most ECMs have received preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is typically sufficient to demonstrate project cost-effectiveness and help prioritize energy measures.

Calculations of energy use and savings are based on the current version of the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*, which is approved by the NJBPU. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances.

Operation and maintenance costs for the proposed new equipment will generally be lower than the current costs for the existing equipment—especially if the existing equipment is at or past its normal useful life. We have conservatively assumed there to be no impact on overall maintenance costs over the life of the equipment.

Financial incentives are based on the current NJCEP prescriptive SmartStart program. A higher level of investigation may be necessary to support any SmartStart Custom, Pay for Performance, or Direct Install incentive applications. Some measures and proposed upgrades may be eligible for higher incentives than those shown below through other NJCEP programs described in a following section of this report.

| # | Energy Conservation Measure | Cost Effective? | 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** | | | **100,736** | **2.8** | **-1** | **$18,424** | **$105,189** | **$11,192** | **$93,997** | **5.1** | **101,231** |
| ECM 1 | Install LED Fixtures | Yes | 90,066 | 0.0 | 0 | $16,491 | $101,150 | $9,400 | $91,750 | 5.6 | 90,695 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | Yes | 127 | 0.2 | 0 | $23 | $275 | $80 | $195 | 8.4 | 128 |
| ECM 3 | Retrofit Fixtures with LED Lamps | Yes | 10,543 | 2.5 | -1 | $1,910 | $3,764 | $1,712 | $2,052 | 1.1 | 10,407 |
| **Lighting Control Measures** | | | **1,019** | **0.3** | **0** | **$186** | **$2,160** | **$490** | **$1,670** | **9.0** | **1,021** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | Yes | 1,019 | 0.3 | 0 | $186 | $2,160 | $490 | $1,670 | 9.0 | 1,021 |
| **Food Service & Refrigeration Measures** | | | **8,059** | **0.9** | **0** | **$1,476** | **$1,150** | **$500** | **$650** | **0.4** | **8,116** |
| ECM 5 | Vending Machine Control | Yes | 8,059 | 0.9 | 0 | $1,476 | $1,150 | $500 | $650 | 0.4 | 8,116 |
| **TOTALS** | | | **109,814** | **3.9** | **-1** | **$20,086** | **$108,499** | **$12,182** | **$96,317** | **4.8** | **110,368** |

* - All incentives presented in this table are based on NJ SmartStart 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).

*Figure 7 – All Evaluated 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** | | **100,736** | **2.8** | **-1** | **$18,424** | **$105,189** | **$11,192** | **$93,997** | **5.1** | **101,231** |
| ECM 1 | Install LED Fixtures | 90,066 | 0.0 | 0 | $16,491 | $101,150 | $9,400 | $91,750 | 5.6 | 90,695 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 127 | 0.2 | 0 | $23 | $275 | $80 | $195 | 8.4 | 128 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 10,543 | 2.5 | -1 | $1,910 | $3,764 | $1,712 | $2,052 | 1.1 | 10,407 |
| **Lighting Control Measures** | | **1,019** | **0.3** | **0** | **$186** | **$2,160** | **$490** | **$1,670** | **9.0** | **1,021** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | 1,019 | 0.3 | 0 | $186 | $2,160 | $490 | $1,670 | 9.0 | 1,021 |
| **Food Service & Refrigeration Measures** | | **8,059** | **0.9** | **0** | **$1,476** | **$1,150** | **$500** | **$650** | **0.4** | **8,116** |
| ECM 5 | Vending Machine Control | 8,059 | 0.9 | 0 | $1,476 | $1,150 | $500 | $650 | 0.4 | 8,116 |
| **TOTALS** | | **109,814** | **3.9** | **-1** | **$20,086** | **$108,499** | **$12,182** | **$96,317** | **4.8** | **110,368** |

* - All incentives presented in this table are based on NJ SmartStart 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).

*Figure 8 – Cost Effective ECMs*

## 4.1 Lighting

| # | 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** | | **100,736** | **2.8** | **-3** | **$18,390** | **$105,189** | **$11,192** | **$93,997** | **5.1** | **100,870** |
| ECM 1 | Install LED Fixtures | 90,066 | 0.0 | 0 | $16,491 | $101,150 | $9,400 | $91,750 | 5.6 | 90,695 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 127 | 0.2 | 0 | $22 | $275 | $80 | $195 | 8.7 | 119 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 10,543 | 2.5 | -3 | $1,876 | $3,764 | $1,712 | $2,052 | 1.1 | 10,056 |

When considering lighting upgrades, we suggest using a comprehensive design approach that simultaneously upgrades lighting fixtures and controls to maximize energy savings and improve occupant lighting. Comprehensive design will also consider appropriate lighting levels for different space types to make sure that the right amount of light is delivered where needed. If conversion to LED light sources is proposed, we suggest converting all of a specific lighting type (e.g. linear fluorescent) to LED lamps to minimize the number of lamp types in use at the facility, which should help reduce future maintenance costs.

### ECM 1: Install LED Fixtures

Replace existing fixtures containing HID with new LED light fixtures. This measure saves energy by installing LEDs, which use less power than other technologies with a comparable light output.

In some cases, HID fixtures can be retrofit with screw-based LED lamps. Replacing an existing HID fixture with a new LED fixture will generally provide better overall lighting optics; however, replacing the HID lamp with a LED screw-in lamp is typically a less expensive retrofit. We recommend you work with your lighting contractor to determine which retrofit solution is best suited to your needs and will be compatible with the existing fixture(s).

Maintenance savings may also be achieved since LED lamps last longer than other light sources and therefore do not need to be replaced as often.

Consider adding additional controls including key switches, coin operated switches, or a photocell interlock supplemental to the existing timeclocks. Such controls would tend to reduce fixture run time relative to existing operations.

**Affected building areas:** building exterior fixtures, court lighting, and field lighting.

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

Retrofit fluorescent fixtures by removing the fluorescent tubes and ballasts and replacing them with LED tubes and LED drivers (if necessary), which are designed to be used in retrofitted fluorescent fixtures.

The measure uses the existing fixture housing but replaces the electric components with more efficient lighting technology, which uses less power than other lighting technologies while providing equivalent lighting output. Maintenance savings may also be achieved since LED tubes last longer than fluorescent tubes and therefore do not need to be replaced as often.

**Affected building areas**: all areas with fluorescent fixtures with T12 tubes.

### ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent and incandescent lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps 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. Maintenance savings may also be available, as longer-lasting LEDs lamps will not need to be replaced as often as the existing lamps.

**Affected building areas:** all areas with fluorescent fixtures with T8 tubes, CFL, and incandescent lamps.

## 4.2 Lighting Controls

| # | 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** | | **1,019** | **0.3** | **0** | **$180** | **$2,160** | **$490** | **$1,670** | **9.3** | **955** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | 1,019 | 0.3 | 0 | $180 | $2,160 | $490 | $1,670 | 9.3 | 955 |

Lighting controls reduce energy use by turning off or lowering lighting fixture power levels when not in use. A comprehensive approach to lighting design should upgrade the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

### ECM 4: Install Occupancy Sensor Lighting Controls

Install occupancy sensors to control lighting fixtures in areas that are frequently unoccupied, even for short periods. For most spaces, we recommend that lighting controls use dual technology sensors, which reduce the possibility of lights turning off unexpectedly.

Occupancy sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Most occupancy sensor lighting controls allow users to manually turn fixtures on/off, as needed. Some controls can also provide dimming options.

Occupancy sensors can be mounted on the wall at existing switch locations, on the ceiling, or in remote locations. In general, wall switch replacement sensors are best suited to single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in large spaces, locations without local switching, and where wall switches are not in the line-of-sight of the main work area.

This measure provides energy savings by reducing the lighting operating hours.

**Affected building areas:** offices and small rooms.

## 4.3 Food Service & Refrigeration Measures

| # | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Food Service & Refrigeration Measures** | | **8,059** | **0.9** | **0** | **$1,476** | **$1,150** | **$500** | **$650** | **0.4** | **8,116** |
| ECM 5 | Vending Machine Control | 8,059 | 0.9 | 0 | $1,476 | $1,150 | $500 | $650 | 0.4 | 8,116 |

### ECM 5: Vending Machine Control

Vending machines operate continuously, even during unoccupied hours. Install occupancy sensor controls to reduce energy use. These controls power down vending machines when the vending machine area has been vacant for some time and power up the machines at necessary regular intervals or when the surrounding area is occupied. Energy savings are dependent on the vending machine and activity level in the area surrounding the machines.

# 5 Energy Efficient Best Practices

A whole building maintenance plan will extend equipment life; improve occupant comfort, health, and safety; and reduce energy and maintenance costs. You may already be doing some of these things— see our list below for potential additions to your maintenance plan. Be sure to consult with qualified equipment specialists for details on proper maintenance and system operation.

## Energy Tracking with ENERGY STAR® Portfolio Manager®

You've heard it before - you can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions[5] . Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

## Weatherization

Caulk or weather strip leaky doors and windows to reduce drafts and loss of heated or cooled air. Sealing cracks and openings can reduce heating and cooling costs, improve building durability, and create a healthier indoor environment. Materials used may include caulk, polyurethane foam, and other weather-stripping materials. There is an energy savings opportunity by reducing the uncontrolled air exchange between the outside and inside of the building. Blower door assisted comprehensive building air sealing will reduce the amount of air exchange which will in turn reduce the load on the buildings heating and cooling equipment and thus providing energy savings and increased occupant comfort.

## Doors and Windows

Close exterior doors and windows in heated and cooled areas. Leaving doors and windows open leads to a loss of heat during the winter and chilled air during the summer. Reducing air changes per hour (ACH) can lead to increased occupant comfort as well as heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

## Window Treatments/Coverings

Use high-reflectivity films or cover windows with shades or shutters to reduce solar heat gain and reduce the load on cooling and heating systems. Older, single pane windows and east or west-facing windows are especially prone to solar heat gain. In addition, use shades or shutters at night during cold weather to reduce heat loss.

[5] https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager.

## Lighting Maintenance

Clean lamps, reflectors and lenses of dirt, dust, oil, and smoke buildup every six to twelve months. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust. Together, this can reduce total light output by up to 60% while still drawing full power.

In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a lighting technician or contractor, decreasing the overall cost of maintenance.

## Lighting Controls

As part of a lighting maintenance schedule, test lighting controls to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight and photocell sensors, maintenance involves cleaning sensor lenses and confirming that setpoints and sensitivity are configured properly. Adjust exterior lighting time clock controls seasonally as needed to match your lighting requirements.

## Fans to Reduce Cooling Load

Install ceiling fans to supplement your cooling system. Thermostat settings can typically be increased by 4°F with no change in overall occupant comfort due to the wind chill effect of moving air.

## AC System Evaporator/Condenser Coil Cleaning

Dirty evaporator and condenser coils restrict air flow and restrict heat transfer. This increases the loads on the evaporator and condenser fan and decreases overall cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

## Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to keeping the heating system running efficiently and preventing expensive repairs. Annual tune-ups should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely and efficiently. Boilers should be cleaned according to the manufacturer's instructions to remove soot and scale from the boiler tubes to improve heat transfer.

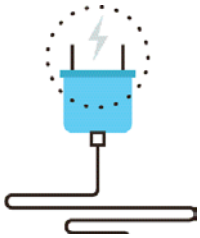
## Water Heater Maintenance

The lower the supply water temperature that is used for hand washing sinks, the less energy is needed to heat the water. Reducing the temperature results in energy savings and the change is often unnoticeable to users. Be sure to review the domestic water temperature requirements for sterilizers and dishwashers as you investigate reducing the supply water temperature.

Also, preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. At least once a year, follow manufacturer instructions to 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. Annual checks should include checks for:

- Leaks or heavy corrosion on the pipes and valves.
- 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 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 more than three years old, have a technician inspect the sacrificial anode annually.

## Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[6]. Your local utility may offer incentives or rebates for this equipment.

[6] For additional information refer to "Assessing and Reducing Plug and Process Loads in Office Buildings" http://www.nrel.gov/docs/fy13osti/54175.pdf, or "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.

## Water Conservation

Installing dual flush or low-flow toilets and low-flow/waterless urinals are ways to reduce water use. The EPA WaterSense® ratings for urinals is 0.5 gallons per flush (gpf) and for flush valve toilets is 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

For more information regarding water conservation go to the EPA's WaterSense® website[7] or download a copy of EPA's "WaterSense® at Work: Best Management Practices for Commercial and Institutional Facilities"[8] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

Water conservation devices that do not reduce hot water consumption will not provide energy savings at the site level, but they may significantly affect your water and sewer usage costs. 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.

If the facility has detached buildings with a master water meter for the entire campus, check for unnatural wet areas in the lawn or water seeping in the foundation at water pipe penetrations through the foundation. Periodically check overnight meter readings when the facility is unoccupied, and there is no other scheduled water usage.

Manage irrigation systems to use water more effectively outside the building. Adjust spray patterns so that water lands on intended lawns and plantings and not on pavement and walls. Consider installing an evapotranspiration irrigation controller that will prevent over-watering.

## Procurement Strategies

Purchasing efficient products reduces energy costs without compromising quality. Consider modifying your procurement policies and language to require ENERGY STAR® or WaterSense® products where available.

[7] https://www.epa.gov/watersense.

[8] https://www.epa.gov/watersense/watersense-work-0.

# 6 On-site Generation

You don't have to look far in New Jersey to see one of the thousands of solar electric systems providing clean power to homes, businesses, schools, and government buildings. On-site generation includes both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) technologies that generate power to meet all or a portion of the facility's electric energy needs. Also referred to as distributed generation, these systems contribute to greenhouse gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, which results in improved electric grid reliability through better use of transmission and distribution systems.

Preliminary screenings were performed to determine if an on-site generation measure could be a cost-effective solution for your facility. Before deciding to install an on-site generation system, we recommend conducting a feasibility study to analyze 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.

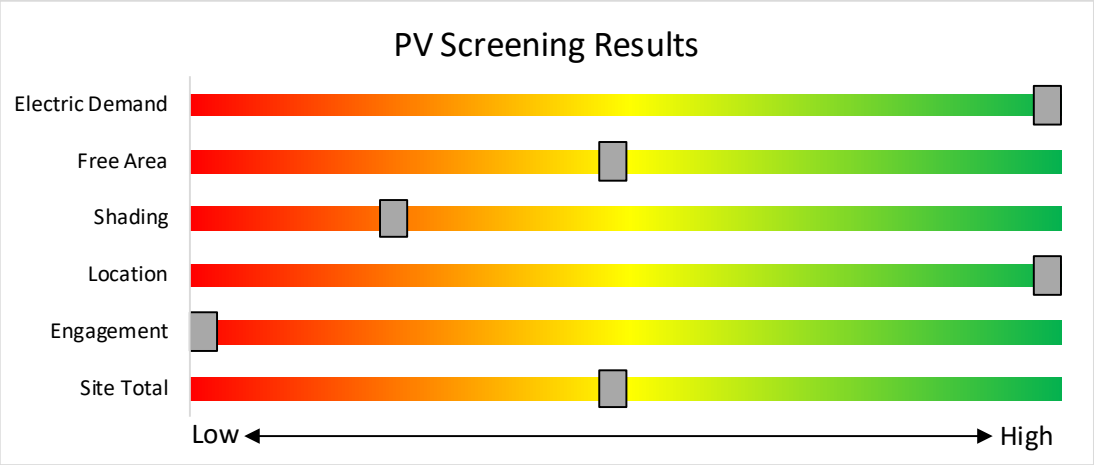
## 6.1 Solar Photovoltaic

Photovoltaic (PV) panels convert sunlight into electricity. Individual panels are combined into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is then connected to the building's electrical distribution system.

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

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the medium potential. A PV array located on the roof may be feasible. If you are interested in pursuing the installation of PV, we recommend conducting a full feasibility study.

The graphic below displays the results of the PV potential screening conducted as a part of this audit. The position of each slider indicates the potential (potential increases to the right) that each factor contributes to the overall site potential.




| | | |
|---|---|---|
| **Potential** | Medium | |
| **System Potential** | 64 | kW DC STC |
| **Electric Generation** | 48,157 | kWh/yr |
| **Displaced Cost** | $8,820 | /yr |
| **Installed Cost** | $166,400 | |

*Figure 9 - Photovoltaic Screening*

**Solar Renewable Energy Certificate (SREC) Registration Program (SRP)**

Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC Registration Program before starting construction. Once your PV system is up and running, you periodically earn credits, which can then be sold on the open market for up to 15 years.

If you are considering installing solar photovoltaics on your building, visit www.njcleanenergy.com/srec for more information about the SREC Registration Program.

Get more information about solar power in New Jersey or find a qualified solar installer who can help you decide if solar is right for your building:

- **Basic Info on Solar PV in New Jersey**: www.njcleanenergy.com/whysolar.
- **New Jersey Solar Market FAQs**: www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs.
- **Approved Solar Installers in the New Jersey Market**: 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) generates electricity at the facility and puts waste heat energy to good use. Common types of CHP systems are reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines.

CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for space cooling.

The key criteria used for screening is the amount of time that the CHP system would operate at full load and the facility's ability to use the recovered heat. Facilities with a continuous need 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 no potential for installing a cost-effective CHP system.

Based on a preliminary analysis, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation. The lack of gas service, low or infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

The graphic below displays the results of the CHP potential screening conducted as a part of this audit. The position of each slider indicates the potential (potential increases to the right) that each factor contributes to the overall site potential.

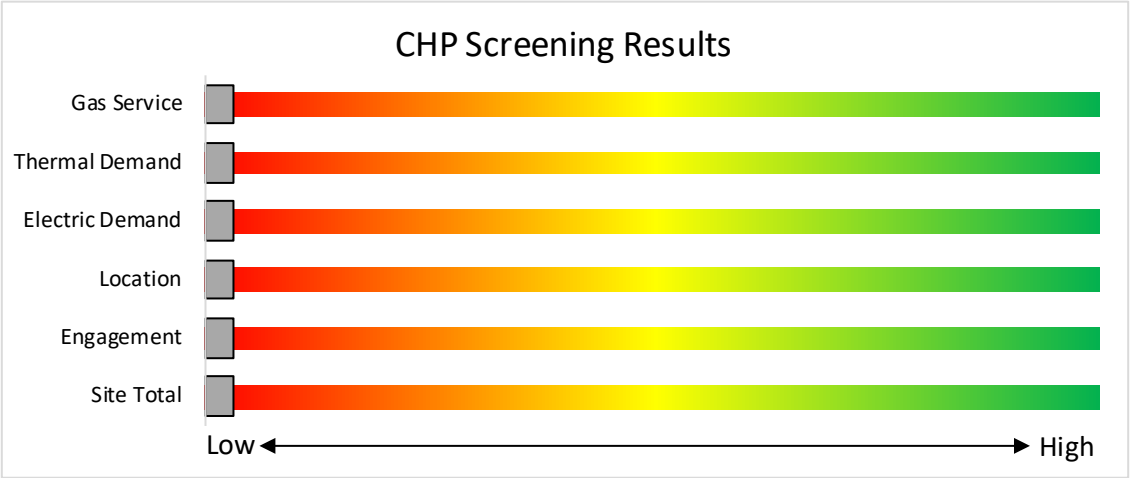



*Figure 10 - Combined Heat and Power Screening*

Find a qualified firm that specializes in commercial CHP cost assessment and installation: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/

# 7 Project Funding and Incentives

Ready to improve your building's performance? New Jersey's Clean Energy Programs can help. Pick the program that works best for you. Incentive programs that may apply to this facility are identified in the Executive Summary. This section provides an overview of currently available New Jersey's Clean Energy Programs.

| | **SmartStart**<br>*Flexibility to install at your own pace* | **Direct Install**<br>*Turnkey installation* | **Pay for Performance**<br>*Whole building upgrades* |
|---|---|---|---|
| **Who should use it?** | Buildings installing individual measures or small group of measures. | Small to mid-size facilities that can bundle multiple measures together.<br>Average peak demand should be below 200 kW.<br>Not suitable for significant building shell issues. | Mid to large size facilities looking to implement as many measures as possible at one time.<br>Peak demand should be over 200 kW. |
| **How does it work?** | Use in-house staff or your preferred contractor. | Pre-approved contractors pass savings along to you via reduced material and labor costs. | Whole-building approach to energy upgrades designed to reduce energy use by at least 15%. The more you save, the higher the incentives. |
| **What are the Incentives?** | Fixed incentives for specific energy efficiency measures. | Incentives pay up to 70% of eligible costs, up to $125,000 per project.<br>You pay the remaining 30% directly to the contractor. | Up to 25% of installation cost, calculated based on level of energy savings per square foot. |
| **How do I participate?** | Submit an application for the specific equipment to be installed. | Contact a participating contractor in your region. | Contact a pre-qualified Partner to develop your Energy Reduction Plan and set your energy savings targets. |
| Take the next step by visiting **www.njcleanenergy.com** for program details, applications, and to contact a qualified contractor. | | | |

## 7.1 SmartStart

SmartStart offers incentives for installing prescriptive and custom energy efficiency measures at your facility. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades. This program serves most common equipment types and sizes.

SmartStart routinely adds, removes, or modifies incentives from year-to-year for various energy efficient 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*

**Incentives**

The SmartStart Prescriptive program provides fixed incentives for specific energy efficiency measures. Prescriptive incentives vary by equipment type.

SmartStart Custom provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives. Custom incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings. Incentives are 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**

Submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. You can work with your preferred contractor or use internal staff to install measures.

Visit www.njcleanenergy.com/SSB for a detailed program description, instructions for applying, and applications.

## 7.2 Direct Install

Direct Install is a turnkey program available to existing small to medium-sized facilities with an average peak electric demand that does not exceed 200 kW over the recent 12-month period. You 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.

Based on the site building and utility data provided, the facility does not meet the requirements of the current DI program.

**Incentives**

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Each entity is limited to incentives up to $250,000 per fiscal year.

**How to Participate**

To participate in Direct Install, 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.

Detailed program descriptions and applications can be found at: www.njcleanenergy.com/DI.

## 7.3 Pay for Performance - Existing Buildings

Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures that results in at least 15% source energy savings, and lighting cannot make up the majority of the savings. P4P is a generally a good option for medium-to-large sized facilities looking to implement as many measures as possible under a single project to achieve deep energy savings. This program has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program.

Based on the site building and utility data provided, the facility does not meet the requirements of the current P4P program.

**Incentives**

Incentives are based on estimated and achieved energy savings ranging from $0.18-$0.22/kWh and $1.80-$2.50/therm, capped at the lesser of 50% total project cost, or $1 million per electric account and $1 million per natural gas account, per fiscal year, not to exceed $2 million per project. An incentive of $0.15/square foot is also available to offset the cost of developing the Energy Reduction Plan (see below) contingent on the project moving forward with measure installation.

**How to Participate**

Contact one of the pre-approved consultants and contractors ("Partners"). Under direct contract to you, they will help further evaluate the measures identified in this report through development of the energy reduction plan), assist you in implementing selected measures, and verify actual savings one year after the installation. Your Partner will also help you apply for incentives.

Approval of the final scope of work is required by the program prior to installation. Installation can be done by the contractor of your choice (some P4P Partners are also contractors) or by internal staff, but the Partner remains involved throughout construction to ensure compliance with the program requirements.

Detailed program descriptions, instructions for applying, applications and list of Partners can be found at: www.njcleanenergy.com/P4P.

## 7.4 Combined Heat and Power

The Combined Heat & Power (CHP) program provides incentives for eligible CHP or waste heat to power (WHP) projects. Eligible CHP or WHP projects must achieve an annual system efficiency of at least 65% (lower heating value, or LHV), based on total energy input and total utilized energy output. Mechanical energy may be included in the efficiency evaluation.

**Incentives**

| Eligible Technologies | Size (Installed Rated Capacity)[1] | Incentive ($/kW) | % of Total Cost Cap per Project[3] | $ Cap per Project[3] |
|---|---|---|---|---|
| Powered by non-renewable or renewable fuel source[4] | ≤500 kW | $2,000 | 30-40%[2] | $2 million |
| Gas Internal Combustion Engine | >500 kW - 1 MW | $1,000 | | |
| Gas Combustion Turbine | > 1 MW - 3 MW | $550 | 30% | $3 million |
| Microturbine<br>Fuel Cells with Heat Recovery | >3 MW | $350 | | |
| Waste Heat to Power* | <1 MW | $1,000 | 30% | $2 million |
| | > 1MW | $500 | | $3 million |

*Waste Heat to Power: Powered by non-renewable fuel source, heat recovery or other mechanical recovery from existing equipment utilizing new electric generation equipment (e.g. steam turbine).

Check the NJCEP website for details on program availability, current incentive levels, and requirements.

**How to Participate**

You work with a qualified developer or consulting firm to complete the CHP application. Once the application is approved the project can be installed. Information about the CHP program can be found at: www.njcleanenergy.com/CHP.

## 7.5 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) serves New Jersey's government agencies by financing energy projects. 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. Annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive for the life of the contract.

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 described above can also be used to help further reduce the total project cost of eligible measures.

**How to Participate**

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 used 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. Carefully consider all alternatives to develop an approach that best meets your needs. A detailed program descriptions and application can be found at: www.njcleanenergy.com/ESIP.

*ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you can use NJCEP incentive programs to help further reduce costs when developing the energy savings plan. Refer to the ESIP guidelines at the link above for further information and guidance on next steps.*

## 7.6 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 prior to the start of construction 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 Renewable Portfolio Standard. Purchasing SRECs can help them meet those requirements. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period fluctuates depending on supply and demand.

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

# 8 Energy Purchasing and Procurement Strategies

## 8.1 Retail Electric Supply Options

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 already buys electricity from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party electric suppliers is available at the NJBPU website[9].

## 8.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey is also deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate monthly. 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 typically depends on whether a customer prefers 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 does not already purchase natural gas from a third-party supplier, consider shopping for a reduced rate from third-party natural gas suppliers. If your facility already purchases natural gas from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party natural gas suppliers is available at the NJBPU website[10].

[9] www.state.nj.us/bpu/commercial/shopping.html.

[10] 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 | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | 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 |
| Electric Room | 1 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | S | 88 | 500 | 2 | Relamp & Reballast | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 500 | 0.1 | 32 | 0 | $6 | $69 | $20 | 8.7 |
| Domestic Hot Water Room | 1 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | S | 88 | 500 | 2 | Relamp & Reballast | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 500 | 0.1 | 32 | 0 | $6 | $69 | $20 | 8.7 |
| Womens RR | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,500 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,725 | 0.1 | 340 | 0 | $60 | $380 | $130 | 4.2 |
| Kitchen | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 3,500 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,415 | 0.1 | 476 | 0 | $84 | $380 | $130 | 3.0 |
| Storage | 1 | Incandescent: bulb | Wall Switch | S | 60 | 500 | 3 | Relamp | No | 1 | LED Lamps: A21 | Wall Switch | 9 | 500 | 0.0 | 28 | 0 | $5 | $35 | $2 | 6.8 |
| Mens Rest Room | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,500 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,725 | 0.2 | 510 | 0 | $90 | $434 | $160 | 3.0 |
| Pavilion Area | 6 | Compact Fluorescent: Br30 | Timeclock | | 60 | 2,184 | 3 | Relamp | No | 6 | LED Lamps: Br30 | Timeclock | 42 | 2,184 | 0.0 | 236 | 0 | $43 | $143 | $36 | 2.5 |
| Pavilion Area | 10 | Compact Fluorescent: Spiral | Timeclock | | 150 | 2,184 | 3 | Relamp | No | 10 | LED Lamps: Spiral | Timeclock | 105 | 2,184 | 0.0 | 983 | 0 | $180 | $352 | $20 | 1.8 |
| Pavilion Area | 2 | Halogen Incandescent: Par 30 | Timeclock | | 75 | 2,184 | 3 | Relamp | No | 2 | LED Lamps: Par30 | Timeclock | 11 | 2,184 | 0.0 | 278 | 0 | $51 | $46 | $12 | 0.7 |
| Kitchen | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office Entrance | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 5,096 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,096 | 0.0 | 182 | 0 | $32 | $37 | $20 | 0.5 |
| Office Entrance | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office Hall | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 5,096 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,516 | 0.3 | 2,080 | -1 | $367 | $599 | $250 | 1.0 |
| Kitchen | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 3,516 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,516 | 0.0 | 125 | 0 | $22 | $37 | $20 | 0.7 |
| Supervisors Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 3,516 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,516 | 0.1 | 251 | 0 | $44 | $73 | $40 | 0.7 |
| Closet | 1 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | S | 88 | 500 | 2 | Relamp & Reballast | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 500 | 0.1 | 32 | 0 | $6 | $69 | $20 | 8.7 |
| Supply light | 1 | Incandescent: bulb | Occupancy Sensor | S | 60 | 500 | 3 | Relamp | No | 1 | LED Lamps: A21 | Occupancy Sensor | 9 | 500 | 0.0 | 28 | 0 | $5 | $35 | $2 | 6.8 |
| Restroom | 2 | LED Lamps: bulb | Occupancy Sensor | S | 9 | 1,500 | | None | No | 2 | LED Lamps: bulb | Occupancy Sensor | 9 | 1,500 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Storage | 1 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | S | 88 | 500 | 2 | Relamp & Reballast | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 500 | 0.1 | 32 | 0 | $6 | $69 | $20 | 8.7 |
| Restroom | 1 | Halogen Incandescent: bulb | Wall Switch | S | 100 | 2,500 | 3 | Relamp | No | 1 | LED Lamps: A21 | Wall Switch | 15 | 2,500 | 0.1 | 230 | 0 | $40 | $35 | $2 | 0.8 |
| Restroom Lobby | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,500 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,500 | 0.0 | 89 | 0 | $16 | $37 | $20 | 1.1 |
| Offices | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 1,500 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,500 | 0.1 | 107 | 0 | $19 | $73 | $40 | 1.8 |
| Boiler Room | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 500 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 500 | 0.0 | 18 | 0 | $3 | $37 | $20 | 5.3 |
| Recreation Room | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 500 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 345 | 0.1 | 68 | 0 | $12 | $380 | $130 | 20.8 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Fixture Quantity** | **Fixture Description** | **Control System** | **Light Level** | **Watts per Fixture** | **Annual Operating Hours** | **ECM #** | **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** |
| Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,500 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,500 | 0.0 | 89 | 0 | $16 | $37 | $20 | 1.1 |
| Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,500 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,725 | 0.1 | 227 | 0 | $40 | $343 | $40 | 7.6 |
| Garage | 11 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,500 | 3 | Relamp | No | 11 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,500 | 0.3 | 980 | 0 | $173 | $402 | $220 | 1.1 |
| Garage Small | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,500 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,500 | 0.1 | 178 | 0 | $31 | $73 | $40 | 1.1 |
| Hallway Upstairs | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,500 | 3 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,500 | 0.1 | 356 | 0 | $63 | $146 | $80 | 1.1 |
| Hallway Downstairs | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,500 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,500 | 0.0 | 89 | 0 | $16 | $37 | $20 | 1.1 |
| Recreation Storage | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,500 | 3 | Relamp | No | 8 | LED - Linear Tubes: (3) 4' Lamps | Wall Switch | 44 | 2,500 | 0.4 | 1,069 | 0 | $189 | $438 | $240 | 1.1 |
| Exterior | 8 | Metal Halide: Wall pack | Timeclock | | 100 | 2,184 | 1 | Fixture Replacement | No | 8 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 30 | 2,184 | 0.0 | 1,223 | 0 | $224 | $2,000 | $1,600 | 1.8 |
| Exterior | 2 | Metal Halide: Wall pack | Timeclock | | 150 | 2,184 | 1 | Fixture Replacement | No | 2 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 45 | 2,184 | 0.0 | 459 | 0 | $84 | $500 | $400 | 1.2 |
| Dreyer Snack Bar | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,500 | 3 | Relamp | No | 3 | LED - Linear Tubes: (3) 4' Lamps | Wall Switch | 44 | 2,500 | 0.1 | 401 | 0 | $71 | $164 | $90 | 1.1 |
| Dreyer Courtyard | 4 | Incandescent: Ceiling Mount | Timeclock | | 100 | 2,912 | 3 | Relamp | No | 4 | LED Lamps: A21 | Timeclock | 15 | 2,912 | 0.0 | 990 | 0 | $181 | $141 | $8 | 0.7 |
| Mens RR | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,912 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,009 | 0.1 | 528 | 0 | $93 | $416 | $150 | 2.9 |
| Womens RR | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,912 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,009 | 0.1 | 528 | 0 | $93 | $416 | $150 | 2.9 |
| Exterior | 5 | Metal Halide: Wallpack | Timeclock | | 70 | 2,912 | 1 | Fixture Replacement | No | 5 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 21 | 2,912 | 0.0 | 713 | 0 | $131 | $1,250 | $1,000 | 1.9 |
| DHW Room | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 500 | 3 | Relamp | No | 3 | LED - Linear Tubes: (3) 4' Lamps | Wall Switch | 44 | 500 | 0.1 | 80 | 0 | $14 | $164 | $90 | 5.3 |
| Electrical Room | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 500 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 500 | 0.0 | 18 | 0 | $3 | $37 | $20 | 5.3 |
| Electrical Room | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Pavilion light | 8 | Metal Halide: Wallpack | Timeclock | | 50 | 2,912 | 1 | Fixture Replacement | No | 8 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 15 | 2,912 | 0.0 | 815 | 0 | $149 | $2,000 | $1,600 | 2.7 |
| Pavilion 2 light | 8 | Metal Halide: Wallpack | Timeclock | | 50 | 2,912 | 1 | Fixture Replacement | No | 8 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 15 | 2,912 | 0.0 | 815 | 0 | $149 | $2,000 | $1,600 | 2.7 |
| Pavilion 3 light | 8 | Metal Halide: Wallpack | Timeclock | | 50 | 2,912 | 1 | Fixture Replacement | No | 8 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 15 | 2,912 | 0.0 | 815 | 0 | $149 | $2,000 | $1,600 | 2.7 |
| Pavilion 4 light | 8 | Metal Halide: Wallpack | Timeclock | | 50 | 2,912 | 1 | Fixture Replacement | No | 8 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 15 | 2,912 | 0.0 | 815 | 0 | $149 | $2,000 | $1,600 | 2.7 |
| Baseball field light | 24 | Metal Halide: (1) 1500W Lamp | Timeclock | | 1,610 | 350 | 1 | Fixture Replacement | No | 24 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 483 | 350 | 0.0 | 9,467 | 0 | $1,733 | $12,000 | $0 | 6.9 |
| Baseball field light | 24 | Metal Halide: (1) 1500W Lamp | Timeclock | | 1,610 | 350 | 1 | Fixture Replacement | No | 24 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 483 | 350 | 0.0 | 9,467 | 0 | $1,733 | $12,000 | $0 | 6.9 |
| Baseball field light | 24 | Metal Halide: (1) 1500W Lamp | Timeclock | | 1,610 | 350 | 1 | Fixture Replacement | No | 24 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 483 | 350 | 0.0 | 9,467 | 0 | $1,733 | $12,000 | $0 | 6.9 |
| Dreyer Snack Road | 10 | Metal Halide: (1) 450W Lamp | Timeclock | | 506 | 1,460 | 1 | Fixture Replacement | No | 10 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 152 | 1,460 | 0.0 | 5,171 | 0 | $947 | $3,000 | $0 | 3.2 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | 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 |
| Field F | 24 | Metal Halide: (1) 1500W Lamp | Timeclock | | 1,610 | 450 | 1 | Fixture Replacement | No | 24 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 483 | 450 | 0.0 | 12,172 | 0 | $2,229 | $12,000 | $0 | 5.4 |
| Field E | 24 | Metal Halide: (1) 1500W Lamp | Timeclock | | 1,610 | 450 | 1 | Fixture Replacement | No | 24 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 483 | 450 | 0.0 | 12,172 | 0 | $2,229 | $12,000 | $0 | 5.4 |
| Field B | 30 | Metal Halide: (1) 1500W Lamp | Timeclock | | 1,610 | 450 | 1 | Fixture Replacement | No | 30 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 483 | 450 | 0.0 | 15,215 | 0 | $2,786 | $15,000 | $0 | 5.4 |
| Field A | 12 | Metal Halide: (1) 1500W Lamp | Timeclock | | 1,610 | 450 | 1 | Fixture Replacement | No | 12 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 483 | 450 | 0.0 | 6,086 | 0 | $1,114 | $6,000 | $0 | 5.4 |
| Volleyball Court | 2 | Metal Halide: (2) 400W Lamps | Timeclock | | 916 | 450 | 1 | Fixture Replacement | No | 2 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 275 | 450 | 0.0 | 577 | 0 | $106 | $600 | $0 | 5.7 |
| Tennis Courts | 8 | Metal Halide: (2) 400W Lamps | Timeclock | | 916 | 450 | 1 | Fixture Replacement | No | 8 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 275 | 450 | 0.0 | 2,308 | 0 | $423 | $2,400 | $0 | 5.7 |
| Basketball Courts | 8 | Metal Halide: (2) 400W Lamps | Timeclock | | 916 | 450 | 1 | Fixture Replacement | No | 8 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 275 | 450 | 0.0 | 2,308 | 0 | $423 | $2,400 | $0 | 5.7 |

## 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? | Remaining Useful Life | Annual Operating Hours | ECM # | 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 |
| Recreation Garage | HW Unit heater | 3 | Fan Coil Unit | 0.3 | 73.4% | No | W | 3,500 | | No | 73.4% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Recreation Garage | Rotary Lift | 1 | Other | 2.0 | 86.5% | No | W | 500 | | No | 86.5% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Recreation Garage | Recreation Garage | 1 | Heating Hot Water Pump | 1.0 | 85.5% | No | W | 1,200 | | No | 85.5% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## 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 (MBh) | Remaining Useful Life | ECM # | Install High Efficiency System? | System Quantity | System Type | Cooling Capacity per Unit (Tons) | Heating Capacity per Unit (MBh) | Cooling Mode Efficiency (SEER/EER) | Heating Mode Efficiency (COP) | 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 |
| Outside Office | Kuschick Office | 1 | Split-System AC | 5.00 | | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Rest Rooms | Pavilion Restrooms | 6 | Electric Resistance Heat | | 17.00 | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Rest Rooms | Restrooms | 2 | Electric Resistance Heat | | 34.00 | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## 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) | Remaining Useful Life | ECM # | 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 |
| Building | Recreation Garage | 1 | Non-Condensing Hot Water Boiler | 179 | W | | No | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## DHW Inventory & Recommendations

| | | Existing Conditions | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | System Quantity | System Type | Remaining Useful Life | ECM # | 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 |
| Kuschick Storage | Offices | 1 | Storage Tank Water Heater (≤ 50 Gal) | B | | No | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Recreation Garae | Recreation Garage | 1 | Storage Tank Water Heater (≤ 50 Gal) | N | | No | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Dreyer Snack Bar | Dreyer snack Bar | 1 | Storage Tank Water Heater (≤ 50 Gal) | W | | No | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Pavilion | Restrooms | 1 | Storage Tank Water Heater (≤ 50 Gal) | W | | No | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Commercial Refrigerator/Freezer Inventory & Recommendations

| | Existing Conditions | | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Refrigerator/ Freezer Type | ENERGY STAR Qualified? | ECM # | 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 | Refrigerator Chest | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen | 1 | Freezer Chest | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Dreyer Snack Bar | 1 | Stand-Up Refrigerator, Glass Door (31 - 50 cu. ft.) | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Dreyer Snack Bar | 1 | Refrigerator Chest | Yes | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Dreyer Snack Bar | 1 | Stand-Up Freezer, Solid Door (≤15 cu. ft.) | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Commercial Ice Maker Inventory & Recommendations

| | Existing Conditions | | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Ice Maker Type | ENERGY STAR Qualified? | ECM # | 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 |
| Dreyer Snack Bar | 1 | Ice Making Head (<450 lbs/day), Batch | Yes | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Cooking Equipment Inventory & Recommendations

| | Existing Conditions | | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Equipment Type | High Efficiency Equipement? | ECM # | Install High Efficiency Equipment? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Kitchen | 1 | Electric Fryer | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Dreyer Snack Bar | 2 | Electric Fryer | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Plug Load Inventory

| | Existing Conditions | | | |
|---|---|---|---|---|
| Location | Quantity | Equipment Description | Energy Rate (W) | ENERGY STAR Qualified? |
| Building | 2 | Microwave | 1,000 | Yes |
| Building | 2 | TV | 250 | Yes |
| Building | 2 | Toaster | 1,250 | Yes |
| Building | 1 | Residential Fridge | 1,000 | Yes |
| Building | 2 | Computers | 125 | Yes |
| Building | 2 | Mini Fridge | 260 | Yes |
| Building | 1 | Medium Printer | 200 | Yes |
| Dreyer Snack Bar | 1 | Pretzel Machine | 1,550 | No |
| Dreyer Snack Bar | 1 | Toaster | 1,200 | No |
| Dreyer Snack Bar | 1 | Coffee Machine | 1,500 | No |
| Dreyer Snack Bar | 1 | Food Warmer | 250 | No |
| Building | 4 | Ceiling Fans | 250 | No |
| Recreation Garage | 1 | Misc. Garage Equipment | 3,000 | No |
| Recreation Storage | 1 | Misc. Garage Equipment | 3,000 | No |

## Vending Machine Inventory & Recommendations

| | Existing Conditions | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Vending Machine Type | ECM # | Install Controls? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Pavillions | 4 | Refrigerated | 5 | Yes | 0.7 | 6,447 | 0 | $1,181 | $920 | $400 | 0.4 |
| Dreyer Snack Bar | 1 | Refrigerated | 5 | Yes | 0.2 | 1,612 | 0 | $295 | $230 | $100 | 0.4 |

# APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

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.

LEARN MORE AT energystar.gov

## ENERGY STAR® Statement of Energy Performance

**N/A**

ENERGY STAR® Score[1]

### Recreation Center Complex (Manalapan Township)

**Primary Property Type:** Other - Recreation
**Gross Floor Area (ft²):** 12,750
**Built:** 1984

**For Year Ending:** April 30, 2019
**Date Generated:** February 28, 2020

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 |
|---|---|---|
| Recreation Center Complex (Manalapan Township)<br>120 Route 522<br>Manalapan, New Jersey 07726 | Manalapan Township<br>120 Route 522<br>Manalapan, NJ 07726<br>(732) 446-3200 | Rose LaFergola<br>120 Route 522<br>Manalapan, NJ 07726<br>(732) 446-8342<br>rlafergola@mtnj.org |

**Property ID:** 8707140

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

**Site EUI**
68.7 kBtu/ft²

**Source EUI**
178.6 kBtu/ft²

| Annual Energy by Fuel | |
|---|---|
| Fuel Oil (No. 2) (kBtu) | 97,359 (11%) |
| Electric - Grid (kBtu) | 778,320 (89%) |

| National Median Comparison | |
|---|---|
| National Median Site EUI (kBtu/ft²) | 43.1 |
| National Median Source EUI (kBtu/ft²) | 112 |
| % Diff from National Median Source EUI | 60% |
| **Annual Emissions** | |
| Greenhouse Gas Emissions (Metric Tons CO2e/year) | 86 |

### Signature & Stamp of Verifying Professional

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

LP Signature: _____Date: _____

**Licensed Professional**

____ _____
,
(____)____-_____
_____

**Professional Engineer or Registered Architect Stamp (if applicable)**

Although classified as a Fast Food Restaurant, this building shares electricity with field lighting so therefore it is not eligible for a SEP score.

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## ENERGY STAR® Statement of Energy Performance

# N/A

ENERGY STAR® Score[1]

### Dreyer Snack Bar

**Primary Property Type:** Fast Food Restaurant
**Gross Floor Area (ft²):** 1,050
**Built:** 1995

**For Year Ending:** March 31, 2019
**Date Generated:** October 27, 2019

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 |
|---|---|---|
| Dreyer Snack Bar<br>120 Route 522<br>Manalapan, New Jersey 07726 | Manalapan Township<br>120 Route 522<br>Manalapan, NJ 07726<br>(732) 446-3200 | Rose LaFergola<br>120 Route 522<br>Manalapan, NJ 07726<br>(732) 446-8342<br>rlafergola@mtnj.org |

**Property ID:** 1699733

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

**Site EUI**
335.4 kBtu/ft²

**Source EUI**
939.2 kBtu/ft²

| Annual Energy by Fuel | |
|---|---|
| Electric - Grid (kBtu) | 352,212 (100%) |

| National Median Comparison | |
|---|---|
| National Median Site EUI (kBtu/ft²) | 316.6 |
| National Median Source EUI (kBtu/ft²) | 886.4 |
| % Diff from National Median Source EUI | 6% |
| **Annual Emissions** | |
| Greenhouse Gas Emissions (Metric Tons CO2e/year) | 36 |

### 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)**

# APPENDIX C: GLOSSARY

| TERM | DEFINITION |
|---|---|
| **Blended Rate** | Used to calculate fiscal savings associated with measures. The blended rate is calculated by dividing the amount of your bill by the total energy use. For example, if your bill is $22,217.22, and you used 266,400 kilowatt-hours, your blended rate is 8.3 cents per kilowatt-hour. |
| **Btu** | *British thermal unit*: a unit of energy equal to the amount of heat required to increase the temperature of one pound of water by one-degree Fahrenheit. |
| **CHP** | *Combined heat and power*. Also referred to as cogeneration. |
| **COP** | *Coefficient of performance*: a measure of efficiency in terms of useful energy delivered divided by total energy input. |
| **Demand Response** | Demand response reduces or shifts electricity usage at or among participating buildings/sites during peak energy use periods in response to time-based rates or other forms of financial incentives. |
| **DCV** | *Demand control ventilation*: a control strategy to limit the amount of outside air introduced to the conditioned space based on actual occupancy need. |
| **US DOE** | *United States Department of Energy* |
| **EC Motor** | *Electronically commutated motor* |
| **ECM** | *Energy conservation measure* |
| **EER** | *Energy efficiency ratio*: a measure of efficiency in terms of cooling energy provided divided by electric input. |
| **EUI** | *Energy Use Intensity:* measures energy consumption per square foot and is a standard metric for comparing buildings' energy performance. |
| **Energy Efficiency** | Reducing the amount of energy necessary to provide comfort and service to a building/area. Achieved through the installation of new equipment and/or optimizing the operation of energy use systems. Unlike conservation, which involves some reduction of service, energy efficiency provides energy reductions without sacrifice of service. |
| **ENERGY STAR®** | ENERGY STAR® is the government-backed symbol for energy efficiency. The ENERGY STAR® program is managed by the EPA. |
| **EPA** | *United States Environmental Protection Agency* |
| **Generation** | The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil). |
| **GHG** | *Greenhouse gas* gases that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface. |
| **gpf** | *Gallons per flush* |

| | |
|---|---|
| **gpm** | *Gallon per minute* |
| **HID** | *High intensity discharge:* high-output lighting lamps such as high-pressure sodium, metal halide, and mercury vapor. |
| **hp** | *Horsepower* |
| **HPS** | *High-pressure sodium*: a type of HID lamp |
| **HSPF** | *Heating seasonal performance factor:* a measure of efficiency typically applied to heat pumps. Heating energy provided divided by seasonal energy input. |
| **HVAC** | *Heating, ventilating, and air conditioning* |
| **IHP 2014** | US DOE Integral Horsepower rule. The current ruling regarding required electric motor efficiency. |
| **IPLV** | *Integrated part load value:* a measure of the part load efficiency usually applied to chillers. |
| **kBtu** | One thousand British thermal units |
| **kW** | *Kilowatt*: equal to 1,000 Watts. |
| **kWh** | *Kilowatt-hour*: 1,000 Watts of power expended over one hour. |
| **LED** | *Light emitting diode*: a high-efficiency source of light with a long lamp life. |
| **LGEA** | *Local Government Energy Audit* |
| **Load** | The total power a building or system is using at any given time. |
| **Measure** | A single activity, or installation of a single type of equipment, that is implemented in a building system to reduce total energy consumption. |
| **MH** | *Metal halide*: a type of HID lamp |
| **MBh** | *Thousand Btu per hour* |
| **MBtu** | *One thousand British thermal units* |
| **MMBtu** | *One million British thermal units* |
| **MV** | *Mercury Vapor:* a type of HID lamp |
| **NJBPU** | *New Jersey Board of Public Utilities* |
| **NJCEP** | *New Jersey's Clean Energy Program:* NJCEP is a statewide program that offers financial incentives, programs and services for New Jersey residents, business owners and local governments to help them save energy, money and the environment. |
| **psig** | Pounds per square inch gauge |
| **Plug Load** | Refers to the amount of power used in a space by products that are powered by means of an ordinary AC plug. |
| **PV** | *Photovoltaic:* refers to an electronic device capable of converting incident light directly into electricity (direct current). |

| | |
|---|---|
| **SEER** | *Seasonal energy efficiency ratio:* a measure of efficiency in terms of annual cooling energy provided divided by total electric input. |
| **SEP** | *Statement of energy performance:* a summary document from the ENERGY STAR® Portfolio Manager®. |
| **Simple Payback** | The amount of time needed to recoup the funds expended in an investment or to reach the break-even point between investment and savings. |
| **SREC** | *Solar renewable energy credit*: a credit you can earn from the state for energy produced from a photovoltaic array. |
| **T5, T8, T12** | A reference to a linear lamp diameter. The number represents increments of 1/8$^{th}$ of an inch. |
| **Temperature Setpoint** | The temperature at which a temperature regulating device (thermostat, for example) has been set. |
| **therm** | 100,000 Btu. Typically used as a measure of natural gas consumption. |
| **tons** | A unit of cooling capacity equal to 12,000 Btu/hr. |
| **Turnkey** | Provision of a complete product or service that is ready for immediate use |
| **VAV** | *Variable air volume* |
| **VFD** | *Variable frequency drive*: a controller used to vary the speed of an electric motor. |
| **WaterSense®** | The symbol for water efficiency. The WaterSense® program is managed by the EPA. |
| **Watt (W)** | Unit of power commonly used to measure electricity use. |