Local Government Energy Audit Report

Sam Naples Center

November 17, 2021

Prepared for:
City of Trenton
611 Chestnut Avenue
Trenton, NJ 08611

Prepared by:
TRC
900 Route 9 North
Woodbridge, NJ 07095

Disclaimer

The goal of this audit report is to identify potential energy efficiency opportunities and help prioritize specific measures for implementation. Most energy conservation measures have received preliminary analysis of feasibility that identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to establish a basis for further discussion and to help prioritize energy measures.

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

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

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

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

Table of Contents

Energy Efficiency Incentive & Rebate Transition

For the purposes of your LGEA, estimated incentives and rebates are included as placeholders for planning purposes. New Jersey utilities are rolling out their own energy efficiency programs, which your project may be eligible for depending on individual measures, quantities, and size of the building.

In 2018, Governor Murphy signed into law the landmark legislation known as the Clean Energy Act. The law called for a significant overhaul of New Jersey's clean energy systems by building sustainable infrastructure in order to fight climate change and reduce carbon emissions, which will in turn create well-paying local jobs, grow the state's economy, and improve public health while ensuring a cleaner environment for current and future residents.

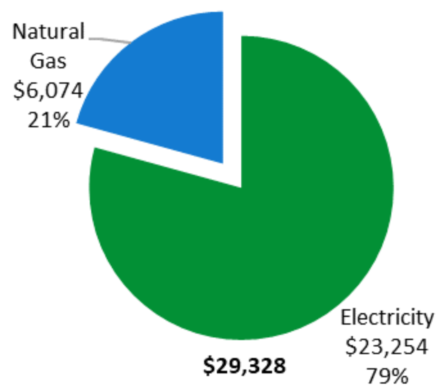
These "next generation" energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and incentives directly to customers like you. NJCEP will still offer programs for new construction, renewable energy, the Energy Savings Improvement Program (ESIP), and large energy users.

New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the NJCEP website.

1 EXECUTIVE SUMMARY

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

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $29,328 Electricity: 172,500 kWh Natural Gas: 6,882 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.

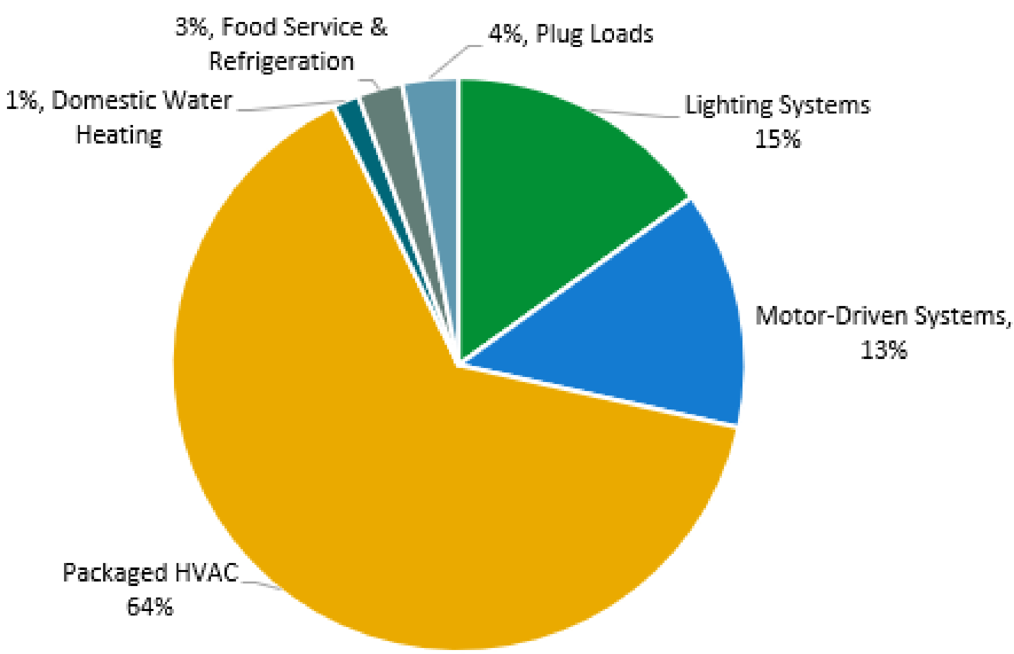


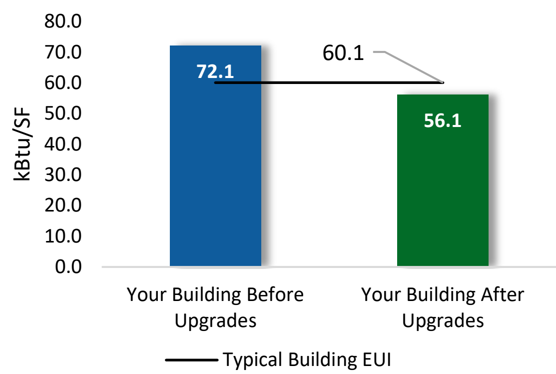
Figure 1 - Energy Use by System

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.

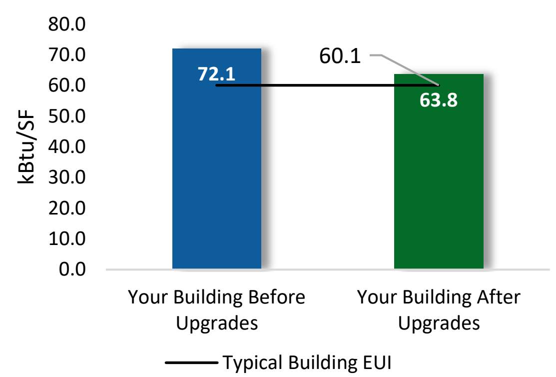
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$99,635
Potential Rebates & Incentives[1]	$17,459
Annual Cost Savings	$9,162
Annual Energy Savings	Electricity: 63,632 kWh Natural Gas: 661 Therms
Greenhouse Gas Emission Savings	36 Tons
Simple Payback	9.0 Years
Site Energy Savings (all utilities)	22%



Scenario 2: Cost Effective Package[2]

Installation Cost	$23,513
Potential Rebates & Incentives	$3,924
Annual Cost Savings	$5,944
Annual Energy Savings	Electricity: 44,303 kWh Natural Gas: -33 Therms
Greenhouse Gas Emission Savings	22 Tons
Simple Payback	3.3 Years
Site Energy Savings (all utilities)	12%



On-site Generation Potential

Photovoltaic	None
Combined Heat and Power	None

[1] Incentives are based on previously run state rebate programs. Contact your utility provider for current program incentives that may apply.

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**35,411**	**7.8**	**-7**	**$4,711**	**$16,500**	**$2,495**	**$14,005**	**3.0**	**34,829**
ECM 1	Install LED Fixtures	Yes	18,541	3.6	-3	$2,469	$7,223	$850	$6,373	2.6	18,262
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	67	0.0	0	$9	$146	$9	$137	15.4	66
ECM 3	Retrofit Fixtures with LED Lamps	Yes	16,803	4.2	-4	$2,234	$9,131	$1,636	$7,495	3.4	16,501
Lighting Control Measures			**6,369**	**1.5**	**-1**	**$847**	**$5,523**	**$1,215**	**$4,308**	**5.1**	**6,254**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	4,891	1.2	-1	$650	$3,858	$445	$3,413	5.2	4,803
ECM 5	Install High/Low Lighting Controls	Yes	1,478	0.3	0	$196	$1,665	$770	$895	4.6	1,451
Motor Upgrades			**973**	**0.2**	**0**	**$131**	**$876**	**$0**	**$876**	**6.7**	**980**
ECM 6	Premium Efficiency Motors	Yes	973	0.2	0	$131	$876	$0	$876	6.7	980
Unitary HVAC Measures			**19,329**	**10.7**	**6**	**$2,662**	**$40,964**	**$7,535**	**$33,429**	**12.6**	**20,213**
ECM 7	Install High Efficiency Air Conditioning Units	No	19,329	10.7	6	$2,662	$40,964	$7,535	$33,429	12.6	20,213
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**63**	**$556**	**$35,158**	**$6,000**	**$29,158**	**52.5**	**7,372**
ECM 8	Install High Efficiency Furnaces	No	0	0.0	63	$556	$35,158	$6,000	$29,158	52.5	7,372
HVAC System Improvements			**0**	**0.0**	**2**	**$16**	**$46**	**$32**	**$14**	**0.9**	**218**
ECM 9	Install Pipe Insulation	Yes	0	0.0	2	$16	$46	$32	$14	0.9	218
Domestic Water Heating Upgrade			**0**	**0.0**	**3**	**$29**	**$108**	**$82**	**$25**	**0.9**	**390**
ECM 10	Install Low-Flow DHW Devices	Yes	0	0.0	3	$29	$108	$82	$25	0.9	390
Food Service & Refrigeration Measures			**1,551**	**0.2**	**0**	**$209**	**$460**	**$100**	**$360**	**1.7**	**1,562**
ECM 11	Vending Machine Control	Yes	1,551	0.2	0	$209	$460	$100	$360	1.7	1,562
TOTALS (COST EFFECTIVE MEASURES)			**44,303**	**9.6**	**-3**	**$5,944**	**$23,513**	**$3,924**	**$19,589**	**3.3**	**44,233**
TOTALS (ALL MEASURES)			**63,632**	**20.4**	**66**	**$9,162**	**$99,635**	**$17,459**	**$82,176**	**9.0**	**71,818**

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

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

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

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

For details on these programs please visit New Jersey's Clean Energy Program website or contact your utility provider.

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 Sam Naples Center. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs.

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

2.1 Site Overview

On March 24, 2021, TRC performed an energy audit at Sam Naples Center located in Trenton, New Jersey. TRC met with Akil Muse to review the facility operations and help focus our investigation on specific energy-using systems.

The Sam Naples Center is a two-story, 17,700 square foot building built in 1899. It houses a senior community center that provides a variety of programs and recreational activities. Spaces include corridors, game room, computer room, gymnasium, offices, stairwells, senior center dining room, a commercial kitchen, and basement mechanical space.

This facility is currently under renovation as part of the U.S. Department of Housing and Urban Development Community Development Block Grant Program.

2.2 Building Occupancy

The facility is occupied year-round. Typical weekday occupancy is five staff and 40 visitors. Meals are typically served twice a day.

Building Name	Weekday/Weekend	Operating Schedule
Sam Naples Center	Weekday	9:00 AM - 5:00 PM
	Weekend	Saturday - 9:00 AM - 5:00 PM Sunday - Closed

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

The structure is comprised of many sections of varying designs, a product of several additions and remodeling projects over its more than 100-year life.

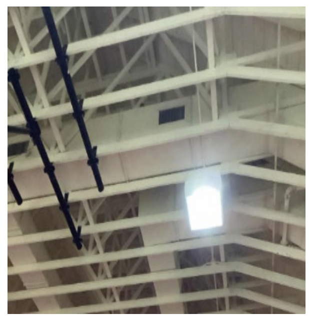
The basic structure of the building appears to be a wood frame, shingled, with a concrete block foundation. There are accent areas of brick façade (at the entry), and of wood clapboard (at some of the eaves).

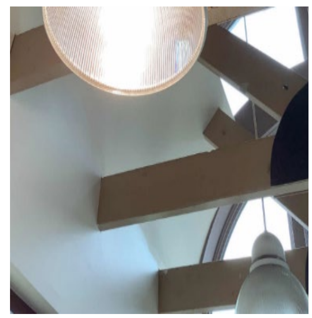
The building has several pitched roof sections with asphalt shingles and a small flat roof section with a white, waterproof membrane.

The interior finish is a combination of painted block and gypsum drywall. The gymnasium has an open wooden truss ceiling.

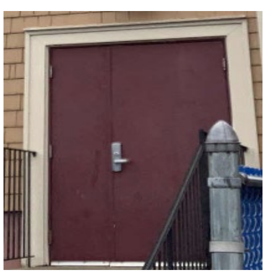

Pitched Roof


Flat Roof


Gymnasium Truss


Front Entrance

Windows of varying form factors provide great architectural enhancement and are a combination of fixed and operable. Most of the windows are double glazed with a wood frame. The glass-to-frame seals are in good condition. The operable window weather seals are in fair condition, showing little evidence of excessive wear. Exterior doors have aluminum frames and are in good condition with undamaged door seals. Degraded window and door seals increase drafts and outside air infiltration.

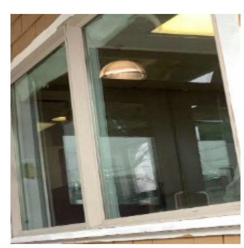

Exterior Doors


Exterior Doors


Exterior Doors


Windows


Windows


Windows

2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several 20-Watt, 2-foot T12 fixtures. Additionally, there are some compact fluorescent lamps (CFL)and one LED plug-in lamp. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts.

Fixture types include 1-lamp, 2-lamp, or 4-lamp, 2-foot or 4-foot-long troffer, recessed, surface mounted fixtures and 2-foot fixtures with U-bend tube lamps.

Most fixtures are in fair condition. Gymnasium fixtures have manually controlled high bay, high intensity discharge (HID) lamps that use metal halide (MH) sources. All exit signs are LED units. Interior lighting levels were generally sufficient. Interior lights are controlled manually.

HID Lighting in Gymnasium and Entrance

HID Lighting Entrance

4-foot Fluorescent Lamps

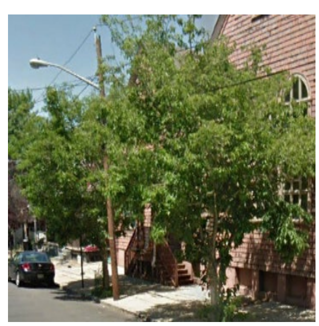
U-bend fluorescent

Exit sign

Exterior Timer Lighting Controls

The cobra head pole lights are maintained by the utility or city. The only exterior lighting for this facility is the overhead entrance lighting. Exterior lights are controlled by a time clock.

Exterior Entrance Lighting



Cobra Head Pole Lights

2.5 Air Handling Systems

Packaged Units

The gymnasium is served with a gas packaged terminal unit controlled by a room thermostat. The unit has a heating capacity of 350 MBh and a cooling capacity of 15 tons.

Unitary Electric HVAC Equipment

The facility has several split system AC units on the roof that are paired with indoor furnaces, serving different parts of the facility. The furnaces are in the basement mechanical room and the second-floor mechanical room. The units are controlled by digital programmable thermostats and are all beyond their useful life, in poor condition and are standard efficiency. The split system AC units' range in size from 5 tons to 10 tons while the furnaces range in size from 81 MBh to 99 MBh.

Refer to Appendix A for detailed information about each unit.

Split system AC units,

Split system AC units

Digital Thermostats

Gas-fired Furnace

Gas-fired Furnace

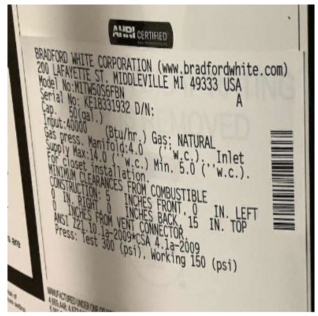
Digital Thermostats

2.6 Domestic Hot Water

Hot water is produced by a 50 gallon, 40 MBh gas-fired storage water heater with an 80% efficiency rating.

The domestic hot water pipes are partially insulated, and the insulation is in good condition.


Domestic Hot Water Heater



Domestic Hot Water Heater

2.7 Food Service Equipment

The kitchen has gas and electric fired equipment that is used to prepare breakfast and lunch for visitors and staff. Most cooking is done using a gas-fired oven. Equipment is not high efficiency and is in fair condition.

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

Gas-fired Cook/Hold Oven

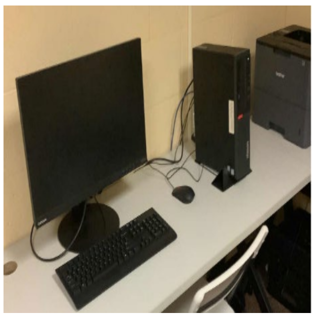

Gas-fired Oven/Range

2.8 Plug Load & Vending Machines

The location is doing a great job managing their electrical plug loads. This report makes additional suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are six computer workstations throughout the facility. Plug loads throughout the building include general café and office equipment. There are several residential-style refrigerators throughout the building that are used to store food. These vary in condition and efficiency.

There is one refrigerated beverage vending machine and one non-refrigerated vending machine. Vending machines not equipped with occupancy-based controls.



Computer Workstation

Microwave

Refrigerated Vending Machine

Non-refrigerated Vending Machine

2.9 Water-Using Systems

There are restrooms with toilets and sinks. Faucet flow rates are at 2.2 gallons per minute (gpm) or higher.

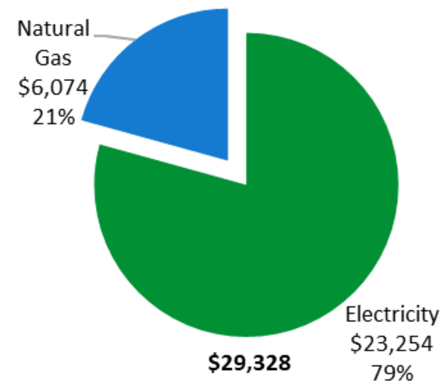
Restroom Sink

Kitchen Sink

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	172,500 kWh	$23,254
Natural Gas	6,882 Therms	$6,074
Total		**$29,328**



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.

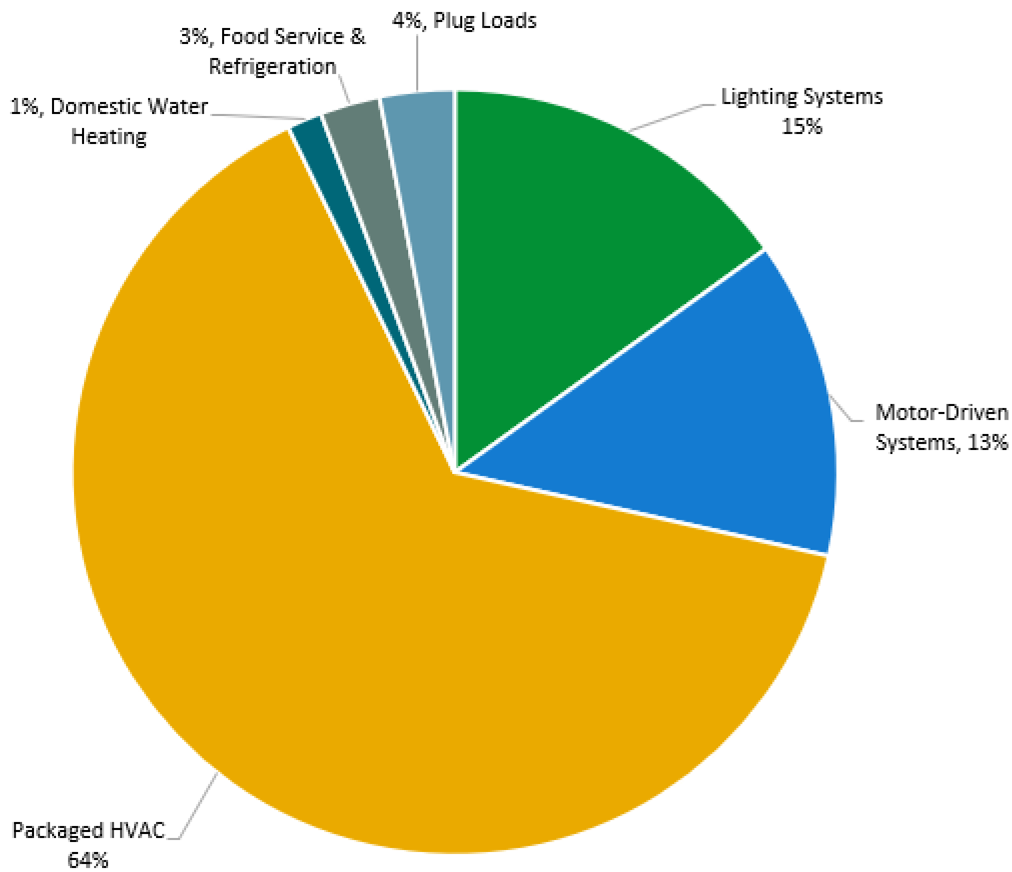
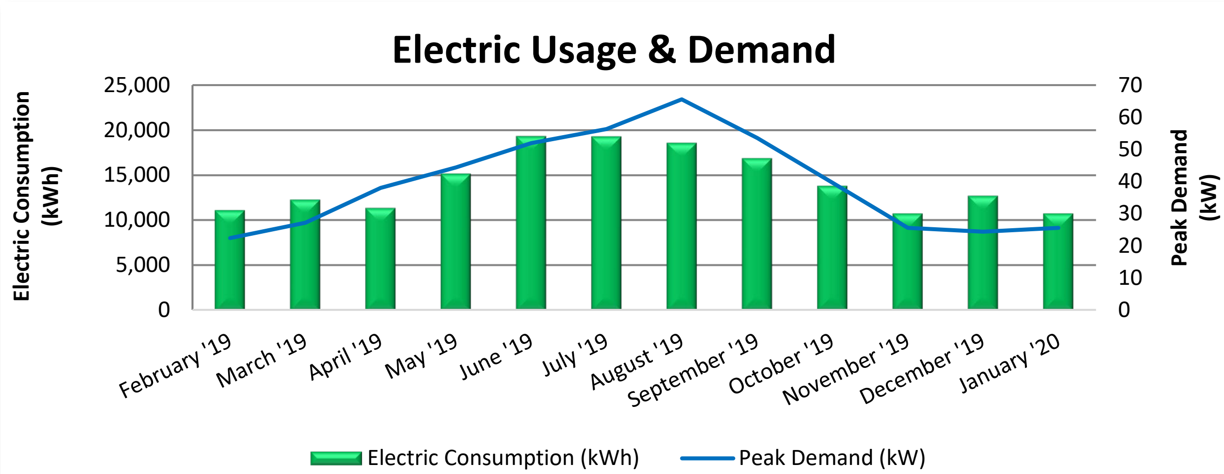


Figure 4 - Energy Balance

3.1 Electricity

PSE&G delivers electricity under rate class General Lighting & Power (GLP), with electric production provided by Direct Energy Business, LLC, a third-party supplier.



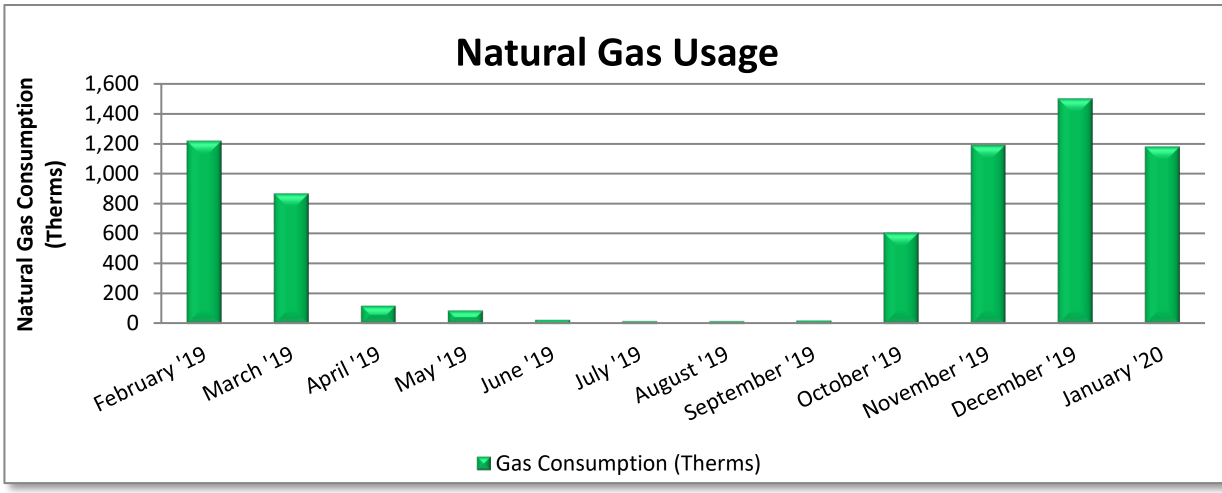
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
3/9/19	31	11,160	22	$88	$1,398
4/8/19	30	12,320	27	$107	$1,523
5/8/19	30	11,400	38	$371	$1,494
6/7/19	30	15,200	44	$612	$2,310
7/9/19	32	19,360	52	$716	$2,829
8/7/19	29	19,320	56	$777	$2,808
9/6/19	29	18,600	66	$258	$2,861
10/7/19	31	16,920	54	$105	$2,079
11/7/19	31	13,860	40	$103	$1,690
12/6/19	32	10,800	26	$101	$1,301
1/8/20	32	12,760	24	$96	$1,591
2/6/20	28	10,800	26	$101	$1,368
Totals	**365**	**172,500**	**66**	**$3,435**	**$23,254**
Annual	**365**	**172,500**	**66**	**$3,435**	**$23,254**

Notes:

- Peak demand of 66 kW occurred in August 2019.
- Average demand over the past 12 months was 40 kW.
- The average electric cost over the past 12 months was $0.135/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

3.2 Natural Gas

PSE&G delivers natural gas under rate class General Service Gas Heating - GSG (HTG.



Gas Billing Data			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
3/9/19	31	1,219	$1,016
4/8/19	30	869	$707
5/8/19	30	122	$113
6/7/19	30	90	$87
7/9/19	32	28	$38
8/7/19	29	21	$32
9/6/19	29	21	$32
10/7/19	31	24	$35
11/7/19	31	609	$558
12/6/19	32	1,194	$1,086
1/8/20	32	1,503	$1,347
2/6/20	28	1,182	$1,024
Totals	**365**	**6,882**	**$6,074**
Annual	**365**	**6,882**	**$6,074**

Notes:

- The average gas cost for the past 12 months is $0.883/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

Benchmarking Score	**[N/A]**

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

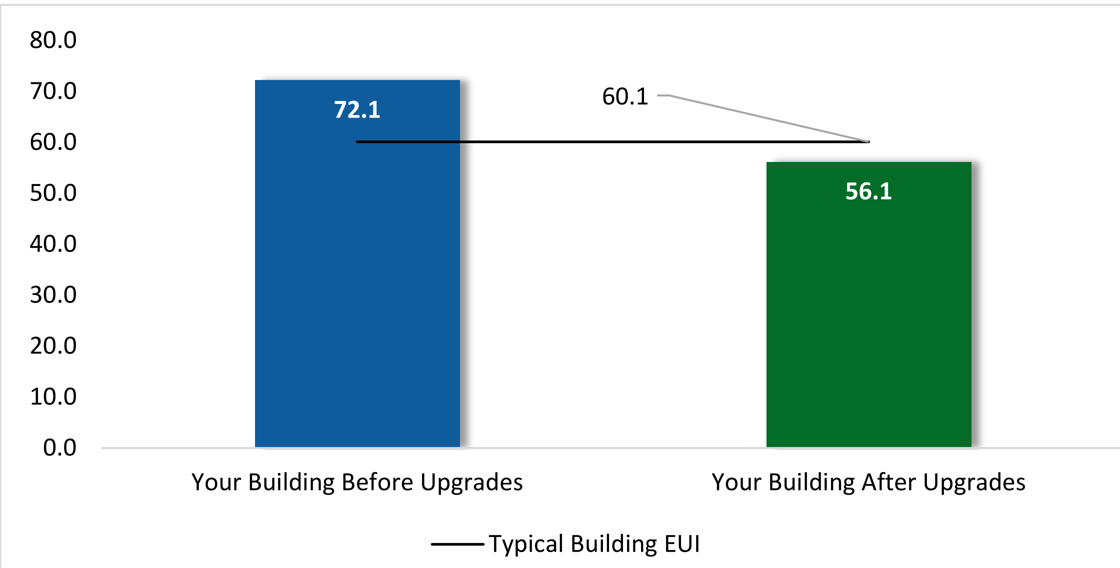


Figure 5 - Energy Use Intensity Comparison[3]

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

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

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

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

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

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

4 ENERGY CONSERVATION MEASURES

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

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

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

Financial incentives are based on previously run state rebate programs. New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the NJCEP website. Some measures and proposed upgrades may be eligible for higher incentives than those shown below.

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**35,411**	**7.8**	**-7**	**$4,711**	**$16,500**	**$2,495**	**$14,005**	**3.0**	**34,829**
ECM 1	Install LED Fixtures	Yes	18,541	3.6	-3	$2,469	$7,223	$850	$6,373	2.6	18,262
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	67	0.0	0	$9	$146	$9	$137	15.4	66
ECM 3	Retrofit Fixtures with LED Lamps	Yes	16,803	4.2	-4	$2,234	$9,131	$1,636	$7,495	3.4	16,501
Lighting Control Measures			**6,369**	**1.5**	**-1**	**$847**	**$5,523**	**$1,215**	**$4,308**	**5.1**	**6,254**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	4,891	1.2	-1	$650	$3,858	$445	$3,413	5.2	4,803
ECM 5	Install High/Low Lighting Controls	Yes	1,478	0.3	0	$196	$1,665	$770	$895	4.6	1,451
Motor Upgrades			**973**	**0.2**	**0**	**$131**	**$876**	**$0**	**$876**	**6.7**	**980**
ECM 6	Premium Efficiency Motors	Yes	973	0.2	0	$131	$876	$0	$876	6.7	980
Unitary HVAC Measures			**19,329**	**10.7**	**6**	**$2,662**	**$40,964**	**$7,535**	**$33,429**	**12.6**	**20,213**
ECM 7	Install High Efficiency Air Conditioning Units	No	19,329	10.7	6	$2,662	$40,964	$7,535	$33,429	12.6	20,213
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**63**	**$556**	**$35,158**	**$6,000**	**$29,158**	**52.5**	**7,372**
ECM 8	Install High Efficiency Furnaces	No	0	0.0	63	$556	$35,158	$6,000	$29,158	52.5	7,372
HVAC System Improvements			**0**	**0.0**	**2**	**$16**	**$46**	**$32**	**$14**	**0.9**	**218**
ECM 9	Install Pipe Insulation	Yes	0	0.0	2	$16	$46	$32	$14	0.9	218
Domestic Water Heating Upgrade			**0**	**0.0**	**3**	**$29**	**$108**	**$82**	**$25**	**0.9**	**390**
ECM 10	Install Low-Flow DHW Devices	Yes	0	0.0	3	$29	$108	$82	$25	0.9	390
Food Service & Refrigeration Measures			**1,551**	**0.2**	**0**	**$209**	**$460**	**$100**	**$360**	**1.7**	**1,562**
ECM 11	Vending Machine Control	Yes	1,551	0.2	0	$209	$460	$100	$360	1.7	1,562
TOTALS			**63,632**	**20.4**	**66**	**$9,162**	**$99,635**	**$17,459**	**$82,176**	**9.0**	**71,818**

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

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

Figure 6 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**35,411**	**7.8**	**-7**	**$4,711**	**$16,500**	**$2,495**	**$14,005**	**3.0**	**34,829**
ECM 1	Install LED Fixtures	18,541	3.6	-3	$2,469	$7,223	$850	$6,373	2.6	18,262
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	67	0.0	0	$9	$146	$9	$137	15.4	66
ECM 3	Retrofit Fixtures with LED Lamps	16,803	4.2	-4	$2,234	$9,131	$1,636	$7,495	3.4	16,501
Lighting Control Measures		**6,369**	**1.5**	**-1**	**$847**	**$5,523**	**$1,215**	**$4,308**	**5.1**	**6,254**
ECM 4	Install Occupancy Sensor Lighting Controls	4,891	1.2	-1	$650	$3,858	$445	$3,413	5.2	4,803
ECM 5	Install High/Low Lighting Controls	1,478	0.3	0	$196	$1,665	$770	$895	4.6	1,451
Motor Upgrades		**973**	**0.2**	**0**	**$131**	**$876**	**$0**	**$876**	**6.7**	**980**
ECM 6	Premium Efficiency Motors	973	0.2	0	$131	$876	$0	$876	6.7	980
HVAC System Improvements		**0**	**0.0**	**2**	**$16**	**$46**	**$32**	**$14**	**0.9**	**218**
ECM 9	Install Pipe Insulation	0	0.0	2	$16	$46	$32	$14	0.9	218
Domestic Water Heating Upgrade		**0**	**0.0**	**3**	**$29**	**$108**	**$82**	**$25**	**0.9**	**390**
ECM 10	Install Low-Flow DHW Devices	0	0.0	3	$29	$108	$82	$25	0.9	390
Food Service & Refrigeration Measures		**1,551**	**0.2**	**0**	**$209**	**$460**	**$100**	**$360**	**1.7**	**1,562**
ECM 11	Vending Machine Control	1,551	0.2	0	$209	$460	$100	$360	1.7	1,562
TOTALS		**44,303**	**9.6**	**-3**	**$5,944**	**$23,513**	**$3,924**	**$19,589**	**3.3**	**44,233**

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

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

Figure 7 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**35,411**	**7.8**	**-7**	**$4,711**	**$16,500**	**$2,495**	**$14,005**	**3.0**	**34,829**
ECM 1	Install LED Fixtures	18,541	3.6	-3	$2,469	$7,223	$850	$6,373	2.6	18,262
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	67	0.0	0	$9	$146	$9	$137	15.4	66
ECM 3	Retrofit Fixtures with LED Lamps	16,803	4.2	-4	$2,234	$9,131	$1,636	$7,495	3.4	16,501

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 fixtures.

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

Affected building areas: gymnasium and 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 2-foot T12 tubes.

ECM 3: Retrofit Fixtures with LED Lamps

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

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

Affected building areas: all areas with fluorescent fixtures with T8 tubes, compact fluorescent lamp, and metal halide lamps.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**6,369**	**1.5**	**-1**	**$847**	**$5,523**	**$1,215**	**$4,308**	**5.1**	**6,254**
ECM 4	Install Occupancy Sensor Lighting Controls	4,891	1.2	-1	$650	$3,858	$445	$3,413	5.2	4,803
ECM 5	Install High/Low Lighting Controls	1,478	0.3	0	$196	$1,665	$770	$895	4.6	1,451

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

ECM 4: Install Occupancy Sensor Lighting Controls

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

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

Occupancy sensors can be mounted on the wall at existing switch locations, 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, gymnasium, restrooms, storage rooms, and other areas noted.

ECM 5: Install High/Low Lighting Controls

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

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

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

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

Affected building areas: hallways and stairwells.

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 Motors

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**973**	**0.2**	**0**	**$131**	**$876**	**$0**	**$876**	**6.7**	**980**
ECM 6	Premium Efficiency Motors	973	0.2	0	$131	$876	$0	$876	6.7	980

ECM 6: Premium Efficiency Motors

Replace standard efficiency motors with IHP 2014 efficiency motors. This evaluation assumes that existing motors will be replaced with motors of equivalent size and type. In some cases, additional savings may be possible by downsizing motors to better meet the motor's current load requirements.

Affected motors:

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Additional Motor Description
Roof	Gym	1	Supply Fan	3.0	

Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours. The base case motor energy consumption is estimated using the efficiencies found on nameplates or estimated based on the age of the motor and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the current *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*.

4.4 Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Unitary HVAC Measures		**19,329**	**10.7**	**6**	**$2,662**	**$40,964**	**$7,535**	**$33,429**	**12.6**	**20,213**
ECM 7	Install High Efficiency Air Conditioning Units	19,329	10.7	6	$2,662	$40,964	$7,535	$33,429	12.6	20,213

Replacing the unitary HVAC units 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 split system is eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

ECM 7: Install High Efficiency Air Conditioning Units

We evaluated replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. Some of the replacement units will incorporate efficient gas furnaces. 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 and heating load and the estimated annual operating hours.

Affected units: dining room, hallways, recreation space, and offices.

4.5 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**63**	**$556**	**$35,158**	**$6,000**	**$29,158**	**52.5**	**7,372**
ECM 8	Install High Efficiency Furnaces	0	0.0	63	$556	$35,158	$6,000	$29,158	52.5	7,372

ECM 8: Install High Efficiency Furnaces

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

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

Affected units: dining room, hallways, recreation space, and offices.

4.6 HVAC Improvements

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**0**	**0.0**	**2**	**$16**	**$46**	**$32**	**$14**	**0.9**	**218**
ECM 9	Install Pipe Insulation	0	0.0	2	$16	$46	$32	$14	0.9	218

ECM 9: Install Pipe Insulation

Install insulation on domestic hot water system piping. Distribution system losses are dependent on system fluid 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.

Affected Systems: domestic hot water piping.

4.7 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**3**	**$29**	**$108**	**$82**	**$25**	**0.9**	**390**
ECM 10	Install Low-Flow DHW Devices	0	0.0	3	$29	$108	$82	$25	0.9	390

ECM 10: Install Low-Flow DHW Devices

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

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

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing. Pre-rinse spray valves (PRSVs — often used in commercial and institutional kitchens — remove food waste from dishes prior to dishwashing.

Additional cost savings may result from reduced water usage.

4.8 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**1,551**	**0.2**	**0**	**$209**	**$460**	**$100**	**$360**	**1.7**	**1,562**
ECM 11	Vending Machine Control	1,551	0.2	0	$209	$460	$100	$360	1.7	1,562

ECM 11: Vending Machine Control

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

5 Energy Efficient Best Practices

A whole building maintenance plan will extend equipment life; improve occupant comfort, health, and safety; and reduce energy and maintenance costs.

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

You may already be doing some of these things— see our list below for potential additions to your maintenance plan. Be sure to consult with qualified equipment specialists for details on proper maintenance and system operation.

Energy Tracking with ENERGY STAR® Portfolio Manager®

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

Weatherization

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

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.

[5] 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.

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.

Ductwork Maintenance

Duct maintenance has two primary goals: keep the ducts clean to avoid air quality problems and seal leaks to save energy. Check for cleanliness, obstructions that block airflow, water damage, and leaks. Ducts should be inspected at least every two years.

The biggest symptoms of clogged air ducts are differing temperatures throughout the building and areas with limited airflow from supply registers. If a particular air duct is clogged, then air flow will only be cut off to some rooms in the building - not all of them. The reduced airflow will make it more difficult for those areas to reach the temperature setpoint which will cause the HVAC system to run longer to cool or heat that area properly. If you suspect clogged air ducts, ensure that all areas in front of supply registers are clear of items that may block or restrict air flow, and check for fire dampers or balancing dampers that have failed closed.

Duct leakage in commercial buildings can account for 5% to 25% of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building wasting conditioned air. Check ductwork for leakage. Eliminating duct leaks can improve ventilation system performance and reduce heating and cooling system operation.

Distribution system losses are dependent on-air system temperature, the size of the distribution system, and the level of insulation of the ductwork. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is missing or worn, the system efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

Furnace Maintenance

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

Water Heater Maintenance

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

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

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

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.

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

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

6 On-site Generation

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

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

6.1 Solar Photovoltaic

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

A preliminary screening based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has no potential for installing a PV array.

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

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

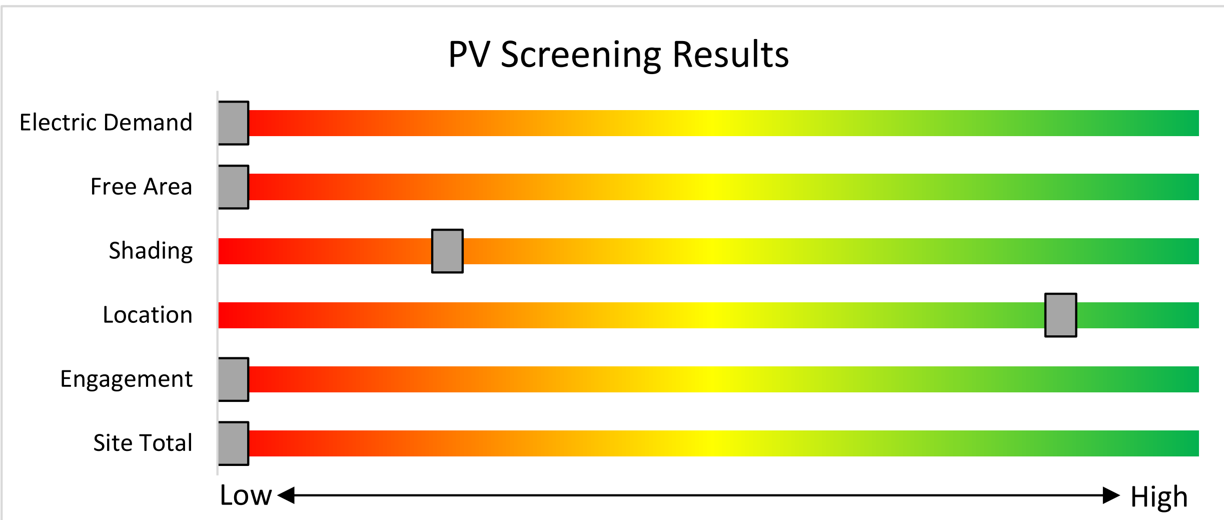


Figure 8 - Photovoltaic Screening

Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program 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 TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installation.

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:

Transition Incentive (TI) Program: https://www.njcleanenergy.com/renewable-energy/programs/transition-incentive-program

- **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.

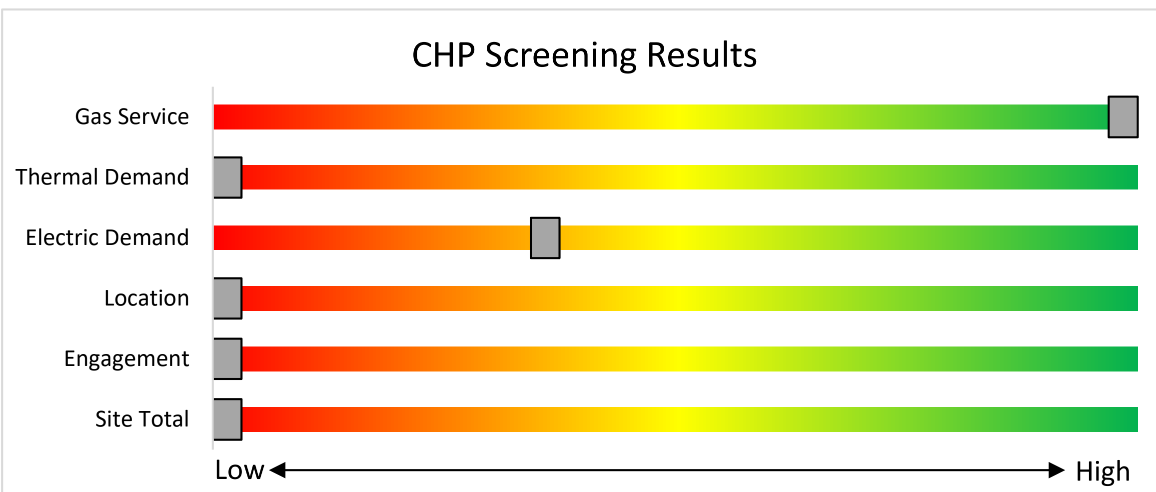


Figure 9 - Combined Heat and Power Screening

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

7 Project Funding and Incentives

Ready to improve your building's performance? Your utility provider may be able to help.

7.1 Utility Energy Efficiency Programs

New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the NJCEP website.

8 New Jersey's Clean Energy Programs

New Jersey's Clean Energy Program will continue to offer some energy efficiency programs.

8.1 Combined Heat and Power

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

Incentives

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

8.2 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 into 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 description 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.

8.3 Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program 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 TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installations. NJBPU calculates the value of a Transition Renewable Energy Certificate (TREC) by multiplying the base compensation rate ($152/MWh) by the project's assigned factor (i.e. $152 x 0.85 = $129.20/MWh). The TREC factors are defined based on the chart below:

Project Type	Factor
Subsection (t): landfill, brownfield, areas of historic fill	1.00
Grid supply (Subsection (r)) rooftop	1.00
Net metered non-residential rooftop and carport	1.00
Community solar	0.85
Grid supply (Subsection (r)) ground mount	0.60
Net metered residential ground mount	0.60
Net metered residential rooftop and carport	0.60
Net metered non-residential ground mount	0.60

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 TRECs.

Eligible projects may generate TRECs for 15 years following the commencement of commercial operations (also referred to as the "Transition Incentive Qualification Life"). After 15 years, projects may be eligible for a NJ Class I REC.

TRECs will be used by the identified compliance entities to satisfy a compliance obligation tied to a new Transition Incentive Renewable Portfolio Standard ("Tl-RPS"), which will exist in parallel with, and completely separate from, the existing Solar RPS for Legacy SRECs. The Tl-RPS is a carve-out of the current Class I RPS requirement. The creation of TRECs is based upon metered generation supplied to PJM-EIS General Attribute Tracking System ("GATS") by the owners of eligible facilities or their agents. GATS would create one TREC for each MWh of energy produced from a qualified facility.

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

Solar projects help the State of New Jersey reach renewable energy goals outlined in the state's Energy Master Plan. The Transition Incentive Program online portal is now open to new applications effective May 1, 2020. There are instructions on "How and When to Transfer my SRP Registration to the Transition Incentive Program". If you are considering installing solar photovoltaics on your building, visit the following link for more information:

https://www.njcleanenergy.com/renewable-energy/programs/transition-incentive-program

9 Project Development

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

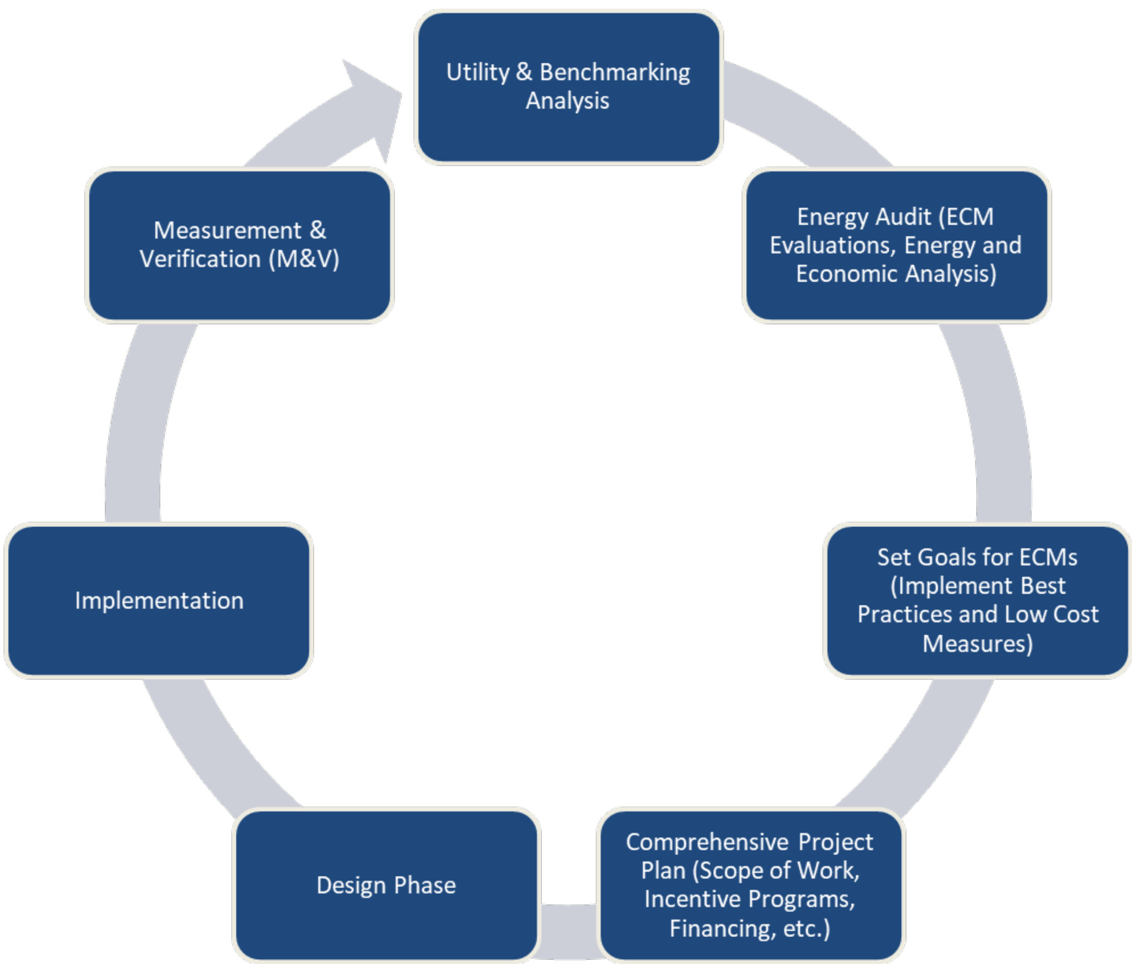


Figure 3 – Project Development Cycle

10 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

10.1 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].

10.2 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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Computer Lab 1	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,583	0.1	635	0	$84	$560	$75	5.7
Elevator Room 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,248	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,248	0.0	44	0	$6	$37	$10	4.5
Exercise Room 1	7	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	7	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,583	0.2	1,110	0	$148	$777	$105	4.6
Exterior 1	5	Metal Halide: (1) 100W Lamp	Timeclock		128	4,368	1	Fixture Replacement	No	5	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	30	4,368	0.0	2,140	0	$289	$1,313	$250	3.7
Furnace Room 1	1	Linear Fluorescent - T12: 2' T12 (20W) - 1L	Wall Switch	S	25	1,248	2	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	1,248	0.0	22	0	$3	$49	$3	15.4
Hallway 1	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Hallway 1	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	4,368	3, 5	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	3,014	0.2	1,110	0	$148	$660	$270	2.6
Game Room 1	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,583	0.1	635	0	$84	$560	$75	5.7
Video Room 1	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,583	0.1	635	0	$84	$560	$75	5.7
Restroom - Unisex 1	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,744	0.0	117	0	$16	$72	$10	4.0
Storage 1	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Storage 1	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,248	3, 4	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	861	0.4	623	0	$83	$672	$110	6.8
Stairwell 2	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch		62	4,368	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,368	0.0	137	0	$18	$72	$10	3.4
Stairwell 2	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch		62	4,368	3	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,368	0.1	274	0	$36	$145	$20	3.4
Dining Room 1	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Dining Room 1	21	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	21	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,583	0.7	3,331	-1	$443	$1,792	$245	3.5
Dining Room 1	1	Metal Halide: (1) 100W Lamp	Wall Switch	S	128	3,744	3, 4	Relamp	Yes	1	LED Lamps - E39: ≤125 W Lamp	Occupancy Sensor	30	2,583	0.1	434	0	$58	$153	$50	1.8
Game Room Storage 1	7	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,248	3, 4	Relamp	Yes	7	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	861	0.2	370	0	$49	$777	$70	14.4
Gymnasium 1	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Gymnasium 1	12	Metal Halide: (1) 400W Lamp	Wall Switch	S	458	3,744	1, 4	Fixture Replacement	Yes	12	LED - Fixtures: Low-Bay	Occupancy Sensor	120	2,583	4.0	18,206	-4	$2,420	$6,180	$635	2.3
Hallway 2	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Hallway 2	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	4,368	3, 5	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	3,014	0.2	925	0	$123	$587	$225	2.9
Janitorial 1	1	Linear Fluorescent - T12: 2' T12 (20W) - 1L	Wall Switch	S	25	1,248	2	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	1,248	0.0	22	0	$3	$49	$3	15.4
Janitorial 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,248	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,248	0.0	44	0	$6	$37	$10	4.5
Kitchen 1	1	LED Lamps: (2) 12W Plug-In Lamps	Wall Switch	S	24	3,744		None	No	1	LED Lamps: (2) 12W Plug-In Lamps	Wall Switch	24	3,744	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 1	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,744	0.1	235	0	$31	$145	$20	4.0
Gymnasium Lobby 1	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Gymnasium Lobby 1	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 5	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,583	0.2	952	0	$127	$660	$60	4.7
Main Entrance 1	2	Compact Fluorescent: (1) 26W G25 Screw-In Lamp	Wall Switch	S	26	3,744	3, 5	Relamp	Yes	2	LED Lamps: G25 Lamps	High/Low Control	18	2,583	0.0	109	0	$14	$50	$4	3.2
Main Entrance 1	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Main Entrance 1	4	Metal Halide: (1) 100W Lamp	Wall Switch	S	128	3,744	3, 5	Relamp	Yes	4	LED Lamps - E39: ≤125 W Lamp	High/Low Control	30	2,583	0.4	1,735	0	$231	$836	$340	2.2
Meeting Room 1	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,583	0.2	952	0	$127	$705	$95	4.8
Office 1	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,583	0.1	317	0	$42	$415	$55	8.5
Recreation Space 1	6	Compact Fluorescent: (1) 42W G25 Screw-In Lamp	Wall Switch	S	42	3,744	3, 4	Relamp	Yes	6	LED Lamps: G25 Lamps	Occupancy Sensor	29	2,583	0.1	527	0	$70	$421	$47	5.3
Recreation Space 1	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Recreation Space 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,583	0.0	170	0	$23	$37	$10	1.2
Recreation Space 1	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,583	0.2	1,019	0	$135	$759	$130	4.6
Recreation Space 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,583	0.0	170	0	$23	$37	$10	1.2
Recreation Space 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,744	3, 4	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,583	0.1	299	0	$40	$73	$20	1.3
Recreation Office 1	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,744	0.0	117	0	$16	$72	$10	4.0
Restroom - Unisex 2	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,744	0.0	117	0	$16	$72	$10	4.0
Restroom - Female 1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 5	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,583	0.1	679	0	$90	$416	$75	3.8
Restroom - Male 1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 5	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,583	0.1	679	0	$90	$416	$75	3.8
Restroom - Unisex 2	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,744	0.0	117	0	$16	$72	$10	4.0
Storage 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,248	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,248	0.0	44	0	$6	$37	$10	4.5
Storage 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,248	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,248	0.0	44	0	$6	$37	$10	4.5
Kitchen Storage 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,248	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,248	0.0	44	0	$6	$37	$10	4.5
Stairwell 1	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairwell 1	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,368	3, 5	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,014	0.2	990	0	$132	$408	$225	1.4
Stairwell 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,368	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,368	0.0	156	0	$21	$37	$10	1.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Break Room 1	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,583	0.1	317	0	$42	$261	$40	5.2
Break Room 2	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,583	0.1	317	0	$42	$261	$40	5.2
Break Room 3	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,583	0.1	317	0	$42	$261	$40	5.2
Janitorial 3	1	Linear Fluorescent - T12: 2' T12 (20W) - 1L	Wall Switch	S	25	1,248	2	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	1,248	0.0	22	0	$3	$49	$3	15.4
Kitchen 2	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,744	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,744	0.0	117	0	$16	$72	$10	4.0
Mechanical 1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,248	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,248	0.1	133	0	$18	$110	$30	4.5
Mechanical 2	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,248	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,248	0.2	267	0	$35	$219	$60	4.5

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	**Area(s)/System(s) Served**	**Motor Quantity**	**Motor Application**	**HP Per Motor**	**Full Load Efficiency**	**VFD Control?**	**Manufacturer**	**Model**	**Remaining Useful Life**	**Annual Operating Hours**	**ECM #**	**Install High Efficiency Motors?**	**Full Load Efficiency**	**Install VFDs?**	**Number of VFDs**	**Total Peak kW Savings**	**Total Annual kWh Savings**	**Total Annual MMBtu Savings**	**Total Annual Energy Cost Savings**	**Estimated M&L Cost ($)**	**Total Incentives**	**Simple Payback w/ Incentives in Years**
Elevator Room 1	Sam Naples Center	1	Other	25.0	75.5%	No	United Technologies Otis	6333DD9	B	936		No	75.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 1	System 2	1	Supply Fan	0.3	65.0%	No	GE	5KH32FN3120T	B	4,368		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 1	System 2	1	Supply Fan	0.3	65.0%	No	Greenheck	BSQ-70-4	B	4,368		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Gym	1	Supply Fan	3.0	80.0%	No	Ruud	RRGF-350150 CKR	B	4,368	6	Yes	89.5%	No		0.2	973	0	$131	$876	$0	6.7
Roof	Sam Naples Center	6	Exhaust Fan	0.3	65.0%	No	Greenheck	Unknown	W	4,368		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Sam Naples Center	1	Makeup Air Fan	0.3	65.0%	No	Greenheck	Unknown	W	4,368		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Sam Naples Center	6	Supply Fan	0.8	75.0%	No	Unknown	Unknown	B	4,368		No	75.0%	No		0.0	0	0	$0	$0	$0	0.0

Packaged HVAC Inventory & Recommendations

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	**Area(s)/System(s) Served**	**System Quantity**	**System Type**	**Cooling Capacity per Unit (Tons)**	**Heating Capacity per Unit (MBh)**	**Cooling Mode Efficiency (SEER/IEER/EER)**	**Heating Mode Efficiency**	**Manufacturer**	**Model**	**Remaining Useful Life**	**ECM #**	**Install High Efficiency System?**	**System Quantity**	**System Type**	**Cooling Capacity per Unit (Tons)**	**Heating Capacity per Unit (MBh)**	**Cooling Mode Efficiency (SEER/IEER/EER)**	**Heating Mode Efficiency**	**Total Peak kW Savings**	**Total Annual kWh Savings**	**Total Annual MMBtu Savings**	**Total Annual Energy Cost Savings**	**Estimated M&L Cost ($)**	**Total Incentives**	**Simple Payback w/ Incentives in Years**
Roof	Gym	1	Package Unit	15.00	350.00	8.00	0.8 AFUE	Ruud	RRGF-350150 CKR	B	7	Yes	1	Package Unit	15.00	350.00	14.00	0.82 Et	4.8	8,679	6	$1,226	$17,812	$2,670	12.3
Roof	2nd Floor	2	Split-System	5.00		10.00		Ruud	RAKA-060CAS	B	7	Yes	2	Split-System	5.00		16.00		2.3	4,050	0	$546	$13,041	$2,100	20.0
Roof	1st Floor	1	Split-System	7.50		10.00		Ruud	RAWD-076CAZ	B	7	Yes	1	Split-System	7.50		14.00		1.3	2,314	0	$312	$5,887	$1,185	15.1
Roof	1st Floor	1	Split-System	10.00		9.00		Ruud	RAWD-100CAZ	B	7	Yes	1	Split-System	10.00		14.00		2.4	4,286	0	$578	$4,224	$1,580	4.6
2nd floor Mechanical Room	1st Floor	1	Forced Air Furnace		99.00		0.795 AFUE	Rheem	RGPH-12EARJR	B	8	Yes	1	Forced Air Furnace		99.00		0.97 22.6573333333333	0.0	0	13	$119	$5,969	$1,000	41.8
2nd floor Mechanical Room	2nd Floor	2	Forced Air Furnace		81.00		0.81 AFUE	Rheem	RGPH-10EBRJR	B	8	Yes	2	Forced Air Furnace		81.00		0.97 22.6573333333333	0.0	0	20	$175	$11,675	$2,000	55.4
Mechanical Room	Dining Room	2	Forced Air Furnace		81.00		0.81 AFUE	Rheem	RGPH-10EBRJR	B	8	Yes	2	Forced Air Furnace		81.00		0.97 22.6573333333333	0.0	0	20	$175	$11,675	$2,000	55.4
Mechanical Room	Basement	1	Forced Air Furnace		81.00		0.81 AFUE	Rheem	RGPH-10EBRJR	B	8	Yes	1	Forced Air Furnace		81.00		0.97 22.6573333333333	0.0	0	10	$87	$5,838	$1,000	55.4

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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Building DHW	9	8	0.75	0.0	0	2	$16	$46	$32	0.9

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Manufacturer	Model	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Sam Naples Center	1	Storage Tank Water Heater (≤ 50 Gal)	Bradford White	M1TW50S6FBN	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommendation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Sam Naples Center	10	8	Faucet Aerator (Kitchen)	2.50	1.50	0.0	0	1	$12	$57	$32	2.1
Restrooms	10	7	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	2	$18	$50	$50	0.0

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 1	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Traulsen	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 1	1	Gas Rack Oven (Single)	MKE		No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen 1	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Vulcan	VCH8-1	No		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Office	6	Desktop	270	No	Dell	Unknown
Break Room	3	Microwave	1,000	No	Hamilton	Unknown
Office	1	Printer	224	No	Brother	Unknown
Dining Room	1	Large Printer	600	No	Biz Hub	Unknown
Meeting Room	1	Refrigerator	226	No	Frigidaire	Unknown
Kitchen Storage Room	1	Refrigerator	463	No	Frigidaire	Unknown
Kitchen 2	1	Refrigerator	226	No	GE	Unknown
Break Room	1	Toaster Oven	1,500	No	Oyster	Unknown

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Hallway	1	Glass Fronted Refrigerated	11	Yes	0.1	1,209	0	$163	$230	$100	0.8
Hallway	1	Non-Refrigerated	11	Yes	0.0	343	0	$46	$230	$0	5.0

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.

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

Sam Naples Center

Primary Property Type: Social/Meeting Hall
Gross Floor Area (ft²): 17,700
Built: 1899

For Year Ending: February 29, 2020
Date Generated: April 19, 2021

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
Sam Naples Center 611 Chestnut Avenue Trenton, New Jersey 08611	City of Trenton 319 East State Street Trenton, NJ 08618 (609) 989-3615	Hoggarth Stephen 319 East State Street Trenton, NJ 08618 (609) 989-3615 hstephen@trentonnj.org

Property ID: 15545222

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
75.4 kBtu/ft²

Source EUI
137.3 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	744,971 (56%)
Electric - Grid (kBtu)	588,877 (44%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	60.1
National Median Source EUI (kBtu/ft²)	109.6
% Diff from National Median Source EUI	25%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	96

Signature & Stamp of Verifying Professional

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

LP Signature: ____________________Date: __________

Licensed Professional

____ ________
,
(___)___-_____
____

Professional Engineer or Registered Architect Stamp (if applicable)

Appendix C: Glossary

TERM	DEFINITION
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.
TREC	*Transition Incentive Renewable Energy Certificate:* a factorized renewable energy certificate you can earn from the state for energy produced from a photovoltaic array.
T5, T8, T12	A reference to a linear lamp diameter. The number represents increments of $1/8^{th}$ of an inch.
Temperature Setpoint	The temperature at which a temperature regulating device (thermostat, for example) has been set.
therm	100,000 Btu. Typically used as a measure of natural gas consumption.
tons	A unit of cooling capacity equal to 12,000 Btu/hr.
Turnkey	Provision of a complete product or service that is ready for immediate use
VAV	*Variable air volume*
VFD	*Variable frequency drive*: a controller used to vary the speed of an electric motor.
WaterSense®	The symbol for water efficiency. The WaterSense® program is managed by the EPA.
Watt (W)	Unit of power commonly used to measure electricity use.