





Local Government Energy Audit Report

Riverside Park

August 10, 2023

Prepared for: Piscataway Township 440 River Road Piscataway, New Jersey 08854 Prepared by: TRC 317 George Street New Brunswick, New Jersey 08901





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

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

Copyright ©2023 TRC. All rights reserved.

Reproduction or distribution of the whole, or any part of the contents of this document without written permission of TRC is prohibited. Neither TRC nor any of its employees makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any data, information, method, product or process disclosed in this document, or represents that its use will not infringe upon any privately-owned rights, including but not limited to, patents, trademarks or copyrights.





Table of Contents

1	Execut	ive Summary	1
	1.1	Planning Your Project	4
	Pick	Your Installation Approach	4
	Optio	ons from Your Utility Company	4
	Preso	riptive and Custom Rebates	4
	Enaii	neered Solutions	4
	Optio	ons from New Jersey's Clean Energy Program	5
2	Existin	g Conditions	6
	2.1	Site Overview	6
	Rece	nt Improvements and Facility Concerns	6
	2.2	Building Occupancy	6
	2.3	Building Envelope	7
	2.4	Lighting Systems	8
	2.5	Air Handling Systems	9
	Unita	ary Heating Equipment	9
	2.6	Domestic Hot Water	10
	2.7	Plug Load and Vending Machines	10
_	2.8	Water-Using Systems	11
3	Energy	Use and Costs	12
	3.1	Electricity	14
	3.2	Natural Gas	15
	J.J		10
^	Traci	Concernation Macauras	.1/ 10
4	Energy	conservation measures	10
	4.1	Lighting	21
	ECM	1: Install LED Fixtures	.21
		Demostic Water Heating	.21 22
	4.2	2. In stall Law Elaw DUM Decises	22
_	ECIVI	3: Install Low-Flow DHW Devices	. 22
5	Energy	Efficient Best Practices	23
	Ener	gy Tracking with ENERGY STAR Portfolio Manager	.23
	Door	s and Windows	.23
	Light	ing Maintenance	.24
	Light	ing Controls	.24
	Moto	pr Controls	.24
	ινιοτά Η\/Δι	C Filter Cleaning and Replacement	.24
	Furn	ace Maintenance	.24





	Wate	er Heater Maintenance	25
	Wate	er Conservation	25
	Proc	urement Strategies	26
6	On-site	e Generation	27
	6.1	Solar Photovoltaic	
	6.2	Combined Heat and Power	30
7	Electri	c Vehicles (EV)	31
	7.1	Electric Vehicle Charging	31
8	Project	t Funding and Incentives	33
	8.1	Utility Energy Efficiency Programs	34
	Pres	criptive and Custom	34
	Direc	ct Install	34
	Engir	neered Solutions	35
	8.2	New Jersey's Clean Energy Programs	
	Large	e Energy Users	
	Com	bined Heat and Power	37
	Succ	essor Solar Incentive Program (SuSI)	38
	Ener	gy Savings Improvement Program	39
9	Project	t Development	40
10	Energy	· Purchasing and Procurement Strategies	41
	10.1	Retail Electric Supply Options	41
	10.2	Retail Natural Gas Supply Options	41
Ар	pendix /	A: Equipment Inventory & Recommendations	A-1
Ap	pendix l	B: ENERGY STAR Statement of Energy Performance	B-1
Ар	pendix (C: Glossary	C-1





1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Riverside Park. 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.







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.



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 ₂ e Emissions Reduction (Ibs)
Lighting Upgrades			8,911	1.0	0	\$6,322	\$99,828	\$9,170	\$90,658	14.3	8,968
ECM 1	Install LED Fixtures	Yes	8,844	0.7	0	\$6,275	\$99,390	\$9 <i>,</i> 050	\$90,340	14.4	8,902
ECM 2	Retrofit Fixtures with LED Lamps	Yes	67	0.2	0	\$47	\$438	\$120	\$318	6.7	66
Domest	ic Water Heating Upgrade		0	0.0	2	\$24	\$36	\$16	\$20	0.8	212
ECM 3	Install Low-Flow DHW Devices	Yes	0	0.0	2	\$24	\$36	\$16	\$20	0.8	212
	TOTALS (COST EFFECTIVE MEASURES)		8,911	1.0	2	\$6,347	\$99,864	\$9,186	\$90,678	14.3	9,181
	TOTALS (ALL MEASURES)		8,911	1.0	2	\$6,347	\$99,864	\$9,186	\$90,678	14.3	9,181

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

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

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 <u>before</u> purchasing materials or starting installation.

Options from Your Utility Company

Prescriptive and Custom Rebates

For facilities wishing to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the Prescriptive and Custom Rebates program. To participate, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval may be required for some incentives. Contact your utility company for more details prior to project installation.

Direct Install

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

Engineered Solutions

The Engineered Solutions program provides tailored energy-efficiency assistance and turnkey engineering services to municipalities, universities, schools, hospitals, and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. The program provides all professional services from audit, design, construction administration, to commissioning and measurement and verification for custom whole-building energy-efficiency projects. Engineered Solutions allows you to install as many measures as possible under a single project as well as address measures that may not qualify for other programs.

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





Options from New Jersey's Clean Energy Program

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

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

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

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

Successor Solar Incentive Program (SuSI)

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

Ongoing Electric Savings with Demand Response

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

Large Energy User Program (LEUP)

LEUP is designed to promote self-investment in energy efficiency. It incentivizes owners/users of buildings to upgrade or install energy conserving measures in existing buildings to help offset the capital costs associated with the project. The efficiency upgrades are customized to meet the requirements of the customers' existing facilities, while advancing the State's energy efficiency, conservation, and greenhouse gas reduction goals.

For more details on these programs please visit New Jersey's Clean Energy Program website .





TRC2 Existing Conditions

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Riverside Park. 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 22, 2023, TRC performed an energy audit at Riverside Park located in Piscataway, New Jersey. TRC met with Jim Ferratti to review the facility operations and help focus our investigation on specific energy-using systems.

Riverside Park is a one-story, 1,800 square foot building built in 2013. Spaces include restrooms, storage room, and outdoor canopy. The facility is 100% heated by one gas-fired unit heater and is not cooled. There is an extensive amount of outdoor lighting, including a number of metal halide field lights.



Aerial View of Facility

Recent Improvements and Facility Concerns

There have been no recent improvements at Riverside Park and there are no critical facility concerns.

2.2 Building Occupancy

The facility is occupied Monday through Sunday from 10:00 AM to 7:00 PM. The park operates for five months out of the year and is occupied by staff intermittently, as needed for maintenance and operations.

Building Name	Weekday/Weekend	Operating Schedule
Columbus Dark	Weekday	10:00 AM - 7:00 PM
Columbus Park	Weekend	10:00 AM - 7:00 PM

Figure 3 -	- Building	Occupancy	Schedule



2.3 Building Envelope

TRC

Riverside Park is comprised of concrete masonry units (CMUs). A pitched standing seam metal roof covering comprises the roof. A picnic canopy attached to the park building also uses a pitched standing seam metal roof. The roof area was not accessible at the time of the audit. Overall, the building envelope is in good condition.

Facility windows are non-operable, privacy windows with wood frames. All windows are in good condition. Exterior doors are solid metal and are in good condition.



Exterior Walls



Picnic Canopy Standing Seam Metal Roof



Facility Windows



Building Exterior Door



2.4 Lighting Systems

The primary interior lighting system for Riverside Park consists of fluorescent and metal halide lighting. Restrooms are illuminated by 4-foot T8 linear fluorescent tubes while high bay metal halide fixtures are used in the storage room. Emergency exit signs are up to date with LED technology.

Restroom interior lighting is controlled by occupancy sensors, and the storage room high bay lights are controlled by wall switch. Overall, the current lighting system is in good condition with adequate light levels.

Exterior grounds and building facade lighting is provided by high pressure sodium (HPS) pole mounted fixtures, HPS wall packs, LED wall packs, and LED floodlights. Metal halide pole mounted fixtures illuminate the surrounding ball fields as needed for sports activities. Photocells and timers control the lights except for the metal halide field lights, which are controlled by a switch. All fixtures are in good condition.



4-Foot T8 Equivalent Linear Fluorescent Tubes



LED Emergency Exit Sign



High Bay Metal Halide Fixture







Ceiling Mounted Occupancy Sensor



Wall Switch



LED Wall Pack



HPS Wall Pack



Photocell



Metal Halide Field Lights

2.5 Air Handling Systems

Unitary Heating Equipment

The storage room is heated by one suspended gas-fired unit heater. The unit has an estimated capacity of 200 MBh and an efficiency rating of 80%. The equipment is in good condition and is controlled by a digital thermostat.



Gas Fired Unit Heater



Thermostat



2.6 Domestic Hot Water

A Rinnai natural gas tankless water heater with an estimated input capacity of 180 MBh is located in the storage room. The unit has an estimated efficiency of 81% and serves the DHW demand of Riverside Park. The DHW units is in good condition and is nearing the end of its useful life.



Tankless Water Heater

2.7 Plug Load and Vending Machines

Plug loads at Riverside Park include one desktop computer and one full-size residential refrigerator. Equipment condition and efficiencies vary.



Riverside Park Plug Load





2.8 Water-Using Systems

There are two restrooms with toilets, urinals, and sinks throughout the facility.

Faucet flow rates are 2.2 gallons per minute (gpm) or lower. Toilets are rated at 2.5 gallons per flush (gpf) and urinals are rated at 2.5 gpf.



Kitchen Faucet

Restroom Faucet

TRC3 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.

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 EDF Energy Services, LLC, a third-party supplier.

Electric Billing Data									
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost				
6/10/21	30	942	106	\$437	\$641				
7/12/21	32	1,057	88	\$378	\$888				
8/10/21	8/10/21 29		126	\$1,726	\$2,055				
9/9/21	9/9/21 30 1,925		122	\$1,689	\$1,779				
10/8/21	29	2,238	125	\$493	\$814				
11/8/21	31	1,949	122	\$484	\$766				
12/9/21	31	412	125	\$493	\$560				
1/11/22	33	523	86	\$341	\$424				
2/9/22	29	549	86	\$342	\$428				
3/11/22	30	515	125	\$493	\$575				
4/11/22	31	739	125	\$494	\$606				
5/11/22	30	913	125	\$495	\$632				
Totals	365	14,330	126	\$7,866	\$10,168				
Annual	365	14,330	126	\$7,866	\$10,168				

Notes:

- Peak demand of 126 kW occurred in July '21.
- Average demand over the past 12 months was 113 kW.
- The average electric cost over the past 12 months was \$0.710/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.
- Demand spikes in July, August, September, and October can be attributed to operation of the ball field lights during the utility peak period. Factoring in the demand charges, meter number 728007489 has an average cost per kWh of \$0.96/kWh when the average is \$0.13/kWh. This could be a billing error; it is recommended to contact PSE&G.

PSE&G delivers natural gas under rate class.

Gas Billing Data									
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost						
6/15/21	30	3	\$20						
7/15/21	30	27	\$42						
8/13/21	29	21	\$38						
9/14/21	32	2	\$20						
10/13/21	29	22	\$43						
11/12/21	30	1	\$19						
12/14/21	32	229	\$312						
1/14/22	31	203	\$259						
2/14/22	31	617	\$776						
3/16/22	30	528	\$682						
4/14/22	29	97	\$135						
5/16/22	32	45	\$78						
Totals	365	1,796	\$2,423						
Annual	365	1,796	\$2,423						

Notes:

• The average gas cost for the past 12 months is \$1.349/therm, which is the blended rate used throughout the analysis.

³ Based on all evaluated ECMs

LGEA Report - Piscataway Township **Riverside Park**

3.3 Benchmarking

TRC

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

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. Building median scores are higher than average due to the outdoor baseball field lighting.

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

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 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: <u>https://www.energystar.gov/buildings/training.</u>

For more information on ENERGY STAR and Portfolio Manager, visit their <u>website</u>.

New Jersey's Cleanenergy program"

TRC 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 in this report are based on the previously run state rebate program SmartStart, which has been retired. Now, all investor-owned gas and electric utility companies are offering complementary energy efficiency programs directly to their customers. Some measures and proposed upgrades may be eligible for higher incentives than those shown below. The incentives in the summary tables should be used for high-level planning purposes. To verify incentives, reach out to your utility provider or visit the <u>NJCEP website</u> for more information.

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (Ibs)
Lighting Upgrades			8,911	1.0	0	\$6,322	\$99,828	\$9,170	\$90 <i>,</i> 658	14.3	8,968
ECM 1	Install LED Fixtures	Yes	8,844	0.7	0	\$6,275	\$99,390	\$9,050	\$90,340	14.4	8,902
ECM 2	Retrofit Fixtures with LED Lamps	Yes	67	0.2	0	\$47	\$438	\$120	\$318	6.7	66
Domestic Water Heating Upgrade			0	0.0	2	\$24	\$36	\$16	\$20	0.8	212
ECM 3	Install Low-Flow DHW Devices	Yes	0	0.0	2	\$24	\$36	\$16	\$20	0.8	212
	TOTALS		8,911	1.0	2	\$6,347	\$99,864	\$9,186	\$90,678	14.3	9,181

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

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

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 ₂ e Emissions Reduction (Ibs)
Lighting Upgrades		8,911	1.0	0	\$6,322	\$99 <i>,</i> 828	\$9,170	\$90,658	14.3	8,968
ECM 1	Install LED Fixtures	8,844	0.7	0	\$6,275	\$99,390	\$9 <i>,</i> 050	\$90,340	14.4	8,902
ECM 2	Retrofit Fixtures with LED Lamps	67	0.2	0	\$47	\$438	\$120	\$318	6.7	66
Domest	ic Water Heating Upgrade	0	0.0	2	\$24	\$36	\$16	\$20	0.8	212
ECM 3	Install Low-Flow DHW Devices	0	0.0	2	\$24	\$36	\$16	\$20	0.8	212
	TOTALS	8,911	1.0	2	\$6,347	\$99,864	\$9,186	\$90,678	14.3	9,181

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

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

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 ₂ e Emissions Reduction (Ibs)
Lighting	g Upgrades	8,911	1.0	0	\$6,322	\$99,828	\$9,170	\$90,658	14.3	8,968
ECM 1	Install LED Fixtures	8,844	0.7	0	\$6,275	\$99,390	\$9,050	\$90,340	14.4	8,902
ECM 2	Retrofit Fixtures with LED Lamps	67	0.2	0	\$47	\$438	\$120	\$318	6.7	66

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

ECM 1: Install LED Fixtures

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

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

The payback period for updating the ball field lighting is long mainly due to the limited hours of operation. However, re-lighting the field has added benefits including recapitalization of the assets and affording an opportunity to reconfigure the fixture layouts to optimize performance. 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.

It should be noted that the payback for replacing the exterior high pressure sodium fixtures with LED fixtures has an estimated pay back of less than two years, mainly because fixtures operate from dusk to dawn.

Affected Building Areas: exterior grounds, ball field, small pavilion, and interior storage area.

ECM 2: Retrofit Fixtures with LED Lamps

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

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

Affected Building Areas: women's restroom and the men's restroom.

4.2 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 ₂ e Emissions Reduction (Ibs)
Domes	tic Water Heating Upgrade	0	0.0	2	\$24	\$36	\$16	\$20	0.8	212
ECM 3	Install Low-Flow DHW Devices	0	0.0	2	\$24	\$36	\$16	\$20	0.8	212

ECM 3: Install Low-Flow DHW Devices

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

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

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing.

Additional cost savings may result from reduced water usage.

TRC 5 ENERGY EFFICIENT BEST PRACTICES

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

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

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

Energy Tracking with ENERGY STAR Portfolio Manager

You've heard it before—you cannot manage what you do not measure. ENERGY STAR Portfolio Manager is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions⁴. 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 weatherstripping materials. There is an energy savings opportunity by reducing the uncontrolled air exchange between the outside and inside of the building. Blower door assisted comprehensive building air sealing will reduce the amount of air exchange, which will in turn reduce the load on the buildings heating and cooling equipment, providing energy savings and increased occupant comfort.

Doors and Windows

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

⁴ <u>https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager.</u>

TRC Lighting Maintenance

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

In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-

lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a lighting technician or contractor, decreasing the overall cost of maintenance.

Lighting Controls

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

Motor Controls

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

Motor Maintenance

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

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.

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 website⁵ or download a copy of EPA's "WaterSense at Work: Best Management Practices

for Commercial and Institutional Facilities"⁶ 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.

⁵ <u>https://www.epa.gov/watersense.</u>

⁶ <u>https://www.epa.gov/watersense/watersense-work-0.</u>

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.

TRCON-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 costeffective solution for your facility. Before deciding to install an on-site generation system, we recommend conducting a feasibility study to analyze existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

6.1 Solar Photovoltaic

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

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

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

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

Figure 8 - Photovoltaic Screening

Successor Solar Incentive Program (SuSI)

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

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

Successor Solar Incentive Program (SuSI): <u>https://www.njcleanenergy.com/renewable-energy/programs/susi-program</u>

- Basic Info on Solar PV in NJ: www.njcleanenergy.com/whysolar
- **NJ Solar Market FAQs**: <u>www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs.</u>
- 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 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: <u>http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/</u>

TRC 7 ELECTRIC VEHICLES (EV)

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

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

7.1 Electric Vehicle Charging

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

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

and usage, other levels of charging power may be more appropriate.

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

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

The type and size of the parking area impact the costs and feasibility of adding EV charging. Parking structure installations can be less costly than surface lot installations as power may be

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

Other factors to consider when planning for EV charging at a facility include who the intended users are, how long they park vehicles at the site, and whether they will need to pay for the electricity they use.

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

Figure 10 – EV Charger Screening

Electric Vehicle Programs Available

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

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

Both Jersey Central Power & Light (JCP&L) and Rockland Electric (RECO) have filed proposals for EV charging programs. BPU staff is currently reviewing those proposals.

For more information and to keep up to date on all EV programs please visit <u>https://www.njcleanenergy.com/commercial-industrial/programs/electric-vehicle-programs</u>

TRC8 PROJECT FUNDING AND INCENTIVES

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

Collectric. Jersey Power	y Central C PSEG
SAS	SOUTH JERSEY
rogram areas to	be served by the Utilities
rogram areas to Existing Buildings (resid government)	be served by the Utilities lential, commercial, industrial,
rogram areas to Existing Buildings (resid government) Efficient Products • HVAC • Appliance Rebates	be served by the Utilities dential, commercial, industrial, Proposed New Programs & Features: Dedicated multi-family program More financing options

TRC8.1 Utility Energy Efficiency Programs

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

Prescriptive and Custom

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

Equipment Examples

LightingVariable Frequency DrivesLighting ControlsElectronically Commutate MotorsHVAC EquipmentVariable Frequency DrivesRefrigerationPlug Loads ControlsGas HeatingWashers and DryersGas CoolingAgriculturalCommercial Kitchen EquipmentWater HeatingFood Service EquipmentVariable Frequency Drives

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

Direct Install

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

Incentives

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

How to Participate

To participate in Direct Install, you will work with a participating contractor. The contractor will be paid the measure incentives directly by the program, which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the Direct Install program, subject to program rules and eligibility, while the remaining percent of the cost is paid to the contractor by the customer.

Engineered Solutions

The Engineered Solutions Program provides tailored energy-efficiency assistance and services to municipalities, universities, schools, hospitals and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. Customers receive expert guided services, including investment-grade energy auditing, engineering design, installation assistance, construction administration, commissioning, and measurement and verification (M&V) services to support the implementation of cost-effective and comprehensive efficiency projects. Engineered Solutions is generally a good option for medium to large sized facilities with a peak demand over 200 kW looking to implement as many measures as possible under a single project to achieve deep energy savings. Engineered Solutions has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program. Incentives for this program are based on project scope and energy savings achieved.

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

TRC8.2 New Jersey's Clean Energy Programs

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

Large Energy Users

The Large Energy Users Program (LEUP) is designed to foster self-directed investment in energy projects. This program is offered to New Jersey's largest energy customers that annually contribute at least \$200,000 to the NJCEP aggregate of all buildings/sites. This equates to roughly \$5 million in energy costs in the prior fiscal year.

Incentives

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

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

How to Participate

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

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

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	<u>≤</u> 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		
Microturbine Fuel Cells with Heat Recovery	>3 MW	\$350	30%	\$3 million
Waste Heat to	<1 MW	\$1,000	30%	\$2 million
Power*	> 1MW	\$500	20.0	\$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 will work with a qualified developer or consulting firm to complete the CHP application. Once the application is approved the project can be installed. Information about the CHP program can be found at www.njcleanenergy.com/CHP.

Successor Solar Incentive Program

Successor Solar Incentive Program (SuSI)

The SuSI program replaces the SREC Registration Program (SRP) and the Transition Incentive (TI) program. The program is used to register and certify solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects *must* register their projects prior to the start of construction to establish the project's eligibility to earn SREC-IIs (Solar Renewable Energy Certificates-II). SuSI consists of two sub-programs. The Administratively Determined Incentive (ADI) Program and the Competitive Solar Incentive (CSI) Program.

Administratively Determined Incentive (ADI) Program

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

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

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

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

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

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

Competitive Solar Incentive Program

The Competitive Solar Incentive (CSI) Program will provide competitively set incentives for grid supply projects and net metered non-residential projects greater than 5MW (dc). The program is currently under development. For updates, please continue to check the <u>Solar Proceedings</u> page on the New Jersey's Clean Energy Program website.

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

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

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 energy conservation measures (ECMs), ensuring that ESIP projects are cash flow positive for the life of the contract.

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

How to Participate

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

- (1) Use an energy services company or "ESCO."
- (2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.
- (3) Use a hybrid approach of the two options described above where the ESCO is used for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

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

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

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.

TRC PROJECT DEVELOPMENT

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

Figure 11 – Project Development Cycle

TRC Every A Construction of the second sec

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. 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 website⁷.

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 fluctuate monthly. The utility provides basic gas supply service to customers who choose not to buy from a third-party supplier for natural gas commodity.

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

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

A list of licensed third-party natural gas suppliers is available at the NJBPU website⁸.

⁷ www.state.nj.us/bpu/commercial/shopping.html.

⁸ 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 Quantit y	Fixture Description	Control System	Light Level	Watts per Fixtur e	Annual Operatin g Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantit y	Fixture Description	Control System	Watts per Fixtur e	Annual Operatin g 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	
Building Exterior Flood	4	LED - Fixtures: Flood Fixture	Photocell		20	4,380		None	No	4	LED - Fixtures: Flood Fixture	Photocell	20	4,380	0.0	0	0	\$0	\$0	\$0	0.0	
Building Exterior Wall Pack	5	LED - Fixtures: Wall Pack	Photocell		20	4,380		None	No	5	LED - Fixtures: Wall Pack	Photocell	20	4,380	0.0	0	0	\$0	\$0	\$0	0.0	
Exterior Grounds	3	High-Pressure Sodium: (1) 200W Lamp	Photocell		250	4,380	1	Fixture Replacement	No	3	LED - Fixtures: Outdoor Pole/Arm- Mounted Area/Roadway Fixture	Photocell	75	4,380	0.0	2,300	0	\$1,632	\$1,336	\$300	0.6	
Exterior Grounds	78	Metal Halide: (1) 1500W Lamp	Wall Switch		1,610	50	1	Fixture Replacement	No	78	LED - Fixtures: Outdoor Pole/Arm- Mounted Area/Roadway Fixture	Wall Switch	483	50	0.0	4,395	0	\$3,119	\$93,600	\$7,800	27.5	
Men's Restroom	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0	
Men's Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupanc y Sensor	S	114	200	2	Relamp	No	3	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	200	0.1	34	0	\$24	\$219	\$60	6.7	
Picnic Pavilion	1	LED - Fixtures: Wall Pack	Photocell		20	200		None	No	1	LED - Fixtures: Wall Pack	Photocell	20	200	0.0	0	0	\$0	\$0	\$0	0.0	
Small Pavilion	15	High-Pressure Sodium: (1) 35W Lamp	Timeclock		46	4,380	1	Fixture Replacement	No	15	LED - Fixtures: Outdoor Wall- Mounted Area Fixture	Timeclock	15	4,380	0.0	2,037	0	\$1,445	\$2,484	\$750	1.2	
Storage	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	
Storage	4	Metal Halide: (1) 350W Lamp	Wall Switch	S	400	100	1	Fixture Replacement	No	4	LED - Fixtures: High-Bay	Wall Switch	120	100	0.7	112	0	\$79	\$1,970	\$200	22.4	
Women's Restroom	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	\$0	\$0	\$0	0.0	
Women's Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupanc y Sensor	S	114	200	2	Relamp	No	3	LED - Linear Tubes: (4) 4' Lamps	Occupanc y Sensor	58	200	0.1	34	0	\$24	\$219	\$60	6.7	

Motor Inventory & Recommendations

		Existin	g Conditions									Proposed Conditions Energy Impact & Financial Analysis									
Location	Area(s)/System(s) Served	Motor Quantit Y	Motor Application	HP Per Motor	Full Load Efficienc Y	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficienc y Motors?	Full Load Efficiency	Install Numbe VFDs? of VFD:	r Total Peak s 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
Storage	Garage Door Motor	1	Other	0.5	70.0%	No			w	3		No	70.0%	No	0.0	0	0	\$0	\$0	\$0	0.0
Men's Restroom	EF - Restroom	1	Exhaust Fan	0.5	70.0%	No			w	200		No	70.0%	No	0.0	0	0	\$0	\$0	\$0	0.0
Women's Restroom	EF - Restroom	1	Exhaust Fan	0.5	70.0%	No			w	200		No	70.0%	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 Quantit y	System Type	Cooling Capacit y per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM # Unstall High System Efficienc Quantit Y System?	System Type	Cooling Capacit y per Unit (Tons)	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
Storage	Unit Heater - Storage	1	Unit Heater		200.00		0.8 Et	Reznor		w	No					0.0	0	0	\$0	\$0	\$0	0.0

DHW Inventory & Recommendations

Existing Conditions						Prop	osed Co	onditio	ns				Energy Impact & Financial Analysis							
Location	Area(s)/System(s) Served	System Quantit y	System Type	Manufacturer	Model	Remaining Useful Life	ECM #	Replace?	System Quantit y	System Type	Fuel Type	System Efficiency	Efficienc y 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
Storage	DHW - Riverside Park	1	Tankless Water Heater	Rinnai		w		No						0.0	0	0	\$0	\$0	\$0	0.0

Low-Flow Device Recommendations

	Reco	mmeda	ation Inputs			Energy Impact & Financial Analysis										
Location	ECM #	Device Quantit y	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				
Storage	3	1	Faucet Aerator (Kitchen)	2.00	1.50	0.0	0	0	\$2	\$7	\$2	2.7				
Men's Restroom	3	2	Faucet Aerator (Lavatory)	2.00	0.50	0.0	0	1	\$11	\$14	\$7	0.6				
Women's Restroom	3	2	Faucet Aerator (Lavatory)	2.00	0.50	0.0	0	1	\$11	\$14	\$7	0.6				

Plug Load Inventory

	Existin	g Conditions				
Location	Quantit y	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified ?	Manufacturer	Model
Riverside Park	1	Desktop	150	No		
Riverside Park	1	Refrigerator (Residential)	200	No		

APPENDIX B: ENERGY STAR STATEMENT OF ENERGY PERFORMANCE

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

(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	<i>British thermal unit</i> : a unit of energy equal to the amount of heat required to increase the temperature of one pound of water by one-degree Fahrenheit.
СНР	Combined heat and power. Also referred to as cogeneration.
СОР	<i>Coefficient of performance</i> : 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	<i>Energy efficiency ratio</i> : a measure of efficiency in terms of cooling energy provided divided by electric input.
EUI	<i>Energy Use Intensity:</i> 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	<i>Greenhouse gas</i> gases that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.
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.
МН	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	<i>New Jersey's Clean Energy Program:</i> NJCEP is a statewide program that offers financial incentives, programs and services for New Jersey residents, business owners and local governments to help them save energy, money, and the environment.
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	<i>Photovoltaic:</i> 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 (II)	Solar renewable energy credit: a credit you can earn from the state for energy produced from a photovoltaic array.
T5, T8, T12	A reference to a linear lamp diameter. The number represents increments of $1/8^{th}$ of an inch.
Temperature Setpoint	The temperature at which a temperature regulating device (thermostat, for example) has been set.
therm	100,000 Btu. Typically used as a measure of natural gas consumption.
tons	A unit of cooling capacity equal to 12,000 Btu/hr.
Turnkey	Provision of a complete product or service that is ready for immediate use.
VAV	Variable air volume
VFD	Variable frequency drive: a controller used to vary the speed of an electric motor.
WaterSense®	The symbol for water efficiency. The WaterSense® program is managed by the EPA.
Watt (W)	Unit of power commonly used to measure electricity use.