



# Local Government Energy Audit Report

Lake Marcia Bathhouse, Restroom, and Pumphouse

July 23, 2024

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## Disclaimer

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The goal of this audit report is to identify potential energy efficiency opportunities and help prioritize specific measures for implementation. Most energy conservation measures 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 energy conservation measures 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 material and labor costs primarily on RS Means cost manuals as well as on our experience at similar facilities. This approach is based on standard cost estimating manuals and is vendor neutral. Cost estimates include material and labor pricing associated with one for one equipment replacements. Cost estimates do not include demolition or removal of hazardous waste. The actual implementation costs for energy savings projects are anticipated to be significantly higher based on the specific conditions at your site(s). We strongly recommend that you work with your design engineer or contractor to develop actual project costs for your specific scope of work for the installation of high efficiency equipment. We encourage you to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on selected products and installers. TRC and NJBPU do not guarantee cost estimates and shall in no event be held liable should actual installed costs vary from these material and labor estimates.

Incentive values provided in this report are estimated based on previously run state efficiency programs. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. Please review all available utility program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

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

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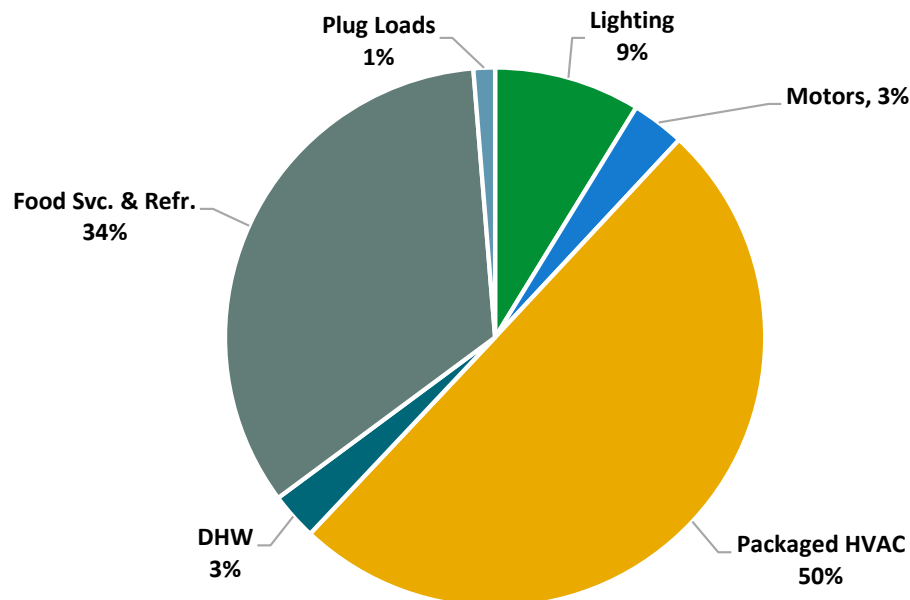
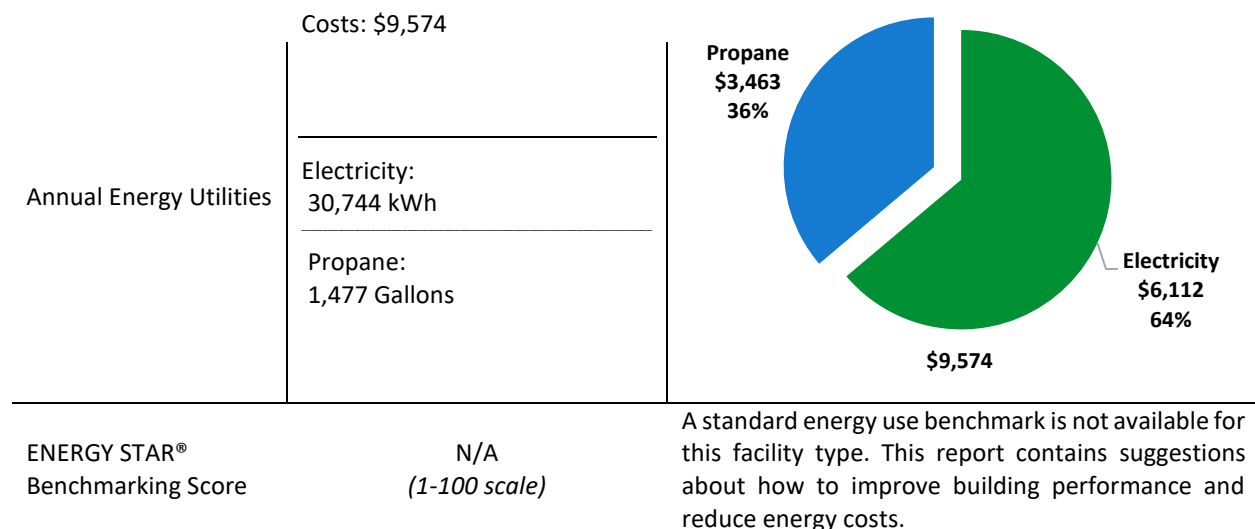


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# 1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBP) has sponsored this Local Government Energy Audit (LGEA) report for Lake Marcia Bathhouse, Restroom, and Pumphouse. 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



Energy Use by System

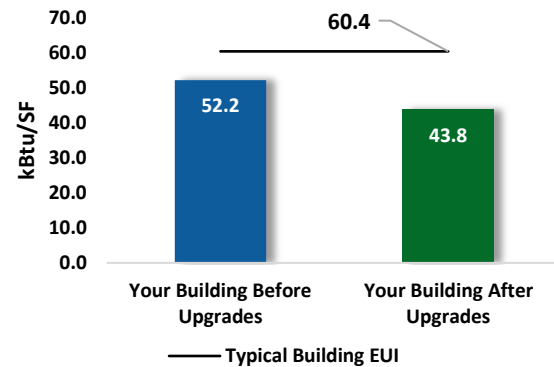
## POTENTIAL IMPROVEMENTS



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.

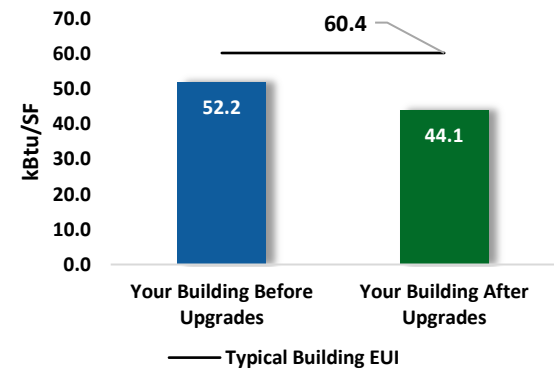
### Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	\$14,780
Potential Rebates & Incentives <sup>1</sup>	\$2,010
Annual Cost Savings	\$1,575
Annual Energy Savings	Electricity: 5,253 kWh Propane: 226 Gallons
Greenhouse Gas Emission Savings	4 Tons
Simple Payback	8.1 Years
Site Energy Savings (All Utilities)	16%



### Scenario 2: Cost Effective Package<sup>2</sup>

Installation Cost	\$12,170
Potential Rebates & Incentives	\$1,690
Annual Cost Savings	\$1,474
Annual Energy Savings	Electricity: 4,718 kWh Propane: 229 Gallons
Greenhouse Gas Emission Savings	4 Tons
Simple Payback	7.1 Years
Site Energy Savings (all utilities)	15%



### On-site Generation Potential

Photovoltaic	None
Combined Heat and Power	None

<sup>1</sup> Incentives are based on previously run state rebate programs. Contact your utility provider for current program incentives that may apply.

<sup>2</sup> 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 M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>			<b>1,862</b>	<b>0.7</b>	<b>-1</b>	<b>\$355</b>	<b>\$3,400</b>	<b>\$600</b>	<b>\$2,800</b>	<b>7.9</b>	<b>1,792</b>
ECM 1	Install LED Fixtures	Yes	1,353	0.4	-1	\$254	\$2,360	\$550	\$1,810	7.1	1,281
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	No	13	0.1	0	\$2	\$180	\$20	\$160	66.8	12
ECM 3	Retrofit Fixtures with LED Lamps	Yes	496	0.1	0	\$99	\$860	\$30	\$830	8.4	499
<b>Lighting Control Measures</b>			<b>680</b>	<b>0.4</b>	<b>0</b>	<b>\$128</b>	<b>\$3,270</b>	<b>\$860</b>	<b>\$2,410</b>	<b>18.9</b>	<b>644</b>
ECM 4	Install Occupancy Sensor Lighting Controls	No	522	0.3	0	\$98	\$2,430	\$300	\$2,130	21.7	494
ECM 5	Install High/Low Lighting Controls	Yes	159	0.1	0	\$30	\$840	\$560	\$280	9.4	150
<b>Gas Heating (HVAC/Process) Replacement</b>			<b>0</b>	<b>0.0</b>	<b>18</b>	<b>\$451</b>	<b>\$3,600</b>	<b>\$500</b>	<b>\$3,100</b>	<b>6.9</b>	<b>2,497</b>
ECM 6	Install High Efficiency Furnaces	Yes	0	0.0	18	\$451	\$3,600	\$500	\$3,100	6.9	2,497
<b>Domestic Water Heating Upgrade</b>			<b>0</b>	<b>0.0</b>	<b>4</b>	<b>\$101</b>	<b>\$110</b>	<b>\$50</b>	<b>\$60</b>	<b>0.6</b>	<b>561</b>
ECM 7	Install Low-Flow DHW Devices	Yes	0	0.0	4	\$101	\$110	\$50	\$60	0.6	561
<b>Food Service &amp; Refrigeration Measures</b>			<b>2,710</b>	<b>0.6</b>	<b>0</b>	<b>\$539</b>	<b>\$4,400</b>	<b>\$0</b>	<b>\$4,400</b>	<b>8.2</b>	<b>2,729</b>
ECM 8	Replace Refrigeration Equipment	Yes	2,710	0.6	0	\$539	\$4,400	\$0	\$4,400	8.2	2,729
<b>TOTALS (COST EFFECTIVE MEASURES)</b>			<b>4,718</b>	<b>1.3</b>	<b>21</b>	<b>\$1,474</b>	<b>\$12,170</b>	<b>\$1,690</b>	<b>\$10,480</b>	<b>7.1</b>	<b>7,718</b>
<b>TOTALS (ALL MEASURES)</b>			<b>5,253</b>	<b>1.7</b>	<b>21</b>	<b>\$1,575</b>	<b>\$14,780</b>	<b>\$2,010</b>	<b>\$12,770</b>	<b>8.1</b>	<b>8,224</b>

\* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

*All Evaluated Energy Improvements<sup>3</sup>*

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

<sup>3</sup> TRC bases estimated material and labor costs primarily on RS Means cost manuals as well as on our experience at similar facilities. This approach is based on standard cost estimating manuals and is vendor neutral. Cost estimates include material and labor pricing associated with one for one equipment replacements. Cost estimates do not include demolition or removal of hazardous waste. The actual implementation costs for energy savings projects are anticipated to be significantly higher based on the specific conditions at your site(s). We strongly recommend that you work with your design engineer or contractor to develop actual project costs for your specific scope of work for the installation of high efficiency equipment. We encourage you to obtain multiple estimates when considering measure installations.



## 1.1 Planning Your Project

Careful planning makes for a successful energy project. When considering this scope of work, you will have some decision 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

Utility-run energy efficiency programs and 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.

### Options from Your Utility Company

#### *Prescriptive and Custom Rebates*

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 Prescriptive and Custom Rebates 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 may be required for some incentives. Contact your utility company for more details prior to project installation.

#### *Direct Install*

The Direct Install program provides turnkey installation of multiple measures through an authorized contractor. This program can provide incentives up to 70% or 80% of the cost of selected measures. A Direct Install contractor will assess and verify individual measure eligibility and perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

#### *Engineered Solutions*

The Engineered Solutions program provides tailored energy-efficiency assistance and turnkey engineering services to municipalities, universities, schools, hospitals, and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. The program provides all professional services from audit, design, construction administration, to commissioning and measurement and verification for custom whole-building energy-efficiency projects. Engineered Solutions 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.

For more details on these programs please contact your utility provider.

## **Options from New Jersey's Clean Energy Program**

### *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 and Power (CHP)*

The CHP program provides incentives for combined heat and power (i.e., 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.

### *Successor Solar Incentive Program (SuSI)*

New Jersey is committed to supporting solar energy. Solar projects help the state reach the renewable goals outlined in the state's Energy Master Plan. The SuSI program is used to register and certify solar projects in New Jersey. Rebates are not available, but certified solar projects are able to earn one SREC II (Solar Renewable Energy Certificates II) for each megawatt-hour of solar electricity produced from a qualifying solar facility.

### *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.

### *Large Energy User Program (LEUP)*

LEUP is designed to promote self-investment in energy efficiency for the largest energy consumers in the state. Customers in this category spend about \$5 million a year on energy bills. This program incentivizes owners/users of buildings to upgrade or install energy conserving measures in existing buildings to help offset the capital costs associated with the project. The efficiency upgrades are customized to meet the requirements of the customers' existing facilities, while advancing the State's energy efficiency, conservation, and greenhouse gas reduction goals.

For more details on these programs please visit [New Jersey's Clean Energy Program website](http://www.njcleanenergy.com).



## 2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBPUB) has sponsored this Local Government Energy Audit (LGEA) report for Lake Marcia Bathhouse, Restroom, and Pumphouse. 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.

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 October 2, 2023, TRC performed an energy audit at the Lake Marcia bathhouse, Lake Marcia restroom, and Lake Marcia pumphouse located in Sussex, New Jersey. TRC met with Chris White to review the facility operations and help focus our investigation on specific energy-using systems.

The Lake Marcia bathhouse is a 4,225 square foot building built in 1995. Spaces include an attic, boiler room, breezeway, corridors, kitchen, lifeguard first aid room, lifeguard room, lobby, restrooms, and storage rooms. The facility is 15 percent cooled by a window AC unit. A propane furnace heats 50 percent of the building.

The Lake Marcia parking lot restroom is a 160 square foot facility built in 1960. Spaces include two restrooms heated by electric resistance heaters.

The Lake Marcia pumphouse is a 216 square foot building constructed in 1987. Electric resistance heat serves the facility.

#### **Recent Improvements and Facility Concerns**

Facility staff have expressed interest in replacing the bathhouse's heating system and roof.

### 2.2 Building Occupancy

The bathhouse is occupied seasonally from May to September, seven days a week. Janitorial services are performed during operational hours.

The parking lot restrooms are open 8:00 AM to 8:00 PM year-round and are cleaned during regular business hours.

The pumphouse is occupied intermittently as needed for maintenance.

Building Name	Weekday/Weekend	Operating Schedule
Lake Marcia Bathhouse	Weekday	9:30 AM - 6:00 PM
	Weekend	9:30 AM - 6:00 PM
Lake Marcia Parking Lot Restrooms	Weekday	8:00 AM - 8:00 PM
	Weekend	8:00 AM - 8:00 PM
Lake Marcia Pumphouse	Weekday	12:00 AM - 12:00 PM
	Weekend	12:00 AM - 12:00 PM

*Building Occupancy Schedule*

## 2.3 Building Envelope

The bathhouse is a wood frame structure with wood siding and stone facades. The wood sections of the building are in fair to poor condition while the stone façade sections are in good condition. A pitched, insulated roof with a wood deck clad in asphalt shingles encloses most of the building. A large glass roof covers the remaining portion of the building. The asphalt and glass sections are in fair and good condition, respectively. Facility windows are operable, double paned units, with metal frames and are in good condition. Two door types are present on-site: aluminum framed glass units and metal doors. The aluminum units are in good condition and the metal doors are in fair condition with signs of wear showing. Door seals are in poor condition and increase drafts and outside air infiltration.



*Bathhouse Envelope*



*Bathhouse: Stone Facade AND Wood Siding*



*Bathhouse: Asphalt Shingle Roof*





*Bathhouse: Facility Windows*



*Bathhouse: Aluminum Framed Units*



*Bathhouse: Flush Metal Doors*

The Lake Marcia restroom building walls are comprised of concrete masonry units (CMUs) with stone facades and wood siding. A roof with a wood deck clad and asphalt shingles encloses the entire building. Both the building walls and the roof are in good condition. Facility doors are flush metal units and are in good condition.



*Restroom Envelope with Stone Façade AND Wood Siding*



*Restroom: Metal Facility Doors*



*Restroom: Asphalt Shingle Roof*

A wood frame with wood siding and stone facades comprises the Lake Marcia pumphouse envelope. An insulated roof with a wood deck clad and asphalt shingles encloses the building. The roof and envelope are in good condition. The facility door is metal and is in fair condition with signs of wear.



*Pumphouse Envelope with Stone Facade and Wood Siding*



*Pumphouse: Facility Door*

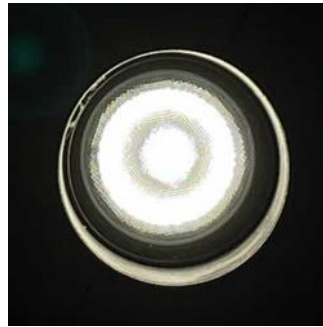
## 2.4 Lighting Systems

The primary interior lighting system for the bathhouse consists primarily of LED sources. Common lamps include 4-foot T8 equivalent linear LED lamps, LED A19 lamps, and LED BR30 lamps. Additional lamps include A19 compact fluorescent lamps (CFL), 4-foot linear fluorescent T8 lamps, and interior high-pressure sodium (HPS) lamps. Emergency exit signs are up to date with LED technology. Surface mounted and recessed fixtures are most common throughout the building. Wall switches control the lights except for the interior HPS lamps which a timeclock controls. Overall, the interior lighting system is in good condition.

Exterior lighting is supplied by LED wall packs and halogen incandescent lamps. A time clock controls the lights, and the system is in good condition.



*Bathhouse: 4-Foot T8 Equivalent  
Linear LED Lamps*



*Bathhouse: LED PAR38 Lamp*



*Bathhouse: Exterior Halogen &  
LED Wall Pack*



*Bathhouse: LED Downlight  
Recessed*



*Bathhouse: Exterior Halogen &  
LED Wall Pack*



*Bathhouse: LED Exit Sign*

The Lake Marcia restrooms are illuminated with LED sources. Surface mounted, 4-foot T8 equivalent LED linear tubes serve the restrooms and operate continuously.

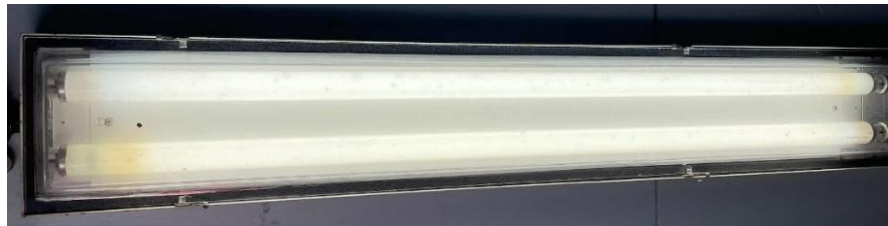
Downlight recessed LED fixtures and surface mounted LED PAR lamps serve the exterior lighting system. A timeclock controls the downlight fixtures while a photocell controls the LED PAR lamps.





*Restroom: LED Downlight Recessed Fixture & LED PAR Lamps*

Surface mounted 4-foot linear fluorescent T12 fixtures serve the pumphouse interior lighting system. Light switches control the interior lighting system which is in good condition. No exterior lighting is present.



*Pumphouse: 4-Foot Linear Fluorescent T12 Lamps*

## 2.5 Air Handling Systems

### **Central Heating Equipment**

A Trane, propane fired furnace, located in the boiler room heats half of the bathhouse. The unit provides 120 MBh of heating and does not run often, as reflected by provided utility data. Local thermostats control the equipment. The unit is in good condition and is operating beyond its rated useful life. The furnace has been evaluated for replacement.



*Bathhouse: Propane Fired Furnace*



*Bathhouse: Thermostat*



### Unitary Electric HVAC Equipment

A 0.5-ton window AC unit serves the bathhouse lifeguard first aid room. Rated at an energy efficiency ratio (EER) of 11, the unit is operating within its rated useful life and is in good condition.



*Bathhouse: Window AC Unit*

Electric resistance heaters heat the Lake Marcia restrooms. An on-board dial controls the units which are in good condition and are operating within its rated useful life.



*Restroom: Electric Resistance Heat*

The pumphouse is served by an electric resistance heater equipped with on-board controls. The unit is used as needed as reflected by utility data. The heater is in fair condition.



*Pumphouse: Electric Resistance Heat*

## 2.6 Domestic Hot Water

An A.O. Smith, propane, 119-gallon tank serves the bathhouse DHW demand. The unit is rated at 500 MBh with a thermal efficiency of 95 percent. Manufactured in 2021, the unit is in good condition and is operating within its rated useful life.

A Bradford White, propane, 55-gallon tank supplements the bathhouse DHW demand. The unit is rated at 78 MBh with a thermal efficiency of 80 percent. Also manufactured in 2021, the unit is in good condition and is operating within its rated useful life.



*Bathhouse: A.O Smith DHW Tank*



*Bathhouse: Bradford White DHW Tank*

## 2.7 Food Service Equipment

The Lake Marica bathhouse kitchen is equipped with a propane-fired fryer and 4-foot griddle. No other cooking equipment was present at the time of the audit. Current equipment appears to be in good condition.

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](https://www.energystar.gov/products/commercial_food_service_equipment) for the latest information on high efficiency food service equipment.



*Bathhouse: Propane Fryer*



*Bathhouse: Propane Griddle*

## 2.8 Refrigeration

The Lake Marcia bathhouse kitchen has several stand-up refrigeration and freezer units. Refrigeration equipment includes a high efficiency, standup refrigerator with solid doors. Freezer equipment consists of one standard and one high efficiency standup freezer with solid doors. Additional equipment includes two standard efficiency freezer chests and a standard efficiency ice machine.

Overall, the current refrigeration equipment is in good condition. Our analysis determined that this building's refrigeration equipment is responsible for a high proportion of the building's total energy consumption.

While cost effective opportunities to replace equipment are somewhat limited at this time, we recommend that you work with your refrigeration suppliers to maintain equipment in a way that minimizes energy use. When refrigeration equipment does need to be replaced consider installing high efficiency or ENERGY STAR labeled equipment.

Visit [https://www.energystar.gov/products/commercial\\_food\\_service\\_equipment](https://www.energystar.gov/products/commercial_food_service_equipment) for the latest information on high efficiency food service equipment.



*Bathhouse: High Efficiency Refrigerator and Standard Efficiency Freezer*



*Bathhouse: Ice Machine*

## 2.9 Plug Load and Vending Machines

Plug loads at the Lake Marcia bathhouse include general office equipment including coffee machines, microwaves, and water coolers. Additional plug loads include ceiling mounted fans.

There is one residential-style refrigerator present throughout the bathhouse. Equipment condition and efficiency vary.

The Lake Marcia parking lot restroom is equipped with two electric hand dryers which are the only plug loads present on site.

## 2.10 Water-Using Systems

Water utility data was not provided, and water analysis was not conducted. Potable water is used for drinking, cleaning, cooking, and sanitary fixtures. No water leaks were observed/reported at the time of the audit.

EPA WaterSense® has set maximum flow rates for sanitary fixtures. They are: 1.28 gallons per flush (gpf) for toilets, 0.5 gpf for urinals, 1.5 gallons per minute (gpm) for lavatory faucets, and 2.0 gpm for showerheads. There are six restrooms throughout the Lake Marcia site with toilets, urinals, and sinks. The bathhouse is also equipped with several shower heads. Faucet flow rates are at 1.8 gpm or lower. Toilets are rated at 2.5 gpf and urinals are rated at 2.5 gpf.



*Bathhouse: Restroom Faucet*

## 2.11 Process Equipment

A 5 hp well water supply pump located at the Lake Marcia pumphouse serves the nearby Lake Marcia sites. Installed in 2007 the pump is operating beyond its rated useful life. A fractional horsepower chemical pump is also on site; supplying NaOCl to treat the well water before being distributed.

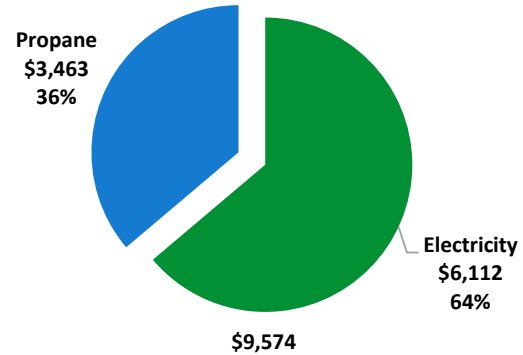


*Well Water Supply Pump Control Box*

### 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.

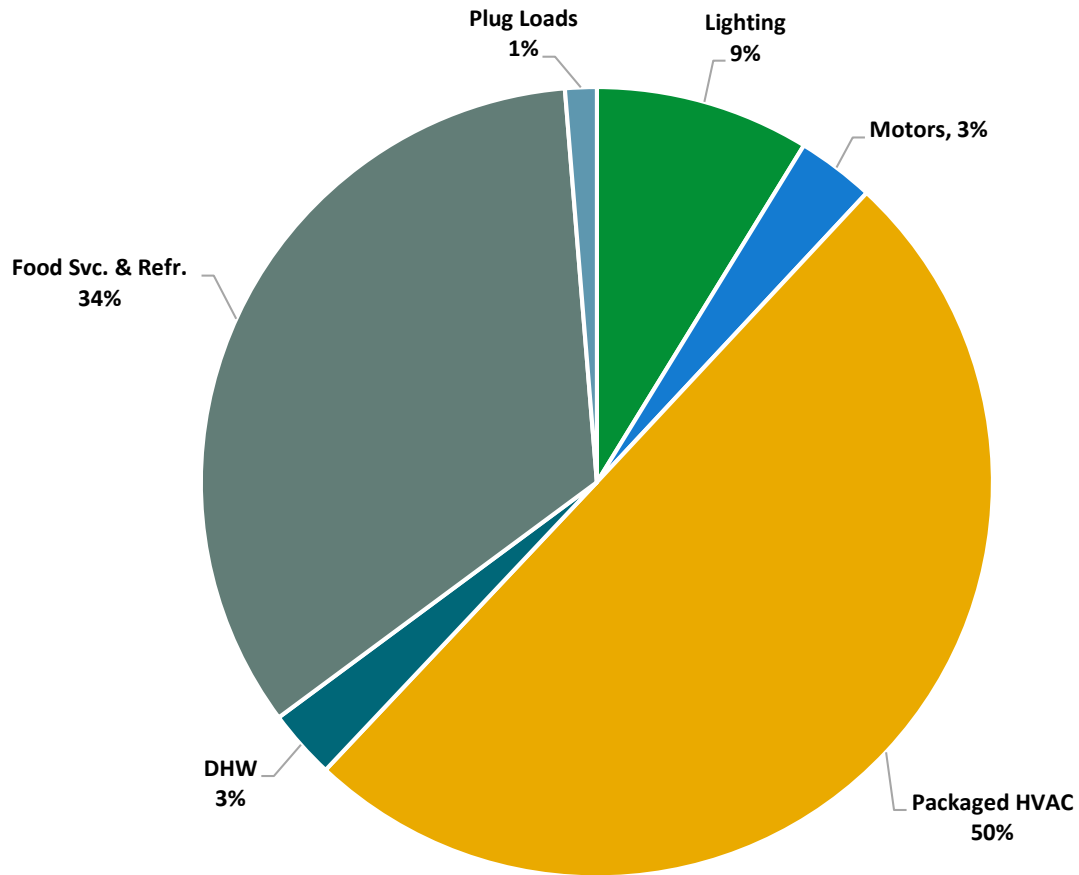
Utility Summary		
Fuel	Usage	Cost
Electricity	30,744 kWh	\$6,112
Propane	1,477 Gallons	\$3,463
Total		\$9,574



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.

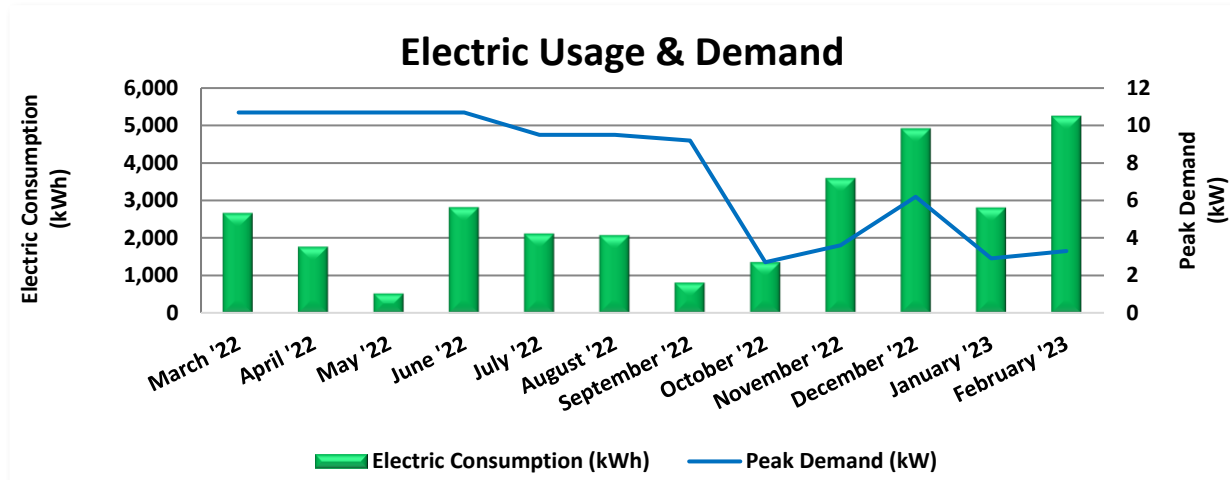




*Energy Balance by System*

### 3.1 Electricity

JCP&L delivers electricity under rate class General Service Secondary 3 Phase JC\_GS3\_01D, with electric production provided by Champion, a third-party supplier.



Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
3/31/22	29	2,667	11	\$3	\$505
5/2/22	32	1,774	11	\$3	\$356
6/2/22	31	531	11	\$3	\$139
7/5/22	33	2,821	11	\$3	\$522
8/3/22	29	2,122	10	\$0	\$430
9/1/22	29	2,079	10	\$0	\$426
10/4/22	33	817	9	\$0	\$186
11/1/22	28	1,365	3	\$0	\$288
12/1/22	30	3,594	4	\$0	\$665
1/3/23	33	4,914	6	\$0	\$968
1/31/23	28	2,810	3	\$0	\$670
3/2/23	30	5,250	3	\$0	\$956
<b>Totals</b>	<b>365</b>	<b>30,744</b>	<b>11</b>	<b>\$10</b>	<b>\$6,112</b>
<b>Annual</b>	<b>365</b>	<b>30,744</b>	<b>11</b>	<b>\$10</b>	<b>\$6,112</b>

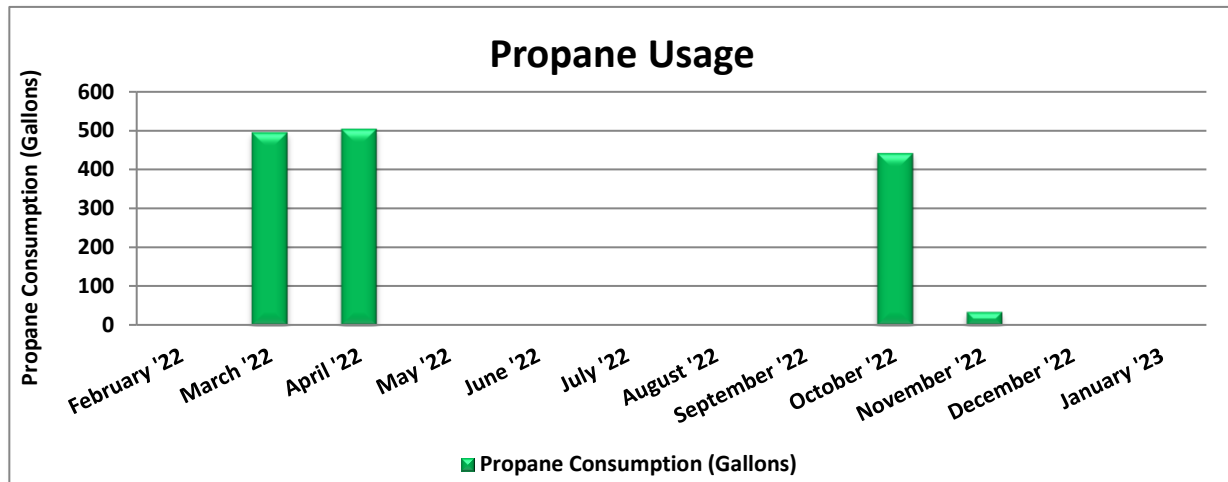
Notes:

- Peak demand of 11 kW occurred in March '22.
- Average demand over the past 12 months was 7 kW.
- The average electric cost over the past 12 months was \$0.199/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.



## 3.2 Propane

Suburban Propane delivers Propane to the project site.



Propane Billing Data			
Period Ending	Days in Period	Propane Usage (Gallons)	Fuel Cost
3/1/22	28	0	\$0
4/1/22	31	496	\$1,075
5/1/22	30	504	\$1,121
6/1/22	31	0	\$0
7/1/22	30	0	\$0
8/1/22	31	0	\$0
9/1/22	31	0	\$0
10/1/22	30	0	\$0
11/1/22	31	442	\$1,157
12/1/22	30	34	\$109
1/1/23	31	0	\$0
2/1/23	31	0	\$0
<b>Totals</b>	<b>365</b>	<b>1,477</b>	<b>\$3,463</b>
<b>Annual</b>	<b>365</b>	<b>1,477</b>	<b>\$3,463</b>

### Notes:

- The average Propane cost for the past 12 months is \$2.345/Gallon, which is the blended rate used throughout the analysis.
- Fuel deliveries do not necessarily correspond to periods of use.
- Utility data for the reported propane account serving the Lake Marcia site did not align with predicted propane usage.
- The monument concession site was reported to utilize propane equipment; however, no propane consuming equipment is on site. Additionally, the utility history for the monument concession propane account aligns much closer with the Lake Marcia bathhouse. As a result, we have assigned the monument concession propane account to the Lake Marcia bathhouse.

### 3.3 Benchmarking

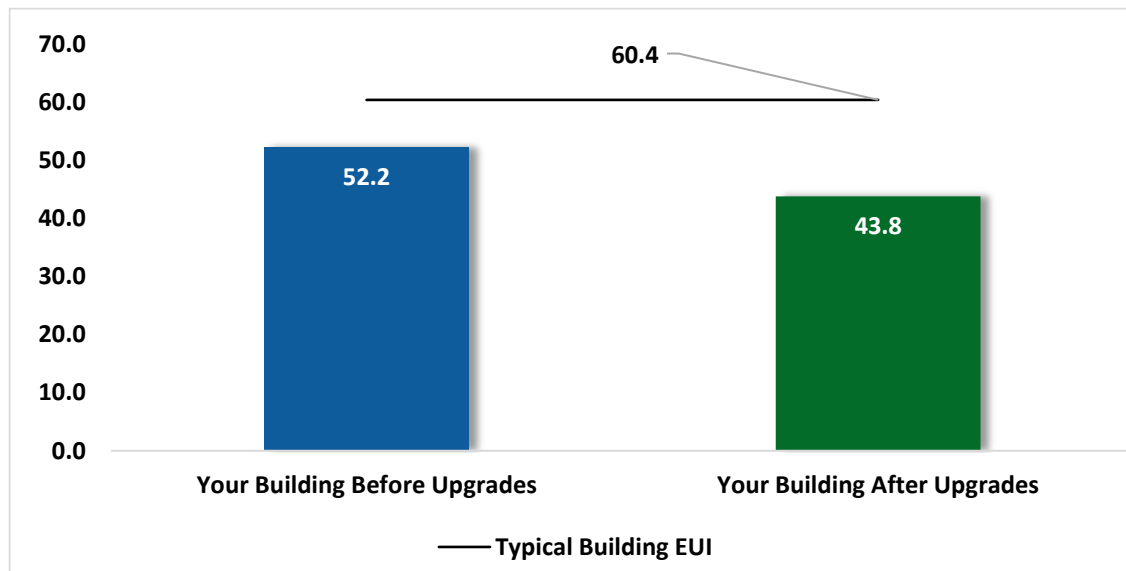
Your building was benchmarked using the United States Environmental Protection Agency's (EPA) Portfolio Manager® software. Benchmarking compares your building's energy use to that of similar buildings across the country, while neutralizing variations due to location, occupancy, and operating hours. Some 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.



*Energy Use Intensity Comparison<sup>4</sup>*

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. Several factors can cause a building to vary from 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.

<sup>4</sup> Based on all evaluated ECMs

### **Tracking your Energy Performance**

Keeping track of your energy and water use on a monthly basis is one of the best ways to keep utility costs in check and keep your facility operating efficiently. 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 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](#).

## **3.4 Understanding Your Utility Bills**

The State of New Jersey Department of the Public Advocate provides detailed information on how to read natural gas and electric bills. Your bills contain important information including account numbers, meter numbers, rate schedules, meter readings, and the supply and delivery charges. Gas and electric bills both provide comparisons of current energy consumption with prior usage.

Sample bills, with annotation, may be viewed at:

[https://www.nj.gov/rpa/docs/Understanding\\_Electric\\_Bill.pdf](https://www.nj.gov/rpa/docs/Understanding_Electric_Bill.pdf)

[https://www.nj.gov/rpa/docs/Understanding\\_Gas\\_Bill.pdf](https://www.nj.gov/rpa/docs/Understanding_Gas_Bill.pdf)

### **Why Utility Bills Vary**

Utility bills vary from one month to another for many reasons. For this reason, assessing the effects of your energy savings efforts can be difficult.

Billing periods vary, typically ranging between 28 and 33 days. Electric bills provide the kilowatt-hours (kWh) used per month while gas bills provide therms (or hundreds of cubic feet - CCF) per month consumption information. Monthly consumption information can be helpful as a tool to assess your efforts to reduce energy, particularly when compared to monthly usage from a similar calendar period in a prior year.

Bills typically vary seasonally, often with more gas consumed in the winter for heating, and more electricity used in the summer when air conditioning is used. Facilities with electric heating may experience higher electricity use in the winter. Seasonal variance will be impacted by the type of heating and cooling systems used. Normal seasonal fluctuations are further impacted by the weather. Extremely cold or hot weathers causes HVAC equipment to run longer, increasing usage. Other monthly fluctuations in usage can be caused by changes in building occupancy. Utility bills provide a comparison of usage between the current period and comparable billing month period of the prior year. Year-to-year monthly use comparisons can point to trends with energy savings for measures/projects that were implemented within the timeframe, but these comparisons do not account for changing weather or occupancy patterns.

The price of fuel and purchased power used to produce and delivery electricity and gas fluctuates. Any increase or decrease in these costs will be reflected in your monthly bill. Additionally, billing rates occasionally change after justification and approval of the NJBPU. For this reason, it is more useful to review energy use rather than cost when assessing energy use trends or the impact of energy conservation measures implemented.

## 4 ENERGY CONSERVATION MEASURES

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The goal of this audit report is to identify and evaluate potential energy efficiency improvements and provide information about the cost effectiveness of those improvements. Most energy conservation measures have received preliminary analysis of feasibility, which identifies expected ranges of savings. 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 in this report are based on the previously run state rebate program SmartStart, which has been retired. Now, all investor-owned gas and electric utility companies are offering complementary energy efficiency programs directly to their customers. Some measures and proposed upgrades may be eligible for higher incentives than those shown below. The incentives in the summary tables should be used for high-level planning purposes. To verify incentives, reach out to your utility provider or visit the [NJCEP website](#) for more information.

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$) *	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs) **	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>			<b>1,862</b>	<b>0.7</b>	<b>-1</b>	<b>\$355</b>	<b>\$3,400</b>	<b>\$600</b>	<b>\$2,800</b>	<b>7.9</b>	<b>1,792</b>
ECM 1	Install LED Fixtures	Yes	1,353	0.4	-1	\$254	\$2,360	\$550	\$1,810	7.1	1,281
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	No	13	0.1	0	\$2	\$180	\$20	\$160	66.8	12
ECM 3	Retrofit Fixtures with LED Lamps	Yes	496	0.1	0	\$99	\$860	\$30	\$830	8.4	499
<b>Lighting Control Measures</b>			<b>680</b>	<b>0.4</b>	<b>0</b>	<b>\$128</b>	<b>\$3,270</b>	<b>\$860</b>	<b>\$2,410</b>	<b>18.9</b>	<b>644</b>
ECM 4	Install Occupancy Sensor Lighting Controls	No	522	0.3	0	\$98	\$2,430	\$300	\$2,130	21.7	494
ECM 5	Install High/Low Lighting Controls	Yes	159	0.1	0	\$30	\$840	\$560	\$280	9.4	150
<b>Gas Heating (HVAC/Process) Replacement</b>			<b>0</b>	<b>0.0</b>	<b>18</b>	<b>\$451</b>	<b>\$3,600</b>	<b>\$500</b>	<b>\$3,100</b>	<b>6.9</b>	<b>2,497</b>
ECM 6	Install High Efficiency Furnaces	Yes	0	0.0	18	\$451	\$3,600	\$500	\$3,100	6.9	2,497
<b>Domestic Water Heating Upgrade</b>			<b>0</b>	<b>0.0</b>	<b>4</b>	<b>\$101</b>	<b>\$110</b>	<b>\$50</b>	<b>\$60</b>	<b>0.6</b>	<b>561</b>
ECM 7	Install Low-Flow DHW Devices	Yes	0	0.0	4	\$101	\$110	\$50	\$60	0.6	561
<b>Food Service &amp; Refrigeration Measures</b>			<b>2,710</b>	<b>0.6</b>	<b>0</b>	<b>\$539</b>	<b>\$4,400</b>	<b>\$0</b>	<b>\$4,400</b>	<b>8.2</b>	<b>2,729</b>
ECM 8	Replace Refrigeration Equipment	Yes	2,710	0.6	0	\$539	\$4,400	\$0	\$4,400	8.2	2,729
<b>TOTALS</b>			<b>5,253</b>	<b>1.7</b>	<b>21</b>	<b>\$1,575</b>	<b>\$14,780</b>	<b>\$2,010</b>	<b>\$12,770</b>	<b>8.1</b>	<b>8,224</b>

\* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

*All Evaluated ECMs*

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>		<b>1,849</b>	<b>0.6</b>	<b>-1</b>	<b>\$353</b>	<b>\$3,220</b>	<b>\$580</b>	<b>\$2,640</b>	<b>7.5</b>	<b>1,780</b>
ECM 1	Install LED Fixtures	1,353	0.4	-1	\$254	\$2,360	\$550	\$1,810	7.1	1,281
ECM 3	Retrofit Fixtures with LED Lamps	496	0.1	0	\$99	\$860	\$30	\$830	8.4	499
<b>Lighting Control Measures</b>		<b>159</b>	<b>0.1</b>	<b>0</b>	<b>\$30</b>	<b>\$840</b>	<b>\$560</b>	<b>\$280</b>	<b>9.4</b>	<b>150</b>
ECM 5	Install High/Low Lighting Controls	159	0.1	0	\$30	\$840	\$560	\$280	9.4	150
<b>Gas Heating (HVAC/Process) Replacement</b>		<b>0</b>	<b>0.0</b>	<b>18</b>	<b>\$451</b>	<b>\$3,600</b>	<b>\$500</b>	<b>\$3,100</b>	<b>6.9</b>	<b>2,497</b>
ECM 6	Install High Efficiency Furnaces	0	0.0	18	\$451	\$3,600	\$500	\$3,100	6.9	2,497
<b>Domestic Water Heating Upgrade</b>		<b>0</b>	<b>0.0</b>	<b>4</b>	<b>\$101</b>	<b>\$110</b>	<b>\$50</b>	<b>\$60</b>	<b>0.6</b>	<b>561</b>
ECM 7	Install Low-Flow DHW Devices	0	0.0	4	\$101	\$110	\$50	\$60	0.6	561
<b>Food Service &amp; Refrigeration Measures</b>		<b>2,710</b>	<b>0.6</b>	<b>0</b>	<b>\$539</b>	<b>\$4,400</b>	<b>\$0</b>	<b>\$4,400</b>	<b>8.2</b>	<b>2,729</b>
ECM 8	Replace Refrigeration Equipment	2,710	0.6	0	\$539	\$4,400	\$0	\$4,400	8.2	2,729
<b>TOTALS</b>		<b>4,718</b>	<b>1.3</b>	<b>21</b>	<b>\$1,474</b>	<b>\$12,170</b>	<b>\$1,690</b>	<b>\$10,480</b>	<b>7.1</b>	<b>7,718</b>

\* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

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 M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>		<b>1,862</b>	<b>0.7</b>	<b>-1</b>	<b>\$355</b>	<b>\$3,400</b>	<b>\$600</b>	<b>\$2,800</b>	<b>7.9</b>	<b>1,792</b>
ECM 1	Install LED Fixtures	1,353	0.4	-1	\$254	\$2,360	\$550	\$1,810	7.1	1,281
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	13	0.1	0	\$2	\$180	\$20	\$160	66.8	12
ECM 3	Retrofit Fixtures with LED Lamps	496	0.1	0	\$99	\$860	\$30	\$830	8.4	499

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 HPS lamps 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 fixtures.

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.

**Affected Building Areas:** Lake Marcia bathhouse - breezeway and interior HPS lamps

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

We evaluated retrofitting 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 use less power than other lighting technologies but provides 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:** Lake Marcia pumphouse - pump room

### ECM 3: Retrofit Fixtures with LED Lamps

Replace linear fluorescent, halogen, and CFL 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. Be sure to specify replacement lamps that are compatible with existing dimming controls, where applicable. In some circumstances, you may need to upgrade your dimming system for optimum performance.

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:** Lake Marcia bathhouse - boiler room, corridor to the lifeguard storage rooms one and two, exterior halogen lamps, men's and women's restroom side access rooms

## 4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Control Measures</b>		<b>680</b>	<b>0.4</b>	<b>0</b>	<b>\$128</b>	<b>\$3,270</b>	<b>\$860</b>	<b>\$2,410</b>	<b>18.9</b>	<b>644</b>
ECM 4	Install Occupancy Sensor Lighting Controls	522	0.3	0	\$98	\$2,430	\$300	\$2,130	21.7	494
ECM 5	Install High/Low Lighting Controls	159	0.1	0	\$30	\$840	\$560	\$280	9.4	150

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

We evaluated installing 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, mounted 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:** Lake Marcia bathhouse - boiler room, kitchen, lifeguard first aid room, lifeguard room, men's restroom, women's restroom, and men's and women's restroom side access rooms



### **ECM 5: Install High/Low Lighting Controls**

Install occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons.

Lighting fixtures with these controls operate at default low levels when the area is unoccupied to provide minimal lighting to meet security or safety code requirements for egress. Sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Fixtures automatically switch back to low level after a predefined period of vacancy. In parking lots and parking garages with significant ambient lighting, this control can sometimes be combined with photocell controls to turn the lights off when there is sufficient daylight.

The controller lowers the light level by dimming the fixture output. Therefore, the controlled fixtures need to have a dimmable ballast or driver. This will need to be considered when selecting retrofit lamps and bulbs for the areas proposed for high/low control.

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

This measure provides energy savings by reducing the light fixture power draw when reduced light output is appropriate.

**Affected Building Areas:** Lake Marcia bathhouse - lifeguard corridor and lobby

## **4.3 Gas-Fired Heating**

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Gas Heating (HVAC/Process) Replacement</b>		<b>0</b>	<b>0.0</b>	<b>18</b>	<b>\$451</b>	<b>\$3,600</b>	<b>\$500</b>	<b>\$3,100</b>	<b>6.9</b>	<b>2,497</b>
ECM 6	Install High Efficiency Furnaces	0	0.0	18	\$451	\$3,600	\$500	\$3,100	6.9	2,497

### **ECM 6: Install High Efficiency Furnaces**

Replace standard efficiency furnaces with condensing furnaces. Improved combustion technology and heat exchanger design optimize heat recovery from the combustion gases, which can significantly improve furnace efficiency. Savings result from improved system efficiency.

Note: these units produce acidic condensate that require proper drainage.

**Affected Units:** propane furnace in the boiler room.

## 4.4 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
	<b>Domestic Water Heating Upgrade</b>	<b>0</b>	<b>0.0</b>	<b>4</b>	<b>\$101</b>	<b>\$110</b>	<b>\$50</b>	<b>\$60</b>	<b>0.6</b>	<b>561</b>
ECM 7	Install Low-Flow DHW Devices	0	0.0	4	\$101	\$110	\$50	\$60	0.6	561

### **ECM 7: Install Low-Flow DHW Devices**

Install low-flow devices to reduce overall hot water demand. The following low-flow devices are recommended to reduce hot water usage:

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm
Faucet aerator (kitchen)	1.5 gpm
Showerhead	2.0 gpm
Pre-rinse spray valve (kitchen)	1.28 gpm

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing. Additional cost savings may result from reduced water usage.

## 4.5 Food Service and Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
	<b>Food Service &amp; Refrigeration Measures</b>	<b>2,710</b>	<b>0.6</b>	<b>0</b>	<b>\$539</b>	<b>\$4,400</b>	<b>\$0</b>	<b>\$4,400</b>	<b>8.2</b>	<b>2,729</b>
ECM 8	Replace Refrigeration Equipment	2,710	0.6	0	\$539	\$4,400	\$0	\$4,400	8.2	2,729

### **ECM 8: Replace Refrigeration Equipment**

Replace existing freezer chests with new ENERGY STAR rated equipment. The energy savings associated with this measure come from reduced energy usage, due to more efficient technology, and reduced run times.

**Affected Units:** Lake Marcia Bathhouse - freezer chests in the kitchen

## 4.6 Measures for Future Consideration

There are additional opportunities for improvement that NJ DEP High Point State Park may wish to consider. These potential upgrades typically require further analysis, involve substantial capital investment, and/or include significant system reconfiguration. These measure(s) are therefore beyond the scope of this energy audit. These measure(s) are described here to support a whole building approach to energy efficiency and sustainability.

NJ DEP High Point State Park may wish to consider the Energy Savings Improvement Program (ESIP) or other whole building approach. With interest in implementing comprehensive, largescale and/or complex system wide projects, these measures may be pursued during development of a future energy savings plan. We recommend that you work with your energy service company (ESCO) and/or design team to:

- Evaluate these measures further.
- Develop firm costs.
- Determine measure savings.
- Prepare detailed implementation plans.

Other modernization or capital improvement funds may be leveraged for these types of refurbishments. As you plan for capital upgrades, be sure to consider the energy impact of the building systems and controls being specified.

### **Upgrade to a Heat Pump System**

Electric resistance heating units work by passing an electric current through wires to heat them. The system is 100 percent efficient since for every unit of electricity consumed, one unit of heat is produced.

But there is a way to convert electricity to create heat at better than a 1:1 ratio. Heat pumps operate on a more efficient principle, the refrigeration cycle. Instead of directly converting electricity to heat, electricity does the work, via a compressor, of moving refrigerant through a system that transfers heat from a cooler place to a warmer place. That system can move three to five as much energy as is available using electric resistance heating methods. Heat pumps work in a similar manner to an air conditioner, except they reverse the cooling process to circulate warm air instead of cold air. Also, heat pumps are generally capable of dispensing refrigerated air as they can typically be operated in air conditioning mode.

Electric resistance heat, including electric furnaces and baseboard heaters, can be inexpensive to install but often expensive to run. Facilities with these systems can save substantial energy at a moderate cost by installing a heat pump when they replace a central air conditioner.

Even in buildings without central air-conditioning, there are opportunities to save energy when an existing electric furnace needs to be replaced, as well as opportunities to install ductless electric heat pumps in buildings with baseboard electric heaters and electric fan coils. Unit ventilators with built-in electric resistance heaters can be replaced with unit ventilators with integrated heat pumps.

Electric heat pumps have high coefficient of performance (COP) ratings and are substantially more efficient than traditional electric heating systems. Further investigation is required to determine whether installing a heat pump system is a cost-effective solution when replacing existing electrical heating systems.

## 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.

Operation and maintenance (O&M) plans enhance the operational efficiency of HVAC and other energy intensive systems and could save 5%–20% of the energy usage in your building without substantial capital investment. A successful plan includes your records of energy usage trends and costs, building equipment lists, current maintenance practices, and planned capital upgrades, and it incorporates your ideas for improved building operation. Your plan will address goals for energy-efficient operation, provide detail on how to reach the goals, and outline procedures for measuring and reporting whether goals have been achieved.

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 cannot manage what you do not 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<sup>5</sup>. 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, 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 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.

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<sup>5</sup> <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.

## **Motor Controls**

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Whenever possible, use automatic devices such as twist timers or occupancy sensors to turn off motors when they are not needed.

## **Motor Maintenance**

Motors have many moving parts. As these parts degrade over time, the efficiency of the motor is reduced. Routine maintenance prevents damage to motor components. Routine maintenance should include cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

## **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.

## **Furnace Maintenance**

Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should check for gas / carbon monoxide leaks; change the air and fuel filters; check components for cracks, corrosion, dirt, or debris build-up; ensure the ignition system is working properly; test and adjust operation and safety controls; inspect electrical connections; and lubricate motors and bearings.

## **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.

### **Refrigeration Equipment Maintenance**

Preventative maintenance keeps commercial refrigeration equipment running reliably and efficiently. Commercial refrigerators and freezers are mission-critical equipment that can cost a fortune when they go down. Even when they appear to be working properly, refrigeration units can be consuming too much energy. Have walk-in refrigeration and freezer and other commercial systems serviced at least annually. This practice will allow systems to perform to their highest capabilities and will help identify system issues if they exist.

Maintaining your commercial refrigeration equipment can save between five and ten percent on energy costs. When condenser coils are dirty, your commercial refrigerators and freezers work harder to maintain the temperature inside. Worn gaskets, hinges, door handles or faulty seals cause cold air to leak from the unit, forcing the unit to run longer and use more electricity.

Regular cleaning and maintenance also help your commercial refrigeration equipment to last longer.

### **Procurement Strategies**

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

## 6 WATER BEST PRACTICES

### **Getting Started**



The commercial and institutional sector is the second largest consumer of publicly supplied water in the United States, accounting for 17% of the withdrawals from public water supplies<sup>6</sup>. In New Jersey, excluding water used for power generation, approximately 80% of total water use was attributed to potable supply during the period of 2009 to 2018. Water withdrawals for potable supply have not changed noticeably during the period from 1990 to 2018<sup>7</sup>.

Water management planning serves as the foundation for any successful water reduction effort. It is the first step a commercial or institutional facility owner or manager should take to achieve and sustain long-term water savings. Understanding how water is used within a facility is critical for the water management planning process. A water assessment provides a comprehensive account of all known water uses at the facility. It allows the water management team to establish a baseline from which progress and program success can be measured. It also enables the water management team to set achievable goals and identify and prioritize specific projects based on the relative savings opportunities and project cost-effectiveness.

Water conservation devices may significantly reduce your water and sewer usage costs. Any reduction in water use reduces grid-level electricity use since a significant amount of electricity is used to treat and deliver water from reservoirs to end users.

For more information regarding water conservation or additional details regarding the practices shown below go to the EPA's WaterSense website<sup>8</sup> or download a copy of EPA's "WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities"<sup>9</sup> to get ideas for creating a water management plan and best practices for a wide range of water using systems.

### **Leak Detection and Repair**

Identifying and repairing leaks and other water use anomalies within a facility's water distribution system or from processes or equipment can keep a facility from wasting significant quantities of water. Examples of common leaks include leaking toilets and faucets, drip irrigation malfunctions, stuck float valves, and broken distribution lines. Reading meters, installing failure abatement technologies, and conducting visual and auditory inspections are important best practices to detect leaks. Train building occupants, employees, and visitors to report any leaks that they detect. To reduce unnecessary water loss, detected leaks should be repaired quickly. Repairing leaks in water distribution that is pressurized by on-site pumps or in heated or chilled water piping will also reduce energy use.

### **Toilets and Urinals**

Toilets and urinals are considered sanitary fixtures and are found in most facilities. High efficiency fixtures are at least 20% more efficient than available standard products. Leaking or damaged equipment is a substantial source of water waste. Train users to report continuously flushing, leaking, or otherwise improperly operating equipment to the appropriate personnel. Depending on the age of the equipment

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<sup>6</sup> Estimated from analyzing data in: [Solley, Wayne B., et al, "Estimated Use of Water in the United States in 1995", U.S Geological Survey Circular 1200, \(1998\)](#)

<sup>7</sup> <https://dep.nj.gov/wp-content/uploads/dsr/trends-water-supply.pdf>

<sup>8</sup> <https://www.epa.gov/watersense>

<sup>9</sup> <https://www.epa.gov/watersense/watersense-work-0>



and the frequency of use, it may be cost effective to replace older inefficient fixtures with current generation WaterSense labeled equipment.

Commercial facilities typically use tank toilets or wall-mount flushometers. Educate and inform users with restroom signage and other means to avoid flushing inappropriate objects. For tank toilets, periodically check to ensure fill valves are working properly and that water level is set correctly. Annually test toilets to ensure the flappers are not worn or allowing water to seep from the tank into the bowl and down the sewer. Control stops and piston valves on flushometer toilets should be checked at least annually.

Most urinals use water to flush liquid. These standard single-user fixtures are present in most facilities. Non-water urinals use a specially designed trap that allows liquid waste to drain out of the fixture through a trap seal, and into the drainage system. Flushing urinals should be inspected at least annually for proper valve and sensor operation. For non-water urinals, follow maintenance practices as directed by the manufacturer to ensure products perform as expected. Non-water urinals can be considered during urinal replacement, however, review the condition and design of the existing plumbing system and the expected usage patterns to ensure that these products will provide the anticipated performance.

### **Faucets and Showerheads**

Faucets and showerheads are sanitary fixtures that generally dispense heated water. Reducing water use by these fixtures translates into a reduction of site fuel or electric use depending on how water is heated. High efficiency fixtures are at least 20% more efficient than available standard products. Leaking or damaged equipment is a substantial source of water waste. Train users to report continuously dripping, leaking, or otherwise improperly operating equipment to the appropriate personnel. Depending on the age of the equipment and the frequency of use, it may be cost effective to replace older fixtures with current generation WaterSense labeled equipment.

Faucets are used for a variety of purposes, and standard flow rates are dictated by the intended use. Public use lavatory faucets and kitchen faucets are subject to maximum flow rates while service sinks are not. Periodically inspect faucet aerators for scale buildup to ensure flow is not being restricted. Clean or replace the aerator or other spout end device as needed. Check and adjust automatic sensors (where installed) to ensure they are operating properly to avoid faucets running longer than necessary. Post materials in restrooms and kitchens to ensure user awareness of the facility's water-efficiency goals. Remind users to turn off the tap when they are done and to consider turning the tap off during sanitation activities when it is not being used. Consider installing lavatory and kitchen faucet fixtures with reduced flow. Federal standards limit kitchen and restroom faucet flows to 2.2 gpm. To qualify for a WaterSense label a faucet cannot exceed 1.5 gpm.

Effective in 1992, the maximum allowable flow rate for all showerheads sold in the United States is 2.5 gpm. Since this standard was enacted, many showerheads have been designed to use even less water. WaterSense labeled equipment is designed to use 2.0 gpm, or less. For optimum showerhead efficiency, the system pressure should be tested to make sure that it is between 20 and 80 pounds per square inch (psi). Verify that plumbing lines are routed through a shower valve to prevent water pressure fluctuations. Periodically inspect showerheads for scale buildup to ensure flow is not being restricted. In general, replace showerheads with 2.5 gpm flow rates or higher with WaterSense labeled models. Note: Use of poor performing replacement reduced flow showerheads may result in increased use if the duration of use is increased to compensate for reduced performance. WaterSense labeled showerheads are independently certified to meet or exceed minimum performance requirements for spray coverage and force.



## **Commercial Kitchen Equipment**

Commercial and institutional sectors, including hospitals, offices, and schools, have substantial kitchen water use. Water in food service is used for steam cooking, spray/flow cleaning, dish washing, and ice making. In most commercial kitchens, the commercial dishwasher and pre-rinse spray valve account for over two-thirds of the water use. Newer technologies and better practices are available that can significantly reduce commercial kitchen equipment water and energy use. For example, ENERGY STAR qualified dishwashers and steam cookers are at least 10% more water-efficient and 15% more energy-efficient than standard models. With some models saving significantly more.

Cooking equipment includes combination ovens, steam cookers, and steam kettles. For efficient steam cooking operation, fill vessels to capacity when possible, set temperatures optimally for the process, and keep doors and lids closed while cooking. Replace gaskets to ensure proper sealing and repair leaks. When replacing combination ovens, select connectionless equipment; replace steam cookers with ENERGY STAR rated steam cookers.

Spray/flow cleaning equipment includes dipper wells, pre-rinse spray valves, food disposals, and wash down sprayers. Turn off water when service periods are slow and keep flow rates to minimum level. Train users to scrape food rather than rely on water pressure. Inspect for leaks and scaling. Test system pressure to ensure it is between 20 and 80 pounds per square inch (psi) for optimum flow and performance of spray equipment. For dipper wells, consider installing in-line flow restrictors to reduce flow. Pre-rinse spray valves can be replaced with new assemblies which use 1.3 gpm or less. Washdown sprayers can be equipped with self-closing nozzles or consider mopping/sweeping as an alternative.

Dishwashers range in type and include undercounter, stationary/hood, conveyor, and flight-type models. Only run dishwashers when they are full, and fill racks to maximum capacity. Be sure to replace damaged dishwasher racks. Educate staff to scrape dishes prior to loading. Ensure that final rinse pressure and water temperature are within the manufacturer's recommendations. Operate the dishwasher close to or at the minimum flow rate and set rinse cycle time to the manufacturer's minimum recommended settings. Make sure that manual fill valves close completely after the wash tank is filled. Find and repair any leaks. Inspect valves and rinse nozzles for proper operation and repair worn nozzles. Look for ENERGY STAR qualified models when purchasing or leasing a new commercial dishwasher or replacing an existing unit. Consider your kitchen throughput to select an appropriately sized commercial dishwasher since an oversized dishwasher will waste water if the machine is not loaded to capacity.

## **Ice Machines**

Commercial ice machines use refrigeration units to freeze water into ice. Ice machines typically use water for two purposes: cooling the refrigeration unit and making ice. Because the ice-making process generates a significant amount of heat, either water or air is used to remove this waste heat from the ice machine's refrigeration unit.

Water-cooled ice machines generally pass water through the machine once to cool it and then dispose of the single-pass water down the drain. Water-cooled systems can use less water by recirculating the cooling water through a chiller or a cooling tower to lower the temperature, returning the water to the machine for reuse. To eliminate using water to cool the refrigeration unit altogether, air can be used to cool the unit. Air-cooled ice machines use motor-driven fans or centrifugal blowers to move air through the refrigeration unit to remove heat. In general, water-cooled units are more energy efficient than air-cooled units but use more water. Commercial ice machines that are ENERGY STAR qualified are, on average, 15% more energy-efficient and 10% more water-efficient than standard air-cooled models.

For optimal ice machine efficiency, consider the following:

- Clean the ice machine to remove lime and scale buildup; sanitize it to kill bacteria and fungi. Run the self-cleaning sequence if available. For machines without a self-cleaning mode, shut down the machine, empty the bin of ice, add cleaning or sanitizing solution to the machine, switch it to cleaning mode, and then switch it to ice production mode. For health and safety purposes, create and discard several batches of ice to remove residual cleaning solution.
- Keep the ice machine's coils clean to ensure the heat exchange process is running efficiently.
- Keep the lid closed to preserve cool air and maintain the appropriate temperature.
- Install a timer to shift ice production to off-peak hours to decrease peak energy demand.
- Work with the manufacturer to ensure that the ice machine's rinse cycle is set to the lowest possible frequency that still provides sufficient ice quality and meets local water quality and site requirements.
- Follow the manufacturer's use and care instructions for the specific ice machine model.
- Train users to report leaking or otherwise improperly operating ice machines to the appropriate personnel.

If the machine is cooled using single-pass water, modify the machine to operate on a closed loop that recirculates the cooling water through a cooling tower or heat exchanger, if possible.

When replacing an ice machine or installing a new one, ensure that the new model is sized appropriately to fit the facility's need. Choose an ice machine that is appropriate for the quality of ice needed. Producing ice of higher quality than required will use water unnecessarily. Look for ENERGY STAR qualified models, all of which are air-cooled. Also consider air- or water-cooled ice machines that meet the efficiency specifications outlined by the Consortium for Energy Efficiency. If feasible, consider selecting air-cooled flake or nugget ice machines, which use less water and energy than cubed ice machines.

## 7 ON-SITE GENERATION

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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.

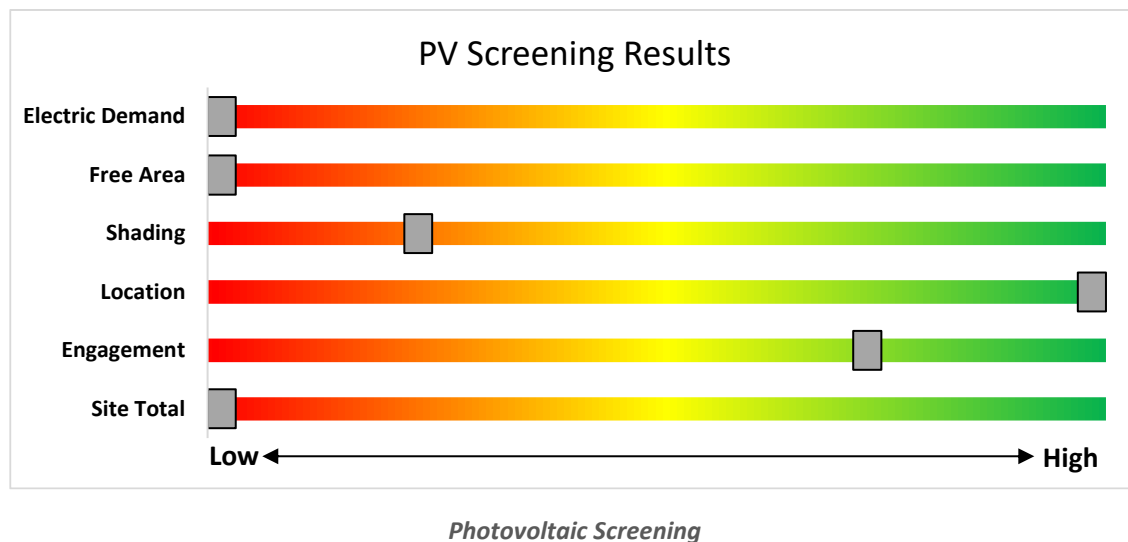
## 7.1 Solar Photovoltaic

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 no potential for installing a PV array.

This facility does not appear to meet the minimum criteria for a cost-effective solar PV installation. To be cost-effective, a solar PV array needs certain minimum criteria, such as sufficient and sustained electric demand and sufficient flat or south-facing rooftop or other unshaded space on which to place the PV panels.

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.



### Successor Solar Incentive Program (SuSI)

The SuSI program replaces the SREC Registration Program (SRP) and the Transition Incentive (TI) program. The SuSI program is used to register and certify solar projects in New Jersey. Rebates are not available for solar projects. Solar projects may qualify to earn SREC- IIs (Solar Renewable Energy Certificates-II), however, the project owners must register their solar projects prior to the start of construction to establish the project's eligibility.

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:

- ◆ **Successor Solar Incentive Program (SuSI):** <https://www.njcleanenergy.com/renewable-energy/programs/susi-program>
- ◆ **Basic Info on Solar PV in NJ:** <http://www.njcleanenergy.com/whysolar>
- ◆ **NJ Solar Market FAQs:** [www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs](http://www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs)
- ◆ **Approved Solar Installers in the NJ Market:** [http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved\\_vendorsearch/?id=60&start=1](http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/?id=60&start=1)

## 7.2 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.

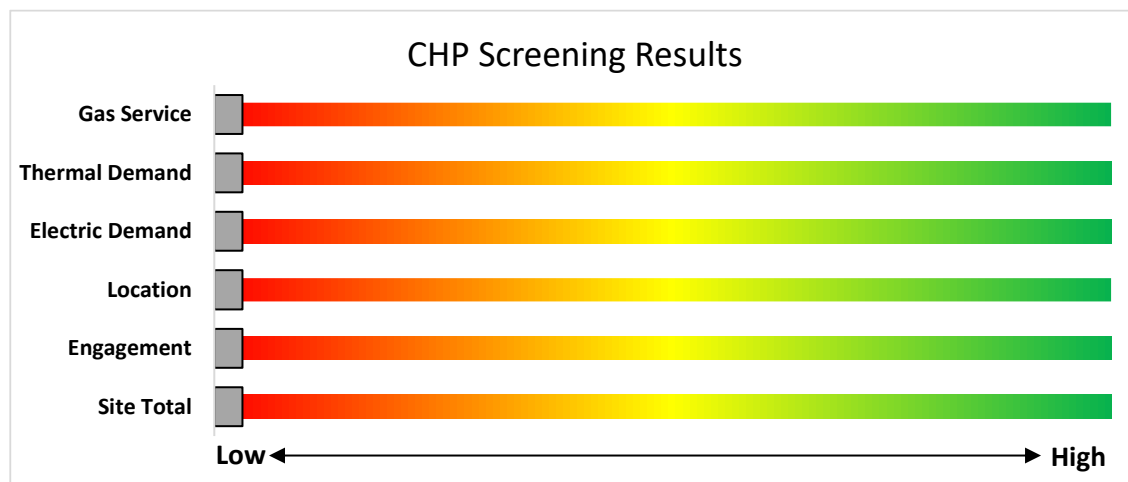
CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be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



*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/](http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/)



## 8 ELECTRIC VEHICLES

All electric vehicles (EVs) have an electric motor instead of an internal combustion engine. EVs function by plugging into a charge point, taking electricity from the grid, and then storing it in rechargeable batteries. Although electricity production may contribute to air pollution, the U.S. EPA categorizes all-electric vehicles as zero-emission vehicles because they produce no direct exhaust or tailpipe emissions.

EVs are typically more expensive than similar conventional and hybrid vehicles, although some cost can be recovered through fuel savings, federal tax credit, or state incentives.

### 8.1 EV Charging

EV charging stations provide a means for electric vehicle operators to recharge their batteries at a facility. While many EV drivers charge at home, others do not have access to regular home charging, and the ability to charge at work or in public locations is critical to making EVs practical for more drivers. Charging can also be used for electric fleet vehicles, which can reduce fuel and maintenance costs for fleets that replace gas or diesel vehicles with EVs.

EV charging comes in three main types. For this assessment, the screening considers addition of Level 2 charging, which is most common at workplaces and other public locations. Depending on the site type and usage, other levels of charging power may be more appropriate.

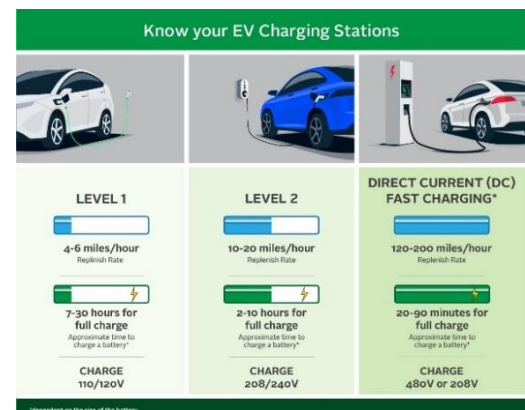
The preliminary assessment of EV charging at the facility shows that there is high potential for adding EV chargers to the facility's parking, based on potential costs of installation and other site factors.

The primary costs associated with installing EV charging are the charger hardware and the cost to extend power from the facility to parking spaces. This may include upgrades to electric panels to serve increased loads.

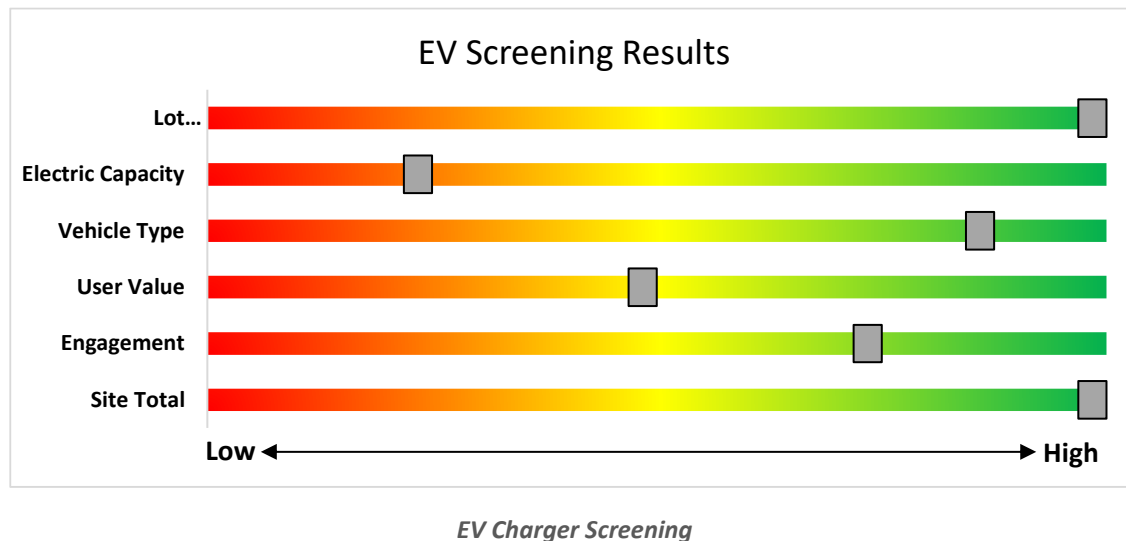
The type and size of the parking area impact the costs and feasibility of adding EV charging. Parking structure installations can be less costly than surface lot installations as power may be readily available, and equipment and wiring can be surface mounted. Parking lot installations often require trenching through concrete or asphalt surface. Large parking areas provide greater flexibility in charger siting than smaller lots.

The location and capacity of facility electric panels also impact charger installation costs. A Level 2 charger generally requires a dedicated 208-240V, 40 Amp circuit. The electric panel nearest the planned installation may not have available capacity and may need to be upgraded to serve new EV charging loads. Alternatively, chargers could be powered from a more distant panel. The distance from the panel to the location of charging stations ties directly to costs, as conduits, cables, and potential trenching costs all increase on a per-foot basis. The more charging stations planned, the more likely it is that additional electrical capacity will be needed.

Other factors to consider when planning for EV charging at a facility include who the intended users are, how long they park vehicles at the site, and whether they will need to pay for the electricity they use. Adding EV charging may have a negative financial impact due to increased electric demand charges.



The graphic below displays the results of the EV charging assessment conducted as part of this audit. The position of each slider indicates the impact each factor has on the feasibility of installing EV charging at the site.



### Electric Vehicle Programs Available

New Jersey is leading the way on electric vehicle (EV) adoption on the East Coast. There are several programs designed to encourage EV adoption in New Jersey, which is crucial to reaching a 100% clean energy future.

NJCEP offers a variety of EV programs for vehicles, charging stations, and fleets. Certain EV charging stations that receive electric utility service from Atlantic City Electric Company (ACE), Public Service Electric and Gas Company (PSE&G) or Jersey Central Power and Light (JCP&L), may be eligible for additional electric vehicle charging incentives directly from the utility. Projects may be eligible for both the incentives offered by this BPU program and incentives offered by ACE, PSE&G or JCP&L, up to 90% of the combined charger purchase and installation costs. Please check ACE, PSE&G or JCP&L program eligibility requirements before purchasing EV charging equipment, as additional conditions on types of eligible chargers may apply for utility incentives.

EV Charging incentive information is available from Atlantic City Electric, PSE&G and JCP&L. For more information and to keep up to date on all EV programs please visit <https://www.njcleanenergy.com/commercial-industrial/programs/electric-vehicle-programs>

## 9 PROJECT FUNDING AND INCENTIVES

Ready to improve your building's performance? New Jersey's Clean Energy Programs and Utility Energy Efficiency Programs can help. Pick the program that works best for you. This section provides an overview of currently available incentive programs in New Jersey.

### NJBPU and NJCEP Administered Programs



- New Construction (residential, commercial, industrial, government)
- Large Energy Users
- Energy Savings Improvement Program (financing)
- State Facilities Initiative\*
- Local Government Energy Audits
- Combined Heat & Power & Fuel Cells

\*State facilities are also eligible for utility programs

### Utility Administered Programs



- Existing buildings (residential, commercial, industrial, government)
- Efficient Products
  - Lighting & Marketplace
  - HVAC
  - Appliance Rebates
  - Appliance Recycling

## 9.1 New Jersey's Clean Energy Program

Save money while saving the planet! New Jersey's Clean Energy Program is a statewide program that offers incentives, programs, and services that benefit New Jersey residents, businesses, educational, non-profit, and government entities to help them save energy, money, and the environment.

### Large Energy Users

The Large Energy Users Program (LEUP) is designed to foster self-directed investment in energy projects. This program is offered to New Jersey's largest energy customers. To qualify entities must have incurred at least \$5 million in total energy costs in the prior fiscal year.

#### **Incentives**

Incentives are based on the specifications below. The maximum incentive per entity is the lesser of:

- \$4 million
- 75% of the total project(s) cost
- 90% of total NJCEP fund contribution in previous year
- \$0.33 per projected kWh saved; \$3.75 per projected Therm saved annually

#### **How to Participate**

To participate in LEUP, you will first need submit an enrollment application. This program requires all qualified and approved applicants to submit an energy plan that outlines the proposed energy efficiency work for review and approval. Applicants may submit a Draft Energy Efficiency Plan (DEEP), or a Final Energy Efficiency Plan (FEED). Once the FEED is approved, the proposed work can begin.

Detailed program descriptions, instructions for applying, and applications can be found at <http://www.njcleanenergy.com/LEUP>.

## 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<sup>10</sup>

Eligible Technology	Size (Installed Rated Capacity)	Incentive (\$/Watt) <sup>5</sup>	% of Total Cost Cap per Project	\$ Cap per Project
CHPs powered by non-renewable or renewable fuel source, or a combination: <sup>4</sup> - Gas Internal Combustion Engine - Gas Combustion Turbine - Microturbine	≤500 kW <sup>1</sup>	\$2.00	30-40% <sup>2</sup>	\$2 million
	>500 kW - 1 MW <sup>1</sup>	\$1.00		
	> 1 MW - 3 MW <sup>1</sup>	\$0.55	30%	\$3 million
	>3 MW <sup>1</sup>	\$0.35		
Fuel Cells ≥60%				
Fuel Cells ≥40%	Same as above <sup>1</sup>	Applicable amount above	30%	\$1 million
Waste Heat to Power (WHP) <sup>3</sup> Powered by non-renewable fuel source. Heat recovery or other mechanical recovery from existing equipment utilizing new electric generation equipment (e.g. steam turbine)	≤1MW <sup>1</sup>	\$1.00	30%	\$2 million
	> 1MW <sup>1</sup>	\$.50	30%	\$3 million

<sup>10</sup>

<sup>1</sup> Incentives are tiered, which means the incentive levels vary based upon the installed rated capacity, as listed in the chart above. For example, a 4 MW CHP system would receive \$2.00/watt for the first 500 kW, \$1.00/watt for the second 500 kW, \$0.55/watt for the next 2 MW and \$0.35/watt for the last 1 MW (up to the caps listed).

<sup>2</sup> The maximum incentive will be limited to 30% of total project. For CHP projects up to 1 MW, this cap will be increased to 40% where a cooling application is used or included with the CHP system (e.g. absorption chiller).

<sup>3</sup> Projects will be eligible for incentives shown above, not to exceed the lesser of % of total project cost per project cap or maximum \$ per project cap. Projects installing CHP or FC with WHP will be eligible for incentive shown above, not to exceed the lesser caps of the CHP or FC incentive. Minimum efficiency will be calculated based on annual total electricity generated, utilized waste heat at the host site (i.e. not lost/rejected), and energy input.

<sup>4</sup> Systems fueled by a Class 1 Renewable Fuel Source, as defined by N.J.A.C. 14:8-2.5, are eligible for a 30% incentive bonus. If the fuel is mixed, the bonus will be prorated accordingly. For example, if the mix is 60/40 (60% being a Class 1 renewable), the bonus will be 18%. This bonus will be included in the final performance incentive payment, based on system performance and fuel mix consumption data. Total incentive, inclusive of bonus, shall not exceed above stipulated caps.

<sup>5</sup> CHP-FC systems located at Critical Facility and incorporating blackstart and islanding technology are eligible for a 25% incentive bonus. This bonus incentive will be paid with the second/Installation incentive payment. Total incentive, inclusive of bonus, shall not exceed above stipulated caps.



### **How to Participate**

You will 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 <http://www.njcleanenergy.com/CHP>.



## Successor Solar Incentive Program (SuSI)

The SuSI program replaces the SREC Registration Program (SRP) and the Transition Incentive (TI) program. The program is used to register and certify 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 SREC-IIs (Solar Renewable Energy Certificates-II). SuSI consists of two sub-programs. The Administratively Determined Incentive (ADI) Program and the Competitive Solar Incentive (CSI) Program.

### **Administratively Determined Incentive (ADI) Program**

The ADI Program provides administratively set incentives for net metered residential projects, net metered non-residential projects 5 MW or less, and all community solar projects.

After the registration is accepted, construction is complete, and a complete final as-built packet has been submitted, the project is issued a New Jersey certification number, which enables it to generate New Jersey SREC- IIs.

Market Segments	Size MW dc	Incentive Value (\$/SREC II)	Public Entities Incentive Value - \$20 Adder (\$/SRECII)
Net Metered Residential	All types and sizes	\$90	N/A
Small Net Metered Non-Residential located on Rooftop, Carport, Canopy and Floating Solar	Projects smaller than 1 MW	\$100	\$120
Large Net Metered Non-Residential located on Rooftop, Carport, Canopy and Floating Solar	Projects 1 MW to 5 MW	\$90	\$110
Small Net Metered Non-Residential Ground Mount	Projects smaller than 1 MW	\$85	\$105
Large Net Metered Non-Residential Ground Mount	Projects 1 MW to 5 MW	\$80	\$100
LMI Community Solar	Up to 5 MW	\$90	N/A
Non-LMI Community Solar	Up to 5 MW	\$70	N/A
Interim Subsection (t)	All types and sizes	\$100	N/A

Eligible projects may generate SREC-IIs for 15 years following the commencement of commercial operations which is defined as permission to operate (PTO) from the Electric Distribution Company. After 15 years, projects may be eligible for a NJ Class I REC.

SREC-IIs will be purchased monthly by the SREC-II Program Administrator who will allocate the SREC-IIs to the Load Serving Entities (BGS Providers and Third-Party Suppliers) annually based on their market share of retail electricity sold during the relevant Energy Year.

The ADI Program online portal is now open to new registrations.

### **Competitive Solar Incentive (CSI) Program**

The CSI Program opened on April 15, 2023, and will serve as the permanent program within the SuSI Program providing incentives to larger solar facilities. The CSI Program is open to qualifying grid supply solar facilities, non-residential net metered solar installations with a capacity greater than five (5) megawatts ("MW"), and to eligible grid supply solar facilities installed in combination with energy storage.

CSI eligible facilities will only be allowed to register in the CSI program upon award of a bid pursuant to N.J.A.C. 14:8-11.10.

The CSI program structure has separate categories, or tranches, to ensure that a range of solar project types, including those on preferred sites, are able to participate despite potentially different project cost profiles. The Board has approved four tranches for grid supply and large net metered solar and an additional fifth tranche for storage in combination with grid supply solar. The following table lists procurement targets for the first solicitation:

Tranche	Project Type	MW (dc) Targets
Tranche 1.	Basic Grid Supply	140
Tranche 2.	Grid Supply on the Built Environment	80
Tranche 3.	Grid Supply on Contaminated Sites and Landfills	40
Tranche 4.	Net Metered Non- Residential	40
Tranche 5.	*Storage Paired with Grid	160 MWh

\*The storage tranche of 160 MWh corresponds to a 4-hour storage pairing of 40 MW of solar

Solar projects help the State of New Jersey reach renewable energy goals outlined in the state's Energy Master Plan.

If you are considering installing solar on your building, visit the following link for more information: <https://njcleanenergy.com/renewable-energy/programs/susi-program>

## 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 contracts to help finance building energy upgrades. Annual payments are lower than the savings projected from the energy conservation measures (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 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](http://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.*

## **Demand Response (DR) Energy Aggregator**

Demand Response Energy Aggregator is a program designed to reduce the electric load when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. Grid operators call upon curtailment service providers and commercial facilities to reduce electric usage during times of peak demand, making the grid more reliable and reducing transmission costs for all ratepayers. Curtailment service providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail its electric usage.

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

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

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

The first step toward participation in a DR program is to contact a curtailment service provider. A list of these providers is available on the website of the independent system operator, PJM, and it includes contact information for each company, as well as the states where they have active business<sup>11</sup>. PJM also posts training materials for program members interested in specific rules and requirements regarding DR activity along with a variety of other DR program information<sup>12</sup>.

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

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<sup>11</sup> <http://www.pjm.com/markets-and-operations/demand-response.aspx>.

<sup>12</sup> <http://www.pjm.com/training/training-events.aspx>.

## 9.2 Utility Energy Efficiency Programs

The Clean Energy Act, signed into law by Governor Murphy in 2018, requires New Jersey's investor-owned gas and electric utilities to reduce their customers' use by set percentages over time. To help reach these targets the New Jersey Board of Public Utilities approved a comprehensive suite of energy efficiency programs to be run by the utility companies.

### **Prescriptive and Custom**

The Prescriptive and Custom rebate program through your utility provider 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.

#### **Equipment Examples**

*Lighting*  
*Lighting Controls*  
*HVAC Equipment*  
*Refrigeration*  
*Gas Heating*  
*Gas Cooling*  
*Commercial Kitchen Equipment*  
*Food Service Equipment*

*Variable Frequency Drives*  
*Electronically Commutate Motors*  
*Variable Frequency Drives*  
*Plug Loads Controls*  
*Washers and Dryers*  
*Agricultural*  
*Water Heating*

The Prescriptive program provides fixed incentives for specific energy efficiency measures. Prescriptive incentives vary by equipment type. The Custom program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives.

### **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 or less 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.

#### **Incentives**

The program pays up to 70% of the total installed cost of eligible measures.

#### **How to Participate**

To participate in Direct Install, you will work with a participating contractor. 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 Direct Install program, subject to program rules and eligibility, while the remaining percent of the cost is paid to the contractor by the customer.

## **Engineered Solutions**

The Engineered Solutions Program provides tailored energy-efficiency assistance and services to municipalities, universities, schools, hospitals, and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. Customers receive expert guided services, including investment-grade energy auditing, engineering design, installation assistance, construction administration, commissioning, and measurement and verification (M&V) services to support the implementation of cost-effective and comprehensive efficiency projects. Engineered Solutions is generally a good option for medium to large sized facilities with a peak demand over 200 kW looking to implement as many measures as possible under a single project to achieve deep energy savings. Engineered Solutions 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. Incentives for this program are based on project scope and energy savings achieved.

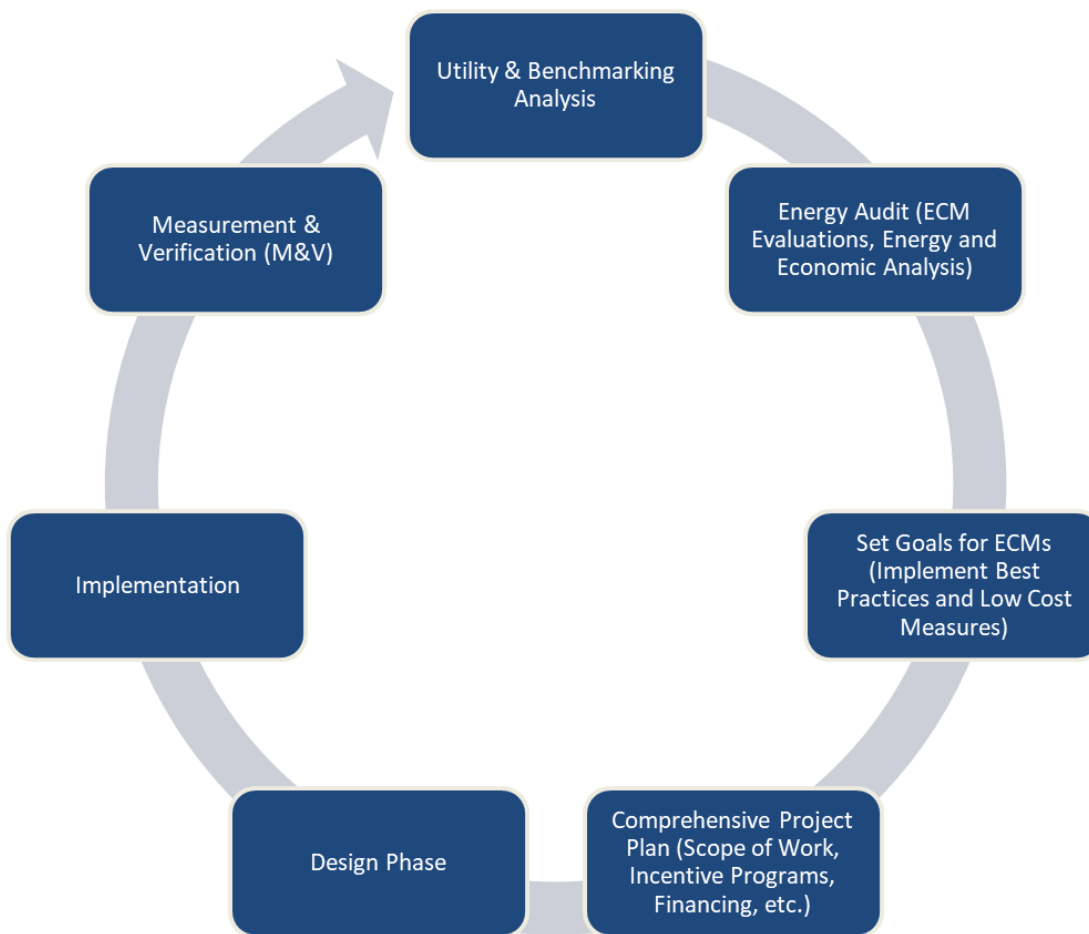
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For more information on any of these programs, contact your local utility provider or visit <https://www.njcleanenergy.com/transition>.



## 10 PROJECT DEVELOPMENT

Energy conservation measures (ECMs) have been identified for your site, and their energy and economic analyses are provided within this LGEA report. Note that some of the identified projects may be mutually exclusive, such as replacing equipment versus upgrading motors or controls. The next steps with project development are to set goals and create a comprehensive project plan. The graphic below provides an overview of the process flow for a typical energy efficiency or renewable energy project. We recommend implementing as many ECMs as possible prior to undertaking a feasibility study for a renewable project. The cyclical nature of this process flow demonstrates the ongoing work required to continually improve building energy efficiency over time. If your building(s) scope of work is relatively simple to implement or small in scope, the measurement and verification (M&V) step may not be required. It should be noted through a typical project cycle, there will be changes in costs based on specific scopes of work, contractor selections, design considerations, construction, etc. The estimated costs provided throughout this LGEA report demonstrate the unburdened turn-key material and labor cost only. There will be contingencies and additional costs at the time of implementation. We recommend comprehensive project planning that includes the review of multiple bids for project work, incorporates potential operations and maintenance (O&M) cost savings, and maximizes your incentive potential.



*Project Development Cycle*

## 11 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

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### 11.1 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. 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<sup>13</sup>.

### 11.2 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 fluctuate monthly. The utility provides basic gas supply service 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<sup>14</sup>.

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<sup>13</sup> [www.state.nj.us/bpu/commercial/shopping.html](http://www.state.nj.us/bpu/commercial/shopping.html)

<sup>14</sup> [www.state.nj.us/bpu/commercial/shopping.html](http://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	Estimated M&L Cost (\$)	Total Incentives	Simple Payback w/ Incentives in Years	
Attic - Lake Marcia Bathhouse	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	45		None	No	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	45	0.0	0	0	\$0	\$0	\$0	0.0	
Boiler Room - Lake Marcia Bathhouse	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	200	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	138	0.0	4	0	\$1	\$150	\$20	178.2	
Boiler Room - Lake Marcia Bathhouse	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	200	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	200	0.0	7	0	\$1	\$50	\$10	29.9	
Breezeway - Lake Marcia Bathhouse	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0	
Breezeway - Lake Marcia Bathhouse	8	High-Pressure Sodium: (1) 50W Lamp	Timeclock	S	66	2,500	1	Fixture Replacement	No	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	15	2,500	0.4	1,102	0	\$207	\$1,720	\$400	6.4	
Corridor Lifeguard - Lake Marcia Bathhouse	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	
Corridor Lifeguard - Lake Marcia Bathhouse	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	1,500	5	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,035	0.0	58	0	\$11	\$280	\$140	12.8	
Corridor Lifeguard Storage Room 1 - Lake Marcia Bathhouse	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	20	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	20	0.0	1	0	\$0	\$50	\$10	298.7	
Corridor Lifeguard Storage Room 2 - Lake Marcia Bathhouse	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	20	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	20	0.0	1	0	\$0	\$50	\$10	298.7	
Employee Men's Restroom - Lake Marcia Bathhouse	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	50		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	50	0.0	0	0	\$0	\$0	\$0	0.0	
Employee Women's Restroom - Lake Marcia Bathhouse	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	50		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	50	0.0	0	0	\$0	\$0	\$0	0.0	
Exterior Halogen - Lake Marcia Bathhouse	6	Halogen Incandescent: (1) 35W Plug-in Lamps	Timeclock		35	2,800	3	Relamp	No	6	LED Lamps: (1) 6W Plug-In Lamp	Timeclock	6	2,800	0.0	487	0	\$97	\$610	\$0	6.3	
HPS Lamps - Lake Marcia Bathhouse	3	High-Pressure Sodium: (1) 35W Lamp	Timeclock	S	46	2,500	1	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	15	2,500	0.1	251	0	\$47	\$640	\$150	10.4	
Exterior LED - Lake Marcia Bathhouse	10	LED - Fixtures: Wall Pack	Timeclock		35	2,800		None	No	10	LED - Fixtures: Wall Pack	Timeclock	35	2,800	0.0	0	0	\$0	\$0	\$0	0.0	
Kitchen - Lake Marcia Bathhouse	6	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	1,000	4	None	Yes	6	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	690	0.0	20	0	\$4	\$330	\$40	76.8	
Kitchen - Lake Marcia Bathhouse	11	LED - Fixtures: Downlight Recessed	Wall Switch	S	10	1,000	4	None	Yes	11	LED - Fixtures: Downlight Recessed	Occupancy Sensor	10	690	0.0	37	0	\$7	\$330	\$40	41.9	
Kitchen Storage Room - Lake Marcia Bathhouse	4	LED - Fixtures: Downlight Recessed	Wall Switch	S	10	1,000		None	No	4	LED - Fixtures: Downlight Recessed	Wall Switch	10	1,000	0.0	0	0	\$0	\$0	\$0	0.0	
Lifeguard First Aid Room - Lake Marcia Bathhouse	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	1,500	4	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,035	0.0	44	0	\$8	\$330	\$40	35.3	
Lifeguard Room - Lake Marcia Bathhouse	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	1,500	4	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,035	0.0	44	0	\$8	\$330	\$40	35.3	
Lobby - Lake Marcia Bathhouse	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0	
Lobby - Lake Marcia Bathhouse	12	LED Lamps: (1) 25W BR30 Screw-In Lamp	Wall Switch	S	25	1,000	5	None	Yes	12	LED Lamps: (1) 25W BR30 Screw-In Lamp	High/Low Control	25	690	0.1	100	0	\$19	\$560	\$420	7.4	
Men's Restroom - Lake Marcia Bathhouse	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	
Men's Restroom - Lake Marcia Bathhouse	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	1,600	4	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	186	0	\$35	\$330	\$40	8.3	
Men's Restroom Side Access Room - Lake Marcia Bathhouse	2	Compact Fluorescent: (1) 26W A19 Screw-In Lamp	Wall Switch	S	26	20	3, 4	Relamp	Yes	2	LED Lamps: A19 Lamps	Occupancy Sensor	19	14	0.0	1	0	\$0	\$200	\$20	1,720.4	
Men's Restroom Side Access Room - Lake Marcia Bathhouse	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	20		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	20	0.0	0	0	\$0	\$0	\$0	0.0	



	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	Estimated M&L Cost (\$)	Total Incentives	Simple Payback w/ Incentives in Years
Women's Restroom - Lake Marcia Bathhouse	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
Women's Restroom - Lake Marcia Bathhouse	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	1,600	4	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,104	0.1	186	0	\$35	\$330	\$40	8.3
Women's Restroom Side Access Room - Lake Marcia Bathhouse	2	Compact Fluorescent: (1) 26W A19 Screw-In Lamp	Wall Switch	S	26	20	3, 4	Relamp	Yes	2	LED Lamps: A19 Lamps	Occupancy Sensor	19	14	0.0	1	0	\$0	\$200	\$20	1,720.4
Women's Restroom Side Access Room - Lake Marcia Bathhouse	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	20		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	20	0.0	0	0	\$0	\$0	\$0	0.0
Exterior LED - Lark Marcia Beach Parking Lot Restroom	1	LED Lamps: (2) 10W BR30 Screw-In Lamps	Photocell		20	4,380		None	No	1	LED Lamps: (2) 10W BR30 Screw-In Lamps	Photocell	20	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Exterior LED - Lark Marcia Beach Parking Lot Restroom	2	LED - Fixtures: Downlight Recessed	Timeclock		10	4,380		None	No	2	LED - Fixtures: Downlight Recessed	Timeclock	10	4,380	0.0	0	0	\$0	\$0	\$0	0.0
Restroom 1 - Lark Marcia Beach Parking Lot Restroom	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,760		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Restroom 2 - Lark Marcia Beach Parking Lot Restroom	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,760		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,760	0.0	0	0	\$0	\$0	\$0	0.0
Pump Room - Lake Marcia Pumphouse	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	100	2	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	100	0.1	13	0	\$2	\$180	\$20	66.8



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?	Manufacturer	Model	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	Estimated M&L Cost (\$)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen - Lake Marcia Bathhouse	Kitchen Hood Exhaust Fan	1	Kitchen Hood Exhaust Fan	1.00	85.5%	No			W	700		No	85.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Men's Restroom - Lake Marcia Bathhouse	Restroom Exhaust Fan	1	Exhaust Fan	0.25	65.0%	No			W	1,200		No	65.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Women's Restroom - Lake Marcia Bathhouse	Restroom Exhaust Fan	1	Exhaust Fan	0.25	65.0%	No			W	1,200		No	65.0%	No		0.0	0	0	\$0	\$0	\$0	0.0
Pump Room - Lake Marcia Pumphouse	Well Water Pump	1	Water Supply Pump	5.00	87.5%	No	Goulds Pumps	25GS50432	B	370		No	87.5%	No		0.0	0	0	\$0	\$0	\$0	0.0
Pump Room - Lake Marcia Pumphouse	Chemical Pump	1	Other	0.10	65.0%	No	LMI	PD751-A30HI	W	150		No	65.0%	No		0.0	0	0	\$0	\$0	\$0	0.0

Packaged 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)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	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/IEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost (\$)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room - Lake Marcia Bathhouse	Furnace	1	Forced Air Furnace		93.60		0.78 AFUE	Trane	TUD120C960A1	B	6	Yes	1	Forced Air Furnace		93.60		0.97 AFUE	0.0	0	18	\$451	\$3,600	\$500	6.9
Lifeguard First Aid Room - Lake Marcia Bathhouse	Window AC Unit	1	Window AC	0.50		11.00		Toshiba	RAC-WK0612CRRU	W		No							0.0	0	0	\$0	\$0	\$0	0.0
Restroom 1 - Lark Marcia Beach Parking Lot Restroom	Electric Resistance Heat	1	Electric Resistance Heat		10.23		1 COP			W		No							0.0	0	0	\$0	\$0	\$0	0.0
Restroom 2 - Lark Marcia Beach Parking Lot Restroom	Electric Resistance Heat	1	Electric Resistance Heat		10.23		1 COP			W		No							0.0	0	0	\$0	\$0	\$0	0.0
Pump Room - Lake Marcia Pumphouse	Electric Resistance Heat	1	Electric Resistance Heat		5.11		1 COP			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	Manufacturer	Model	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	Estimated M&L Cost (\$)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room - Lake Marcia Bathhouse	DHW Tank	1	Storage Tank Water Heater (> 50 Gal)	A.O. Smith	BTH-500A 301	W		No						0.0	0	0	\$0	\$0	\$0	0.0
Boiler Room - Lake Marcia Bathhouse	DHW Tank	1	Storage Tank Water Heater (> 50 Gal)	Bradford White	RG255H6X	W		No						0.0	0	0	\$0	\$0	\$0	0.0

Low-Flow Device Recommendations

		Recommendation Inputs				Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost (\$)	Total Incentives	Simple Payback w/ Incentives in Years
Lake Marcia Bathhouse	7	4	Faucet Aerator (Kitchen)	1.80	1.50	0.0	0	0	\$9	\$30	\$10	2.3
Lake Marcia Bathhouse	7	10	Faucet Aerator (Lavatory)	1.80	0.50	0.0	0	4	\$93	\$80	\$40	0.4

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	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	Estimated M&L Cost (\$)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen - Lake Marcia Bathhouse	1	Freezer Chest	Danby		No	8	Yes	0.3	1,355	0	\$269	\$2,200	\$0	8.2
Kitchen Storage Room - Lake Marcia Bathhouse	1	Freezer Chest	Electrolux	LFFC1466DW4	No	8	Yes	0.3	1,355	0	\$269	\$2,200	\$0	8.2
Kitchen - Lake Marcia Bathhouse	1	Stand-Up Freezer, Solid Door (16 - 30 cu. ft.)	Electrolux	FCRS181RQBB	Yes		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen - Lake Marcia Bathhouse	1	Stand-Up Freezer, Solid Door (31 - 50 cu. ft.)	Artic Air	AF49EZ	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen - Lake Marcia Bathhouse	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Artic Air	AR49E	Yes		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	Manufacturer	Model	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	Estimated M&L Cost (\$)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen - Lake Marcia Bathhouse	1	Ice Making Head (<450 lbs/day), Continuous	Hoshizaki America Inc		No		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	Manufacturer	Model	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	Estimated M&L Cost (\$)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen - Lake Marcia Bathhouse	1	Gas Fryer	Black Diamond	BDCTF-60/LPG	No		No	0.0	0	0	\$0	\$0	\$0	0.0
Kitchen - Lake Marcia Bathhouse	1	Gas Griddle (4 Feet Width)	Star Max		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 ?	Manufacturer	Model
Lake Marcia Bathhouse	1	Coffee Machine	900	No		
Lake Marcia Bathhouse	2	Fan	25	No		
Lake Marcia Bathhouse	2	Microwave	1,000	No		
Lake Marcia Bathhouse	1	Refrigerator (Residential)	220	No		
Lake Marcia Bathhouse	1	Water Cooler	500	No		
Lark Marcia Beach Parking Lot Restroom	2	Hand Dryer	1,850	No		

## APPENDIX B: ENERGY STAR STATEMENT OF ENERGY PERFORMANCE

Energy use intensity (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.

NJCEP uses the EPA's ENERGY STAR Portfolio Manager system to generate baseline energy usage results and comparable building EUIs. Combined reports will be evaluated based on the entire High Point state park EUI scores. Portfolio Manager is specifically designed for benchmarking energy consumption within a building. NJCEP is unable to provide an ENERGY STAR Statement of Energy Performance (SEP) for these facilities due to their building type. Site utility bills have been entered into Portfolio Manager. We encourage you to keep the utility bills updated monthly within Portfolio Manager for energy and cost savings purposes.



### ENERGY STAR® Statement of Energy Performance

# N/A

**ENERGY STAR® Score<sup>1</sup>**

**DEP - High Point State Park (HPSP Campus)**

Primary Property Type: Other - Public Services  
 Gross Floor Area (ft²): 44,105  
 Built: 1940

For Year Ending: February 28, 2023  
 Date Generated: April 29, 2024

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			
<b>Property Address</b> DEP - High Point State Park (HPSP Campus) 1480 State Route 23 Wantage, New Jersey 07461	<b>Property Owner</b> State of New Jersey 428 East State Street Trenton, NJ 08625 (609) 940-4129	<b>Primary Contact</b> New Jersey Board of Public Utilities State Energy Services 44 South Clinton Ave Trenton, NJ 08625 6096339866 BPU.EnergyServices@bpu.nj.gov	
Property ID: 28480750			

Energy Consumption and Energy Use Intensity (EUI)			
<b>Site EUI</b>	<b>Annual Energy by Fuel</b>	<b>National Median Comparison</b>	
68.7 kBtu/ft²	Electric - Grid (kBtu)	790,514 (26%)	National Median Site EUI (kBtu/ft²)
	Propane (kBtu)	1,225,164 (40%)	National Median Source EUI (kBtu/ft²)
	Fuel Oil (No. 2) (kBtu)	1,014,203 (34%)	% Diff from National Median Source EUI
<b>Source EUI</b>	<b>Annual Emissions</b>		
101.5 kBtu/ft²	Total (Location-Based) GHG Emissions (Metric Tons CO2e/year)		
			225

**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)

## APPENDIX C: GLOSSARY

TERM	DEFINITION
<b>Blended Rate</b>	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.
<b>Btu</b>	<i>British thermal unit</i> : a unit of energy equal to the amount of heat required to increase the temperature of one pound of water by one-degree Fahrenheit.
<b>CHP</b>	<i>Combined heat and power</i> . Also referred to as cogeneration.
<b>COP</b>	<i>Coefficient of performance</i> : a measure of efficiency in terms of useful energy delivered divided by total energy input.
<b>Demand Response</b>	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.
<b>DCV</b>	<i>Demand control ventilation</i> : a control strategy to limit the amount of outside air introduced to the conditioned space based on actual occupancy need.
<b>US DOE</b>	<i>United States Department of Energy</i>
<b>EC Motor</b>	<i>Electronically commutated motor</i>
<b>ECM</b>	<i>Energy conservation measure</i>
<b>EER</b>	<i>Energy efficiency ratio</i> : a measure of efficiency in terms of cooling energy provided divided by electric input.
<b>EUI</b>	<i>Energy Use Intensity</i> : measures energy consumption per square foot and is a standard metric for comparing buildings' energy performance.
<b>Energy Efficiency</b>	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.
<b>ENERGY STAR</b>	ENERGY STAR is the government-backed symbol for energy efficiency. The ENERGY STAR program is managed by the EPA.
<b>EPA</b>	<i>United States Environmental Protection Agency</i>
<b>Generation</b>	The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil).
<b>GHG</b>	<i>Greenhouse gas</i> 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.
<b>gpf</b>	<i>Gallons per flush</i>

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

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