Local Government Energy Audit Report

Bergen Performing Arts Center (PAC) - Theater

August 12, 2019

Prepared for:

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Disclaimer

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information about financial incentives that may be available. Most energy conservation measures 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 Energy Services (TRC) reviewed the energy conservation measures and estimates of energy savings were reviewed for technical accuracy. Actual, achieved energy savings depend on behavioral factors and other uncontrollable variables and, therefore, estimates of final energy savings are not guaranteed. TRC and the New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. We encourage the owner of the facility to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on individual measures and conditions. TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

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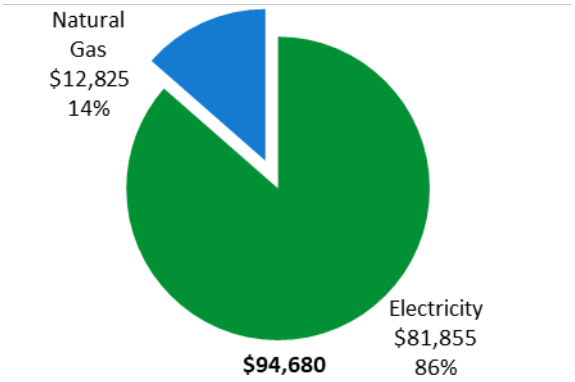
1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Bergen PAC-Theater. 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 Energy Services (TRC) conducted this study as part of a comprehensive effort to assist New Jersey school districts and local governments in controlling their energy costs and to help protect our environment by reducing statewide energy consumption.

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $94,680 Electricity: 524,416 kWh Natural Gas: 12,962 Therms	
ENERGY STAR® Benchmarking Score	N/A *(1-100 scale)*	A standard energy use benchmark is not available for this facility type. This report contains suggestions about how to improve building performance and reduce energy costs.

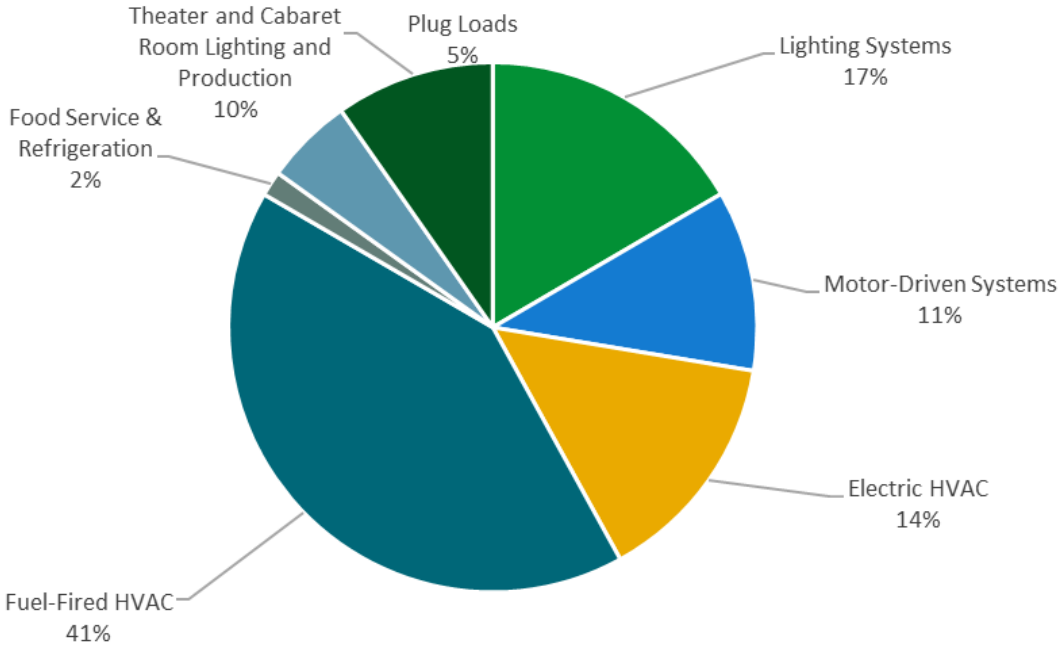


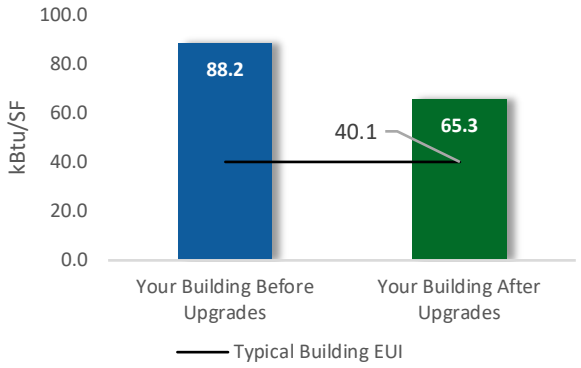
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

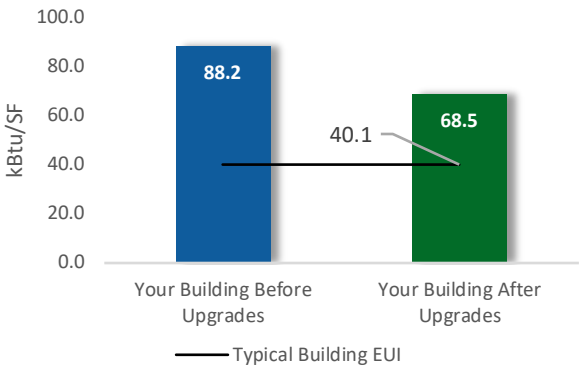
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$372,702
Potential Rebates & Incentives[1]	$19,922
Annual Cost Savings	$29,874
Annual Energy Savings	Electricity: 179,450 kWh Natural Gas: 1,884 Therms
Greenhouse Gas Emission Savings	101 Tons
Simple Payback	11.8 Years
Site Energy Savings (all utilities)	26%



Scenario 2: Cost Effective Package[2]

Installation Cost	$259,373
Potential Rebates & Incentives	$13,260
Annual Cost Savings	$27,416
Annual Energy Savings	Electricity: 168,529 kWh Natural Gas: 1,123 Therms
Greenhouse Gas Emission Savings	91 Tons
Simple Payback	9.0 Years
Site Energy Savings (all utilities)	22%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

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

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

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Lifetime Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**108,363**	**114.7**	**-7**	**$16,850**	**$252,744**	**$206,014**	**$8,115**	**$197,899**	**11.7**	**108,357**
ECM 1	Install LED Fixtures	2,754	0.5	0	$430	$6,447	$6,400	$1,600	$4,800	11.2	2,773
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	25,398	11.2	-5	$3,911	$58,662	$17,519	$2,468	$15,051	3.8	24,942
ECM 3	Retrofit Fixtures with LED Lamps	80,211	103.0	-1	$12,509	$187,635	$182,094	$4,047	$178,047	14.2	80,642
Lighting Control Measures		**4,265**	**1.7**	**-1**	**$657**	**$5,254**	**$9,094**	**$705**	**$8,389**	**12.8**	**4,189**
ECM 4	Install Occupancy Sensor Lighting Controls	3,825	1.5	-1	$589	$4,712	$7,294	$705	$6,589	11.2	3,757
ECM 5	Install High/Low Lighting Controls	440	0.2	0	$68	$542	$1,800	$0	$1,800	26.6	432
Variable Frequency Drive (VFD) Measures		**49,187**	**16.6**	**0**	**$7,677**	**$115,161**	**$45,248**	**$4,440**	**$40,808**	**5.3**	**49,531**
ECM 6	Install VFDs on Constant Volume (CV) Fans	46,905	16.0	0	$7,321	$109,818	$38,726	$4,440	$34,286	4.7	47,233
ECM 7	Install VFDs on Heating Water Pumps	2,282	0.6	0	$356	$5,343	$6,522	$0	$6,522	18.3	2,298
Electric Unitary HVAC Measures		**8,199**	**6.7**	**0**	**$1,280**	**$19,196**	**$64,624**	**$3,512**	**$61,112**	**47.8**	**8,256**
ECM 8	Install High Efficiency Air Conditioning Units	8,199	6.7	0	$1,280	$19,196	$64,624	$3,512	$61,112	47.8	8,256
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**76**	**$754**	**$15,088**	**$40,383**	**$3,150**	**$37,233**	**49.4**	**8,927**
ECM 9	Install High Efficiency Hot Water Boilers	0	0.0	76	$754	$15,088	$40,383	$3,150	$37,233	49.4	8,927
HVAC System Improvements		**8,602**	**0.0**	**120**	**$2,526**	**$27,790**	**$7,125**	**$0**	**$7,125**	**2.8**	**22,669**
ECM 10	Install Programmable Thermostats	8,602	0.0	29	$1,633	$17,968	$6,597	$0	$6,597	4.0	12,102
ECM 11	Install Pipe Insulation	0	0.0	90	$893	$9,822	$527	$0	$527	0.6	10,566
Domestic Water Heating Upgrade		**834**	**0.0**	**0**	**$130**	**$1,302**	**$215**	**$0**	**$215**	**1.7**	**840**
ECM 12	Install Low-Flow DHW Devices	834	0.0	0	$130	$1,302	$215	$0	$215	1.7	840
TOTALS (COST EFFECTIVE MEASURES)		**168,529**	**132.3**	**112**	**$27,416**	**$396,366**	**$259,373**	**$13,260**	**$246,113**	**9.0**	**182,855**
TOTALS (ALL MEASURES)		**179,450**	**139.7**	**188**	**$29,874**	**$436,536**	**$372,702**	**$19,922**	**$352,781**	**11.8**	**202,769**

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

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

Energy Conservation Measure		SmartStart	Direct Install	Pay For Performance
ECM 1	Install LED Fixtures	x		x
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		x
ECM 3	Retrofit Fixtures with LED Lamps	x		x
ECM 4	Install Occupancy Sensor Lighting Controls	x		x
ECM 5	Install High/Low Lighting Controls			x
ECM 6	Install VFDs on Constant Volume (CV) HVAC	x		x
ECM 7	Install VFDs on Hot Water Pumps			x
ECM 8	Install High Efficiency Electric AC	x		x
ECM 9	Install High Efficiency Hot Water Boilers	x		x
ECM 10	Install Programmable Thermostats			x
ECM 11	Install Pipe Insulation			x
ECM 12	Install Low-Flow Domestic Hot Water Devices			x

Figure 3 – Funding Options

New Jersey Clean Energy Programs At-A-Glance

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

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

Individual Measures with SmartStart

For facilities wishing to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation.

Turnkey Installation with Direct Install

The Direct Install program provides turnkey installation of multiple measures through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70% of the cost of selected measures. Direct Install contractors will assess and verify individual measure eligibility and, in most cases, they perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

Whole Building Approach with Pay for Performance

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

More Options from Around the State

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

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the ESIP. Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. You have already taken the first step as an LGEA customer, because this report is required to participate in ESIP.

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

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

Ongoing Electric Savings with Demand Response

The Demand Response Energy Aggregator program reduces electric loads at commercial facilities when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. By enabling commercial facilities to reduce electric demand during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment service providers provide regular payments to medium and large consumers of electric power for their participation in demand response (DR) programs. Program participation is voluntary, and facilities receive payments regardless of whether they are called upon to curtail their load during times of peak demand.

2 EXISTING CONDITIONS

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

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

2.1 Site Overview

On May 20, 2019, TRC performed an energy audit at Bergen PAC-Theater located in Englewood, NJ. TRC met with Dan Hayden to review the facility operations and help focus our investigation on specific energy-using systems.

Bergen PAC-Theater is a 3-story, 35,000 square foot building built in 1926. Spaces include: the theater, box office, lobby and bar area, cabaret room, administration offices, gallery, the crew and production area, a multipurpose room, dressing rooms, corridors, stairwells and mechanical space. The facility is 100% heated and cooled. The facility hosts approximately 200 events a year. These include concerts, comedians, and local community events. Over the last five years the facility has been replacing some older inefficient lamps with LED lamps. There are future renovations being scheduled which include upgrades to many areas of the facility. We recommend these upgrades be completed with energy efficiency in mind.

2.2 Building Occupancy

The facility is occupied year-round. Typical weekday occupancy is 25 staff. There is the administration staff who occupy the office areas about 8 hours a day on weekdays. The box office is open every day with extended hours during show days. There are also union and stage head personnel, as well as custodians, who occupy the building on show days. The theater and cabaret room are used for events throughout the year with no regular schedule. On a show day there may be an additional 1,300 occupants who attend the event. The facility can host approximately 150,000 people a year.

Building Name	Weekday/Weekend	Operating Schedule
Box Office	Weekday	11:00 AM - 6:00 PM
	Weekend (Shows)	6:00 PM - 11:00 PM
Administration Offices	Weekday	9:00 AM - 5:00 PM
	Weekend	No Use
Cabaret Room	Weekday	Varies
	Weekend	Varies
Theater	Weekday	Varies
	Weekend	Varies

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block over structural steel with a stone or brick facade. The roof has a flat portion and a pitched portion. The roof is in fair condition. The walls are made of concrete masonry units (CMUs). Most of the windows are double pane and operable with metal frames. The glass-to-frame seals are in fair condition. The operable window weather seals are in fair condition. The exterior doors are double pane glass with metal frames and are in good condition, however they have worn door seals. Degraded window and door seals increase drafts and outside air infiltration.

Building Facade

Entrance Door – Air Gap

2.4 Lighting Systems

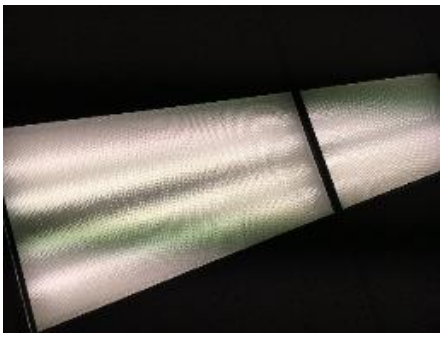
The primary interior lighting system uses 34-Watt U-bend & 40-Watt linear fluorescent T12 lamps. There are also several compact fluorescent lamp (CFL), halogen incandescent, and LED lamp fixtures. Additionally, there are some linear fluorescent T8 lamp fixtures in the box office. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts. Fixture types include decorative fixtures, cove light fixtures, strip fixtures, recessed troffer fixtures, and wall sconce fixtures. Most fixtures are in fair condition. The theater has metal halide spot lights which are rarely used. The theater general lighting includes halogen incandescent mini can lamps and LED candelabra lamps, as well as LED dimmable screw in lamp recessed can fixtures. All exit signs are LED. Interior lighting levels were generally sufficient. Lighting fixtures throughout the building are controlled by wall switches. The theater lighting is controlled by dimmers.

Cabaret Room LED Lighting

Lobby T12 and LED Lighting

Under Bar T12 Lighting

U-lamp T12 Fixture



Linear fluorescent T12 Troffer Fixtures

LED Gallery Track Lighting

8-foot T12 Fixtures in Multipurpose Room

LED Screw in Globe Lamps

LED and Halogen Incandescent Fixtures in Theater

Wall Switches

Exterior fixtures include high pressure sodium lamp wall pack fixtures. There are two that are controlled by photocells and the remainder are controlled by a timeclock. The marquee sign is lit by many halogen incandescent push-in lamps.

Marquee Sign

Wall Pack with Photocell

Wall Pack on Timer

2.5 Air Handling Systems

Packaged Units

The building addition (multipurpose room, dressing rooms, and workshop) is served by packaged roof top units (RTUs). These are in poor condition and were installed in the 1990s. They are controlled by room thermostats. The theater/lobby and back of house are served by two large units, which were installed in 2011 and are in fair condition. They provide cooling only and are manually turned on and off at the breaker. All of these units have constant speed supply fan motors. The RTUs are summarized below:

Location	Area Served	Description	Capacity	Cooling Efficiency (EER)	Remaining Useful Life (B- Beyond, W- Within)
Roof	Building Addition	Packaged AC	7.5 tons	9.0	B
Roof	Theater/Lobby	Packaged AC	50 tons	10.5	W
Addition Roof	Back of House	Packaged AC	50 tons	10.5	W
Addition Roof	2nd & 3rd Floor	Packaged AC with Electric Heat	6.0 tons 32.8 MBH	8.4	B

Refer to Appendix A for detailed information about each unit.

RTU – Building Addition

RTU – 2nd & 3rd Floor Building Addition

RTU – Theater/Lobby

RTU – Back of House

The ductwork may not be insulated, this could not be verified on site. If this ductwork is not insulated, we recommend installing duct insulation to mitigate the heat gain during the summer months when these RTUs are in cooling mode.

Breaker – Theater/Lobby

Breaker – Back of House

Air Conditioners

The administration office, cabaret room, box office, and spot light booth are served by split air conditioning (AC) systems. Equipment was installed 15 to 20 years ago and vary in condition. They are controlled by room thermostats and are summarized in the following table:

Location	Area Served	Description	Capacity	Cooling Efficiency (EER)	Remaining Useful Life (B- Beyond, W- Within)
Roof	Administration Office	Split-System AC	10 tons	9.0	B
Roof	Cabaret Room	Split-System AC	5 tons	9.0	B
Roof	Box Office	Split-System AC	5 tons	11.2	B
Spot Light Booth	Spot Light Booth	Split-System AC	6 tons	9.5	B

Indoor Unit – Admin Offices

Outdoor Condensing Unit

Ductless Split AC Indoor Unit

Outdoor Condensing Unit

Outdoor Condensing Unit in Poor Condition

Manual Dial Thermostat

2.6 Heating Hot Water System

Six Slant Fin Cast Iron 300 Mbh non-condensing hot water boilers serve the building heating load. They were installed in 1987 and are in fair condition. The burners are non-modulating with a nominal efficiency of 80%. The boilers are configured in an automated control scheme. Three of the boilers are required under high load conditions. The hydronic distribution system is a 2-pipe, heating only system. The pipes in the basement are uninsulated.

The boilers are configured in a constant flow primary distribution with two 2.0 hp constant speed hot water pumps operating with a lead-lag control scheme. The boilers provide hot water to fin tube radiators and cast-iron radiators throughout the building. There are two ¼ hp constant speed hot water pumps which provide water to the cast iron radiators at the back of the stage.

The hot water system temperature controls are unknown. They likely operate based on an outdoor air reset temperature. Without the knowledge of supply water and return water temperatures, the replacement recommendation is limited to high efficiency non-condensing hot water boilers. We recommend further investigation of the boiler controls and operations.

Hot Water Boilers

Hot Water Boilers

Hot Water Pumps

Uninsulated Piping

Manual Dial Thermostats

Lead Lag Controls in Boiler Room

Hot Water Baseboard Heat in Offices

Hot Water Radiators on Stage

2.7 Domestic Hot Water

Hot water is produced with a few electric storage tank water heaters and an instantaneous electric water heater. They serve the sink aerators and showerheads throughout the building. These are summarized below:

Quantity	Area Served	Description	Electric Heating Capacity per Unit	Tank Capacity per Unit	Remaining Useful Life (B- Beyond, W- Within)
1	Domestic Hot Water - Lobby Restrooms	Storage Tank Water Heater (≤ 50 Gal)	5 kW	10 Gal	W
2	2nd Floor Office Restrooms	Storage Tank Water Heater (≤ 50 Gal)	1.5 kW	3 Gal	W
1	Crew and Production Restrooms	Storage Tank Water Heater (> 50 Gal)	4.5 kW	120 Gal	W
1	Dressing Room Restrooms	Storage Tank Water Heater (≤ 50 Gal)	5 kW	10 Gal	W
1	Cabaret Room Restrooms	Tankless Water Heater	4.1 kW	N/A	W

Electric Storage Tank Water Heaters

Electric Storage Tank Water Heater

Instantaneous Electric Water Heater

High Flow Sink Aerator

2.8 Refrigeration

The facility has several stand-up refrigerators and freezers with either solid or glass doors. There is also a new energy efficient ice maker. Equipment varies in efficiency and condition.

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

Glass Door Refrigerators

Undercounter Refrigerators

Wine Cooler

Ice Maker in Closet near Bar

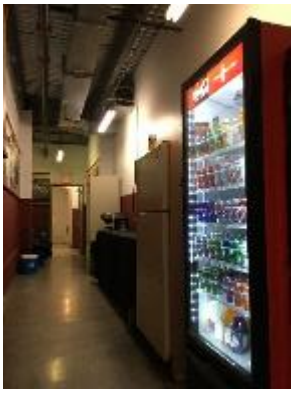
2.9 Theater Production Equipment and Plug Load

The utility bill analysis indicates that Theater and Cabaret specialty lighting and production equipment loads consume approximately 10% percent of total building energy use.

Additionally, traditional plug loads consume about 5% of the building energy. For example, there are approximately 26 computer work stations throughout the facility. Plug loads throughout the building include general café, office, and sound equipment. There are several residential style refrigerators and mini fridges throughout the building. These vary in condition and efficiency.

The traditional plug load consumption is higher than a typical building. You may wish to consider paying particular attention to minimizing your plug load usage. This report makes suggestions for ECMs in this area as well as Energy Efficient Best Practices.

General Café Equipment



Residential Fridges

Laundry Machines

Performance Equipment

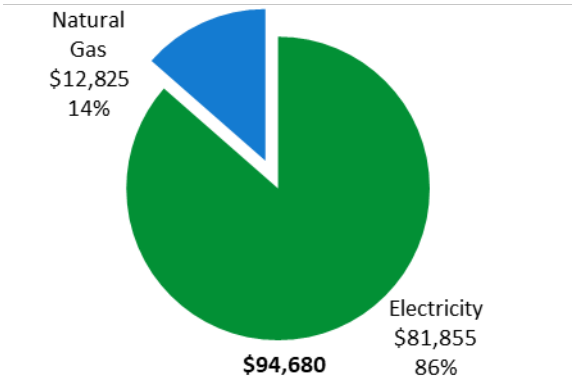
2.10 Water-Using Systems

There are restrooms with toilets, urinals, and sinks. There are a few restrooms with showers. Faucet flow rates are at 2.0 per minute (gpm) or higher. Toilets, urinals, and showerheads vary in flow rates.

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	524,416 kWh	$81,855
Natural Gas	12,962 Therms	$12,825
Total		**$94,680**



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

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

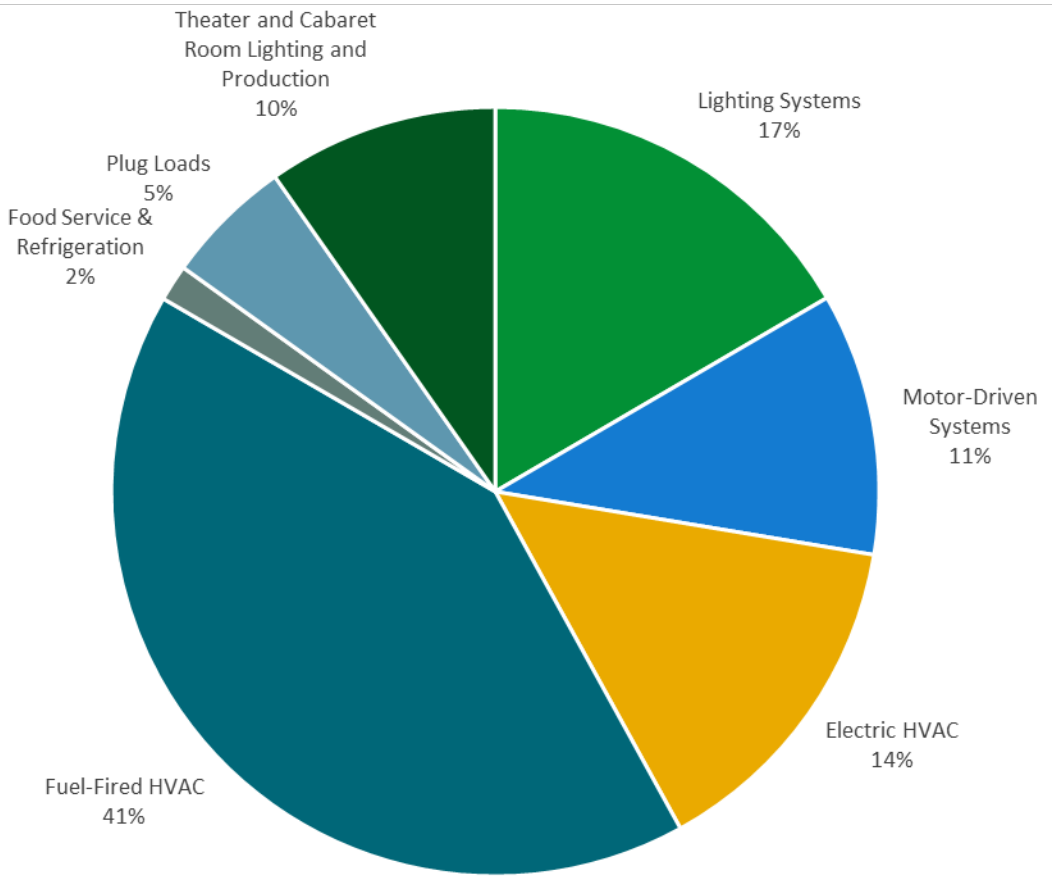
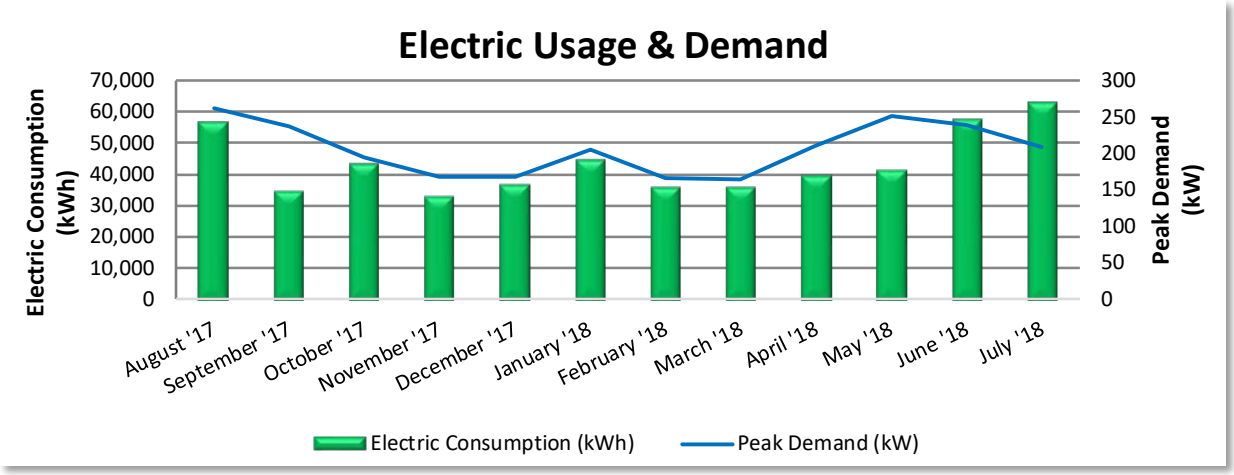


Figure 5 - Energy Balance

3.1 Electricity

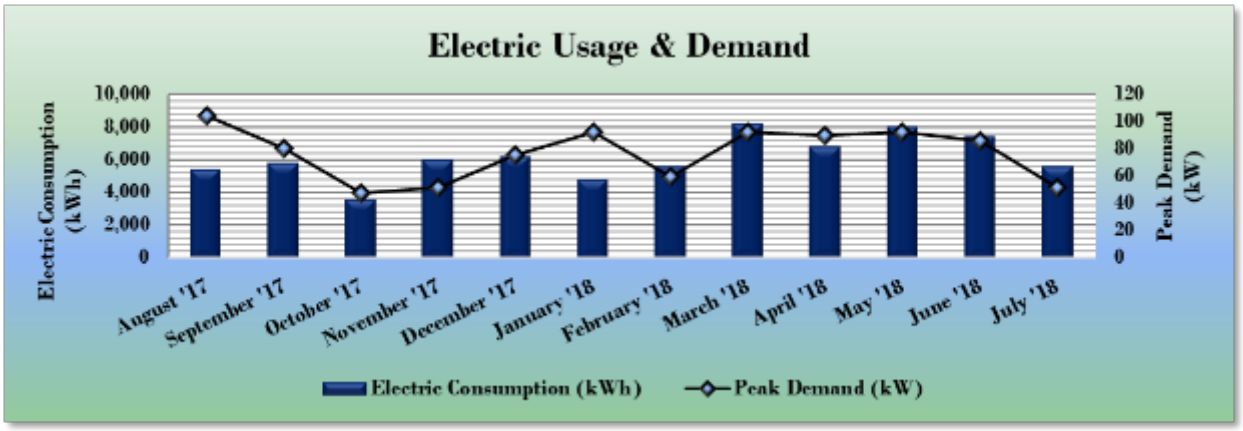
PSE&G supplies and delivers electricity under rate class GLP. Meter #1 & #2 has electric production provided by Life Energy, LLC, a third-party supplier.



Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
8/22/17	29	56,669	261	$1,942	$9,583	Yes
9/21/17	30	34,991	237	$1,641	$5,704	No
10/20/17	29	43,403	195	$692	$7,083	No
11/20/17	31	33,345	168	$692	$5,101	No
12/21/17	31	37,076	168	$706	$5,673	No
1/23/18	33	44,617	206	$861	$6,794	No
2/22/18	30	36,222	167	$686	$5,544	No
3/23/18	29	35,967	164	$704	$5,512	No
4/26/18	34	39,688	211	$843	$4,046	No
5/23/18	27	41,649	251	$975	$6,212	No
6/22/18	30	57,819	239	$2,814	$10,146	No
7/24/18	32	62,970	209	$2,441	$10,456	No
Totals	**365**	**524,416**	**261**	**$14,997**	**$81,855**	
Annual	**365**	**524,416**	**261**	**$14,997**	**$81,855**	

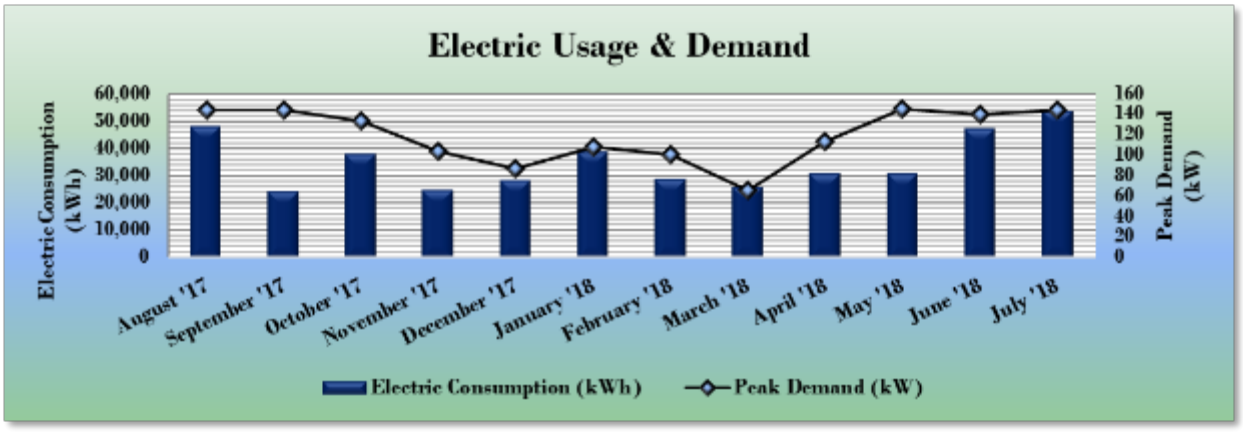
Notes:

- Peak demand of 261 kW occurred in August '17.
- The average electric cost over the past 12 months was $0.156/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.
- The increased electric use in the summer months is indicative of cooling energy use
- The slight increase in electric use in the winter months is indicative of electric heating
- See following graphs depicting usage by electrical meter



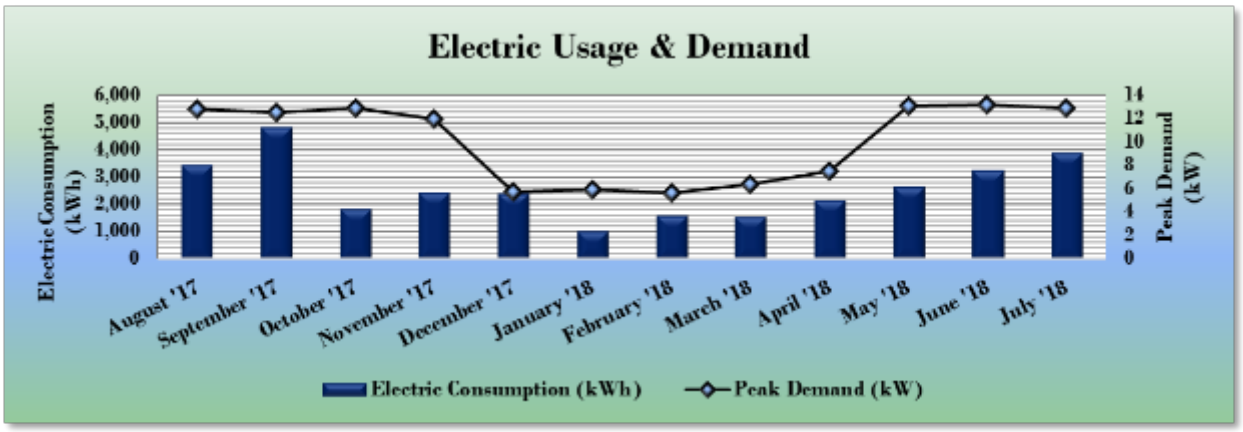
Electric Meter #1

This meter serves the additional lighting and production for the cabaret room



Electric Meter #2

This meter serves most of the facility (excluding the theater)

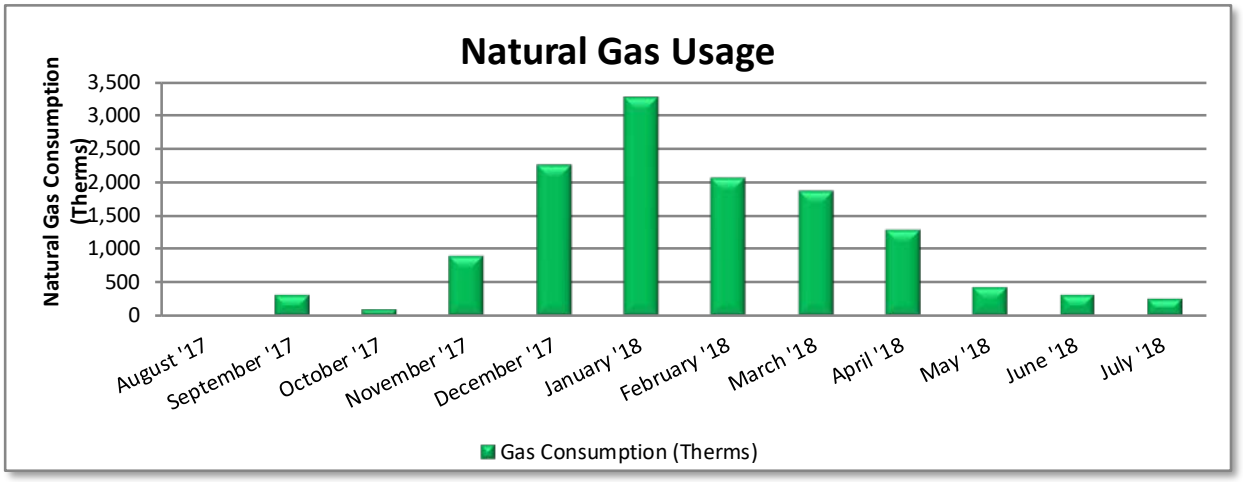


Electric Meter #3

This meter is for all the lights and production of the theater including the house lights and stage works

3.2 Natural Gas

PSE&G supplies and delivers natural gas under rate class LVG.



Gas Billing Data				
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**	**TRC Estimated Usage?**
8/22/17	29	0	$107	No
9/21/17	30	303	$297	No
10/20/17	29	87	$269	No
11/20/17	31	880	$1,112	No
12/21/17	31	2,240	$2,140	No
1/23/18	33	3,266	$3,129	Yes
2/23/18	31	2,050	$2,037	Yes
3/23/18	28	1,861	$1,848	No
4/26/18	34	1,284	$956	No
5/23/18	27	424	$366	No
6/22/18	30	316	$302	No
7/24/18	32	250	$264	No
Totals	**365**	**12,962**	**$12,825**	
Annual	**365**	**12,962**	**$12,825**	

Notes:

- The average gas cost for the past 12 months is $0.989/therm, which is the blended rate used throughout the analysis.
- The gas consumption in the summer months is indicative of excess space heating boiler use, likely due to issues with boiler system controls

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 county, while neutralizing variations due to location, occupancy and operating hours. Some building types can be scored with a 1-100 ranking of a building's energy performance relative to the national building market. A score of 50 represents the national average and a score of 100 is best.

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

Benchmarking Score	**N/A**

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

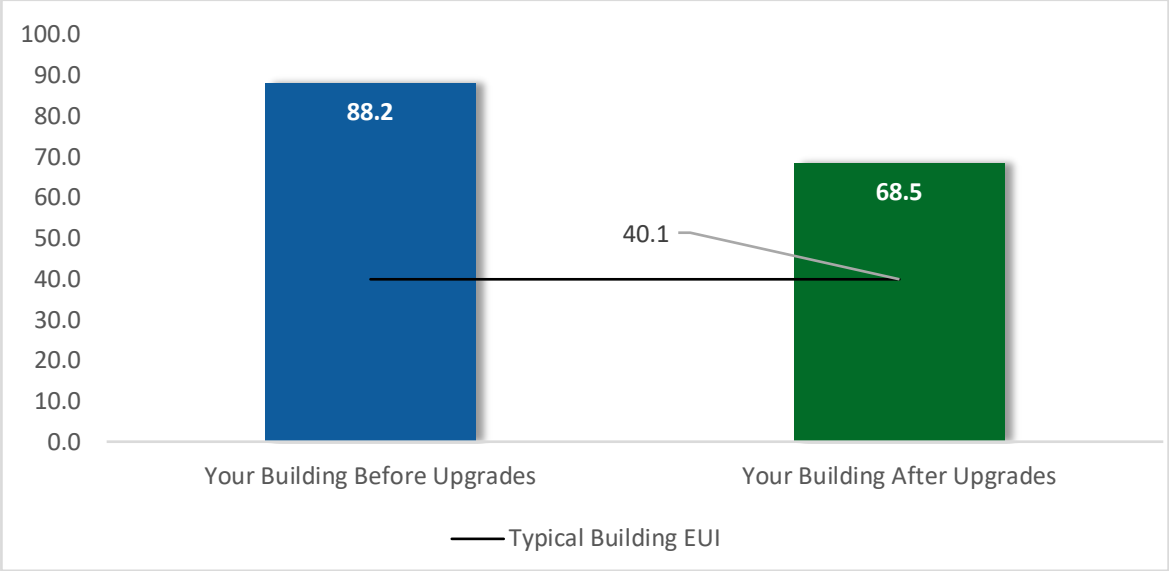


Figure 6 - Energy Use Intensity Comparison

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

Tracking Your Energy Performance

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

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

Free online training is available to help you use ENERGY STAR® Portfolio Manager® to track your building's performance at: https://www.energystar.gov/buildings/training.

For more information on ENERGY STAR® and Portfolio Manager®, visit their website[3].

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

4 ENERGY CONSERVATION MEASURES

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

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

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

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

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

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#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**108,363**	**114.7**	**-7**	**$16,850**	**$206,014**	**$8,115**	**$197,899**	**11.7**	**108,357**
ECM 1	Install LED Fixtures	2,754	0.5	0	$430	$6,400	$1,600	$4,800	11.2	2,773
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	25,398	11.2	-5	$3,911	$17,519	$2,468	$15,051	3.8	24,942
ECM 3	Retrofit Fixtures with LED Lamps	80,211	103.0	-1	$12,509	$182,094	$4,047	$178,047	14.2	80,642
Lighting Control Measures		**4,265**	**1.7**	**-1**	**$657**	**$9,094**	**$705**	**$8,389**	**12.8**	**4,189**
ECM 4	Install Occupancy Sensor Lighting Controls	3,825	1.5	-1	$589	$7,294	$705	$6,589	11.2	3,757
ECM 5	Install High/Low Lighting Controls	440	0.2	0	$68	$1,800	$0	$1,800	26.6	432
Variable Frequency Drive (VFD) Measures		**49,187**	**16.6**	**0**	**$7,677**	**$45,248**	**$4,440**	**$40,808**	**5.3**	**49,531**
ECM 6	Install VFDs on Constant Volume (CV) Fans	46,905	16.0	0	$7,321	$38,726	$4,440	$34,286	4.7	47,233
ECM 7	Install VFDs on Heating Water Pumps	2,282	0.6	0	$356	$6,522	$0	$6,522	18.3	2,298
Electric Unitary HVAC Measures		**8,199**	**6.7**	**0**	**$1,280**	**$64,624**	**$3,512**	**$61,112**	**47.8**	**8,256**
ECM 8	Install High Efficiency Air Conditioning Units	8,199	6.7	0	$1,280	$64,624	$3,512	$61,112	47.8	8,256
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**76**	**$754**	**$40,383**	**$3,150**	**$37,233**	**49.4**	**8,927**
ECM 9	Install High Efficiency Hot Water Boilers	0	0.0	76	$754	$40,383	$3,150	$37,233	49.4	8,927
HVAC System Improvements		**8,602**	**0.0**	**120**	**$2,526**	**$7,125**	**$0**	**$7,125**	**2.8**	**22,669**
ECM 10	Install Programmable Thermostats	8,602	0.0	29	$1,633	$6,597	$0	$6,597	4.0	12,102
ECM 11	Install Pipe Insulation	0	0.0	90	$893	$527	$0	$527	0.6	10,566
Domestic Water Heating Upgrade		**834**	**0.0**	**0**	**$130**	**$215**	**$0**	**$215**	**1.7**	**840**
ECM 12	Install Low-Flow DHW Devices	834	0.0	0	$130	$215	$0	$215	1.7	840
TOTALS		**179,450**	**139.7**	**188**	**$29,874**	**$372,702**	**$19,922**	**$352,781**	**11.8**	**202,769**

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

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

Figure 7 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**108,363**	**114.7**	**-7**	**$16,850**	**$206,014**	**$8,115**	**$197,899**	**11.7**	**108,357**
ECM 1	Install LED Fixtures	2,754	0.5	0	$430	$6,400	$1,600	$4,800	11.2	2,773
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	25,398	11.2	-5	$3,911	$17,519	$2,468	$15,051	3.8	24,942
ECM 3	Retrofit Fixtures with LED Lamps	80,211	103.0	-1	$12,509	$182,094	$4,047	$178,047	14.2	80,642
Lighting Control Measures		**3,825**	**1.5**	**-1**	**$589**	**$7,294**	**$705**	**$6,589**	**11.2**	**3,757**
ECM 4	Install Occupancy Sensor Lighting Controls	3,825	1.5	-1	$589	$7,294	$705	$6,589	11.2	3,757
Variable Frequency Drive (VFD) Measures		**46,905**	**16.0**	**0**	**$7,321**	**$38,726**	**$4,440**	**$34,286**	**4.7**	**47,233**
ECM 6	Install VFDs on Constant Volume (CV) Fans	46,905	16.0	0	$7,321	$38,726	$4,440	$34,286	4.7	47,233
HVAC System Improvements		**8,602**	**0.0**	**120**	**$2,526**	**$7,125**	**$0**	**$7,125**	**2.8**	**22,669**
ECM 10	Install Programmable Thermostats	8,602	0.0	29	$1,633	$6,597	$0	$6,597	4.0	12,102
ECM 11	Install Pipe Insulation	0	0.0	90	$893	$527	$0	$527	0.6	10,566
Domestic Water Heating Upgrade		**834**	**0.0**	**0**	**$130**	**$215**	**$0**	**$215**	**1.7**	**840**
ECM 12	Install Low-Flow DHW Devices	834	0.0	0	$130	$215	$0	$215	1.7	840
TOTALS		**168,529**	**132.3**	**112**	**$27,416**	**$259,373**	**$13,260**	**$246,113**	**9.0**	**182,855**

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

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

Figure 8 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**108,363**	**114.7**	**-7**	**$16,850**	**$206,014**	**$8,115**	**$197,899**	**11.7**	**108,357**
ECM 1	Install LED Fixtures	2,754	0.5	0	$430	$6,400	$1,600	$4,800	11.2	2,773
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	25,398	11.2	-5	$3,911	$17,519	$2,468	$15,051	3.8	24,942
ECM 3	Retrofit Fixtures with LED Lamps	80,211	103.0	-1	$12,509	$182,094	$4,047	$178,047	14.2	80,642

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 are proposed, we suggest converting all of a specific lighting type (e.g. linear fluorescent) to LED lamps to minimize the number of lamp types in use at the facility, which should help reduce future maintenance costs.

ECM 1: Install LED Fixtures

Replace existing fixtures containing HID 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 fixture(s).

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

Affected building areas: exterior fixtures.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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

The measure uses the existing fixture housing but replaces the electric components with more efficient lighting technology which 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: all areas with fluorescent fixtures with T12 tubes.

ECM 3: Retrofit Fixtures with LED Lamps

Replace compact fluorescent, linear fluorescent T8, halogen and incandescent lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as a direct replacement for most other lighting technologies.

This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space. Maintenance savings may also be available, as longer-lasting LEDs lamps will not need to be replaced as often as the existing lamps.

Affected building areas: all areas with compact fluorescent, linear fluorescent T8, halogen and incandescent lamps.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**4,265**	**1.7**	**-1**	**$657**	**$9,094**	**$705**	**$8,389**	**12.8**	**4,189**
ECM 4	Install Occupancy Sensor Lighting Controls	3,825	1.5	-1	$589	$7,294	$705	$6,589	11.2	3,757
ECM 5	Install High/Low Lighting Controls	440	0.2	0	$68	$1,800	$0	$1,800	26.6	432

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

ECM 4: Install Occupancy Sensor Lighting Controls

Install occupancy sensors to control lighting fixtures in areas that are frequently unoccupied, even for short periods. For most spaces, we recommend 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: offices, multipurpose room, dressing rooms, lobby, restrooms, and lounge areas.

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 requirements. 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.

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 taken into account when selecting retrofit lamps and bulbs for the areas proposed for high/low control.

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

Affected building areas: hallways.

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 an occupant approaches.

4.3 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**49,187**	**16.6**	**0**	**$7,677**	**$45,248**	**$4,440**	**$40,808**	**5.3**	**49,531**
ECM 6	Install VFDs on Constant Volume (CV) Fans	46,905	16.0	0	$7,321	$38,726	$4,440	$34,286	4.7	47,233
ECM 7	Install VFDs on Heating Water Pumps	2,282	0.6	0	$356	$6,522	$0	$6,522	18.3	2,298

Variable frequency drives control motors for fans, pumps, and process equipment based on the actual output required of the driven equipment. Energy savings result from more efficient control of motor energy usage when equipment operates at partial load. The magnitude of energy savings depends on the estimated amount of time that the motor would operate at partial load. For equipment with proposed VFDs, we have included replacing the controlled motor with a new motor —unless the existing motor meets or exceeds IHP 2014 standards—to conservatively account for the cost of an inverter duty rated motor.

ECM 6: Install VFDs on Constant Volume (CV) Fans

Install VFDs to control constant volume fan motor speeds. This converts a constant-volume, single-zone air handling system into a variable-air-volume (VAV) system. A separate VFD is usually required to control the return fan motor or dedicated exhaust fan motor, if the air handler has one.

Zone thermostats signal the VFD to adjust fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature.

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coil required to prevent the coil from freezing must be determined during the final project design. The control system programming should maintain the minimum air flow whenever the compressor is operating.

Energy savings result from reducing the fan speed (and power) when conditions allow for reduced air flow.

Affected air handlers: Packaged RTUs and the indoor unit serving the administration offices.

ECM 7: Install VFDs on Heating Water Pumps

We evaluated the installation of variable frequency drives (VFD) to control heating water pumps. Two-way valves must serve the hot water coils and the hot water loop must have a differential pressure sensor installed. If three-way valves or a bypass leg are used in the hot water distribution, they will need to be modified when this measure is implemented. As the hot water valves close, the differential pressure increases and the VFD modulates the pump speed to maintain a differential pressure setpoint.

Energy savings result from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

Installing VFDs for the hot water pump motors has a long payback period and may not be justifiable based simply on energy considerations. This should be evaluated at the time hot water pumps reach the end of their useful life. At that time, we recommend installing premium efficient motors and variable frequency drives.

4.4 Electric Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		**8,199**	**6.7**	**0**	**$1,280**	**$64,624**	**$3,512**	**$61,112**	**47.8**	**8,256**
ECM 8	Install High Efficiency Air Conditioning Units	8,199	6.7	0	$1,280	$64,624	$3,512	$61,112	47.8	8,256

Replacing the AC units and systems has a long payback period and may not be justifiable based simply on energy considerations. However, most of the units at this facility are nearing or have reached the end of their normal useful life. Typically, the marginal cost of purchasing a high efficiency unit can be justified by the marginal savings from the improved efficiency. When the packaged RTUs and split AC systems are eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

ECM 8: Install High Efficiency Air Conditioning Units

We evaluated the replacement of standard efficiency packaged air conditioning units and split AC systems with high efficiency systems. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

4.5 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**76**	**$754**	**$40,383**	**$3,150**	**$37,233**	**49.4**	**8,927**
ECM 9	Install High Efficiency Hot Water Boilers	0	0.0	76	$754	$40,383	$3,150	$37,233	49.4	8,927

ECM 9: Install High Efficiency Hot Water Boilers

We evaluated the replacement of older inefficient hot water boilers with high efficiency hot water boilers. Energy savings results from improved combustion efficiency and reduced standby losses at low loads.

For the purposes of this analysis, we evaluated the replacement of boilers on a one-for-one basis with equipment of the same capacity. We recommend that you work with your mechanical design team to select boilers that are sized appropriately for the heating load at this facility. In many cases installing multiple modular boilers rather than one or two large boilers will result in higher overall plant efficiency while providing additional system redundancy.

This measure assumes the installation of non-condensing hot water boilers with a nominal efficiency of 85%. We recommend that you work with your design team to investigate the potential for condensing hot water boilers. The most notable efficiency improvement is condensing hydronic boilers which can achieve over 90% efficiency under the proper conditions. Condensing hydronic boilers typically operate at efficiencies between 85% and 87% (comparable to other high efficiency boilers) when the return water temperature is above 130°F. The boiler efficiency increases as the return water temperature drops below 130°F. Therefore, condensing hydronic boilers are evaluated when the return water temperature is less than 130°F during most of the operating hours.

Replacing the boilers has a long payback and may not be justifiable based simply on energy considerations. However, the boilers have reached the end of their normal useful life. Typically, the marginal cost of purchasing high efficiency boilers can be justified by the marginal savings from the improved efficiency. When the boiler is eventually replaced, consider purchasing boilers that exceed the minimum efficiency required by building codes. We also recommend working with your mechanical design team to determine whether the heating system can operate with return water temperatures below 130°F, which would allow the use of condensing boilers.

Finally, based on the summer gas use associated with the boiler system, we stress the value of boiler maintenance, especially with respect to controls, including outside air lockouts and temperature resets. We believe a substantial savings can be realized at low cost through the implementation of such measures.

4.6 HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**8,602**	**0.0**	**120**	**$2,526**	**$7,125**	**$0**	**$7,125**	**2.8**	**22,669**
ECM 10	Install Programmable Thermostats	8,602	0.0	29	$1,633	$6,597	$0	$6,597	4.0	12,102
ECM 11	Install Pipe Insulation	0	0.0	90	$893	$527	$0	$527	0.6	10,566

ECM 10: Install Programmable Thermostats

Replace manual thermostats with programmable thermostats which provide energy savings by reducing heating and cooling energy usage when a room is unoccupied. Manual thermostats are generally adjusted to a single heating and cooling setpoint and left at that setting regardless of occupancy and they provide the same level of heating and cooling regardless of whether the space is being used. Programmable thermostats can maintain different temperature settings for different times of day and for different days of the week. By reducing heating temperature setpoints and raising cooling temperature setpoints when spaces are unoccupied, the operation of the HVAC equipment is reduced while maintaining comfortable space temperatures for building usage.

ECM 11: Install Pipe Insulation

Install insulation on heating water system piping. Distribution system losses are dependent on water system temperature, the size of the distribution system, and the level of insulation of the piping. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is exposed to water, when the insulation has been removed from some areas of the pipe, or when valves have not been properly insulated system efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

4.7 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**834**	**0.0**	**0**	**$130**	**$215**	**$0**	**$215**	**1.7**	**840**
ECM 12	Install Low-Flow DHW Devices	834	0.0	0	$130	$215	$0	$215	1.7	840

ECM 12: 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

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.

5 ENERGY EFFICIENT BEST PRACTICES

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

Energy Tracking with ENERGY STAR® Portfolio Manager®

You've heard it before - you can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions.[4] 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.

Doors and Windows

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

Window Treatments/Coverings

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

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.

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

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.

Fans to Reduce Cooling Load

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

Destratification Fans

For areas with high ceilings, destratification fans f air balance the air temperature from floor to ceiling. They help reduce the recovery time needed to warm the space after nightly temperature setbacks and will increase occupants' the comfort level.

Areas with high ceilings require the heating system to heat a larger volume of space than that which is occupied. As the warm air rises, the warmest space is at the ceiling level, rather than floor level. Higher temperatures at the ceiling accelerate heat loss through the roof, which requires additional energy consumption by the heating equipment to compensate for this accelerated heat transfer.

Thermostat Schedules and Temperature Resets

Use thermostat setback temperatures and schedules to reduce heating and cooling energy use during periods of low or no occupancy. Thermostats should be programmed for a setback of 5-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

Economizer Maintenance

Economizers can significantly reduce cooling system load. A malfunctioning economizer can increase the amount of heating and mechanical cooling required by introducing excess amounts of cold or hot outside air. Common economizer malfunctions include broken outdoor thermostat or enthalpy control, or dampers that are stuck or improperly adjusted.

Periodic inspection and maintenance will keep economizers working in sync with the heating and cooling system. This maintenance should be part of annual system maintenance, and it should include proper setting of the outdoor thermostat/enthalpy control, inspection of control and damper operation, lubrication of damper connections, and adjustment of minimum damper position.

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.

HVAC Filter Cleaning and Replacement

Air filters should be checked regularly (often monthly) and cleaned or replaced when appropriate. Air filters reduce indoor air pollution, increase occupant comfort, and help keep equipment operating efficiently. If the building has a building management system, consider installing a differential pressure switch across filters to send an alarm about premature fouling or overdue filter replacement. Over time, filters become less and less effective as particulate buildup increases. Dirty filters also restrict air flow through the air conditioning or heat pump system, which increases the load on the distribution fans.

Duct Sealing

Duct leakage in commercial buildings can account for five to twenty-five percent of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building wasting conditioned air. Eliminating duct leaks can improve ventilation system performance and reduce heating and cooling system operation.

Boiler Maintenance

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

Furnace Maintenance

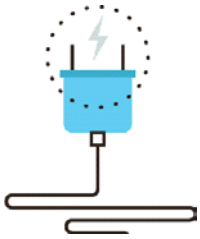
Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should check for gas / carbon monoxide leaks; change the air and fuel filters; check components for cracks, corrosion, dirt, or 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

Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. At least once a year, follow manufacturer instructions to drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Annual checks should include checks for:

- Leaks or heavy corrosion on the pipes and valves.
- Corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot, or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional.
- For electric water heaters, look for signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank.
- For water heaters more than three years old, have a technician inspect the sacrificial anode annually.

Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[5]. Your local utility may offer incentives or rebates for this equipment.

Computer Power Management Software

Many computers consume power during nights, weekends, and holidays. Screen savers are commonly confused as a power management strategy. This contributes to avoidable, excessive electrical energy consumption. There are innovative power management software packages available that are designed to deliver significant energy saving and provide ongoing tracking measurements. A central power management platform helps enforce energy savings policies as well as identify and eliminate underutilized devices

Water Conservation

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

For more information regarding water conservation go to the EPA's WaterSense website[6] or download a copy of EPA's "WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities"[7] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

Water conservation devices that do not reduce hot water consumption will not provide energy savings at the site level, but they may significantly affect your water and sewer usage costs. Any reduction in water use does however ultimately reduce grid-level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users.

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

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

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

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

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

Procurement Strategies

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

6 On-site Generation

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

Preliminary screenings were performed to determine if an on-site generation measure could be a cost-effective solution for your facility. Before deciding to install an on-site generation system, we recommend conducting a feasibility study to analyze existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

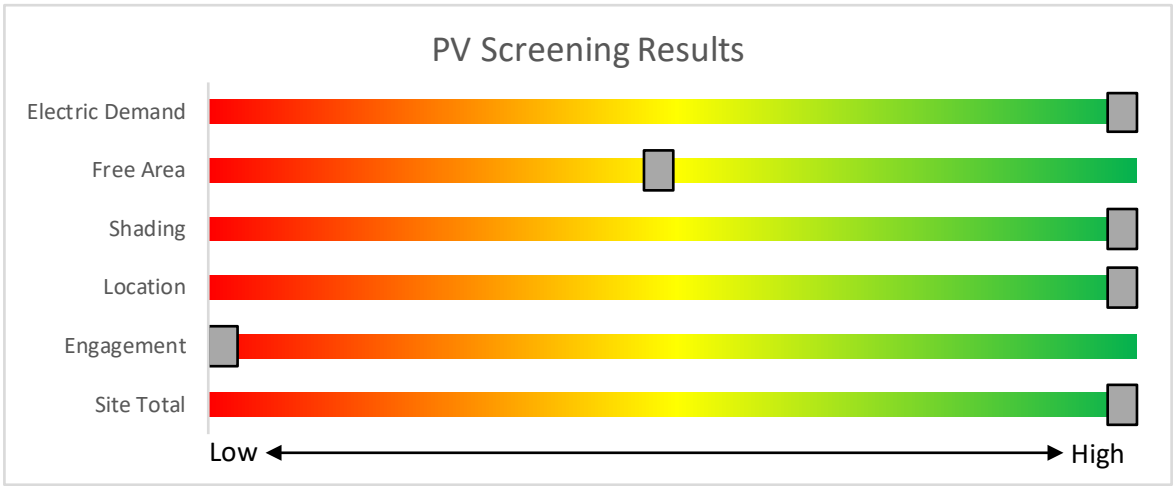
6.1 Solar Photovoltaic

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

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

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

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



Potential	High	
System Potential	90	kW DC STC
Electric Generation	107,224	kWh/yr
Displaced Cost	$16,740	/yr
Installed Cost	$234,000	

Figure 9 - Photovoltaic Screening

Solar Renewable Energy Credit (SREC) Registration Program

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

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

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

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

6.2 Combined Heat and Power

Combined heat and power (CHP) generates electricity at the facility and puts waste heat energy to good use. Common types of CHP systems are reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines.

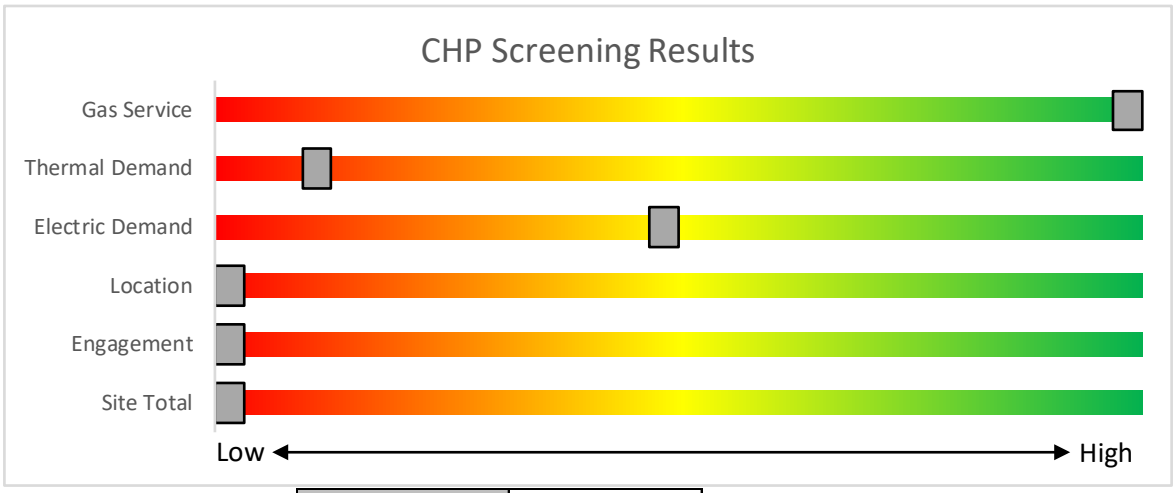
CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be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

The key criteria used for screening is the amount of time that the CHP system would operate at full load and the facility's ability to use the recovered heat. Facilities with a continuous need for large quantities of waste heat are the best candidates for CHP.

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has **no potential** for installing a cost-effective CHP system.

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

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



Potential	None	
System Type	None	
System Potential	20	kW
Electric Generation	32,190	kWh/yr
Thermal Generation	637,893	MBtu/yr
Displaced Cost	$2,691	/yr
Installed Cost	$57,000	

Figure 10 - Combined Heat and Power Screening

7 PROJECT FUNDING AND INCENTIVES

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

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

7.1 SmartStart

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

SmartStart routinely adds, removes, or modifies incentives from year-to-year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

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

Incentives

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

SmartStart Custom provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives. Custom incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings. Incentives are capped at 50% of the total installed incremental project cost, or a project cost buy down to a one-year payback (whichever is less). Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

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

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

7.2 Direct Install

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

Based on the utility information provided, the entire facility does not currently meet the requirements for this program. However, there may be an opportunity to qualify by just considering the meter that serves the main building and implementing projects associated with this portion of electrical loads.

Incentives

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

How to Participate

To participate in Direct Install, you will need to contact the participating contractor assigned to the region of the state where your facility is located. A complete list of Direct Install program partners is provided on the Direct Install website linked below. The contractor will be paid the measure incentives directly by the program which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the program, subject to program caps and eligibility, while the remaining 30% of the cost is paid to the contractor by the customer.

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

7.3 Pay for Performance - Existing Buildings

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

Incentives

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

How to Participate

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

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

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

7.4 Combined Heat and Power

The Combined Heat & Power (CHP) program provides incentives for eligible CHP or

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

The high-level screening results indicated no potential for installing a cost-effective CHP system. The overview of the program and incentives are provided here for demonstration purposes only.

Incentives

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

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

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

How to Participate

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

7.5 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) serves New Jersey's government agencies by financing energy projects. An ESIP is a type of performance contract, whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. Annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive for the life of the contract.

ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs described above can also be used to help further reduce the total project cost of eligible measures.

How to Participate

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

(1) Use an energy services company or "ESCO."

(2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.

(3) Use a hybrid approach of the two options described above where the ESCO is used for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

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

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

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

7.6 SREC Registration Program

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

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

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

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar Renewable Portfolio Standard. Purchasing SRECs can help them meet those requirements. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period fluctuates depending on supply and demand.

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

8 Energy Purchasing and Procurement Strategies

8.1 Retail Electric Supply Options

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

If your facility is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third-party electric suppliers. If your facility already buys electricity from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party electric suppliers is available at the NJBPU website[8].

8.2 Retail Natural Gas Supply Options

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

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

If your facility does not already purchase natural gas from a third-party supplier, consider shopping for a reduced rate from third-party natural gas suppliers. If your facility already purchases natural gas from a third-party supplier, review and compare prices at the end of each contract year.

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

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Basement	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	500	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	500	0.1	46	0	$7	$129	$20	15.2
Boiler Room	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	500	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	500	0.1	46	0	$7	$129	$20	15.2
Storage	2	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	500	2	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	500	0.2	93	0	$14	$257	$40	15.2
Storage	2	Compact Fluorescent: Screw in Lamps	Wall Switch	S	13	500		None	No	2	Compact Fluorescent: Screw in Lamps	Wall Switch	13	500	0.0	0	0	$0	$0	$0	0.0
Liquor Storage	3	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	500	2	Relamp & Reballast	No	3	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	500	0.2	139	0	$21	$386	$60	15.2
Marquee Sign	4,000	Halogen Incandescent: Push-in Lamps	None		50	500	3	Relamp	No	4,000	LED Lamps: Push-in Lamps	None	13	500	99.0	75,000	0	$11,707	$180,000	$4,000	15.0
Restroom	8	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	S	72	2,080	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.3	885	0	$136	$1,108	$115	7.3
Restroom	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	305	0	$47	$138	$20	2.5
Restroom	2	Compact Fluorescent: (2) 13W Plug-In Lamps	Wall Switch	S	26	2,080	3, 4	Relamp	Yes	2	LED Lamps: (2) 5W Plug-In Lamps	Occupancy Sensor	10	1,435	0.0	86	0	$13	$101	$4	7.3
Restroom	2	Compact Fluorescent: 13W CFL / Recessed Can	Wall Switch	S	13	2,080	3, 4	Relamp	Yes	2	LED Lamps: Screw in Lamp	Occupancy Sensor	9	1,435	0.0	31	0	$5	$34	$2	6.9
Closets	2	LED Lamps: Screw in Lamp	Wall Switch	S	7	500		None	No	2	LED Lamps: Screw in Lamp	Wall Switch	7	500	0.0	0	0	$0	$0	$0	0.0
Restroom	5	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	S	72	2,080	2, 4	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	553	0	$85	$794	$85	8.3
Restroom	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	305	0	$47	$138	$20	2.5
Restroom	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	305	0	$47	$138	$20	2.5
Restroom	2	Compact Fluorescent: (2) 13W Plug-In Lamps	Wall Switch	S	26	2,080	3, 4	Relamp	Yes	2	LED Lamps: (2) 5W Plug-In Lamps	Occupancy Sensor	10	1,435	0.0	86	0	$13	$101	$4	7.3
Box Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2	Relamp & Reballast	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,080	0.1	265	0	$41	$118	$20	2.4
Box Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	74	0	$11	$37	$10	2.3
Office	2	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.2	611	0	$94	$353	$60	3.1
Office	3	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.4	916	0	$141	$471	$80	2.8
Office	2	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.2	611	0	$94	$353	$60	3.1
Stairs	1	LED Lamps: (5) 7W Candelabra Lamps	Wall Switch	S	35	2,080		None	No	1	LED Lamps: (5) 7W Candelabra Lamps	Wall Switch	35	2,080	0.0	0	0	$0	$0	$0	0.0
Hallway	2	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 5	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	1,435	0.2	611	0	$94	$462	$40	4.5
Office	3	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.4	916	0	$141	$471	$80	2.8
Office	2	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.2	611	0	$94	$353	$60	3.1
Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	305	0	$47	$234	$20	4.6

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	305	0	$47	$234	$20	4.6
Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	305	0	$47	$234	$20	4.6
Office	4	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.5	1,222	0	$188	$589	$100	2.6
Office	4	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.5	1,222	0	$188	$589	$100	2.6
CEO Office	2	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.2	611	0	$94	$353	$60	3.1
Server Closet	1	Incandescent: Screw in Lamp	Wall Switch	S	100	2,080	3	Relamp	No	1	LED Lamps: Screw in Lamp	Wall Switch	15	2,080	0.1	191	0	$29	$17	$1	0.6
Hallway	1	Compact Fluorescent: Screw in Lamp	Wall Switch	S	23	2,080	3	Relamp	No	1	LED Lamps: Screw in Lamp	Wall Switch	15	2,080	0.0	18	0	$3	$17	$1	5.9
Restroom	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	305	0	$47	$388	$20	7.8
Restroom	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	305	0	$47	$388	$20	7.8
Storage	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	2,080	0.1	193	0	$30	$129	$20	3.7
Stairs	1	LED Lamps: (4) 9W Screw in Lamps	Wall Switch	S	36	2,080		None	No	1	LED Lamps: (4) 9W Screw in Lamps	Wall Switch	36	2,080	0.0	0	0	$0	$0	$0	0.0
Gallery	3	LED Lamps: (3) 7W Screw in Lamps	Wall Switch	S	21	2,080		None	No	3	LED Lamps: (3) 7W Screw in Lamps	Wall Switch	21	2,080	0.0	0	0	$0	$0	$0	0.0
Gallery	15	LED Lamps: 9W PAR Lamps on Track	Wall Switch	S	9	2,080		None	No	15	LED Lamps: 9W PAR Lamps on Track	Wall Switch	9	2,080	0.0	0	0	$0	$0	$0	0.0
Entrance	15	LED Lamps: (2) 5W Plug-In Lamps	Wall Switch		10	2,080		None	No	15	LED Lamps: (2) 5W Plug-In Lamps	Wall Switch	10	2,080	0.0	0	0	$0	$0	$0	0.0
Crew Room	3	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, 4	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,435	0.3	730	0	$112	$656	$95	5.0
Hallway	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, 5	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 8' Lamps	High/Low Control	72	1,435	0.1	243	0	$37	$354	$20	8.9
Hallway	4	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Wall Switch	S	50	2,080	2, 5	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	1,435	0.1	344	0	$53	$484	$24	8.7
Restroom	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, 4	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,435	0.1	243	0	$37	$399	$20	10.1
Restroom	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, 4	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,435	0.1	243	0	$37	$399	$20	10.1
Production Room	3	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, 4	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,435	0.3	730	0	$112	$656	$95	5.0
Hallway	2	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, 5	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 8' Lamps	High/Low Control	72	1,435	0.2	487	0	$75	$482	$40	5.9
Pit	4	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, 4	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,435	0.4	973	0	$150	$785	$115	4.5
Hallway	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2, 5	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,435	0.1	305	0	$47	$363	$20	7.3
Office	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	305	0	$47	$254	$40	4.5
Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2, 4	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	153	0	$24	$185	$10	7.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Office	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2, 4	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	153	0	$24	$185	$10	7.4
Elevator Room	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	133	0	$20	$69	$10	2.9
Hallway	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2, 5	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,435	0.1	153	0	$24	$294	$10	12.1
Loading Dock	4	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2	Relamp & Reballast	No	4	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	2,080	0.3	773	0	$119	$515	$80	3.7
Multipurpose Room	9	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, 4	Relamp & Reballast	Yes	9	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,435	0.9	2,190	0	$337	$1,428	$215	3.6
Restroom	2	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	S	72	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.1	221	0	$34	$479	$20	13.5
Restroom	2	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	S	72	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.1	221	0	$34	$479	$20	13.5
Stairs	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2	Relamp & Reballast	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.3	795	0	$122	$413	$60	2.9
Dressing Room	4	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	S	72	2,080	2, 4	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	442	0	$68	$689	$75	9.0
Restroom	1	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	S	72	2,080	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,080	0.0	88	0	$13	$105	$10	7.0
Hallway	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2, 5	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,435	0.2	611	0	$94	$500	$40	4.9
Hallway	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2, 5	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,435	0.1	153	0	$24	$294	$10	12.1
Dressing Room	3	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, 4	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,435	0.3	730	0	$112	$656	$95	5.0
Restroom	4	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	S	72	2,080	2, 4	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	442	0	$68	$689	$75	9.0
Dressing Room	3	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, 4	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,435	0.3	730	0	$112	$656	$95	5.0
Restroom	4	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	S	72	2,080	2, 4	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,435	0.2	442	0	$68	$689	$75	9.0
Stairs	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	2,080	2	Relamp & Reballast	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.3	795	0	$122	$413	$60	2.9
Catwalk	8	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	100	2	Relamp & Reballast	No	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	100	0.8	102	0	$16	$947	$160	50.1
Stage	4	LED Lamps: Screw in Lamp	Wall Switch	S	14	2,080		None	No	4	LED Lamps: Screw in Lamp	Wall Switch	14	2,080	0.0	0	0	$0	$0	$0	0.0
Spot Light Booth	3	Compact Fluorescent: (3) 40W Biax Lamps	Wall Switch	S	120	100		None	No	3	Compact Fluorescent: (3) 40W Biax Lamps	Wall Switch	120	100	0.0	0	0	$0	$0	$0	0.0
Spot Lights	4	Metal Halide: (1) 1000W Lamp	Other		1,080	20		None	No	4	Metal Halide: (1) 1000W Lamp	Other	1,080	20	0.0	0	0	$0	$0	$0	0.0
Catwalk	8	Compact Fluorescent: Screw in Lamp	Wall Switch	S	23	100		None	No	8	Compact Fluorescent: Screw in Lamp	Wall Switch	23	100	0.0	0	0	$0	$0	$0	0.0
Theater	4	LED Lamps: (6) Screw in Lamp Dome Fixtures	Other		56	1,000		None	No	4	LED Lamps: (6) Screw in Lamp Dome Fixtures	Other	56	1,000	0.0	0	0	$0	$0	$0	0.0
Theater Occulus	64	LED Lamps: Decorative Screw in Lamps	Other		5	1,000		None	No	64	LED Lamps: Decorative Screw in Lamps	Other	5	1,000	0.0	0	0	$0	$0	$0	0.0
Theater	22	LED Lamps: Dimmable Screw in Lamp Recessed Fan Fixtures	Other		9	1,000		None	No	22	LED Lamps: Dimmable Screw in Lamp Recessed Fan Fixtures	Other	9	1,000	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mezzanine Track Lights	17	LED - Fixtures: Specalty Track Spot Lighting	Other		300	100		None	No	17	LED - Fixtures: Specalty Track Spot Lighting	Other	300	100	0.0	0	0	$0	$0	$0	0.0
Theater	16	Halogen Incandescent: 250W Lamp	Other		250	1,000	3	Relamp	No	16	LED Lamps: E11 Mini Candelabra Lamps	Other	18	1,000	3.3	4,009	-1	$617	$1,600	$16	2.6
Theater	5	Halogen Incandescent: Spot Lights	Other		150	1,000	3	Relamp	No	5	LED Lamps: Screw in Lamp	Other	23	1,000	0.6	686	0	$106	$86	$5	0.8
Caberet Room	15	LED Lamps: Screw in Lamp / Recessed Can Fixtures	Wall Switch	S	12	2,080		None	No	15	LED Lamps: Screw in Lamp / Recessed Can Fixtures	Wall Switch	12	2,080	0.0	0	0	$0	$0	$0	0.0
Caberet Room	16	LED Lamps: MR16 Lamps	Wall Switch	S	7	2,080		None	No	16	LED Lamps: MR16 Lamps	Wall Switch	7	2,080	0.0	0	0	$0	$0	$0	0.0
Restroom	2	Compact Fluorescent: (2) 13W Plug-In Lamps	Wall Switch	S	26	2,080	3	Relamp	No	2	LED Lamps: (2) 5W Plug-In Lamps	Wall Switch	10	2,080	0.0	72	0	$11	$101	$4	8.8
Lobby	9	LED Lamps: (2) 5W Plug-In Lamps	Wall Switch	S	10	2,080		None	No	9	LED Lamps: (2) 5W Plug-In Lamps	Wall Switch	10	2,080	0.0	0	0	$0	$0	$0	0.0
Lobby	8	LED Lamps: Screw in Lamp / Recessed Can Fixtures	Wall Switch	S	12	2,080		None	No	8	LED Lamps: Screw in Lamp / Recessed Can Fixtures	Wall Switch	12	2,080	0.0	0	0	$0	$0	$0	0.0
Lobby	16	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	S	46	2,080	2, 4	Relamp & Reballast	Yes	16	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,435	0.5	1,294	0	$199	$1,078	$115	4.8
Lobby	3	LED Lamps: (6) Decorative Lamp Surface Mounted Fixtures	Other	S	42	2,000		None	No	3	LED Lamps: (6) Decorative Lamp Surface Mounted Fixtures	Other	42	2,000	0.0	0	0	$0	$0	$0	0.0
Lobby	2	LED Lamps: (4) Decorative Lamp Wall Sconce Fixtures	Other	S	20	2,000		None	No	2	LED Lamps: (4) Decorative Lamp Wall Sconce Fixtures	Other	20	2,000	0.0	0	0	$0	$0	$0	0.0
Lobby	11	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	S	46	2,080	2, 4	Relamp & Reballast	Yes	11	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,435	0.4	889	0	$137	$826	$90	5.4
Lobby Bar	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	S	46	2,080	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,435	0.1	162	0	$25	$101	$10	3.7
Lobby Bar	3	Linear Fluorescent - T12: 2' T12 (20W) - 1L	Wall Switch	S	25	2,080	2, 4	Relamp & Reballast	Yes	3	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	1,435	0.1	129	0	$20	$416	$44	18.7
Lobby Bar	4	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	2,080	2, 4	Relamp & Reballast	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.5	1,222	0	$188	$743	$115	3.3
Transition Spaces	20	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	20	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Exterior	2	High-Pressure Sodium: (1) 50W Lamp	Photocell		66	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell	20	4,380	0.1	403	0	$63	$800	$200	9.5
Exterior	14	High-Pressure Sodium: (1) 50W Lamp	Timeclock		66	3,650	1	Fixture Replacement	No	14	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	20	3,650	0.4	2,351	0	$367	$5,600	$1,400	11.4

Motor Inventory & Recommendations

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Hot Water Heating	1	Heating Hot Water Pump	2.0	78.5%	No	W	1,373	7	No	86.5%	Yes	1	0.3	1,141	0	$178	$3,261	$0	18.3
Boiler Room	Hot Water Heating	1	Heating Hot Water Pump	2.0	78.5%	No	W	1,373	7	No	86.5%	Yes	1	0.3	1,141	0	$178	$3,261	$0	18.3
Boiler Room	Hot Water Heating	1	Heating Hot Water Pump	0.3	74.0%	No	W	1,373		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Hot Water Heating	1	Heating Hot Water Pump	0.3	74.0%	No	W	1,373		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Boiler Exhaust	3	Exhaust Fan	0.2	74.0%	No	W	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Boiler Exhaust	3	Exhaust Fan	0.2	74.0%	No	W	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Addition Roof	2nd Floor	1	Supply Fan	7.5	89.5%	No	B	2,745	6	No	91.0%	Yes	1	2.2	6,626	0	$1,034	$4,738	$600	4.0
Packaged RTU	Building Addition	1	Supply Fan	2.0	84.0%	No	B	2,745	6	No	86.5%	Yes	1	0.6	1,923	0	$300	$3,261	$160	10.3
Packaged RTU	Theater/Lobby/BackofHouse	2	Supply Fan	20.0	93.0%	No	W	2,745	6	No	93.0%	Yes	2	11.4	33,029	0	$5,155	$17,164	$3,200	2.7
Packaged RTU	Theater/Lobby/BackofHouse	4	Exhaust Fan	1.5	86.5%	No	W	2,745	6	No	86.5%	Yes	4	1.8	5,327	0	$831	$13,562	$480	15.7
Addition Roof	3rd Floor	1	Supply Fan	0.8	74.0%	No	B	2,745		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0

Electric HVAC Inventory & Recommendations

		Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Administration Office	1	Split-System AC	10.00		B	8	Yes	1	Split-System AC	10.00		11.50		1.4	1,763	0	$275	$11,638	$730	39.6
Roof	Caberet Room	1	Split-System AC	5.00		B	8	Yes	1	Split-System AC	5.00		14.00		1.2	1,448	0	$226	$7,481	$460	31.1
Roof	Box Office	1	Split-System AC	5.00		B	8	Yes	1	Split-System AC	5.00		14.00		0.5	657	0	$103	$7,481	$460	68.4
Roof	Building Addition	1	Packaged AC	7.50		B	8	Yes	1	Packaged AC	7.50		11.50		1.1	1,322	0	$206	$13,366	$548	62.1
Roof	Theater/Lobby	1	Packaged AC	50.00		W		No							0.0	0	0	$0	$0	$0	0.0
Addition Roof	2nd & 3rd Floor	1	Packaged AC	6.00		B	8	Yes	1	Packaged AC	6.00		11.50		1.2	1,405	0	$219	$10,693	$438	46.8
Addition Roof	2nd & 3rd Floor	1	Electric Forced Air Furnace		32.76	B		No							0.0	0	0	$0	$0	$0	0.0
Addition Roof	Back of House	1	Packaged AC	50.00		W		No							0.0	0	0	$0	$0	$0	0.0
Spot Light Booth	Spot Light Booth	2	Split-System AC	6.00		B	8	Yes	2	Split-System AC	6.00		11.50		1.3	1,603	0	$250	$13,965	$876	52.3

Fuel Heating Inventory & Recommendations

		Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Heating System	1	Non-Condensing Hot Water Boiler	300.00	B	9	Yes	1	Non-Condensing Hot Water Boiler	300.00	85.00%	Et	0.0	0	13	$126	$6,731	$525	49.4
Boiler Room	Heating System	1	Non-Condensing Hot Water Boiler	300.00	B	9	Yes	1	Non-Condensing Hot Water Boiler	300.00	85.00%	Et	0.0	0	13	$126	$6,731	$525	49.4
Boiler Room	Heating System	1	Non-Condensing Hot Water Boiler	300.00	B	9	Yes	1	Non-Condensing Hot Water Boiler	300.00	85.00%	Et	0.0	0	13	$126	$6,731	$525	49.4
Boiler Room	Heating System	1	Non-Condensing Hot Water Boiler	300.00	B	9	Yes	1	Non-Condensing Hot Water Boiler	300.00	85.00%	Et	0.0	0	13	$126	$6,731	$525	49.4
Boiler Room	Heating System	1	Non-Condensing Hot Water Boiler	300.00	B	9	Yes	1	Non-Condensing Hot Water Boiler	300.00	85.00%	Et	0.0	0	13	$126	$6,731	$525	49.4
Boiler Room	Heating System	1	Non-Condensing Hot Water Boiler	300.00	B	9	Yes	1	Non-Condensing Hot Water Boiler	300.00	85.00%	Et	0.0	0	13	$126	$6,731	$525	49.4

Programmable Thermostat Recommendations

		Recommendation Inputs					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Thermostat Quantity	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
2nd Floor Offices	Hot Water Baseboard	10	2.00	0.00	0.00	300.00	0.0	0	15	$145	$660	$0	4.5
2nd Floor Offices	Cooling Roof Top Unit	10	2.00	10.00	0.00		0.0	730	0	$114	$660	$0	5.8
Multipurpose Room	Heating/Cooing Unit	10	2.00	7.50	0.00	300.00	0.0	547	15	$231	$660	$0	2.9
Administration Office	Cooling System	10	2.00	10.00	0.00		0.0	730	0	$114	$660	$0	5.8
Caberet Room	Cooling System	10	2.00	5.00	0.00		0.0	365	0	$57	$660	$0	11.6
Box Office	Cooling System	10	2.00	5.00	0.00		0.0	294	0	$46	$660	$0	14.4
Building Addition	Cooling System	10	2.00	7.50	0.00		0.0	547	0	$85	$660	$0	7.7
Addition Roof	2nd & 3rd Floor	10	2.00	6.00	32.76		0.0	2,262	0	$353	$660	$0	1.9
Packaged RTU	Theater/Lobby/BackofHouse	10	4.00	50.00	0.00		0.0	3,128	0	$488	$1,319	$0	2.7

Pipe Insulation Recommendations

		Recommendation Inputs			Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Length of Uninsulated Pipe (ft)	Pipe Diameter (in)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Heating Hot Water System	11	60	4.00	0.0	0	90	$893	$527	$0	0.6

DHW Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Basement	Domestic Hot Water - Lobby Restrooms	1	Storage Tank Water Heater (≤ 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0
Restroom	2nd Floor Office Restrooms	2	Storage Tank Water Heater (≤ 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0
Addition	Crew and Production Restrooms	1	Storage Tank Water Heater (> 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0
Addition	Dressing Room Restrooms	1	Storage Tank Water Heater (≤ 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0
Restroom	Caberet Room Restrooms	1	Tankless Water Heater	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation 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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Lobby Restrooms	12	8	Faucet Aerator (Lavatory)	2.00	0.50	0.0	196	0	$31	$57	$0	1.9
2nd Floor Office Restrooms	12	2	Faucet Aerator (Lavatory)	2.20	0.50	0.0	56	0	$9	$14	$0	1.7
Addition Restrooms	12	2	Faucet Aerator (Lavatory)	3.00	0.50	0.0	82	0	$13	$14	$0	1.1
Dressing Room Restrooms	12	18	Faucet Aerator (Lavatory)	2.20	0.50	0.0	500	0	$78	$129	$0	1.7

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Basement Storage	2	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Basement Storage	1	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	No		No	0.0	0	0	$0	$0	$0	0.0
Basement Storage	1	Stand-Up Refrigerator, Glass Door (≤15 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Multipurpose Room	2	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Multipurpose Room	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes		No	0.0	0	0	$0	$0	$0	0.0
Lobby Bar	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	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	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Storage	1	Ice Making Head (<450 lbs/day), Batch	Yes		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?**
Performing Arts Center	26	Computers	120.0	
Performing Arts Center	5	Microwave	1,500.0	
Performing Arts Center	5	Coffee Machine	1,200.0	
Performing Arts Center	11	Mini Fridge	260.0	
Performing Arts Center	5	Small Office Printer	150.0	
Performing Arts Center	1	Medium Office Printer	350.0	
Performing Arts Center	5	Water Cooler	1,100.0	
Performing Arts Center	5	TV	90.0	
Performing Arts Center	3	Fan	100.0	
Performing Arts Center	3	Electric Unit Heater	1,500.0	
Performing Arts Center	2	Residential Fridge	690.0	
Performing Arts Center	2	Toaster	900.0	
Performing Arts Center	2	Small Speakers	250.0	
Performing Arts Center	1	Washer/Dryer	5,500.0	
Performing Arts Center	4	Large Speakers	500.0	
Cabaret Room	4	TV	90.0	
Cabaret Room	4	Small Speakers	250.0	
Cabaret Room	2	Large Speakers	500.0	
Theater	6	Large Speakers	500.0	

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

EUI is presented in terms of *site energy* and *source energy*. Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

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ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

Bergen Performing Arts Center

Primary Property Type: Performing Arts
Gross Floor Area (ft²): 35,000
Built: 1926

For Year Ending: June 30, 2018
Date Generated: June 07, 2019

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Bergen Performing Arts Center 30 N Van Brunt Street Englewood, New Jersey 07631	Bergen Performing Arts Center Inc. 30 N Van Brunt Street Englewood, NJ 07631 (____)____-_____	Marc Farrand 30 N Van Brunt Street Englewood, NJ 07631 201-816-8160 x 31 mfarrand@bergenpac.org

Property ID: 6894197

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
89 kBtu/ft²

Source EUI
184.5 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	1,819,754 (58%)
Natural Gas (kBtu)	1,295,969 (42%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	54.1
National Median Source EUI (kBtu/ft²)	112
% Diff from National Median Source EUI	65%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	253

Signature & Stamp of Verifying Professional

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

Signature: _____Date: _____

Licensed Professional

Marc Farrand
30 N Van Brunt Street
Englewood, NJ 07631
201-816-8160 x 31
mfarrand@bergenpac.org

Professional Engineer Stamp
(if applicable)

APPENDIX C: GLOSSARY

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

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

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