Local Government Energy Audit Report

JCNWJ Temple & Community Center

June 17, 2024

Prepared for:
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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.

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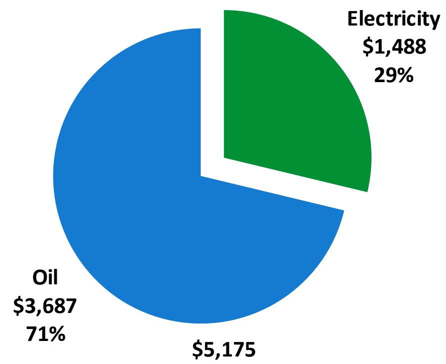
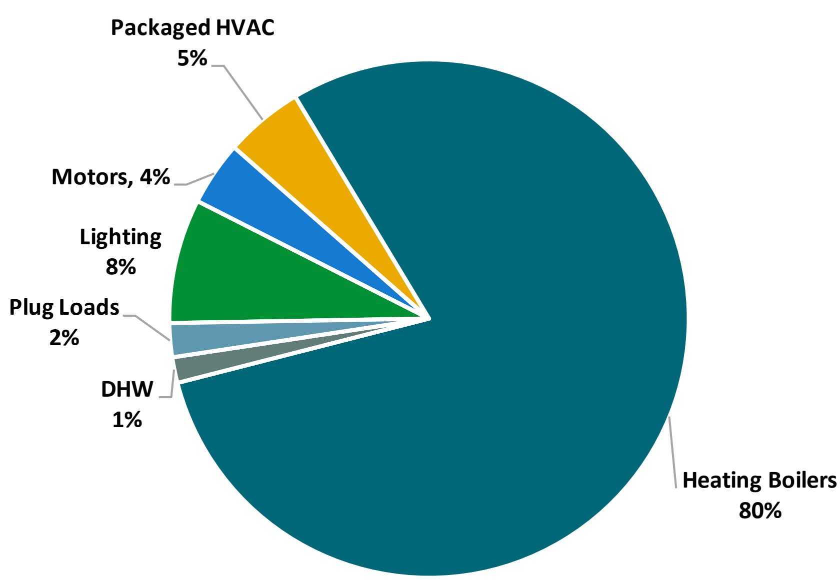
1 Executive Summary

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for JCNWJ Temple & Community 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 Energy Utilities	Costs: $5,175 Electricity: 9,190 kWh No. 2 Fuel Oil: 978 Gallons	
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.



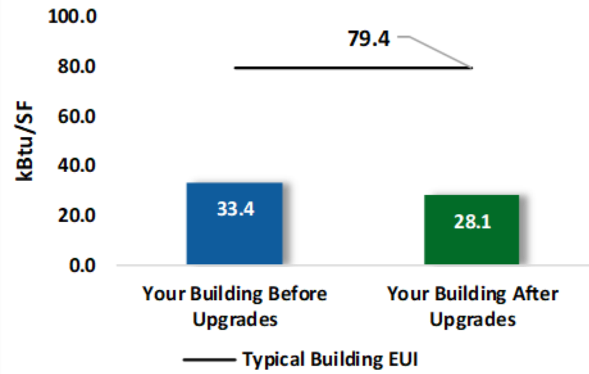
Energy Use by System

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.

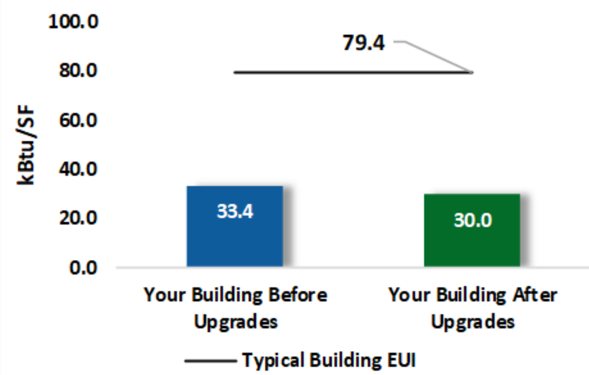
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$24,800
Potential Rebates & Incentives[1]	$1,080
Annual Cost Savings	$770
Annual Energy Savings	Electricity: 812 kWh No. 2 Fuel Oil: 169 Gallons
Greenhouse Gas Emission Savings	2 Tons
Simple Payback	30.8 Years
Site Energy Savings (All Utilities)	16%



Scenario 2: Cost Effective Package[2]

Installation Cost	$600
Potential Rebates & Incentives	$80
Annual Cost Savings	$463
Annual Energy Savings	No. 2 Fuel Oil: 123 Gallons
Greenhouse Gas Emission Savings	1 Tons
Simple Payback	1.1 Years
Site Energy Savings (all utilities)	10%



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)
Unitary HVAC Measures			**812**	**1.6**	**0**	**$132**	**$13,700**	**$600**	**$13,100**	**99.6**	**818**
ECM 1	Install High Efficiency Air Conditioning Units	No	812	1.6	0	$132	$13,700	$600	$13,100	99.6	818
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**6**	**$175**	**$10,500**	**$400**	**$10,100**	**57.6**	**1,055**
ECM 2	Install High Efficiency Hot Water Boilers	No	0	0.0	6	$175	$10,500	$400	$10,100	57.6	1,055
HVAC System Improvements			**0**	**0.0**	**16**	**$430**	**$570**	**$70**	**$500**	**1.2**	**2,583**
ECM 3	Install Pipe Insulation	Yes	0	0.0	16	$430	$570	$70	$500	1.2	2,583
Domestic Water Heating Upgrade			**0**	**0.0**	**1**	**$33**	**$30**	**$10**	**$20**	**0.6**	**201**
ECM 4	Install Low-Flow DHW Devices	Yes	0	0.0	1	$33	$30	$10	$20	0.6	201
TOTALS (COST EFFECTIVE MEASURES)			**0**	**0.0**	**17**	**$463**	**$600**	**$80**	**$520**	**1.1**	**2,784**
TOTALS (ALL MEASURES)			**812**	**1.6**	**23**	**$770**	**$24,800**	**$1,080**	**$23,720**	**30.8**	**4,657**

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

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

All Evaluated Energy Improvements[3]

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

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

Options from Your Utility Company

Prescriptive and Custom Rebates

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

Direct Install

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

Engineered Solutions

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

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

Options from New Jersey's Clean Energy Program

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

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

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

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

Successor Solar Incentive Program (SuSI)

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

Ongoing Electric Savings with Demand Response

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

Large Energy User Program (LEUP)

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

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

2 Existing Conditions

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for JCNWJ Temple & Community 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 7, 2024, TRC performed an energy audit at JCNWJ Temple & Community Center located in Washington, New Jersey. TRC met with Jeff Berkowitz to review the facility operations and help focus our investigation on specific energy-using systems.

JCNWJ Temple & Community Center is a 2-story, 5,000 square foot building built in 1946. Spaces include a few classrooms, an office, residential kitchen, prayer sanctuary, dining room, and basement mechanical space. This building is heated by a No. 2 oil boiler that sends hot water to terminal units throughout the building. The boiler also has an indirect water heater attached to it that serves the domestic hot water heating. A split system condensing unit on the exterior of the building serves an air handling unit that cools the prayer space. The facility is in the process of running a gas line to the facility. This gives the facility more options when considering equipment replacements.

2.2 Building Occupancy

The facility is occupied intermittently. The temple is typically occupied from 6:30 PM to 9:30 PM a few weekends and some weeknights out of the month. Two to three times each year, the temple hosts 60-100 people for large holidays and community gatherings. The facility is partially occupied for maintenance, as needed.

Building Name	Weekday/Weekend	Operating Schedule
JCC & Temple	Weekday	Intermittent
	Weekend	Intermittent

Building Occupancy Schedule

2.3 Building Envelope

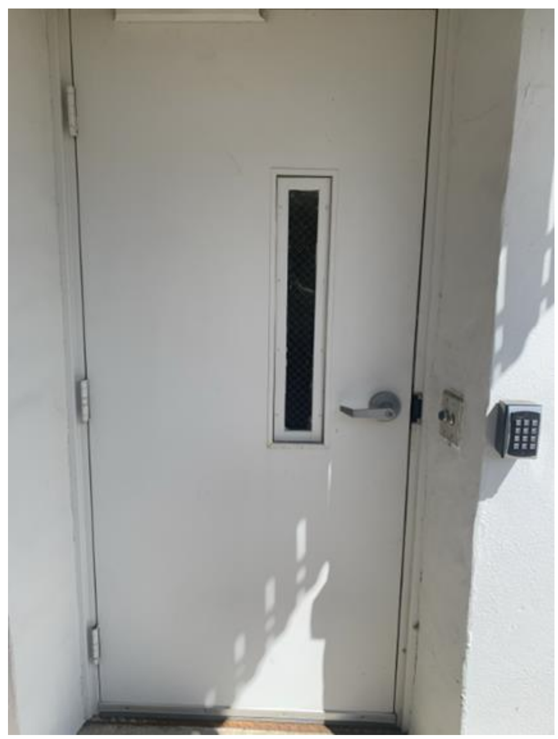
Building walls are concrete block over structural steel or wood. The roof is pitched and covered by asphalt shingles. The roof was replaced in the last 5 years and is in good condition. The walls are made of concrete masonry units (CMUs) with a stucco veneer. The interior walls have a drywall finish. Steel trusses support a pitched roof with asphalt shingles and enclose all conditioned and semi-conditioned spaces in the building.

Most of the windows on site are double pane with aluminum frames. The glass to frame seals and the operable window weather seals are in fair condition. There are some double pane stained-glass exterior doors with aluminum or wood frames, depending on the door. The exterior doors and are also in fair condition with undamaged door seals. Degraded window and door seals increase drafts and outside air infiltration.

Exterior Window

Exterior Window

Front Door

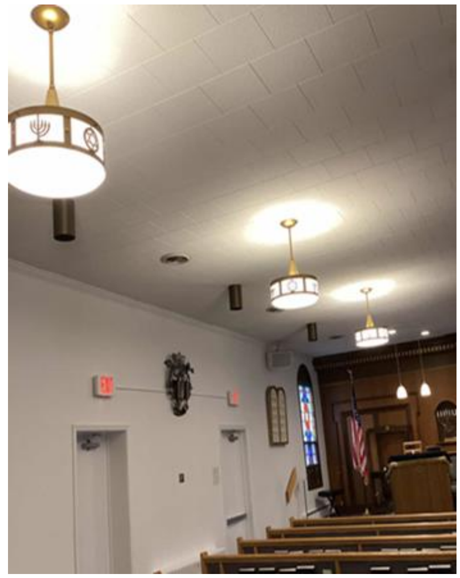


Side Door

2.4 Lighting Systems.

The primary interior lighting system uses LED linear fixtures. Fixture types include 1x4 surface mount and 2x4 recessed LED fixtures, cove lighting, downlights, and pendant fixtures. All the exit signs are LED. And the fixtures are in good condition. At the time of the audit the interior lighting levels were generally sufficient. Fixtures in most of the building are controlled by wall switches. The restrooms in the basement are the only area where fixtures are controlled by wall mounted occupancy sensors.

1 x 4 Surface Mount



LED Downlight

LED Exit Sign

Wall Switches

Bathroom Occupancy

Exterior Wall Pack

Exterior Flood Lights

Exterior Downlight

2.5 Air Handling Systems

<u>Air Handling Units (AHUs</u>)

The sanctuary space is conditioned by an air handling unit. This unit is equipped with a supply fan motor, hot water heating coil, and a refrigerant coil for cooling. It is physically located above the ceiling and was inaccessible during the energy audit. The supply fan motor is assumed to be 2 hp, constant speed, and standard efficiency.

The outdoor Johnson Control condensing unit is in fair condition and has reached the end of its useful life. The cooling capacity of the unit is 7.5 tons and has an energy efficiency ratio (EER) of 9.7. Supply air temperatures are determined by a remote controlled nest thermostat.

Outdoor Condensing Unit

2.6 Heating Hot Water Systems

One Weil-McLain 152 MBh input, oil-fired hot water boiler serves the building heating load and domestic hot water needs. The boiler has two fractional horsepower hot water pumps for recirculation and an indirect domestic hot water coil attached to the boiler. The boiler provides heating hot water to baseboard radiant heaters throughout the building and the AHU in the sanctuary. A Nest thermostat controls the temperature in the sanctuary while other spaces have manual thermostats.

Hot Water Boiler

2.7 Domestic Hot Water

Domestic hot water is produced by a heat exchanger using hot water from the space heating boiler. Small fractional horsepower pumps recirculate domestic hot water throughout the building The domestic hot water pipes are not insulated. We recommend insulating these pipes.

Indirect Domestic Hot Water Heater

2.8 Plug Load and Vending Machines

The location is doing a great job managing the electrical plug loads. This report makes additional suggestions for ECMs in this area as well as energy efficient best practices. The kitchen has various residential style plug loads and food service equipment. A double oven and an electric stove top are used to prepare food for events and occasionally the staff. There is a residential style fridge, a dishwasher and other plug loads in the kitchen.

Kitchen Dishwasher

Kitchen Oven

2.9 Water-Using Systems

Water is provided by the municipal water supply company.

Potable water is used for drinking, cleaning, cooking, sanitary fixtures, building conditioning and irrigation. Water leaks were not observed.

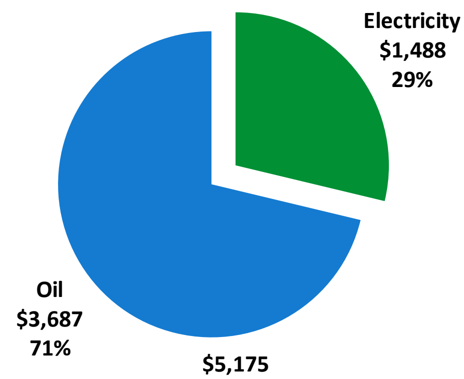
Restroom Faucet

Kitchen Faucet

3 Energy and Water Use and Costs

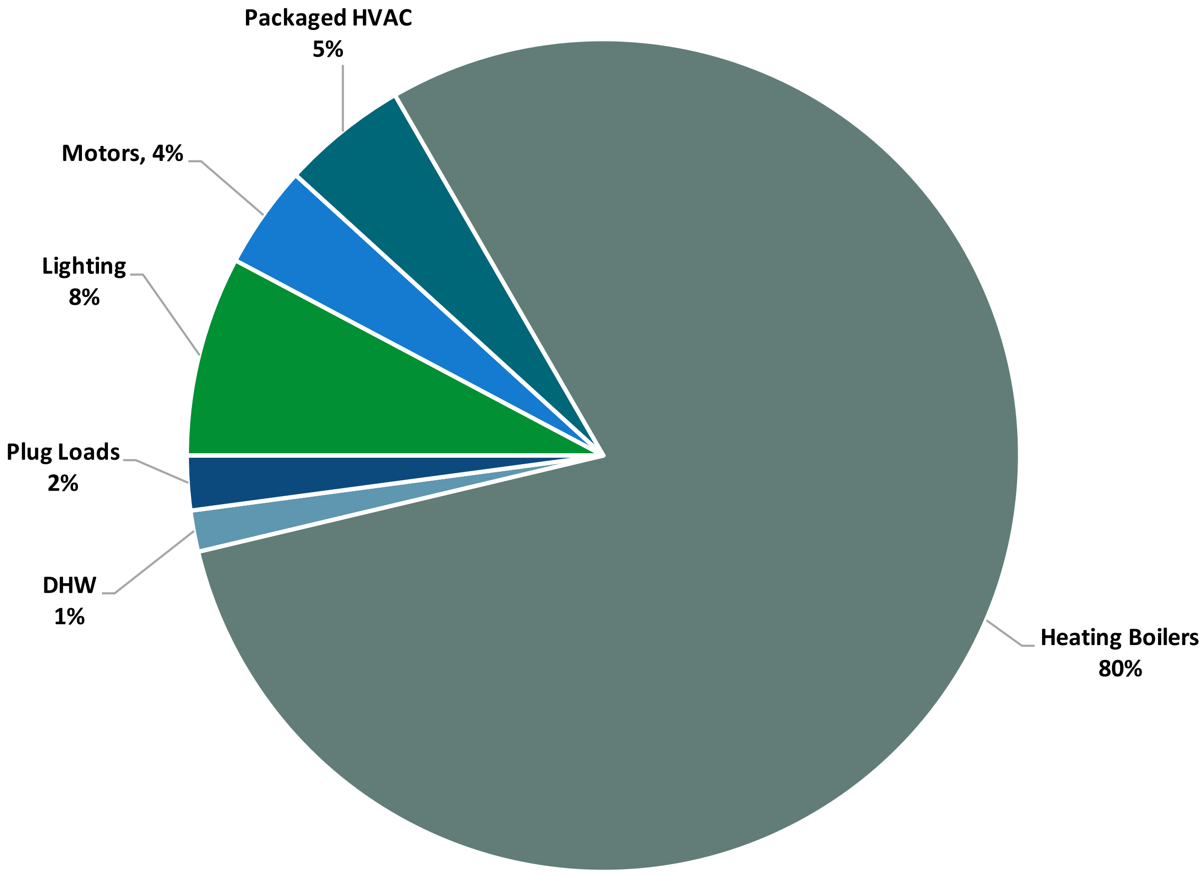
Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	9,190 kWh	$1,488
No. 2 fuel oil	978 Gallons	$3,687
Total		**$5,175**



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

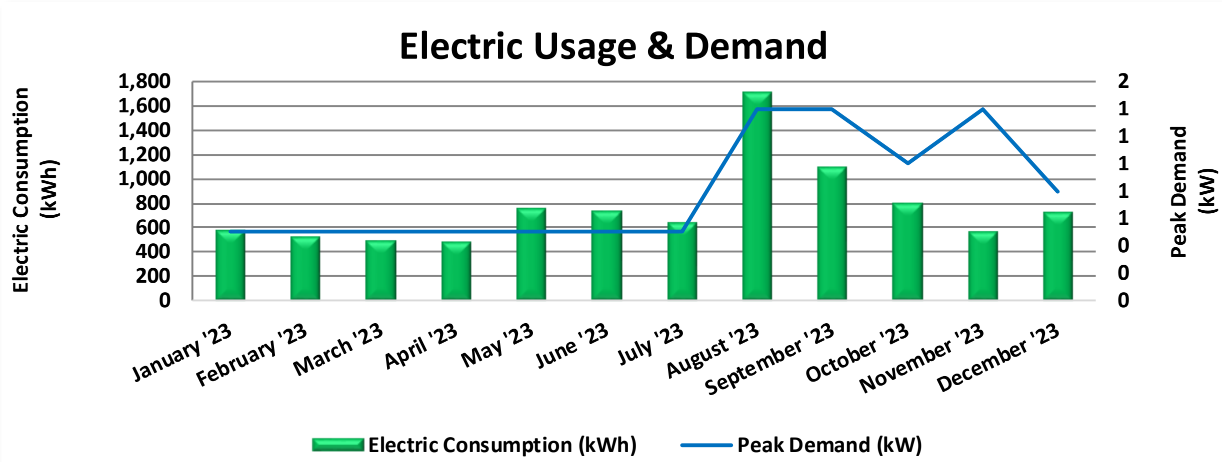
The energy auditor collects information regarding equipment operating hours, capacity, efficiency, and other operational parameters from facility staff, drawings, and on-site observations. This information is used as the inputs to calculate the existing conditions energy use for the site. The calculated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



Energy Balance by System

3.1 Electricity

JCP&L delivers electricity under rate class General Service Secondary House of Worship JC_GS3_09F.



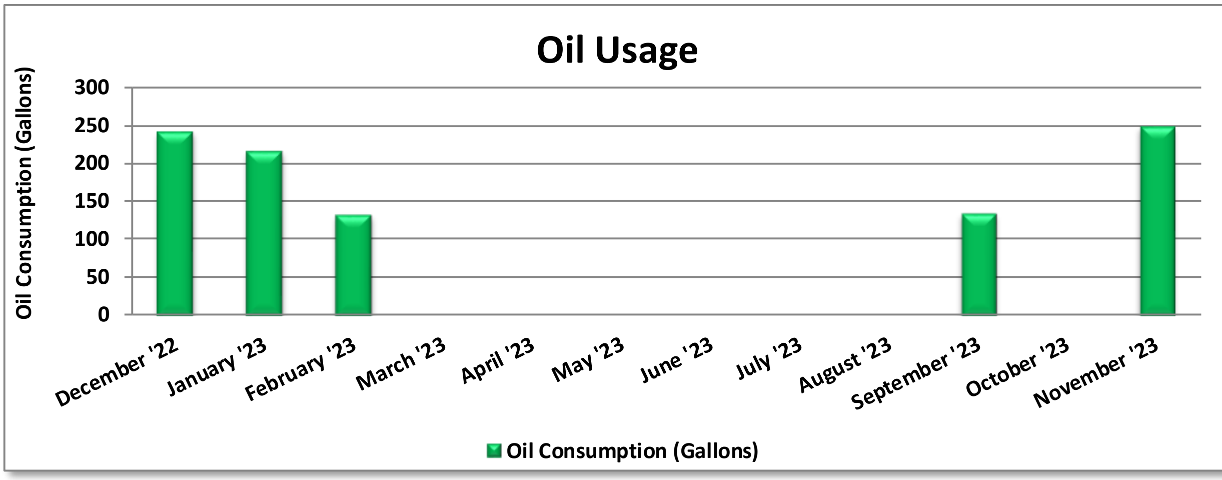
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
1/28/23	30	588	1	$2	$95
2/27/23	30	533	1	$2	$88
3/29/23	30	499	1	$2	$84
4/27/23	29	491	1	$2	$83
5/30/23	33	758	1	$2	$121
6/28/23	29	747	1	$2	$125
7/28/23	30	648	1	$2	$112
8/28/23	31	1,713	1	$11	$252
9/28/23	31	1,101	1	$10	$175
10/30/23	32	805	1	$7	$132
11/29/23	30	574	1	$5	$99
12/29/23	30	733	1	$6	$121
Totals	**365**	**9,190**	**1**	**$52**	**$1,488**
Annual	**365**	**9,190**	**1**	**$52**	**$1,488**

Notes:

- Peak demand of 1 kW occurred in August '23.
- Average demand over the past 12 months was 1 kW.
- The average electric cost over the past 12 months was $0.162/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 No. 2 Fuel Oil

Region Energy delivers No. 2 fuel oil to the project site.



No. 2 fuel oil Billing Data			
Period Ending	**Days in Period**	**Oil Usage (Gallons)**	**Fuel Cost**
1/1/23	31	243	$992
2/1/23	31	217	$813
3/1/23	28	133	$479
4/1/23	31	0	$0
5/1/23	30	0	$0
6/1/23	31	0	$0
7/1/23	30	0	$0
8/1/23	31	0	$0
9/1/23	31	0	$0
10/1/23	30	135	$533
11/1/23	31	0	$0
12/1/23	30	250	$870
Totals	**365**	**978**	**$3,687**
Annual	**365**	**978**	**$3,687**

Notes:

- The average No. 2 fuel oil cost for the past 12 months is $3.771/Gallon, which is the blended rate used throughout the analysis.
- Fuel deliveries do not necessarily correspond to periods of use.

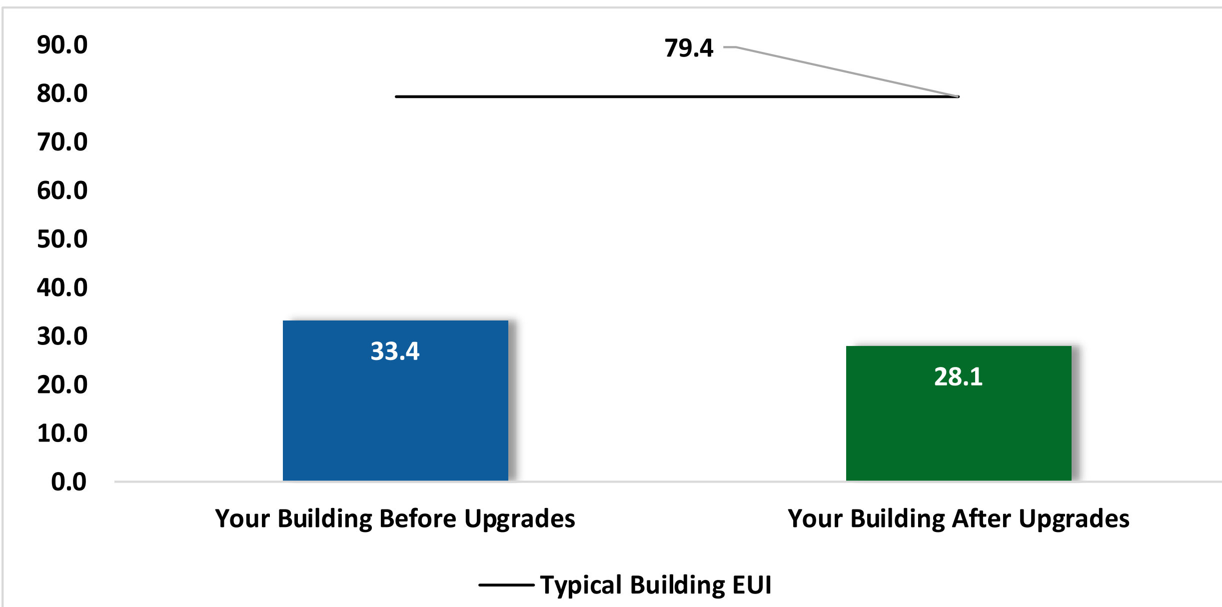
3.3 Benchmarking

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

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

Benchmarking Score	N/A

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



Energy Use Intensity Comparison[4]

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.

[4] Based on all evaluated ECMs

Tracking your Energy Performance

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

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

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

For more information on ENERGY STAR and Portfolio Manager, visit their website.

3.4 Understanding Your Utility Bills

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

Sample bills, with annotation, may be viewed at:
https://www.nj.gov/rpa/docs/Understanding_Electric_Bill.pdf
https://www.nj.gov/rpa/docs/Understanding_Gas_Bill.pdf

Why Utility Bills Vary

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

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

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

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

4 Energy Conservation Measures

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

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

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

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

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

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#	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)
Unitary HVAC Measures			**812**	**1.6**	**0**	**$132**	**$13,700**	**$600**	**$13,100**	**99.6**	**818**
ECM 1	Install High Efficiency Air Conditioning Units	No	812	1.6	0	$132	$13,700	$600	$13,100	99.6	818
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**6**	**$175**	**$10,500**	**$400**	**$10,100**	**57.6**	**1,055**
ECM 2	Install High Efficiency Hot Water Boilers	No	0	0.0	6	$175	$10,500	$400	$10,100	57.6	1,055
HVAC System Improvements			**0**	**0.0**	**16**	**$430**	**$570**	**$70**	**$500**	**1.2**	**2,583**
ECM 3	Install Pipe Insulation	Yes	0	0.0	16	$430	$570	$70	$500	1.2	2,583
Domestic Water Heating Upgrade			**0**	**0.0**	**1**	**$33**	**$30**	**$10**	**$20**	**0.6**	**201**
ECM 4	Install Low-Flow DHW Devices	Yes	0	0.0	1	$33	$30	$10	$20	0.6	201
TOTALS			**812**	**1.6**	**23**	**$770**	**$24,800**	**$1,080**	**$23,720**	**30.8**	**4,657**

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

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

All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**0**	**0.0**	**16**	**$430**	**$570**	**$70**	**$500**	**1.2**	**2,583**
ECM 3	Install Pipe Insulation	0	0.0	16	$430	$570	$70	$500	1.2	2,583
Domestic Water Heating Upgrade		**0**	**0.0**	**1**	**$33**	**$30**	**$10**	**$20**	**0.6**	**201**
ECM 4	Install Low-Flow DHW Devices	0	0.0	1	$33	$30	$10	$20	0.6	201
TOTALS		**0**	**0.0**	**17**	**$463**	**$600**	**$80**	**$520**	**1.1**	**2,784**

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

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

Cost Effective ECMs

4.1 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		**812**	**1.6**	**0**	**$132**	**$13,700**	**$600**	**$13,100**	**99.6**	**818**
ECM 1	Install High Efficiency Air Conditioning Units	812	1.6	0	$132	$13,700	$600	$13,100	99.6	818

ECM 1: Install High Efficiency Air Conditioning Units

Replace standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. 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: Johnson Control condensing unit

4.2 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**	**6**	**$175**	**$10,500**	**$400**	**$10,100**	**57.6**	**1,055**
ECM 2	Install High Efficiency Hot Water Boilers	0	0.0	6	$175	$10,500	$400	$10,100	57.6	1,055

ECM 2: Install High Efficiency Hot Water Boilers

Replace older inefficient hot water boilers with high efficiency hot water boilers. Energy savings results from improved combustion efficiency and reduced standby losses at low loads.

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

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

4.3 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**	**16**	**$430**	**$570**	**$70**	**$500**	**1.2**	**2,583**
ECM 3	Install Pipe Insulation	0	0.0	16	$430	$570	$70	$500	1.2	2,583

ECM 3: Install Pipe Insulation

Install insulation on heating water system piping. Distribution system thermal losses are dependent on system fluid temperature, the size of the distribution system, and the extent and condition of piping insulation. When the insulation has been damaged due to exposure to water, when the insulation has been removed from some areas of the pipe, or when valves have not been properly insulated, system thermal efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

Affected Systems: hot water piping and domestic hot water piping

4.4 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**1**	**$33**	**$30**	**$10**	**$20**	**0.6**	**201**
ECM 4	Install Low-Flow DHW Devices	0	0.0	1	$33	$30	$10	$20	0.6	201

ECM 4: 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.

4.5 Measures for Future Consideration

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

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

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

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

Disaggregate Boiler System

A major consumer of energy in this building is the heating mechanical equipment. Due to the boiler plant serving the domestic water and space heating needs of the facility, a boiler must operate year-round at light load conditions, which results in an overall poor cycle efficiency. A potential solution includes the installation of a dedicated boiler, which would operate to meet the domestic water needs during the summer months, eliminating the need for the heating boiler during this period.

This action will increase the efficiency of the boiler plant operation and significantly reduce fuel consumption. The non-space heating boiler must be sized to meet the requirements of the domestic water heating system. This will allow for the mitigation of short cycling and cycling losses in the system. The system will include the boiler, a new heat exchanger, blending valve and additional gas and water piping and electrical connections. We recommend that an HVAC contractor who specializes in boiler systems be contacted for a detailed evaluation and implementation costs.

VRF Systems

Consider variable refrigerant flow (VRF) systems as part of a comprehensive package unit upgrade project. (VRF systems use direct expansion (DX) heat pumps to transport heat between an outdoor condensing unit and a network of indoor evaporators, located near or within the conditioned space, through refrigerant piping installed in the building. Attributes that distinguish VRF from other DX system types are:

- Multiple indoor units connected to a common outdoor unit
- Scalability
- Variable capacity
- Distributed control
- Simultaneous heating and cooling capability

VRF provides flexibility by allowing for many different indoor units (with different capacities and configurations), individual zone control, the unique ability to offer simultaneous heating and cooling in separate zones on a common refrigerant circuit, and heat recovery from one zone to another. VRF systems are equipped with at least one variable-speed and/or variable-capacity compressor.

To match the building's load profiles, energy is transferred from one indoor space to another through the refrigerant line, and only one energy source is necessary to provide both heating and cooling. VRF systems also operate efficiently at part load because of the compressor's variable capacity control. VRF systems are ideal for applications with varying loads or where zoning is required. Some other advantages of VRF systems include consistent comfort, quiet operation, energy efficiency, installation flexibility, zoned heating and cooling, state-of-the-art controls, and reliability.

VRF systems are more expensive than conventional heat pump systems; however, the higher initial cost can be offset by improved cooling efficiency during part load operation—a SEER (cooling) rating of 18.0 is not uncommon for small packaged VRF-equipped heat pumps.

When you are replacing packaged HVAC equipment, we recommend a comprehensive approach. Work with your contractor or design engineer to make sure your systems are sized and zoned according to current space configurations and occupancy. Select high efficiency equipment and controls that match your heating and cooling needs. Commission the system and controls to ensure proper operation, comfort, ventilation, and energy use.

5 ENERGY EFFICIENT BEST PRACTICES

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

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

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

Energy Tracking with ENERGY STAR Portfolio Manager

You've heard it before—you cannot manage what you do not measure. ENERGY STAR Portfolio Manager is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions[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, 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.

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-

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

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 Short Cycling Reduction

Frequent stopping and starting of motors places substantial stress on rotors and other parts. This leads to wear and tear, lower efficiency, and higher maintenance costs. Adjust the load on the motor to limit the amount of unnecessary stopping and starting to improve motor performance.

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.

Thermostat Schedules and Temperature Resets

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

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.

<u>**Boiler Maintenance**</u>

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

<u>**Optimize HVAC Equipment Schedules**</u>

Energy management systems (BAS) typically provide advanced controls for building HVAC systems, including chillers, boilers, air handling units, rooftop units and exhaust fans. The BAS monitors and reports operational status, schedules equipment start and stop times, locks out equipment operation based on outside air or space temperature, and often optimizes damper and valve operation based on complex algorithms. These BAS features, when in proper adjustment, can improve comfort for building occupants and save substantial energy.

Know your BAS scheduling capabilities. Regularly monitor HVAC equipment operating schedules and match them to building operating hours to eliminate unnecessary equipment operation and save energy. Monitoring should be performed often at sites with frequently changing usage patterns – daily in some cases. We recommend using the optimal start feature of the BAS (if available) to optimize the building warmup sequence. Most BAS scheduling programs provide for holiday schedules, which can be used during reduced use or shutdown periods. Finally, many systems are equipped with a one-time override function, which can be used to provide additional space conditioning due to a one-time, special event. When available this override feature should be used rather than changing the base operating schedule.

<u>**Procurement Strategies**</u>

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

6 Water Best Practices

Getting Started

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

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

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

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

Leak Detection and Repair

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

Toilets and Urinals

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

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

[7] https://dep.nj.gov/wp-content/uploads/dsr/trends-water-supply.pdf

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

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

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

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

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

Faucets and Showerheads

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

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

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

7 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.

7.1 Solar Photovoltaic

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

An additional study for solar photovoltaic for JCNWJ Temple & Community Center is provided below.

An additional study for solar photovoltaic for the Jewish Community Center of Northwest Jersey is provided below.

Executive Summary

This section summarizes projected energy and cost impacts, as well as design considerations, for a proposed 10 kW-DC roof mounted solar photovoltaic (PV) for the Jewish Community Center of Northwest Jersey located at 115 Youmans Ave, Washington, NJ 07882. Please note this is a feasibility stage study, and all cost/savings values are solely estimates and not for design level application.

The system consists of:

10-kW Roof Mount PV System: The roof-mounted solar panels are strategically positioned to make best use of the available roof area and meet 100% of the building's net electrical requirements.

Please note that a battery and energy storage system (BESS) for this site was not found to be economically feasible. The peak demand (kW) charges are too low for this facility to accrue any meaningful savings over the life of a BESS.

Equipment	Estimated Max Demand Savings (kW)	Estimated Annual Energy Generation (kWh)	Estimated Annual GHG Reduction (MT-CO_2e)	Estimated Annual Cost Savings ($)	Estimated Gross Project Cost ($)	Total Incentives ($)	Net Project Cost ($)	Simple Payback Period[10] (yr.)
10 kW Solar PV	0	9,654	2	$1,117	$37,000	$20,350	$16,650	14.9

Project Summary Table

[10] Simple payback is computed as the "Net Project Cost" divided by the "Estimated Annual Cost Savings".

Equipment	Estimated Gross Project Cost ($)	ITC Rebate (1)	MACRS Rebate (2)	Net Project Cost
10 kW Solar PV	$37,000	$11,100	$9,250	$16,650

Incentive Summary Table

Multiple incentives are available to reduce the project cost.

1. Federal Income Tax Credit (ITC): As of the passage of the 2022 Inflation Reduction Act, the ITC refund can be claimed by non-taxable entities as a cash rebate. The ITC is equal to 30% of the system cost and is scheduled to persist until 2033.

2. Modified Accelerated Cost Recovery System (MACRS): As of the passage of the 2022 Inflation Reduction Act, the MACRS refund can be claimed by non-taxable entities as a cash rebate. This rebate allows 85% of the system cost to be claimed as equipment depreciation at Year 1, approximately equivalent to 25% of the system cost.

Ownership Models

This report explores two ownership models: Cash Purchase and Power Purchase Agreement (PPA).

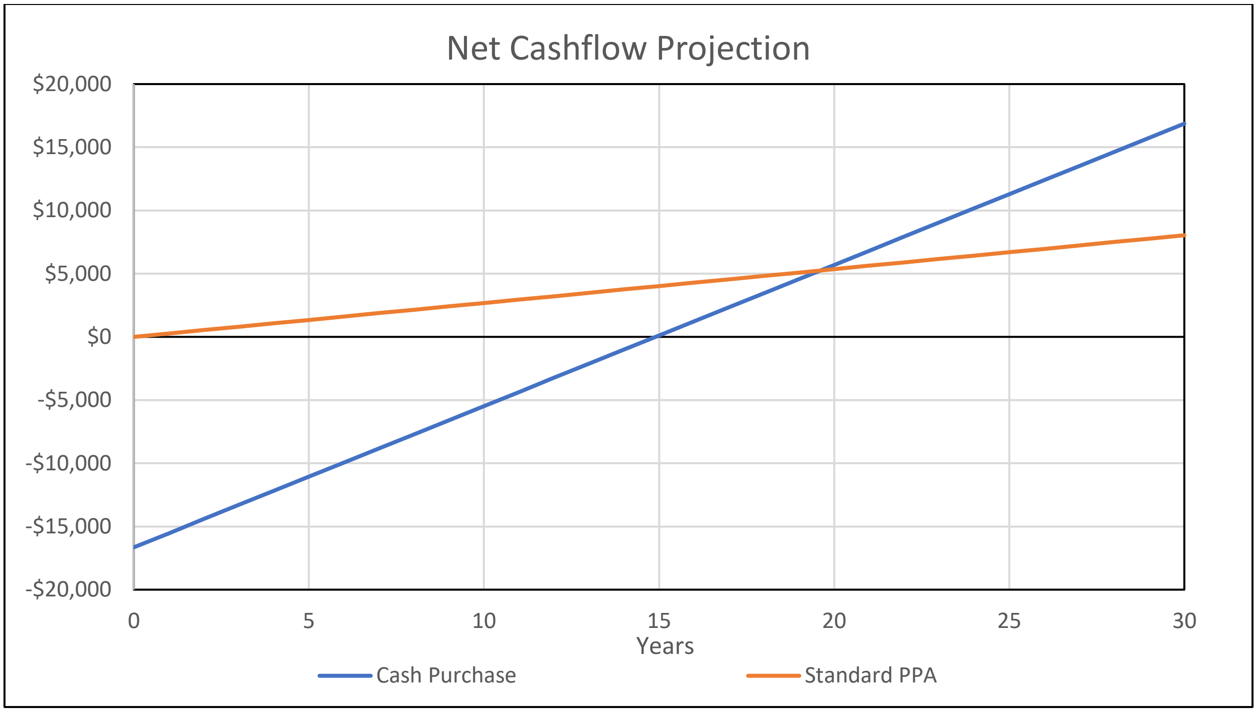
- Cash Purchase: In this case, the entire system is purchased upfront by the customer.

- Standard Power Purchase Agreement: In this scenario, a third party installs and owns the system, and sells electricity to the customer at a reduced rate. Calculations assume the owner charges a 3% interest rate on the system. In the table below, the interest rate is factored in as an offset to the "Annual Savings ($)". Return on Investment (ROI) is null because there is no cost to the customer.

Ownership Plan	Upfront Gross Project Cost ($)	Year 1 Cost After Rebates ($)	Annual Savings ($)	Lifetime 30-Year Cost Savings ($)	30-Year ROI
Cash Purchase	$37,000	$16,650	$1,117	$33,520	201%
PPA	$0	$0	$268	$8,036	-

Ownership Model Table

Analysis clearly shows that opting for a cash purchase is more advantageous than choosing a Power Purchase Agreement (PPA). This conclusion is based on the consideration of existing available incentives (i.e., ITC & MACRS) and relatively higher interest rates.



Ownership Model Life Cycle Comparison

PV System Sizing

TRC modeled the proposed solar PV system using HelioScope, a meteorologically and location-dependent solar resource, to estimate its available size and component quantities. The software accounts for building shading, tree shading, panel angles, and appropriate spacing. The panels have been sized to achieve Net Zero Energy. This means that for a period of 1 year, the building should export as much energy as it imports. It will still draw energy from the grid at night and potentially during the winter, but it will produce more energy than it needs during the day and in the summer.

Solar PV Layout Figure – HelioScope Design

Energy Generation and Management

A HelioScope model was developed to establish approximate PV system sizing. The output was entered into Energy Toolbase® (ETB), a TOU BESS and utility cost analysis tool that compares the generation profile vs the building's monthly consumption data. Because the site's energy rate structure and load profile are unusual, ETB's estimate of baseline utility cost varied from available billing data by 15%. ETB outputs were supplemented with worksheet calculations to true up the difference. Cost savings were finalized by applying an 0.5% annual maintenance cost penalty to the solar PV system.

Project Cost

Project cost estimates were calculated using RS Means 2022 Construction Cost Catalogue, along with vendor quotes and guidelines available from the modeling software. Costs include contingencies and markups for all potential project tasks, including design, permitting, taxes, and a 10% contingency for infrastructure upgrades. A line-by-line breakdown of the costs considered is provided in Appendix C.

At a high level, average system costs are $3.70/Watt solar PV based on the gross project cost. Please note that while detailed, cost estimates are still at the feasibility stage. Costs may vary by 30% relative to engineering assessments of the electrical and structural infrastructure.

Successor Solar Incentive Program (SuSI)

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

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

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

7.2 Combined Heat and Power

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

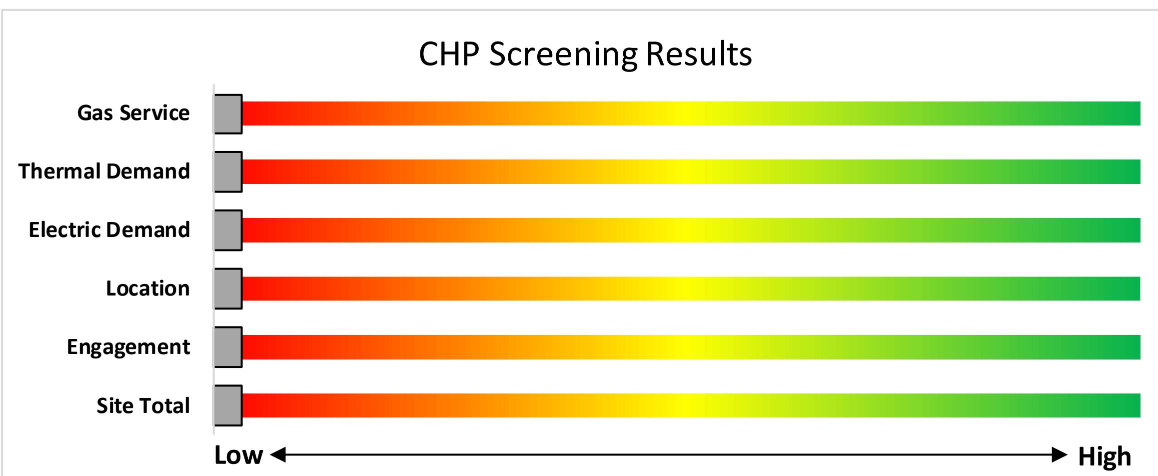
CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be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

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

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

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

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



Combined Heat and Power Screening

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

8 Electric Vehicles

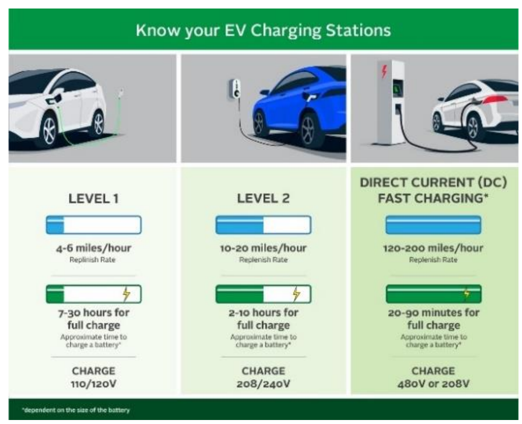
All electric vehicles (EVs) have an electric motor instead of an internal combustion engine. EVs function by plugging into a charge point, taking electricity from the grid, and then storing it in rechargeable batteries. Although electricity production may contribute to air pollution, the U.S. EPA categorizes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

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

8.1 EV Charging

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

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



The preliminary assessment of EV charging at the facility shows that there is no potential for adding EV chargers to the facility's parking, based on potential costs of installation and other site factors.

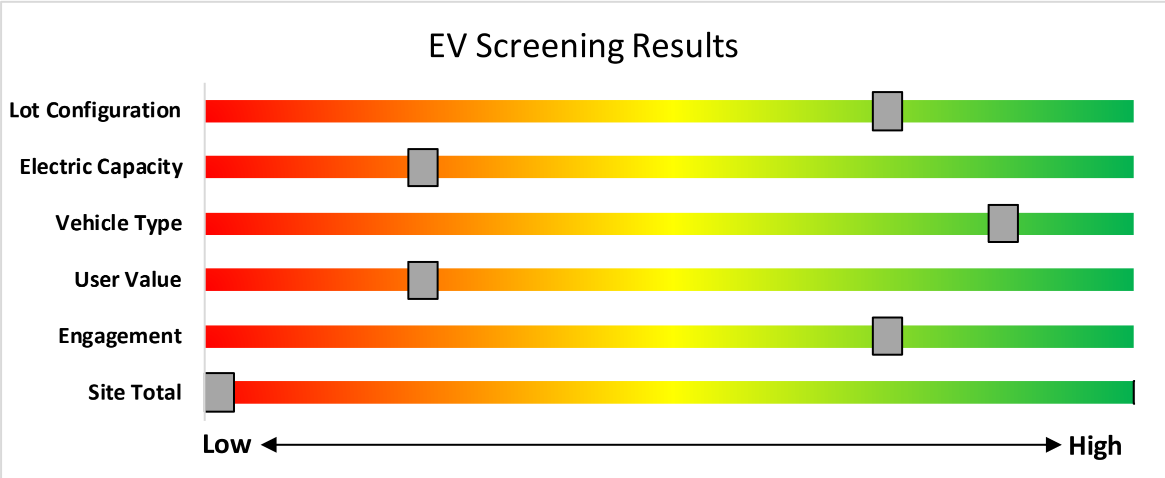
The primary costs associated with installing EV charging are the charger hardware and the cost to extend power from the facility to parking spaces. This may include upgrades to electric panels to serve increased loads.

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

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

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

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



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

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

9 Project Funding and Incentives

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

NJBPU and NJCEP Administered Programs

New Jersey's cleanenergy program

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

*State facilities are also eligible for utility programs

Utility Administered Programs

atlantic city electric — AN EXELON COMPANY; Jersey Central Power & Light — A FirstEnergy Company; PSEG; Rockland Electric Company; ELIZABETHTOWN GAS; SOUTH JERSEY GAS; New Jersey Natural Gas

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

9.1 New Jersey's Clean Energy Program

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

Large Energy Users

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

Incentives

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

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

How to Participate

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

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

Combined Heat and Power

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

Incentives[11]

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

11

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

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

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

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

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

How to Participate

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

Successor Solar Incentive Program (SuSI)

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

Administratively Determined Incentive (ADI) Program

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

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

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

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

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

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

Competitive Solar Incentive (CSI) Program

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

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

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

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

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

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

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

Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

Demand Response (DR) Energy Aggregator

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

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

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

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

The first step toward participation in a DR program is to contact a curtailment service provider. A list of these providers is available on the website of the independent system operator, PJM, and it includes contact information for each company, as well as the states where they have active business[12]. PJM also posts training materials for program members interested in specific rules and requirements regarding DR activity along with a variety of other DR program information[13].

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

[12] http://www.pjm.com/markets-and-operations/demand-response.aspx.

[13] http://www.pjm.com/training/training-events.aspx.

9.2 Utility Energy Efficiency Programs

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

Prescriptive and Custom

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

Equipment Examples

Lighting
Lighting Controls
HVAC Equipment
Refrigeration
Gas Heating
Gas Cooling
Commercial Kitchen Equipment
Food Service Equipment
Variable Frequency Drives
Electronically Commutate Motors
Variable Frequency Drives
Plug Loads Controls
Washers and Dryers
Agricultural
Water Heating

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

Direct Install

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

Incentives

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

How to Participate

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

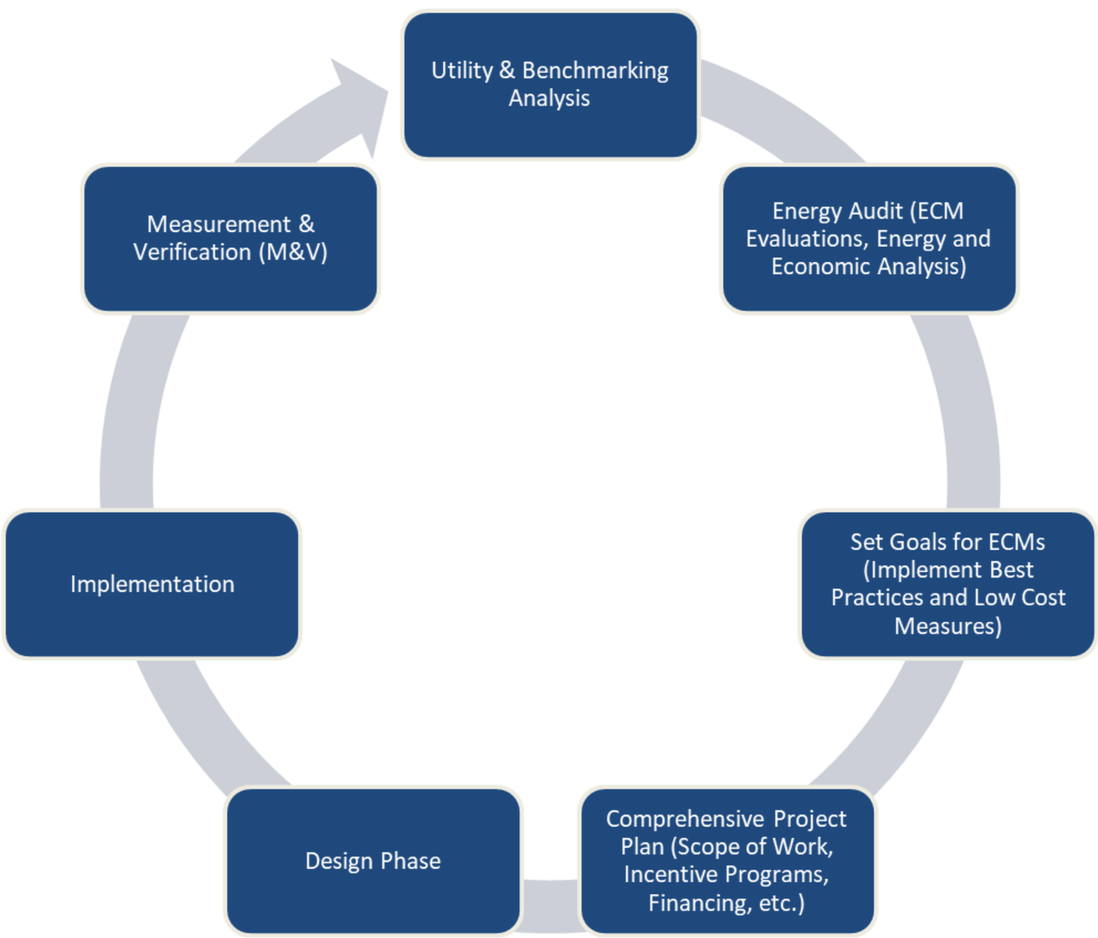
Engineered Solutions

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

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

10 Project Development

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



Project Development Cycle

11 Energy Purchasing and Procurement Strategies

11.1 Retail Electric Supply Options

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

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

A list of licensed third-party electric suppliers is available at the NJBPU website[14].

11.2 Retail Natural Gas Supply Options

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

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

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

A list of licensed third-party natural gas suppliers is available at the NJBPU website[15].

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

[15] 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
Basement Corridor	1	LED - Fixtures: Linear Strip	Wall Switch	S	25	1,143		None	No	1	LED - Fixtures: Linear Strip	Wall Switch	25	1,143	0.0	0	0	$0	$0	$0	0.0
Basement Restroom	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	24	3,155		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	24	3,155	0.0	0	0	$0	$0	$0	0.0
Basement Restroom 2	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	S	24	3,155		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	24	3,155	0.0	0	0	$0	$0	$0	0.0
Boiler Room	1	LED - Fixtures: Linear Strip	Wall Switch	S	25	1,143		None	No	1	LED - Fixtures: Linear Strip	Wall Switch	25	1,143	0.0	0	0	$0	$0	$0	0.0
Classroom	2	LED - Fixtures: Linear Strip	Wall Switch	S	25	1,143		None	No	2	LED - Fixtures: Linear Strip	Wall Switch	25	1,143	0.0	0	0	$0	$0	$0	0.0
Classroom 2	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
Classroom 2	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	1,143		None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	38	1,143	0.0	0	0	$0	$0	$0	0.0
Classroom 3	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	1,143		None	No	1	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	38	1,143	0.0	0	0	$0	$0	$0	0.0
Corridor 2	3	LED - Fixtures: Downlight Pendant	Wall Switch	S	20	1,143		None	No	3	LED - Fixtures: Downlight Pendant	Wall Switch	20	1,143	0.0	0	0	$0	$0	$0	0.0
Dining Area	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	30	1,143		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	30	1,143	0.0	0	0	$0	$0	$0	0.0
Dining Area	8	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	1,143		None	No	8	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	38	1,143	0.0	0	0	$0	$0	$0	0.0
Exterior	2	Halogen Incandescent: (2) 45W A19 Screw-In Lamps	Occupancy Sensor	S	90	3,155		None	No	2	Halogen Incandescent: (2) 45W A19 Screw-In Lamps	Occupancy Sensor	90	3,155	0.0	0	0	$0	$0	$0	0.0
Exterior Cove Downmount	2	LED - Fixtures: Cove Mount	Timeclock		9	4,830		None	No	2	LED - Fixtures: Cove Mount	Timeclock	9	4,830	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack	5	LED - Fixtures: Wall Pack	Timeclock		60	4,830		None	No	5	LED - Fixtures: Wall Pack	Timeclock	60	4,830	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Sconce	5	LED - Fixtures: Wall Sconces	Wall Switch		25	1,143		None	No	5	LED - Fixtures: Wall Sconces	Wall Switch	25	1,143	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	LED Lamps: (1) 5.5W A19 Screw-In Lamp	Wall Switch	S	6	1,143		None	No	1	LED Lamps: (1) 5.5W A19 Screw-In Lamp	Wall Switch	6	1,143	0.0	0	0	$0	$0	$0	0.0
Kitchen	9	LED - Fixtures: Cove Mount	Wall Switch	S	9	1,143		None	No	9	LED - Fixtures: Cove Mount	Wall Switch	9	1,143	0.0	0	0	$0	$0	$0	0.0
Rabbi Office	1	LED - Fixtures: Linear Strip	Wall Switch	S	25	1,143		None	No	1	LED - Fixtures: Linear Strip	Wall Switch	25	1,143	0.0	0	0	$0	$0	$0	0.0
Sanctuary	4	LED Lamps: (1) 5W A19 Screw-In Lamp	Wall Switch	S	5	1,143		None	No	4	LED Lamps: (1) 5W A19 Screw-In Lamp	Wall Switch	5	1,143	0.0	0	0	$0	$0	$0	0.0
Sanctuary	5	LED - Fixtures: Cove Mount	Wall Switch	S	9	1,143		None	No	5	LED - Fixtures: Cove Mount	Wall Switch	9	1,143	0.0	0	0	$0	$0	$0	0.0
Sanctuary	6	LED - Fixtures: Downlight Pendant	Wall Switch	S	20	1,143		None	No	6	LED - Fixtures: Downlight Pendant	Wall Switch	20	1,143	0.0	0	0	$0	$0	$0	0.0
Sanctuary	1	Incandescent: (1) 15W A19 Screw-In Lamp	None	S	15	4,573		None	No	1	Incandescent: (1) 15W A19 Screw-In Lamp	None	15	4,573	0.0	0	0	$0	$0	$0	0.0
Storage	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	38	1,143		None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	38	1,143	0.0	0	0	$0	$0	$0	0.0
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

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
Boiler Room	Boiler	1	Combustion Air Fan	0.14	60.0%	No	Beckett	K41GWAAH-1007	B	722		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Kitchen	Kitchen Stove	1	Kitchen Hood Exhaust Fan	1.00	70.0%	No	CaptiveAire Systems	SC-110110fp	B	50		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Lift	Electrical Lift	1	Other	3.00	90.0%	No	Services Industiels Savaria Inc	V1504P	B	100		No	90.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Boiler	2	Heating Hot Water Pump	0.05	60.0%	No	Taco		B	40		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Prayer Room	AHU-1 - Prayer Space	1	Supply Fan	2.00	85.0%	No			B	1,250		No	85.0%	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
Exterior Of Building	Prayer Space	1	Split-System	7.50		9.30		Jonhnson Control	YH-07C00ATAA	B	1	Yes	1	Split-System	7.50		14.00		1.6	812	0	$132	$13,700	$600	99.6

Space Heating Boiler Inventory & Recommendations

		Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Basement	JCC Center	1	Non-Condensing Hot Water Boiler	152	Weil-McLain	WTGO-5	B	2	Yes	1	Non-Condensing Hot Water Boiler	150	85.00%	AFUE	0.0	0	6	$175	$10,500	$400	57.6

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
Boiler Room	Weil-McClain Boiler and DHW	3	10	1.50	0.0	0	7	$182	$190	$20	0.9
Boiler Room	Weil-McClain Boiler and DHW	3	25	0.75	0.0	0	9	$248	$380	$50	1.3

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
Basement	JCC Center	1	Indirect System	Weil-McLain	WTGO-5	B		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	4	1	Faucet Aerator (Kitchen)	2.30	1.50	0.0	0	0	$6	$10	$0	1.6
Restroom	4	2	Faucet Aerator (Lavatory)	2.30	0.50	0.0	0	1	$27	$20	$10	0.4

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
JCC & Temple	2	Coffee Machine	800	No		
JCC & Temple	1	Dehumidifier	480	No		
JCC & Temple	2	Fan (Portable)	50	No		
JCC & Temple	1	Laptop	270	No		
JCC & Temple	1	Microwave	1,000	No		
JCC & Temple	2	Printer (Medium/Small)	225	No		
JCC & Temple	1	Projector	275	No		
JCC & Temple	1	Refrigerator (Residential)	300	No		
JCC & Temple	4	Speakers (Large)	160	No		
JCC & Temple	1	Oven (Residential)	4,500	No		
JCC & Temple	1	Stove (Residential)	1,500	No		
JCC & Temple	1	Dishwasher (Residential)	9,000	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.

LEARN MORE AT energystar.gov

ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

Jewish Center of Northwest Jersey

Primary Property Type: Social/Meeting Hall
Gross Floor Area (ft²): 5,000
Built: 1946

For Year Ending: November 30, 2023
Date Generated: March 29, 2024

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Jewish Center of Northwest Jersey 115 Youmans Ave. Washington, New Jersey 07882	Jewish Community Center 115 Youmans Ave. Washington, NJ 07882 (908) 451-2833	Mathew Polsky 115 Youmans Ave. Washington, NJ 07882 908-451-2833 innovator3@hotmail.com

Property ID: 32978417

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
29.9 kBtu/ft²

Annual Energy by Fuel

Fuel Oil (No. 2) (kBtu)	118,418 (79%)
Electric - Grid (kBtu)	30,933 (21%)

Source EUI
41.2 kBtu/ft²

National Median Comparison

National Median Site EUI (kBtu/ft²)	79.4
National Median Source EUI (kBtu/ft²)	109.6
% Diff from National Median Source EUI	-62%

Annual Emissions

Total (Location-Based) GHG Emissions (Metric Tons CO2e/year)	12

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: ADDITIONAL SCOPE

Summary

Solar kW
10

DER	Gross Project Cost ($)	Energy Generation (kWh)	Demand Reduction (kW)	GHG Reduction (MT CO2)	Total Annual Utility Cost Savings ($/yr)	New Maintenance Penalty ($/yr)	Net Annual Cost Savings ($/yr)	Incentives (ITC) ($)	Depreciation (MACRS) ($)	Net Project Cost ($)	Net Simple Payback (yr)
10 kW Solar PV	$37,000	9,654	0	1.9	$1,302	$185	$1,117	$11,100	$9,250	$16,650	14.9
Total	$37,000	9,654	0	1.9	$1,302	$185	$1,117	$11,100	$9,250	$16,650	14.9

PPA Alternative:	$268	Annual Utility Savings

Baseline kWh	9,190
Saved kWh	9,654
% NZE	105%
NZE Solar Size kW	10

Equipment	Estimated Max Demand Savings (kW)	Estimated Annual Energy Generation (kWh)	Estimated Annual GHG Reduction ($MT\text{-}CO_2e$)	Estimated Annual Cost Savings ($)	Estimated Gross Project Cost ($)	Total Incentives ($)	Net Project Cost ($)	Simple Payback Period (yr)
10 kW Solar PV	0	9,654	2	$1,117	$37,000	$20,350	$16,650	14.9
Total	0	9,654	2	$1,117	$37,000	$20,350	$16,650	14.9

Ownership Plan	Upfront Cost	Year 1 Cost After Rebates	Annual Savings	Lifetime 30-Year Cost Savings ($)	30-Year ROI
Cash Purchase	$37,000	$16,650	$1,117	$33,520	201%
PPA	$0	$0	$268	$8,036	-

Equipment	Estimated Gross Project Cost ($)	ITC Rebate	MACRS Rebate	Net Project Cost
10 kW Solar PV	$37,000	$11,100	$9,250	$16,650
Total	$37,000	$11,100	$9,250	$16,650

New PV

System Description	Quantity	Unit	Equipment Cost per Unit ($)	Labor Cost Per Unit ($)	Material Cost Per Unit ($)	Total Material Cost ($)	Total Equipment Cost ($)	Total Labor Cost ($)	Total Cost ($)	Source	Notes
Solar Array											
PV Modules (LG 400 W)	10,000	Watts DC			$0.45	$4,500	$0.00	$0.00	$4,500	PV size from ETB, cost from NREL report	https://www.nrel.gov/docs/fy22osti/83586.pdf
Inverter, 10 kW	1	Ea.		$400	$2,400	$2,400	$0.00	$1,602	$4,002	Inverter size from Helioscope - Cost from online quote Labor - 4 Hrs Electrician per unit	Fronius Primo Lite 10kW Inverter SKU Part Number 4,210,075,801 (powerstore.com)
PV Mounting Cost/Labor/Installation	10,000	Watts DC		$1.21	$0.20	$2,000	$0.00	$12,111	$14,111	Energy ToolBase	Cost associated to core structural upgrades not considered under PV mounting cost.
PV String Combiner Panels	3	Ea.		$100	$568	$1,705	$0.00	$601	$2,306	Online Quote Labor - 1 Hrs Electrician per unit	https://www.solaris-shop.com/sma-cu1000-us-11-string-combiner-w-disconnect/
Electrical BOS Roof mounted	50	m^2	$0.00	$0.00	$38	$1,900	$0.00	$0.00	$1,900	https://www.nrel.gov/docs/fy22osti/83586.pdf	U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2022
Installation rental equipment roof mounted	50	m^2	$3.95	$0.00	$0.00	$0.00	$198	$0.00	$198	https://www.nrel.gov/docs/fy22osti/83586.pdf	U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2022
User Training	4	Hr.	$0.00	$150	$0.00	$0.00	$0.00	$600	$600		
Total						**$16,500**	**$200**	**$18,900**	**$27,616**		

Markup	Cost
System Cost	$27,616
Tax (6.625%)	$1,093
O&P Cost (10%)	$2,762
EPC Markup (5%)	$1,381
Contingency (10%)	$2,762
2024 Inflation Markup (6%)	$1,657
Total Cost	$37,000

Battery Cost	$0	
Solar Cost	$36,196	
Electrical Upgrades, Permitting and Misc...	$804	
Battery Cost with Elec Upgrades	$0	
Solar Cost with Elec Upgrades	$37,000	$3.70

TRC

PPA Analysis

	Income			Net		
Year	Cash Purchase	Standard PPA	PPA with Year 10 Buyout	Cash Purchase	Standard PPA	PPA with Year 10 Buyout
0	-$16,650	$0	$0	-$16,650	$0	$0
1	$1,117	$268	$268	-$15,533	$268	$268
2	$1,117	$268	$268	-$14,415	$536	$536
3	$1,117	$268	$268	-$13,298	$804	$804
4	$1,117	$268	$268	-$12,181	$1,071	$1,071
5	$1,117	$268	$268	-$11,063	$1,339	$1,339
6	$1,117	$268	$268	-$9,946	$1,607	$1,607
7	$1,117	$268	$268	-$8,829	$1,875	$1,875
8	$1,117	$268	$268	-$7,711	$2,143	$2,143
9	$1,117	$268	$268	-$6,594	$2,411	$2,411
10	$1,117	$268	$268	-$5,477	$2,679	$2,679
11	$1,117	$268	-$8,261	-$4,359	$2,947	-$5,583
12	$1,117	$268	$1,117	-$3,242	$3,214	-$4,465
13	$1,117	$268	$1,117	-$2,125	$3,482	-$3,348
14	$1,117	$268	$1,117	-$1,007	$3,750	-$2,231
15	$1,117	$268	$1,117	$110	$4,018	-$1,113
16	$1,117	$268	$1,117	$1,227	$4,286	$4
17	$1,117	$268	$1,117	$2,345	$4,554	$1,121
18	$1,117	$268	$1,117	$3,462	$4,822	$2,239
19	$1,117	$268	$1,117	$4,579	$5,089	$3,356
20	$1,117	$268	$1,117	$5,697	$5,357	$4,473
21	$1,117	$268	$1,117	$6,814	$5,625	$5,591
22	$1,117	$268	$1,117	$7,931	$5,893	$6,708
23	$1,117	$268	$1,117	$9,049	$6,161	$7,825
24	$1,117	$268	$1,117	$10,166	$6,429	$8,943
25	$1,117	$268	$1,117	$11,283	$6,697	$10,060
26	$1,117	$268	$1,117	$12,401	$6,964	$11,177
27	$1,117	$268	$1,117	$13,518	$7,232	$12,295
28	$1,117	$268	$1,117	$14,635	$7,500	$13,412
29	$1,117	$268	$1,117	$15,753	$7,768	$14,529
30	$1,117	$268	$1,117	$16,870	$8,036	$15,647

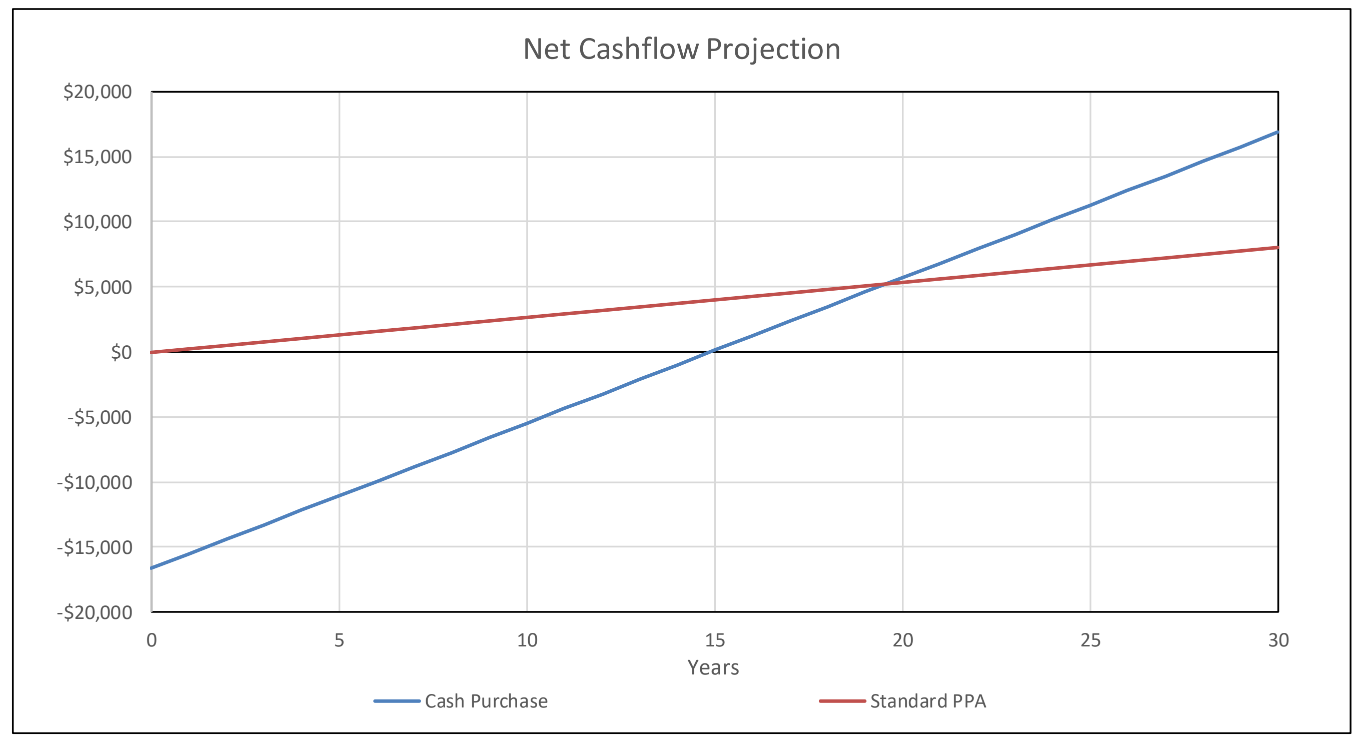
Cash Purchase	
Gross Project Cost	$37,000
Rebates	-$11,100
85% Depreciation	-$9,250
n/a	$0
Final Cost	$16,650
Utility Savings	$1,117
Payback	14.9
Financial Life (yr)	30
ROI (Over EUL)	201%

Battery Cost: $0
Solar Cost: $37,000

Standard PPA	
Gross Project Cost	$37,000
Rebates	-$11,100
85% Depreciation	-$9,250
n/a	$0
Final Cost	$16,650
Financial Life (yr)	30
Interest Rate	3.0%
Annual Income from Loan	$849
Utility Savings	$1,117
Annual Savings	$268

Battery Cost: $0
Solar Cost: $37,000

PPA with Year 10 Buyout	
Gross Project Cost	$37,000
Rebates	-$11,100
85% Depreciation	-$9,250
n/a	$0
Final Cost	$16,650
Financial Life (yr)	30
Interest Rate	3.0%
Years 1-10	
Contractor's Income	$849
Utility Savings	$1,117
Customer Savings	$268
Years 11-30	
Contractor O&P	15%
Buyout Cost	$9,379
Utility Savings	$1,117
Year 11-25 Payback	8.4
Lifetime Savings	$25,025
ROI (Over RUL)	267%



EBT Outputs

					Raw Utility Info					-15%	Cost Markup	
Bill Date Ranges			Energy Before PV/ESS (kWh)	Max Demand Before PV/ESS (kW)	Charges Before PV/ESS ($)				Charges Before PV/ESS ($)			
Start Date	End Date	Season	Total	NC / Max	Other	Energy	Demand	Total	Other	Energy	Demand	Total
1/28/2023	2/28/2023	W	533	11	14.69	88.33	7.38	110.4	$ 12.49	$ 75.08	$ 6.27	$ 93.84
2/28/2023	3/27/2023	W	499	11	14.69	82.7	7.38	104.77	$ 12.49	$ 70.30	$ 6.27	$ 89.05
3/27/2023	4/27/2023	W	491	11	14.69	81.37	7.38	103.44	$ 12.49	$ 69.16	$ 6.27	$ 87.92
4/27/2023	5/30/2023	W	758	11	14.69	125.62	7.38	147.69	$ 12.49	$ 106.78	$ 6.27	$ 125.54
5/30/2023	6/1/2023	W	48	11	1.01	7.95	0.51	9.48	$ 0.86	$ 6.76	$ 0.43	$ 8.06
6/1/2023	6/28/2023	S	699	11	13.68	119.2	7.37	140.25	$ 11.63	$ 101.32	$ 6.26	$ 119.21
6/28/2023	7/28/2023	S	648	11	14.69	110.5	7.92	133.11	$ 12.49	$ 93.93	$ 6.73	$ 113.14
7/28/2023	8/28/2023	S	1713	11	14.69	248.59	7.92	271.2	$ 12.49	$ 211.30	$ 6.73	$ 230.52
8/28/2023	9/28/2023	S	1101	11	14.69	181.59	7.92	204.2	$ 12.49	$ 154.35	$ 6.73	$ 173.57
9/28/2023	10/1/2023	S	75	11	1.38	12.79	0.74	14.91	$ 1.17	$ 10.87	$ 0.63	$ 12.67
10/1/2023	10/30/2023	W	730	11	13.31	120.98	6.69	140.98	$ 11.31	$ 102.83	$ 5.69	$ 119.83
10/30/2023	11/29/2023	W	574	11	14.69	95.13	7.38	117.2	$ 12.49	$ 80.86	$ 6.27	$ 99.62
11/29/2023	12/29/2023	W	733	11	14.69	121.48	7.38	143.55	$ 12.49	$ 103.26	$ 6.27	$ 122.02
12/29/2022	1/28/2023	W	588	11	14.69	97.45	7.38	119.52	$ 12.49	$ 82.83	$ 6.27	$ 101.59
Subtotal			9190		176.28	1493.67	90.73	0	$ 149.84	$ 1,269.62	$ 77.12	$ -
Adjustments			0		0	0	0	0	$ -	$ -	$ -	$ -
Total			9190		176.28	1493.67	90.73	1760.68	$ 149.84	$ 1,269.62	$ 77.12	$ 1,496.58
Bill Date Ranges			Energy After PV & Before ESS (kWh)	Max Demand After PV & Before ESS (kW)	Charges After PV & Before ESS ($)				Charges After PV & Before ESS ($)			
Start Date	End Date	Season	Total	NC / Max	Other	Energy	Demand	Total	Other	Energy	Demand	Total
1/28/2023	2/28/2023	W	-89	11	14.69	-14.75	7.38	7.32	$ 12.49	$ (12.54)	$ 6.27	$ 6.22
2/28/2023	3/27/2023	W	-203	11	14.69	-33.64	7.38	-11.57	$ 12.49	$ (28.59)	$ 6.27	$ (9.83)
3/27/2023	4/27/2023	W	-444	11	14.69	-73.58	7.38	-51.51	$ 12.49	$ (62.54)	$ 6.27	$ (43.78)
4/27/2023	5/30/2023	W	-469	11	14.69	-77.73	7.38	-55.66	$ 12.49	$ (66.07)	$ 6.27	$ (47.31)
5/30/2023	6/1/2023	W	-48	11	1.01	-7.95	0.51	-6.43	$ 0.86	$ (6.76)	$ 0.43	$ (5.47)
6/1/2023	6/28/2023	S	-397	10	13.68	-67.7	0	-54.02	$ 11.63	$ (57.55)	$ -	$ (45.92)
6/28/2023	7/28/2023	S	-509	11	14.69	-86.8	7.92	-64.19	$ 12.49	$ (73.78)	$ 6.73	$ (54.56)
7/28/2023	8/28/2023	S	653	10	14.69	111.36	0	126.05	$ 12.49	$ 94.66	$ -	$ 107.14
8/28/2023	9/28/2023	S	238	11	14.69	40.59	7.92	63.2	$ 12.49	$ 34.50	$ 6.73	$ 53.72
9/28/2023	10/1/2023	S	2	11	1.38	0.34	0.74	2.46	$ 1.17	$ 0.29	$ 0.63	$ 2.09
10/1/2023	10/30/2023	W	130	11	13.31	21.54	6.69	41.55	$ 11.31	$ 18.31	$ 5.69	$ 35.32
10/30/2023	11/29/2023	W	137	11	14.69	22.7	7.38	44.77	$ 12.49	$ 19.30	$ 6.27	$ 38.05
11/29/2023	12/29/2023	W	381	11	14.69	63.14	7.38	85.21	$ 12.49	$ 53.67	$ 6.27	$ 72.43
12/29/2022	1/28/2023	W	154	11	14.69	25.52	7.38	47.59	$ 12.49	$ 21.69	$ 6.27	$ 40.45
Subtotal			-464		176.28	-76.96	75.44	0	$ 149.84	$ (65.42)	$ 64.12	$ -
Adjustments			0		0	0	0	0	$ -	$ -	$ -	$ -
Total			-464		176.28	-23.2	75.44	228.52	$ 149.84	$ (19.72)	$ 64.12	$ 194.24

Energy Toolbase

PV SYSTEM DETAILS

GENERAL INFORMATION

Facility: Meter #1
Address: 115 Youmans Ave Washington NJ 07882

SOLAR PV EQUIPMENT DESCRIPTION

Solar Panels: (25) LG Electronics LG400N2W-V5_R12
Inverters: (1) Fronius Primo 10.0-1

SOLAR PV EQUIPMENT TYPICAL LIFESPAN

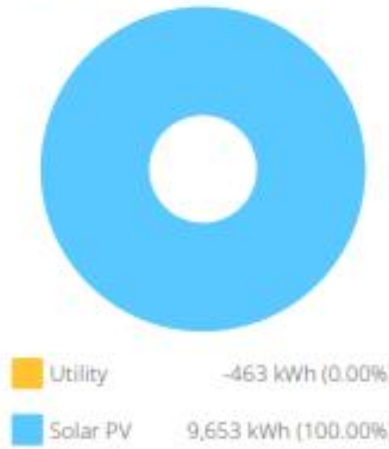
Solar Panels: Greater than 30 Years
Inverters: 10 Years

SOLAR PV SYSTEM RATING

Power Rating: 10,000 W-DC
Power Rating: 8,800 W-AC-CEC

ENERGY CONSUMPTION MIX

Annual Energy Use: 9,190 kWh



MONTHLY ENERGY USE VS SOLAR GENERATION

energytoolbase

Prepared By: TRC Companies

ENVIRONMENTAL BENEFITS

OVER THE NEXT 20 YEARS, YOUR SYSTEM WILL DO MORE THAN JUST SAVE YOU MONEY. ACCORDING TO THE EPA'S GREENHOUSE GAS EQUIVALENCIES CALCULATOR (SOURCE), YOUR SOLAR PV SYSTEM WILL HAVE THE IMPACT OF REDUCING:

151

tons of CO2 Offset

343,856

Miles Driven By Cars

2,268

Trees Planted

Appendix D: 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 (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 1/8th of an inch.
Temperature Setpoint	The temperature at which a temperature regulating device (thermostat, for example) has been set.
therm	100,000 Btu. Typically used as a measure of natural gas consumption.
tons	A unit of cooling capacity equal to 12,000 Btu/hr.
Turnkey	Provision of a complete product or service that is ready for immediate use.
VAV	*Variable air volume*
VFD	*Variable frequency drive*: a controller used to vary the speed of an electric motor.
WaterSense®	The symbol for water efficiency. The WaterSense® program is managed by the EPA.
Watt (W)	Unit of power commonly used to measure electricity use.