



# Local Government Energy Audit Report

Public Works Warehouse

November 9, 2021

*Prepared for:*

City of Orange Township

384 Jackson Street

City of Orange Township, New Jersey 07050

*Prepared by:*

TRC

900 Route 9 North

Woodbridge, New Jersey 07095

# Disclaimer

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

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

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

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

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

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## ENERGY EFFICIENCY INCENTIVE & REBATE TRANSITION

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

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

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

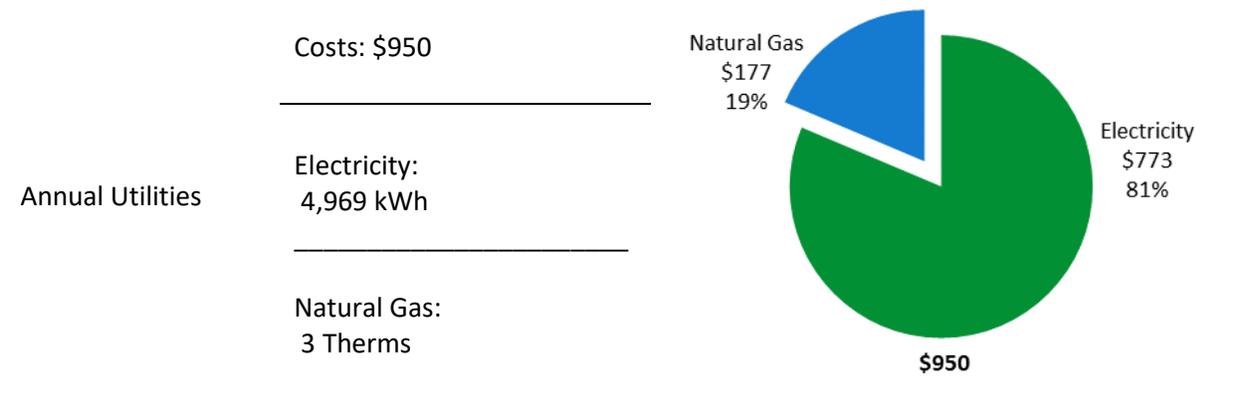
New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the [NJCEP website](#).

The infographic features logos for Atlantic City Electric, Jersey Central Power & Light, PSEG, Rockland Electric Company, Elizabethtown Gas, South Jersey Gas, and New Jersey Natural Gas. Below the logos, the text reads: "Program areas to be served by the Utilities:" followed by a list of areas: Existing Buildings (residential, commercial, industrial, government) and Efficient Products (HVAC, Appliance Rebates, Appliance Recycling). A separate box titled "Proposed New Programs & Features:" lists: Dedicated multi-family program, More financing options, and Quick home energy check-ups.

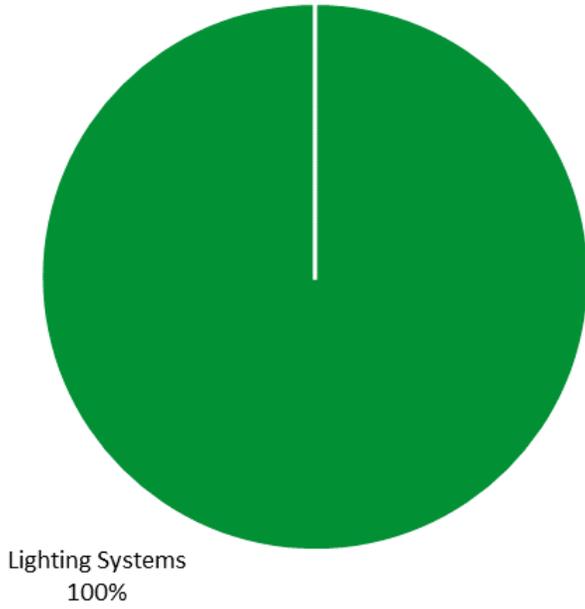
# 1 EXECUTIVE SUMMARY

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

## BUILDING PERFORMANCE REPORT



ENERGY STAR® Benchmarking Score	N/A	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.
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*Figure 1 - Energy Use by System*

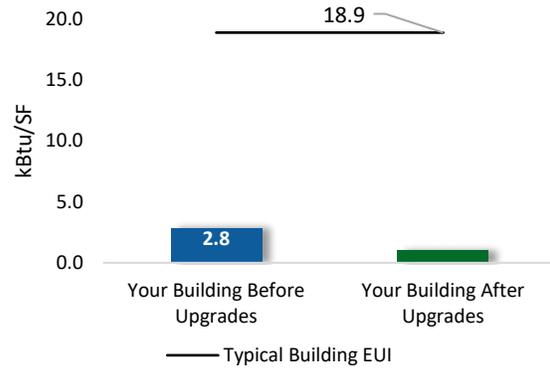
## POTENTIAL IMPROVEMENTS



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

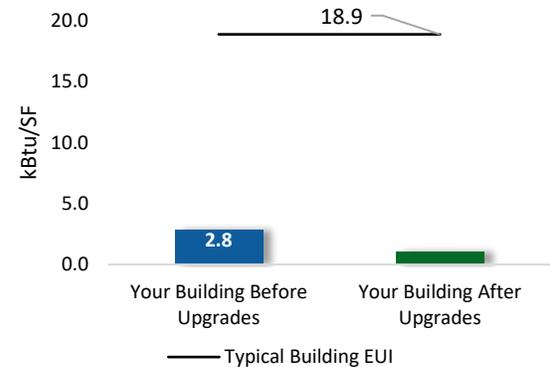
### Scenario 1: Full Package (all evaluated measures)

Installation Cost	\$1,960
Potential Rebates & Incentives <sup>1</sup>	\$356
Annual Cost Savings	\$504
Annual Energy Savings	Electricity: 3,238 kWh
Greenhouse Gas Emission Savings	2 Tons
Simple Payback	3.2 Years
Site Energy Savings (all utilities)	64%



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

Installation Cost	\$1,960
Potential Rebates & Incentives	\$356
Annual Cost Savings	\$504
Annual Energy Savings	Electricity: 3,238 kWh
Greenhouse Gas Emission Savings	2 Tons
Simple Payback	3.2 Years
Site Energy Savings (all utilities)	64%



### On-site Generation Potential

Photovoltaic	None
Combined Heat and Power	None

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>			<b>2,859</b>	<b>0.5</b>	<b>0</b>	<b>\$445</b>	<b>\$1,072</b>	<b>\$286</b>	<b>\$786</b>	<b>1.8</b>	<b>2,879</b>
ECM 1	Retrofit Fixtures with LED Lamps	Yes	2,859	0.5	0	\$445	\$1,072	\$286	\$786	1.8	2,879
<b>Lighting Control Measures</b>			<b>380</b>	<b>0.1</b>	<b>0</b>	<b>\$59</b>	<b>\$888</b>	<b>\$70</b>	<b>\$818</b>	<b>13.9</b>	<b>382</b>
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	380	0.1	0	\$59	\$888	\$70	\$818	13.9	382
<b>TOTALS (COST EFFECTIVE MEASURES)</b>			<b>3,238</b>	<b>0.7</b>	<b>0</b>	<b>\$504</b>	<b>\$1,960</b>	<b>\$356</b>	<b>\$1,604</b>	<b>3.2</b>	<b>3,261</b>
<b>TOTALS (ALL MEASURES)</b>			<b>3,238</b>	<b>0.7</b>	<b>0</b>	<b>\$504</b>	<b>\$1,960</b>	<b>\$356</b>	<b>\$1,604</b>	<b>3.2</b>	<b>3,261</b>

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

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

Figure 2 – Evaluated Energy Improvements

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

## 1.1 Planning Your Project

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

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

### Pick Your Installation Approach

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

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



## Options from Around the State

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

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

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

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

### *Ongoing Electric Savings with Demand Response*

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

## 2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBP) has sponsored this Local Government Energy Audit (LGEA) Report for Public Works Warehouse. 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 May 5, 2021, TRC performed an energy audit at Public Works Warehouse located in City of Orange Township, New Jersey. TRC met with Carnell Townes to review the facility operations and help focus our investigation on specific energy-using systems.

The Public Works Warehouse is a one-story, 6,076 square foot building built in 1963. This building is an open warehouse with some caged areas but has no interior walls.

The only recent change made of was the retirement of the natural gas unit heater. This unit was no longer operational and staff deemed it unnecessary.

The facility concerns were primarily related to the condition of the building envelope, as there are areas of degradation in the brick exterior, and holes and gaps in the garage door. This warehouse has minimal occupancy and is mostly used for storage of materials.

### 2.2 Building Occupancy

The facility does not have consistent occupancy as it is primarily used for storage of materials. As staff members need tools or materials throughout the week, they will collect them from the warehouse but rarely spend extended time in the facility. The space is continuously accessible to staff.

Building Name	Weekday/Weekend	Operating Schedule
Public Works Warehouse	Weekday	8:00 AM - 4:00 PM
	Weekend	Generally not in Use

*Figure 3 - Building Occupancy Schedule*

## 2.3 Building Envelope

The building walls are constructed of painted concrete block. The walls are overall in fair condition, but there are sections of block that have been deteriorated over time likely due to water infiltration, and it may need repairs. The roof is flat but was not accessed during the audit; therefore, the roof condition was not assessed.

Site staff report the following issues with the building envelope:

- Degrading concrete walls, both interior and exterior
- Gaps around doors
- Condition and functionality of the garage door

This facility does not have any windows. There are two standard sized metal framed doors in fair condition, which are poorly sealed, increasing the potential for drafts and outside air infiltration. There is a single metal framed garage door on the front of the facility, which is currently inoperable. This door is in poor condition and sections of panels have been replaced with cardboard to reduce infiltration.



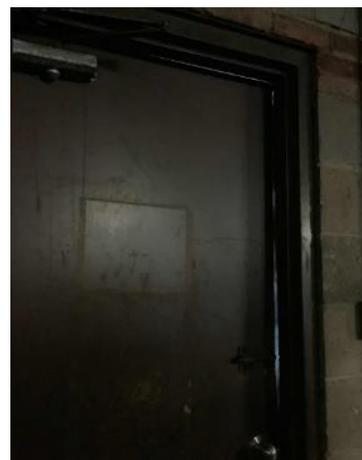
*Cement Block Wall- Degradation from Water*



*Cement Block Wall- Deterioration*



*Garage Door with Cardboard Repair Panels*



*Real Metal Door- Poor Sealing*

## 2.4 Lighting Systems

The interior lighting is provided by 4-foot 32-Watt linear fluorescent T8 lamps. Each fixture is a 4-lamp hanging shop light fixture with 4-foot linear tube lamps installed end-to-end in an 8-foot configuration. Most fixtures are in fair condition.

The building interior was generally judged to be underlit. Lighting fixtures in the warehouse are controlled with manual wall switches.



*Warehouse Fluorescent Fixtures*



*Light Fixture in Caged Area*

There are two small sconce fixtures mounted to the exterior at the front of the facility on either side of the garage door. These fixtures do not have lamps installed and are in poor condition. The single operable exterior fixture is a flood light on the back of the warehouse that has a single high intensity discharge (HID) lamp installed. This fixture provides light to the side of a baseball field, which recently had additional lighting installed, so this fixture may no longer be necessary.

The controls for the inoperable fixtures on the front of the building could not be confirmed. The flood light on the back of the building is photocell controlled.



*Rear Flood Light Fixture with Photocell*

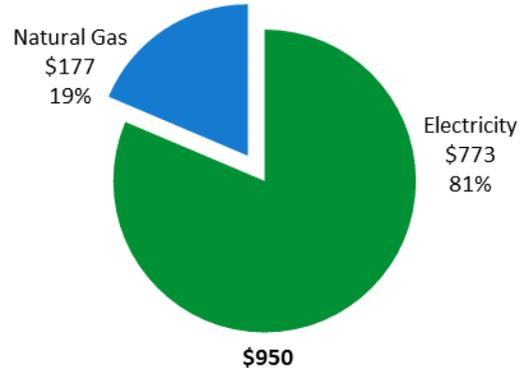


*Front Sconce Fixture- Currently Inoperable*

### 3 ENERGY USE AND COSTS

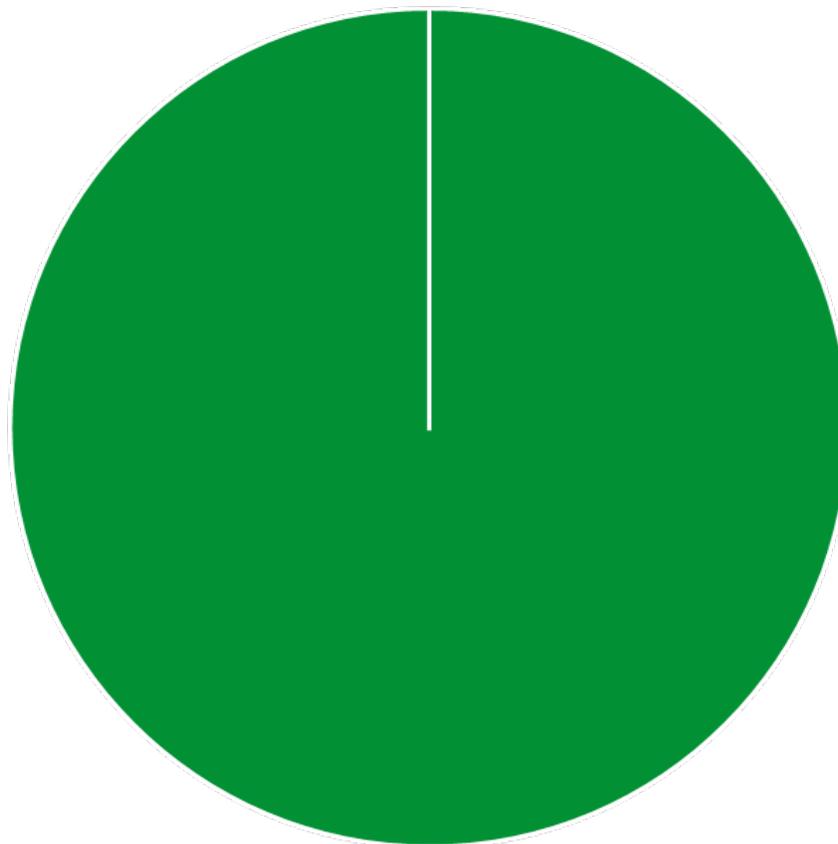
Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

Utility Summary		
Fuel	Usage	Cost
Electricity	4,969 kWh	\$773
Natural Gas	3 Therms	\$177
<b>Total</b>		<b>\$950</b>



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.

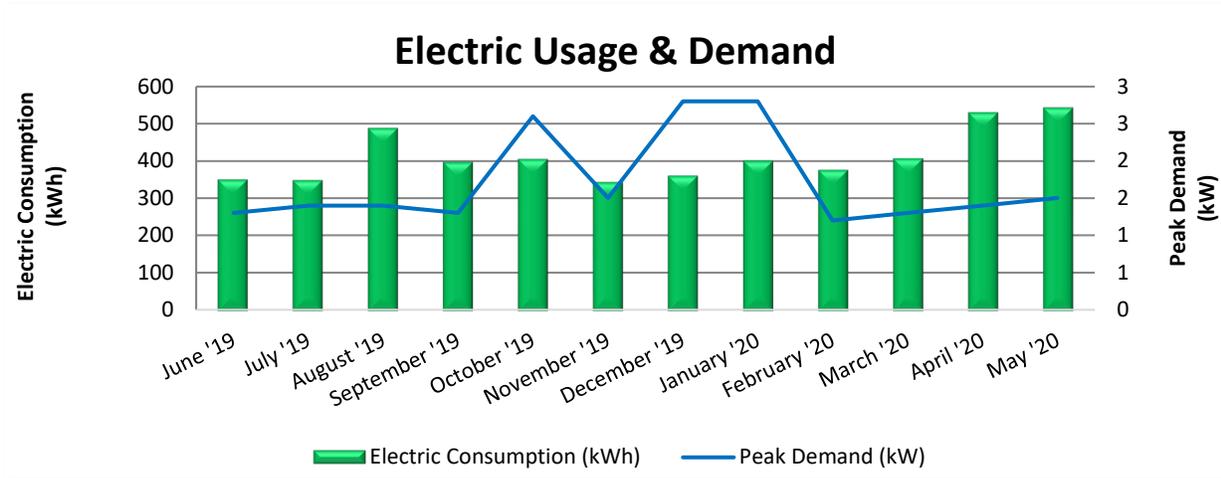


Lighting Systems  
100%

*Figure 4 - Energy Balance*

### 3.1 Electricity

PSE&G delivers electricity under rate class GLP, with electric production.



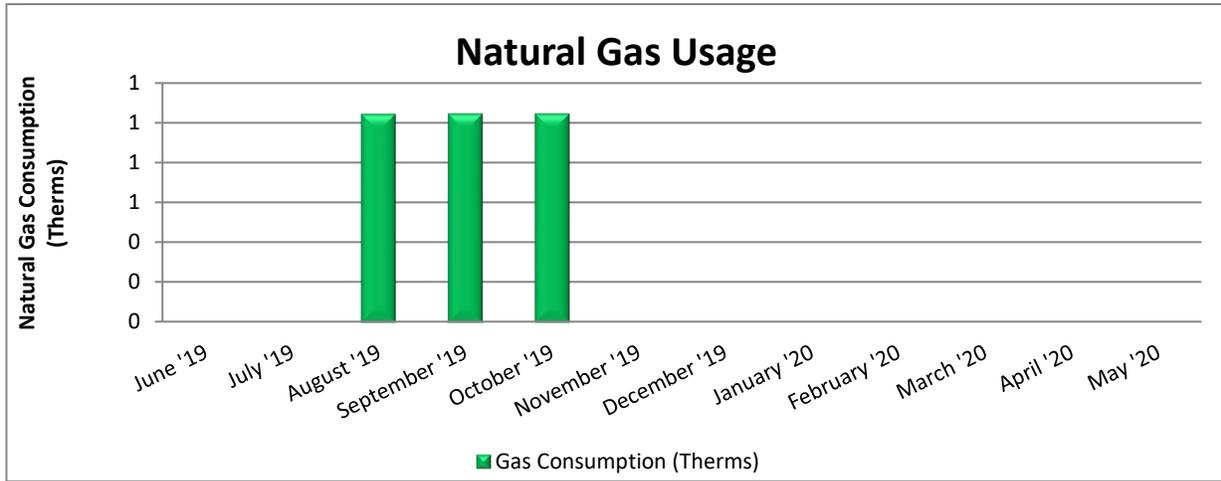
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
6/20/19	29	351	1	\$24	\$68
7/23/19	33	349	1	\$37	\$66
8/21/19	29	488	1	\$37	\$73
9/19/19	29	398	1	\$35	\$64
10/21/19	32	406	3	\$5	\$59
11/19/19	29	344	2	\$6	\$52
12/19/19	30	361	3	\$19	\$53
1/22/20	34	401	3	\$19	\$55
2/20/20	29	377	1	\$5	\$55
3/20/20	29	407	1	\$25	\$64
4/21/20	32	530	1	\$6	\$80
5/20/20	29	543	2	\$6	\$82
<b>Totals</b>	<b>364</b>	<b>4,955</b>	<b>3</b>	<b>\$225</b>	<b>\$771</b>
<b>Annual</b>	<b>365</b>	<b>4,969</b>	<b>3</b>	<b>\$225</b>	<b>\$773</b>

Notes:

- Peak demand of 3 kW occurred in December '19.
- Average demand over the past 12 months was 2 kW.
- The average electric cost over the past 12 months was \$0.156/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

### 3.2 Natural Gas

PSE&G delivers natural gas under rate class GSG-HTG.



Gas Billing Data			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
6/20/19	29	0	\$15
7/23/19	33	0	\$15
8/20/19	28	1	\$16
9/20/19	31	1	\$16
10/21/19	31	1	\$17
11/19/19	29	0	\$16
12/19/19	30	0	\$16
1/22/20	34	0	\$0
2/20/20	29	0	\$16
3/20/20	29	0	\$16
4/21/20	32	0	\$16
5/20/20	29	0	\$16
<b>Totals</b>	<b>364</b>	<b>3</b>	<b>\$176</b>
<b>Annual</b>	<b>365</b>	<b>3</b>	<b>\$177</b>

Notes:

- The average gas cost for the past 12 months is \$56.342/therm, which is the blended rate used throughout the analysis.
- There is no equipment installed on site that consumes natural gas at this time. The cost incurred on the natural gas bills is primarily the meter charge and administrative fee’s related to having a gas service installed. The reported therm usage could be a glitch in the meter reading. Consider deactivating the meter if no future gas usage is planned. See details in Section 4.

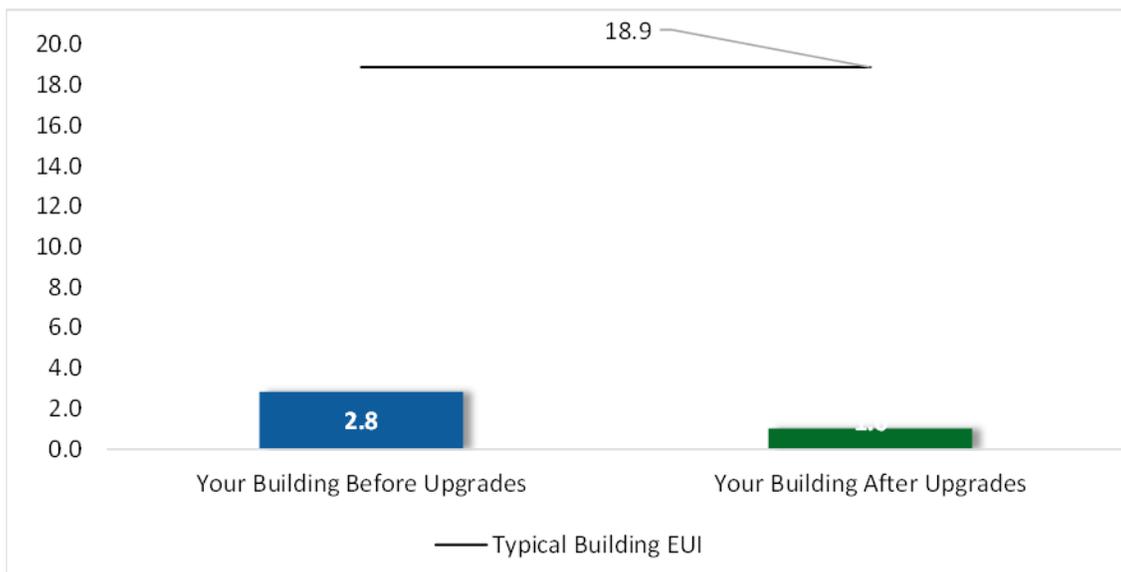
### 3.3 Benchmarking

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.

<b>Benchmarking Score</b>	<b>N/A</b>
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Due to its unique characteristics, this building type is not able to receive a benchmarking score. This report contains suggestions about how to improve building performance and reduce energy costs.



*Figure 5 - Energy Use Intensity Comparison<sup>3</sup>*

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

<sup>3</sup> Based on all evaluated ECMs

### **Tracking Your Energy Performance**

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

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

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

For more information on ENERGY STAR® and Portfolio Manager®, visit their website<sup>4</sup>.

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

## 4 ENERGY CONSERVATION MEASURES

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

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

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

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>			<b>2,859</b>	<b>0.5</b>	<b>0</b>	<b>\$445</b>	<b>\$1,072</b>	<b>\$286</b>	<b>\$786</b>	<b>1.8</b>	<b>2,879</b>
ECM 1	Retrofit Fixtures with LED Lamps	Yes	2,859	0.5	0	\$445	\$1,072	\$286	\$786	1.8	2,879
<b>Lighting Control Measures</b>			<b>380</b>	<b>0.1</b>	<b>0</b>	<b>\$59</b>	<b>\$888</b>	<b>\$70</b>	<b>\$818</b>	<b>13.9</b>	<b>382</b>
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	380	0.1	0	\$59	\$888	\$70	\$818	13.9	382
<b>TOTALS</b>			<b>3,238</b>	<b>0.7</b>	<b>0</b>	<b>\$504</b>	<b>\$1,960</b>	<b>\$356</b>	<b>\$1,604</b>	<b>3.2</b>	<b>3,261</b>

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

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

Figure 6– All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>		<b>2,859</b>	<b>0.5</b>	<b>0</b>	<b>\$445</b>	<b>\$1,072</b>	<b>\$286</b>	<b>\$786</b>	<b>1.8</b>	<b>2,879</b>
ECM 1	Retrofit Fixtures with LED Lamps	2,859	0.5	0	\$445	\$1,072	\$286	\$786	1.8	2,879
<b>Lighting Control Measures</b>		<b>380</b>	<b>0.1</b>	<b>0</b>	<b>\$59</b>	<b>\$888</b>	<b>\$70</b>	<b>\$818</b>	<b>13.9</b>	<b>382</b>
ECM 2	Install Occupancy Sensor Lighting Controls	380	0.1	0	\$59	\$888	\$70	\$818	13.9	382
<b>TOTALS</b>		<b>3,238</b>	<b>0.7</b>	<b>0</b>	<b>\$504</b>	<b>\$1,960</b>	<b>\$356</b>	<b>\$1,604</b>	<b>3.2</b>	<b>3,261</b>

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

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

Figure 7 – Cost Effective ECMs

## 4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>		<b>2,859</b>	<b>0.5</b>	<b>0</b>	<b>\$445</b>	<b>\$1,072</b>	<b>\$286</b>	<b>\$786</b>	<b>1.8</b>	<b>2,879</b>
ECM 1	Retrofit Fixtures with LED Lamps	2,859	0.5	0	\$445	\$1,072	\$286	\$786	1.8	2,879

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

### **ECM 1: Retrofit Fixtures with LED Lamps**

Replace fluorescent and HID lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as a direct replacement for most other lighting technologies. For the exterior flood lamp, another option is to retire it completely. It is possible that since additional lighting was installed at the baseball field, this fixture is no longer necessary.

This measure saves energy by installing LEDs, which use less power than other lighting technologies yet provide equivalent lighting output for the space. Maintenance savings may also be available, as longer-lasting LEDs lamps will not need to be replaced as often as the existing lamps. We recommend you select your replacement LED lamps which are rated to provide slightly more light than the existing case.

**Affected building areas:** all interior spaces in the warehouse and the flood lamp on the back side of the building.

## 4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Control Measures</b>		<b>380</b>	<b>0.1</b>	<b>0</b>	<b>\$59</b>	<b>\$888</b>	<b>\$70</b>	<b>\$818</b>	<b>13.9</b>	<b>382</b>
ECM 2	Install Occupancy Sensor Lighting Controls	380	0.1	0	\$59	\$888	\$70	\$818	13.9	382

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

## **ECM 2: Install Occupancy Sensor Lighting Controls**

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

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

Occupancy sensors can be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are best suited to single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in large spaces, locations without local switching, and where wall switches are not in the line-of-sight of the main work area.

While lights may be used infrequently due to low usage patterns, there is also a possibility for them to be left on for long periods of time when no one is present. This measure provides energy savings by reducing the lighting operating hours.

**Affected building areas:** all interior fixtures except for the lights on the edge of the warehouse due to the larger quantity of sensors required for this space.

### 4.3 Measures for Future Consideration

There are additional opportunities for improvement that City of Orange Township 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.

City of Orange Township 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.

### **Retire Gas Meter**

As noted in the utility section, there is no operable equipment on site that consumes natural gas as the gas unit heater was previously retired. If there are no intentions of installing heating in this facility, then we recommend fully retiring the gas meter to reduce the utility expenditure each month. This would save an estimated \$180 dollars annually. If there are plans to install a new gas fired heater in the future, we recommend repairing some of the envelope concerns discussed in Section 2.3 prior to heating the facility. This would include replacing the garage door, repairing some of the cement blocks that have degraded over time, and resealing the exterior doors to reduce infiltration.

## 5 ENERGY EFFICIENT BEST PRACTICES

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

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

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

### **Energy Tracking with ENERGY STAR® Portfolio Manager®**



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

### **Weatherization**

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

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<sup>5</sup> <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager>.

## **Lighting Maintenance**

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- Clean lamps, reflectors and lenses of dirt, dust, oil, and smoke buildup every six to twelve months. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust. Together, this can reduce total light output by up to 60% while still drawing full power.
  - In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a lighting technician or contractor, decreasing the overall cost of maintenance.

## **Procurement Strategies**

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

## 6 ON-SITE GENERATION

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

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

## 6.1 Solar Photovoltaic

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

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

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

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

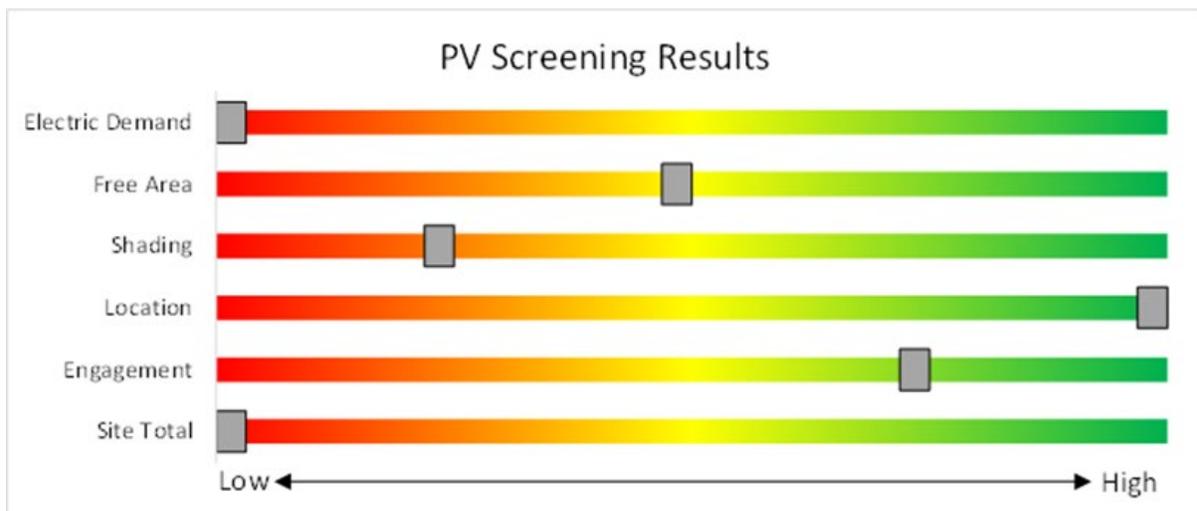


Figure 8 - Photovoltaic Screening

### Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects *must* register their projects prior to the start of construction to establish the project's eligibility to earn TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installation.

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

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

## 6.2 Combined Heat and Power

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

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

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

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

Based on a preliminary analysis, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation. The lack of thermal load and minimal electric demand are the most significant factors contributing to the lack of CHP potential.

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

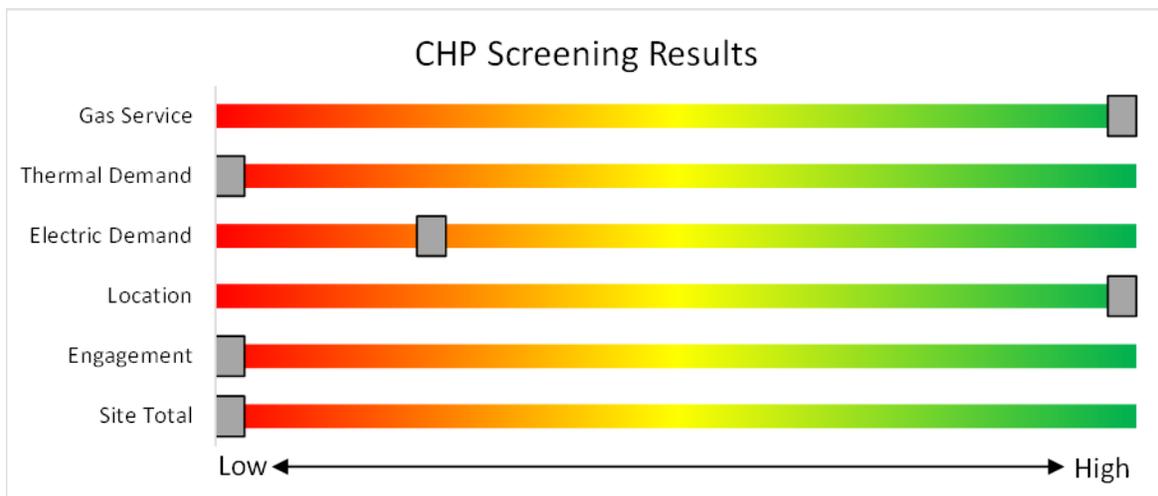


Figure 9 - Combined Heat and Power Screening

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

## 7 PROJECT FUNDING AND INCENTIVES

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

### 7.1 Utility Energy Efficiency Programs

The infographic features logos for Atlantic City Electric, Jersey Central Power & Light, PSEG, Rockland Electric Company, Elizabethtown Gas, South Jersey Gas, and New Jersey Natural Gas. Below the logos, it lists program areas to be served by utilities and proposed new programs & features.

**Program areas to be served by the Utilities:**

- Existing Buildings (residential, commercial, industrial, government)
- Efficient Products
  - HVAC
  - Appliance Rebates
  - Appliance Recycling

**Proposed New Programs & Features:**

- Dedicated multi-family program
- More financing options
- Quick home energy check-ups

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

## 8 NEW JERSEY'S CLEAN ENERGY PROGRAMS

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



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**Program areas staying with NJCEP:**

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

## 8.1 Combined Heat and Power

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

### Incentives

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

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

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

### How to Participate

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

## 8.2 Energy Savings Improvement Program

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

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

### How to Participate

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

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

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

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

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

### 8.3 Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects *must* register their projects prior to the start of construction to establish the project's eligibility to earn TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installations. NJBPU calculates the value of a Transition Renewable Energy Certificate (TREC) by multiplying the base compensation rate (\$152/MWh) by the project's assigned factor (i.e.  $\$152 \times 0.85 = \$129.20/\text{MWh}$ ). The TREC factors are defined based on the chart below:

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

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number, which enables it to generate New Jersey TRECs.

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

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

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

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

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

## 9 PROJECT DEVELOPMENT

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

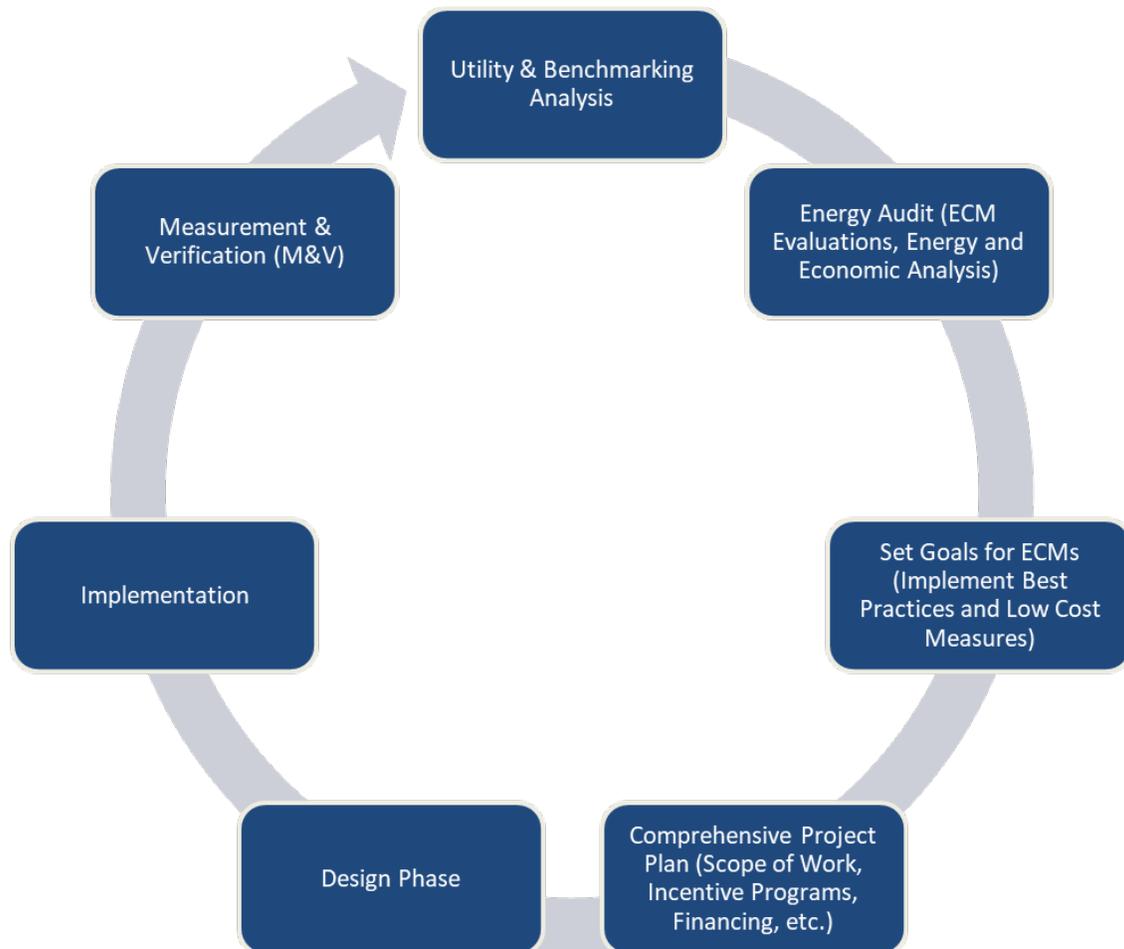


Figure 30 – Project Development Cycle

## 10 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

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### 10.1 Retail Electric Supply Options

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

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

A list of licensed third-party electric suppliers is available at the NJBPU website<sup>6</sup>.

### 10.2 Retail Natural Gas Supply Options

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

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

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

A list of licensed third-party natural gas suppliers is available at the NJBPU website<sup>7</sup>.

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<sup>6</sup> [www.state.nj.us/bpu/commercial/shopping.html](http://www.state.nj.us/bpu/commercial/shopping.html).

<sup>7</sup> [www.state.nj.us/bpu/commercial/shopping.html](http://www.state.nj.us/bpu/commercial/shopping.html).

## APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

### Lighting Inventory & Recommendations

Location	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
	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
Center of Warehouse Lights	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	5	114	2,480	1, 2	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,711	0.3	1,101	0	\$171	\$978	\$190	4.6
Edge of Warehouse Lights	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	U	114	2,450	1	Relamp	No	5	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,450	0.2	686	0	\$107	\$365	\$100	2.5
Cage 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	U	114	2,080	1, 2	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	154	0	\$24	\$189	\$20	7.1
Cage 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	U	114	2,080	1, 2	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	154	0	\$24	\$189	\$20	7.1
Cage 3	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	U	114	2,080	1, 2	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.1	154	0	\$24	\$189	\$20	7.1
Back of Building	1	Metal Halide: (2) 100W Lamps	Photocell		256	4,380	1	LED Retrofit	No	1	LED Lamps: (2) LED Screw-in Bulb	Photocell	30	4,380	0.0	990	0	\$154	\$50	\$6	0.3

**Motor Inventory & Recommendations**

Location	Area(s)/System(s) Served	Existing Conditions									Proposed Conditions				Energy Impact & Financial Analysis							
		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
Warehouse	Garage Door Opener	1	Other	0.3	65.0%	No	Not Legible	Not Legible	B	0		No	65.0%	No		0.0	0	0	\$0	\$0	\$0	0.0

# APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

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

**ENERGY STAR® Statement of Energy Performance**

LEARN MORE AT [energystar.gov](http://energystar.gov)

**N/A** **Public Works - Warehouse**

**ENERGY STAR® Score<sup>1</sup>**

Primary Property Type: Non-Refrigerated Warehouse  
 Gross Floor Area (ft<sup>2</sup>): 6,076  
 Built: 1963

For Year Ending: December 31, 2019  
 Date Generated: May 28, 2021

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

Property & Contact Information		
<b>Property Address</b> Public Works - Warehouse 384 Jackson Street City of Orange Township, New Jersey 07050	<b>Property Owner</b> Orange Township City Municipality 29 North Day Street Orange Township, City of, NJ 07050 862-438-0647	<b>Primary Contact</b> Kathrina Nease 29 North Day Street Orange Township, City of, NJ 07050 862-438-0647 knease@orangenj.gov
Property ID: 11907297		

Energy Consumption and Energy Use Intensity (EUI)			
<b>Site EUI</b> 2.5 kBtu/ft <sup>2</sup>	<b>Annual Energy by Fuel</b>		<b>National Median Comparison</b>
	Electric - Grid (kBtu)	15,360 (100%)	
	Natural Gas (kBtu)	0 (0%)	National Median Source EUI (kBtu/ft <sup>2</sup> )
			% Diff from National Median Source EUI
<b>Source EUI</b> 7.1 kBtu/ft <sup>2</sup>			<b>Annual Emissions</b>
			Greenhouse Gas Emissions (Metric Tons CO <sub>2</sub> e/year)
			2

### Signature & Stamp of Verifying Professional

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

LP Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Licensed Professional

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



Professional Engineer or Registered Architect Stamp (if applicable)

## APPENDIX C: GLOSSARY

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

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

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