Local Government Energy Audit Report

Hoboken Terminal

October 12, 2023

Prepared for:

NJ Transit Corporation

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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.

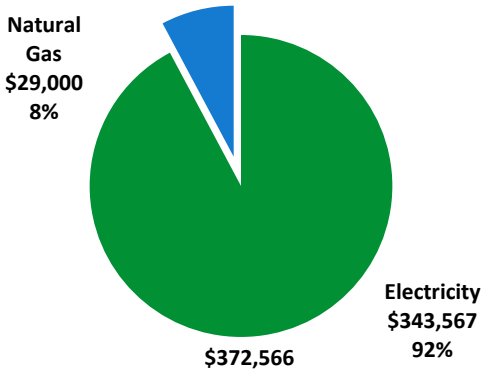
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state, and federal requirements.

Table of Contents

1 EXECUTIVE SUMMARY

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

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $372,566 Electricity: 2,971,965 kWh Natural Gas: 37,860 Therms	
ENERGY STAR® Benchmarking Score	N/A *(1-100 scale)*	A standard energy use benchmark is not available for this facility type. This report contains suggestions about how to improve building performance and reduce energy costs.

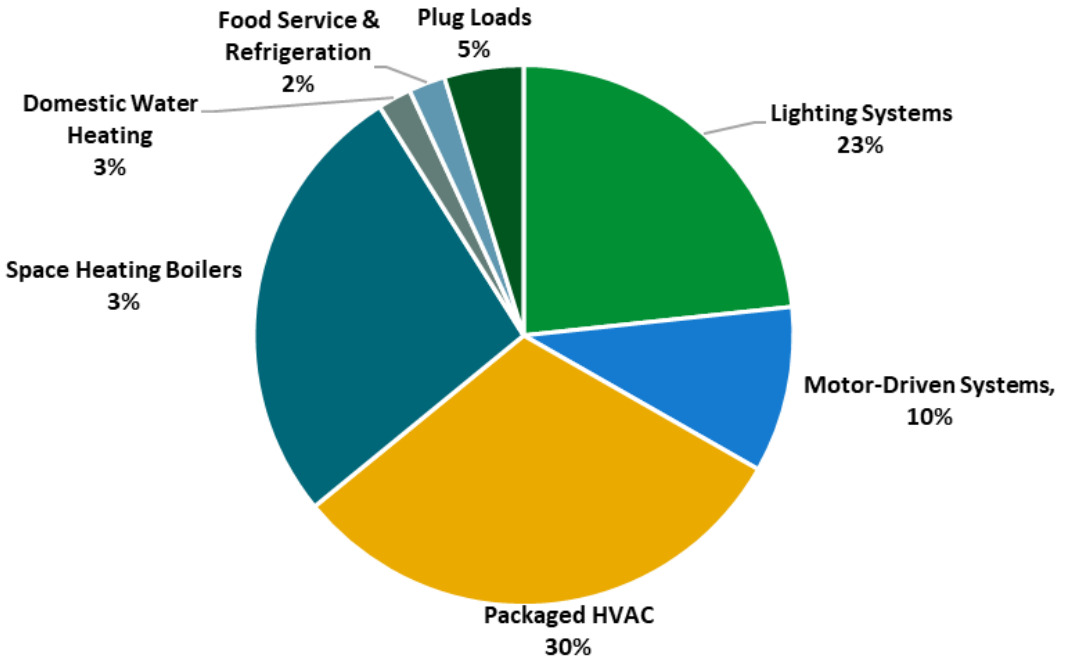


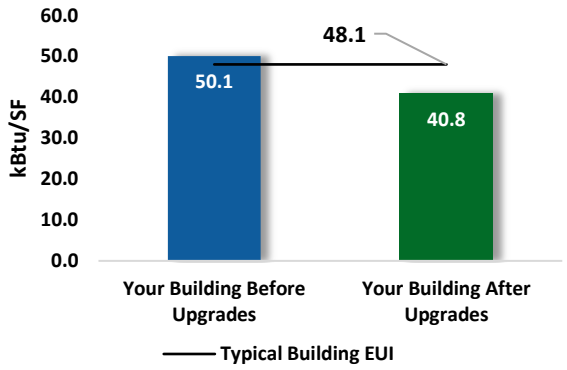
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

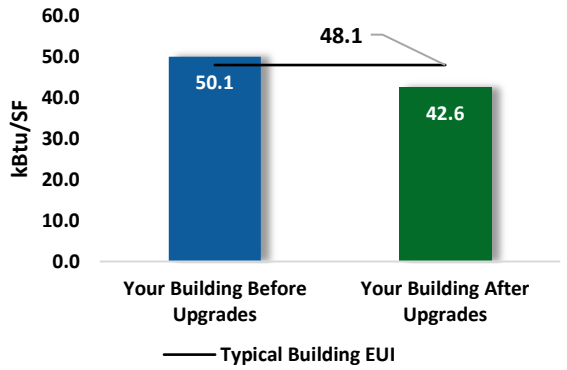
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$596,864
Potential Rebates & Incentives[1]	$53,599
Annual Cost Savings	$86,353
Annual Energy Savings	Electricity: 744,951 kWh Natural Gas: 305 Therms
Greenhouse Gas Emission Savings	377 Tons
Simple Payback	6.3 Years
Site Energy Savings (All Utilities)	18%



Scenario 2: Cost Effective Package[2]

Installation Cost	$210,143
Potential Rebates & Incentives	$36,017
Annual Cost Savings	$70,467
Annual Energy Savings	Electricity: 609,230 kWh Natural Gas: 48 Therms
Greenhouse Gas Emission Savings	307 Tons
Simple Payback	2.5 Years
Site Energy Savings (all utilities)	15%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**302,931**	**19.7**	**-51**	**$34,630**	**$66,163**	**$12,270**	**$53,893**	**1.6**	**299,091**
ECM 1	Install LED Fixtures	Yes	70,575	0.0	0	$8,159	$25,393	$3,450	$21,943	2.7	71,068
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	6,255	0.6	-1	$712	$1,125	$170	$955	1.3	6,130
ECM 3	Retrofit Fixtures with LED Lamps	Yes	226,102	19.1	-49	$25,759	$39,646	$8,650	$30,996	1.2	221,892
Lighting Control Measures			**209,272**	**6.6**	**-19**	**$24,049**	**$80,980**	**$18,250**	**$62,730**	**2.6**	**208,536**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	55,932	4.6	-13	$6,367	$29,130	$3,690	$25,440	4.0	54,816
ECM 5	Install Photocell Controls	Yes	127,616	0.0	0	$14,753	$33,400	$0	$33,400	2.3	128,508
ECM 6	Install High/Low Lighting Controls	Yes	25,725	1.9	-6	$2,929	$18,450	$14,560	$3,890	1.3	25,212
Motor Upgrades			**1,303**	**0.2**	**0**	**$151**	**$4,368**	**$0**	**$4,368**	**29.0**	**1,313**
ECM 7	Premium Efficiency Motors	No	1,303	0.2	0	$151	$4,368	$0	$4,368	29.0	1,313
Variable Frequency Drive (VFD) Measures			**74,814**	**10.3**	**75**	**$9,219**	**$54,453**	**$5,250**	**$49,203**	**5.3**	**84,060**
ECM 8	Install VFDs on Constant Volume (CV) Fans	Yes	62,990	10.2	0	$7,282	$41,909	$4,950	$36,959	5.1	63,431
ECM 9	Install VFDs on Kitchen Hood Fan Motors	Yes	11,823	0.1	75	$1,937	$12,545	$300	$12,245	6.3	20,630
Unitary HVAC Measures			**124,352**	**35.5**	**2**	**$14,391**	**$278,696**	**$12,582**	**$266,114**	**18.5**	**125,453**
ECM 10	Install High Efficiency Air Conditioning Units	No	124,352	35.5	2	$14,391	$278,696	$12,582	$266,114	18.5	125,453
Electric Chiller Replacement			**10,065**	**-0.4**	**0**	**$1,164**	**$97,782**	**$4,500**	**$93,282**	**80.2**	**10,136**
ECM 11	Install High Efficiency Chillers	No	10,065	-0.4	0	$1,164	$97,782	$4,500	$93,282	80.2	10,136
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**24**	**$181**	**$5,875**	**$500**	**$5,375**	**29.7**	**2,770**
ECM 12	Install High Efficiency Furnaces	No	0	0.0	24	$181	$5,875	$500	$5,375	29.7	2,770
HVAC System Improvements			**3,428**	**0.0**	**0**	**$396**	**$597**	**$50**	**$547**	**1.4**	**3,452**
ECM 13	Install Pipe Insulation	Yes	3,428	0.0	0	$396	$597	$50	$547	1.4	3,452
Domestic Water Heating Upgrade			**3,753**	**0.0**	**0**	**$434**	**$194**	**$97**	**$97**	**0.2**	**3,780**
ECM 14	Install Low-Flow DHW Devices	Yes	3,753	0.0	0	$434	$194	$97	$97	0.2	3,780
Food Service & Refrigeration Measures			**3,909**	**0.4**	**0**	**$452**	**$920**	**$100**	**$820**	**1.8**	**3,936**
ECM 15	Vending Machine Control	Yes	3,909	0.4	0	$452	$920	$100	$820	1.8	3,936
Custom Measures			**11,123**	**0.0**	**0**	**$1,287**	**$6,836**	**$0**	**$6,836**	**5.3**	**11,201**
ECM 16	Replace Electric Water Heater with Heat Pump Water Heater	Yes	11,123	0.0	0	$1,287	$6,836	$0	$6,836	5.3	11,201
TOTALS (COST EFFECTIVE MEASURES)			**609,230**	**37.0**	**5**	**$70,467**	**$210,143**	**$36,017**	**$174,126**	**2.5**	**614,055**
TOTALS (ALL MEASURES)			**744,951**	**72.3**	**30**	**$86,353**	**$596,864**	**$53,599**	**$543,265**	**6.3**	**753,727**

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

Utility-run energy efficiency programs and New Jersey's Clean Energy Programs, give you the flexibility to do a little or a lot. Rebates, incentives, and financing are available to help reduce both your installation costs and your energy bills. If you are planning to take advantage of these programs, make sure to review incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives *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. It incentivizes owners/users of buildings to upgrade or install energy conserving measures in existing buildings to help offset the capital costs associated with the project. The efficiency upgrades are customized to meet the requirements of the customers' existing facilities, while advancing the State's energy efficiency, conservation, and greenhouse gas reduction goals.

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

2 EXISTING CONDITIONS

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

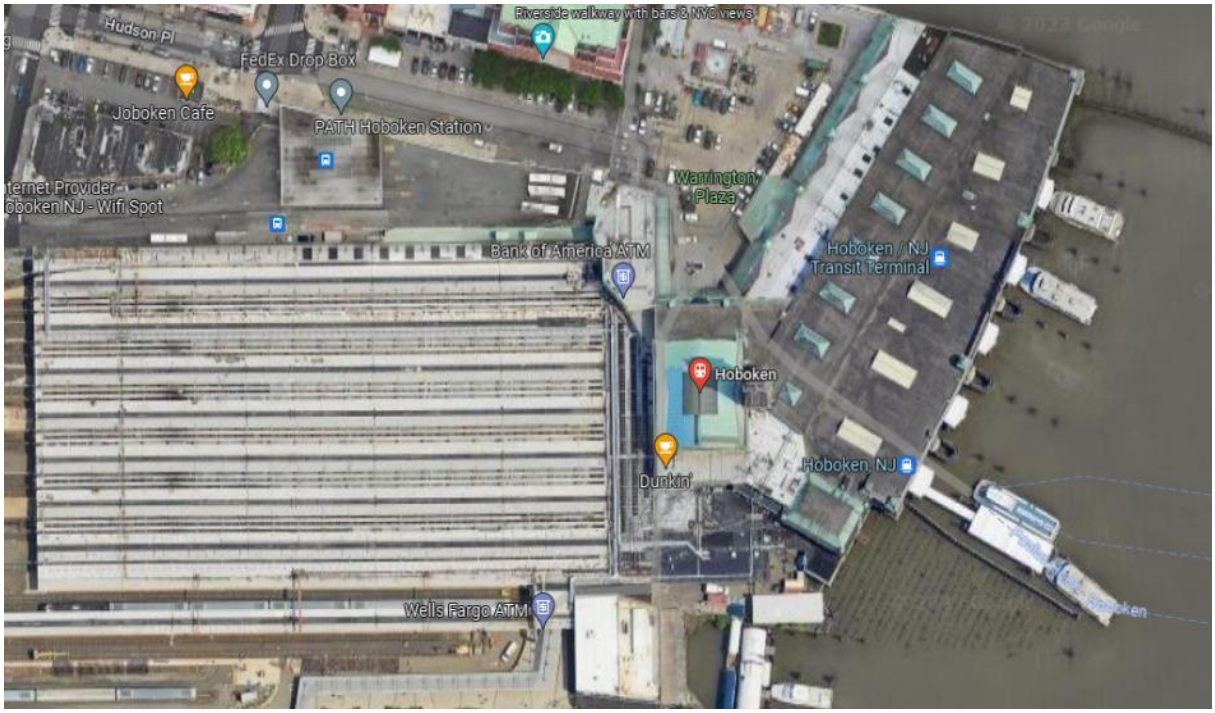
TRC conducted this study as part of a comprehensive effort to assist New Jersey educational and local government facilities in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

2.1 Site Overview

On March 14, 2023, TRC performed an energy audit at Hoboken Terminal located in Hoboken, New Jersey. TRC met with Gennaro Addesso and Diomedes Mendoza to review the facility operations and help focus our investigation on specific energy-using systems.

Hoboken Terminal is a four-story, 278,000 square foot rail intermodal passenger station building built in 1907 and subject to numerous renovations and restorations in response to changing service needs. In 1973 the terminal building was added to both the New Jersey Register of Historic Places and to the National Register of Historic Places. It is currently served by multiple commuter rail lines, busses, rapid transit, and ferry system. Spaces include lobbies and public circulation areas including a food court and public restrooms. There are also kitchen areas, offices, locker rooms, lounges, mechanical areas, and storage spaces for transit staff use.

The complex also consists of Hoboken Railyard which is comprised of lighted track areas and passenger train sidings that extend inland from the terminal. The extent of the facility audited during the site visit can be seen in the image below.



Hoboken Terminal

New Jersey Transit is in the process of upgrading terminal and yard areas to harden the complex against severe storms and is planning other upgrades to accommodate passengers and to enhance the customer experience as part of the Hoboken Connect project.

Interior lighting is mainly provided by a mix of linear fluorescent T8 and LED fixtures. Railyard lighting uses mostly LED sources. Four hot water boilers provide heating to most spaces while cooling is provided to some areas by an air-cooled chiller or unitary HVAC equipment, depending on location.

2.2 Building Occupancy

The facility is fully occupied year-round, with a typical occupancy of approximately 1,000 staff.

Building Name	Weekday/Weekend	Operating Schedule
Terminal and Yard Hoboken	Weekday	24/7
	Weekend	24/7

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block over structural steel with a block and copper facade. The roof has pitched and flat areas, with a copper covering over the pitched areas and a gray rubber membrane partially covered with pebbles over the flat areas. The roof is in poor condition and is uninsulated according to facility staff.

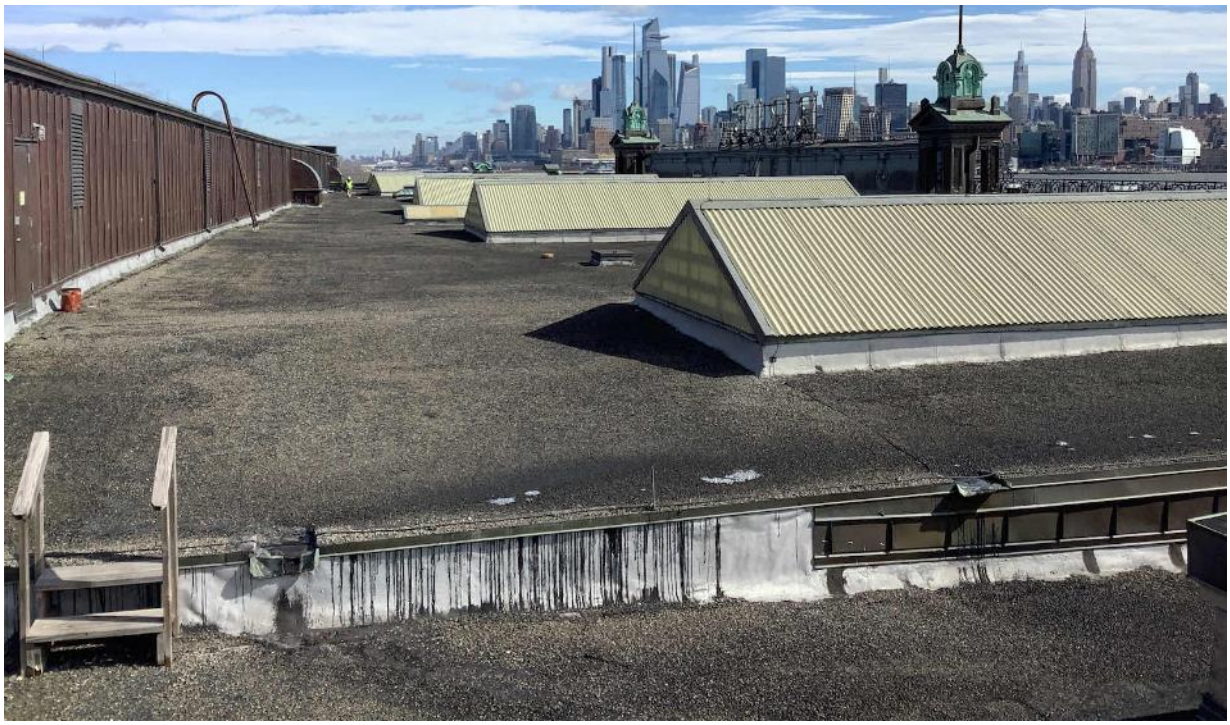
Most of the windows are single glazed with wooden frames, with some newer doubled glazed windows with aluminum frames in the YMCA building area. The glass-to-frame seals are in fair to poor condition. The operable window weather seals are in fair to poor condition, showing some evidence of excessive wear. Exterior doors have a mix of aluminum and wood frames and are in fair to poor condition with worn, damaged seals. Degraded window and door seals increase drafts and outside air infiltration. Overall, the building envelope appears in poor condition. The installation of building insulation and window replacements have been identified as measures for future consideration within Section 4.

Building Walls

Building Windows

Entrance Doors

Exit Doors



Roof

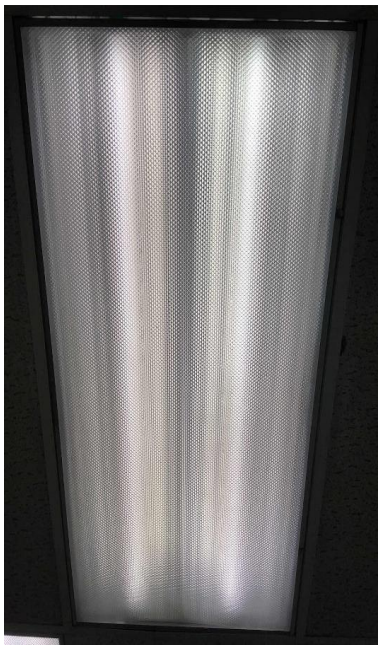
2.4 Lighting Systems

The primary interior lighting system uses 32-Watt straight and U-bend fluorescent T8 lamps, although there are a significant number of LED lamps and fixtures. Fixture types include 1-lamp, 2-lamp, 3-lamp, and 4-lamp, 4-foot long recessed, surface mounted, and pendant fixtures.

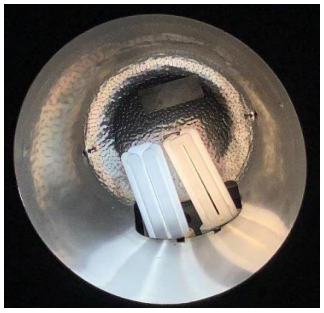
Compact fluorescent lamps (CFL), fluorescent T12, fluorescent T5HO, and incandescent lamps are also used in some spaces. Typically, CFLs at this site are between 23-Watts and 42-Watts, fluorescent T12s require 40-Watts, fluorescent T5HO use 54-Watts, and incandescent lamps draw 65-Watts. Exit signs use LED sources. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts.

Interior light fixtures are primarily controlled by manual wall switches, with some occupancy sensors used in the ferry ticketing area. All light fixtures are in good condition. Interior lighting levels were generally sufficient.

Exterior fixtures in track areas used LED sources while fixtures in ferry slip areas use a combination of LED, high-pressure sodium (HPS), and T5HO fluorescent sources. Building mounted, parking, and general area lighting is provided by a range of sources, mostly LED. Exterior fixtures are photocell and timer controlled, with the lighting in some areas running continuously.



Fluorescent T8 Fixtures



CFL Fixture

LED Fixtures

Exterior HPS Fixture

Exterior LED Fixture

2.5 Air Handling Systems

Unitary Electric HVAC Equipment

Various areas are conditioned using a mix of mini-split heat pump (HP) units, variable refrigerant flow (VRF) HP units, split system air conditioning (AC) units, window AC units, and mini-split AC units.

Window AC units and mini-split systems serve small individual area and range in cooling capacity between 0.6 tons and 3.0 tons with cooling efficiencies between 9.8 EER and 20.8 EER. The mini-split HP units have heating capacities between 21.6 MBh and 37.0 MBh with heating capacities between 8.2 HSPF and 11 HSPF.

Larger split system AC units and heat pumps serve larger areas, including the food court and Ticket Office. Cooling capacities for these units range from 5.0 tons to 25.67 tons with cooling efficiencies between 8.6 EER and 14.0 EER. The two Mitsubishi heat pumps can provide 108 MBh of heating with an efficiency rating of 3.52 COP.

The units are in good to fair condition and thermostatically controlled, with some of the older units being recommended for replacement in Section 4.

Mini-split HP

Split System

Unitary Heating Equipment

A significant number of areas are heated using electric resistance heaters, and there is one Trane gas-fired forced air furnace. The electric resistance heaters vary in heating capacity between 1 kW and 30 kW while the gas-fired forced air furnace has a heating capacity of 240 MBh and a nominal efficiency rating of 80%. The units are in fair to good condition and are thermostatically controlled.

Electric Resistance Heaters

Packaged Units

Various areas, including the clock tower server room, are conditioned by one of three packaged units with electric cooling and either gas or electric heating. The units are equipped with constant speed supply fans and range in cooling capacity from 0.3 tons to 10.0 tons with cooling efficiencies between 8.6 EER and 11.7 EER. The electric heating units have heating of 1.3 kW and 11.5 kW, while the gas-fired heating unit has a heating capacity of 144 MBh. The units are in fair condition and are thermostatically controlled.

Packaged Unit

Air Handling Units (AHUs)

Some areas of the facility are conditioned by air handling units (AHUs) equipped with constant speed supply fans.

The units serving the YMCA building are equipped with chilled water-cooling coils and electric resistance heaters. The remaining units are equipped with heating hot water coils, with some connected to exterior split systems to provide DX cooling. The units are in fair condition and are thermostatically controlled.

Air Handling Unit

2.6 Heating Hot Water Systems

The building heating system consists of four Aerco gas-fired condensing hot water boilers, each with an output capacity of 1,880 MBh. The burners are fully modulating with a nominal efficiency of 94%. Each boiler is equipped with a combustion air fan. The boilers are configured in a lead/lag control scheme. Multiple boilers are required under high-load conditions. Installed in 2017, the boilers are in good condition and are monitored and controlled using the facility BAS. There is a service contract in place.

The boilers are configured in a variable flow primary distribution with two, 5 hp VFD controlled hot water pumps (HWP-1 and HWP-2) operating with an automated control scheme for Boilers #1 and #2, and two 3 hp VFD controlled hot water pumps (HWP-3 and HWP-4) operating with an automated control scheme for Boilers #3 and #4. The boilers provide hot water to air handling units, radiators, and unit heaters throughout the facility.

Hot Water Boilers

Heating Hot Water Pumps

2.7 Chilled Water Systems

The chiller plant consists of two, 25-ton Trane variable speed, air-cooled scroll chillers located on the roof of the YMCA building. The chillers supply chilled water to the air handling units within the YMCA building area and are thermostatically controlled. Installed in 1986, the chillers are in poor condition and have been recommended for replacement.

Air-cooled Chiller

2.8 Building Automation System (BAS)

A Honeywell BAS controls the HVAC equipment in the two boiler rooms. The BAS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, heating water loop temperatures. The level of control provided by the BAS is limited. At the time of the audit, the BAS was not accessible at this site.

2.9 Domestic Hot Water

Hot water for the facility is produced by a total of 16 electric storage water heaters. These range in capacity from 1.6 kW to 18 kW, with storage capacities between 6 gallons and 119 gallons. Two fractional hp circulation pumps distribute water to end uses. The circulation pumps operate continuously.

Installed between 2011 and 2021, the units are in fair to good condition. The domestic hot water pipes are partially insulated, and the insulation is in good condition. Section 4 includes a discussion about insulating some of the piping, and a separate discussion about replacing some of the electric storage water heaters with heat pump water heaters. Refer to Appendix A for detailed information about each unit.

Water Heaters

2.10 Food Service Equipment

The Dunkin Donuts kitchen has all electric equipment that is used to prepare food and drinks. Most cooking is done using convection electric ovens. Equipment is not high efficiency and is in good condition.

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

Electric Convection Ovens

2.11 Refrigeration

The Dunkin Donuts, Fabre News, and liquor store have several stand-up refrigerators with either solid or glass doors. There is also one stand-up solid door freezer in the Dunkin Donuts store. Equipment is a mix of standard and high efficiency, and in good condition.

The flower store's walk-in refrigerator was inaccessible during the site visit and has an estimated 0.5-ton compressor located above the unit with an estimated two-fan evaporator. Additionally, there were several walk-in units identified within the food court kitchen, but they were disconnected and inoperable during the site visit. Ice machines were noted at the Dunkin Donuts and in the grand concourse.

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

Stand-up Refrigerator

Stand-up Freezer

2.12 Plug Load and Vending Machines

You may wish to consider paying particular attention to minimizing your plug load usage. This report makes suggestions for ECMs in this area as well as energy efficient best practices.

There are 53 computer workstations throughout the facility. Plug loads throughout the building include general office equipment. There are typical office loads such as copiers, printers, microwaves, televisions, and mini fridges. There are several servers and monitoring equipment.

There are twelve residential-style refrigerators throughout the facility that are used to store food and drinks. These vary in condition and efficiency. There are two refrigerated beverage vending machine and two non-refrigerated vending machines located in the facility. Vending machines are not equipped with occupancy-based controls.

Vending Machines

Residential-style Refrigerator

2.13 Water-Using Systems

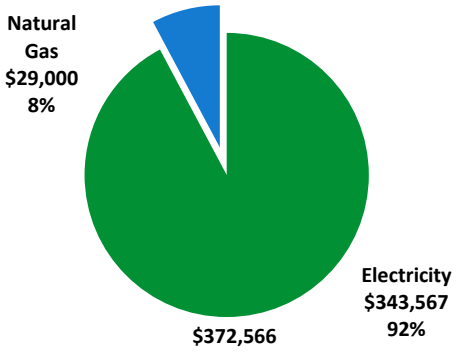
There are 38 restrooms and locker rooms with toilets, urinals, showers, and sinks. Some sinks are equipped with low-flowing fixtures, with the rest having flow rates at 2.2 gallons per minute (gpm) or higher.

Typical Restroom Sinks

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	2,971,965 kWh	$343,567
Natural Gas	37,860 Therms	$29,000
Total		**$372,566**



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

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

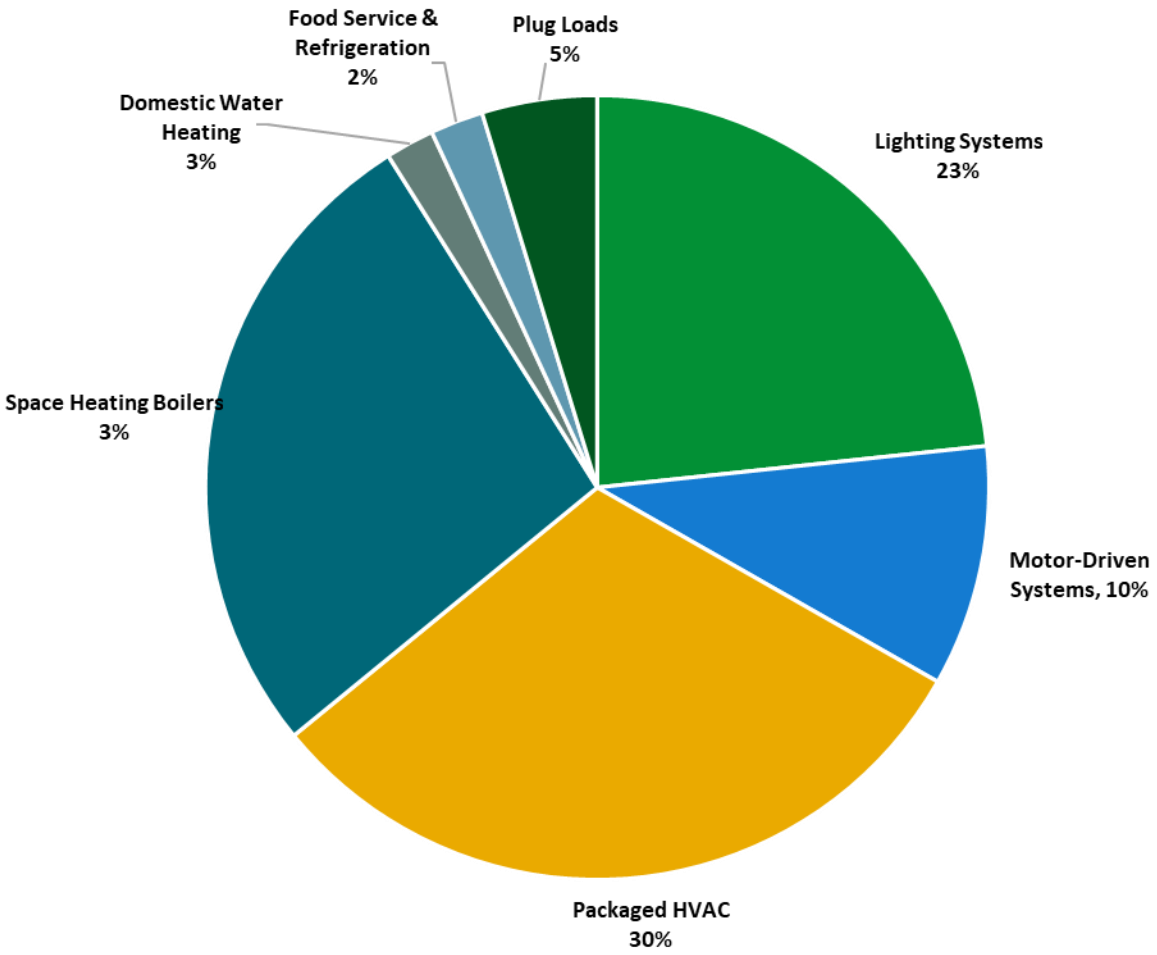
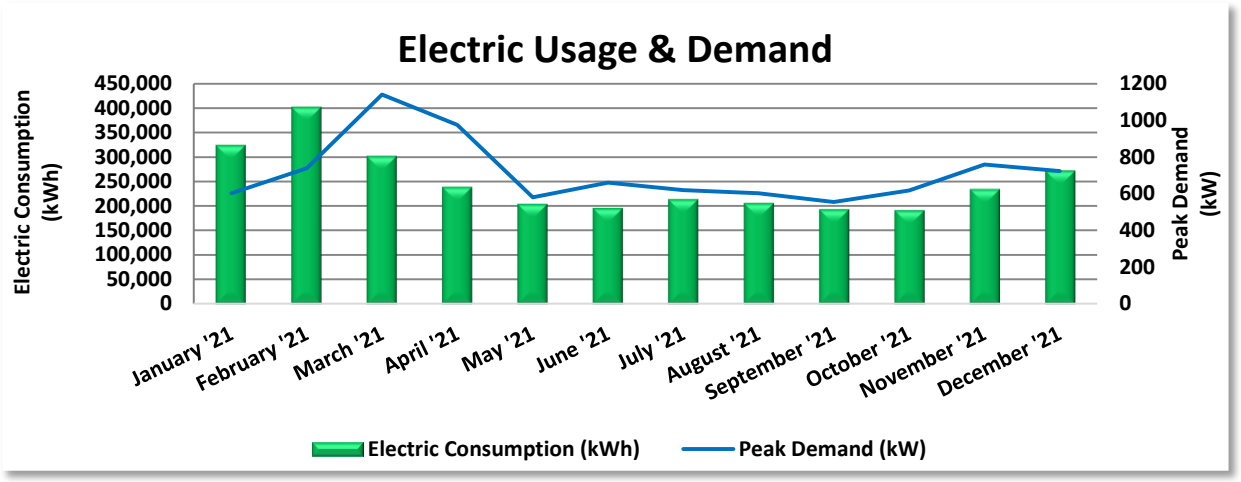


Figure 4 - Energy Balance

3.1 Electricity

PSE&G delivers electricity under rate class High Tension Service (HTS), with electric production provided by Direct Energy, a third-party supplier.



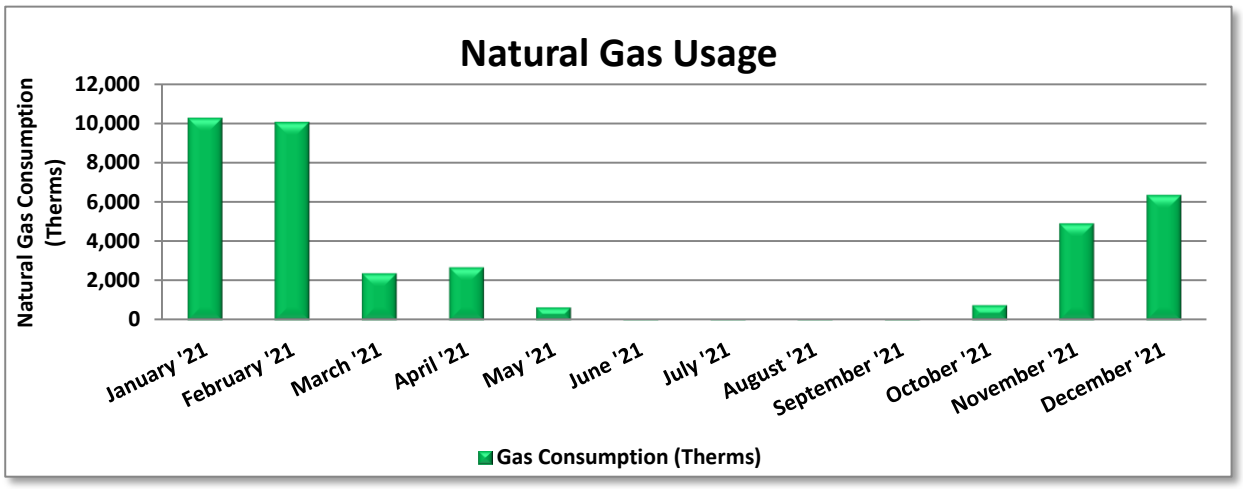
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
1/31/21	31	323,226	602	$1,475	$34,970
2/28/21	28	400,535	738	$1,475	$42,689
3/31/21	31	301,341	1,142	$1,305	$32,774
4/30/21	30	238,354	975	$2,225	$26,579
5/31/21	31	204,185	580	$1,322	$23,234
6/30/21	30	195,762	660	$4,087	$24,998
7/31/21	31	213,426	620	$3,918	$26,577
8/31/21	31	205,972	602	$3,844	$25,761
9/30/21	30	192,823	554	$3,644	$24,238
10/31/21	31	190,830	617	$1,322	$22,045
11/30/21	30	233,674	759	$1,322	$26,287
12/31/21	31	271,837	723	$1,322	$33,414
Totals	**365**	**2,971,965**	**1,142**	**$27,261**	**$343,567**
Annual	**365**	**2,971,965**	**1,142**	**$27,261**	**$343,567**

Notes:

- Peak demand of 1,142 kW occurred in March '21.
- Average demand over the past 12 months was 714 kW.
- The average electric cost over the past 12 months was $0.116/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 Large Volume Gas (LVG), with natural gas supply provided by Direct Energy, a third-party supplier.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
2/1/21	32	10,263	$7,099
3/3/21	30	10,041	$6,828
4/1/21	29	2,382	$2,535
5/3/21	32	2,697	$1,725
6/2/21	30	665	$531
7/1/21	29	8	$152
8/2/21	32	9	$153
8/31/21	29	8	$152
9/30/21	30	41	$169
10/29/21	29	779	$611
12/1/21	33	4,919	$4,096
1/3/22	33	6,359	$5,189
Totals	**368**	**38,171**	**$29,238**
Annual	**365**	**37,860**	**$29,000**

Notes:

- The average gas cost for the past 12 months is $0.766/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

Benchmarking Score	**N/A**

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

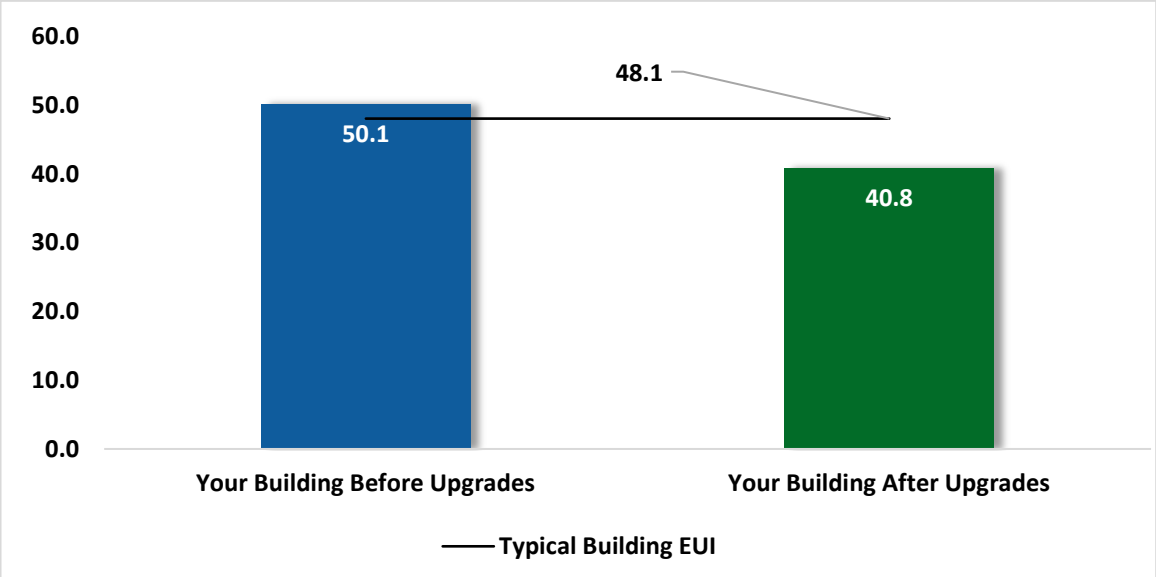


Figure 5 - Energy Use Intensity Comparison[3]

Energy use intensity (EUI) measures energy consumption per square foot and is the standard metric for comparing buildings' energy performance. A lower EUI means better performance and less energy consumed. 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.

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

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

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

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

4 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.

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**302,931**	**19.7**	**-51**	**$34,630**	**$66,163**	**$12,270**	**$53,893**	**1.6**	**299,091**
ECM 1	Install LED Fixtures	Yes	70,575	0.0	0	$8,159	$25,393	$3,450	$21,943	2.7	71,068
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	6,255	0.6	-1	$712	$1,125	$170	$955	1.3	6,130
ECM 3	Retrofit Fixtures with LED Lamps	Yes	226,102	19.1	-49	$25,759	$39,646	$8,650	$30,996	1.2	221,892
Lighting Control Measures			**209,272**	**6.6**	**-19**	**$24,049**	**$80,980**	**$18,250**	**$62,730**	**2.6**	**208,536**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	55,932	4.6	-13	$6,367	$29,130	$3,690	$25,440	4.0	54,816
ECM 5	Install Photocell Controls	Yes	127,616	0.0	0	$14,753	$33,400	$0	$33,400	2.3	128,508
ECM 6	Install High/Low Lighting Controls	Yes	25,725	1.9	-6	$2,929	$18,450	$14,560	$3,890	1.3	25,212
Motor Upgrades			**1,303**	**0.2**	**0**	**$151**	**$4,368**	**$0**	**$4,368**	**29.0**	**1,313**
ECM 7	Premium Efficiency Motors	No	1,303	0.2	0	$151	$4,368	$0	$4,368	29.0	1,313
Variable Frequency Drive (VFD) Measures			**74,814**	**10.3**	**75**	**$9,219**	**$54,453**	**$5,250**	**$49,203**	**5.3**	**84,060**
ECM 8	Install VFDs on Constant Volume (CV) Fans	Yes	62,990	10.2	0	$7,282	$41,909	$4,950	$36,959	5.1	63,431
ECM 9	Install VFDs on Kitchen Hood Fan Motors	Yes	11,823	0.1	75	$1,937	$12,545	$300	$12,245	6.3	20,630
Unitary HVAC Measures			**124,352**	**35.5**	**2**	**$14,391**	**$278,696**	**$12,582**	**$266,114**	**18.5**	**125,453**
ECM 10	Install High Efficiency Air Conditioning Units	No	124,352	35.5	2	$14,391	$278,696	$12,582	$266,114	18.5	125,453
Electric Chiller Replacement			**10,065**	**-0.4**	**0**	**$1,164**	**$97,782**	**$4,500**	**$93,282**	**80.2**	**10,136**
ECM 11	Install High Efficiency Chillers	No	10,065	-0.4	0	$1,164	$97,782	$4,500	$93,282	80.2	10,136
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**24**	**$181**	**$5,875**	**$500**	**$5,375**	**29.7**	**2,770**
ECM 12	Install High Efficiency Furnaces	No	0	0.0	24	$181	$5,875	$500	$5,375	29.7	2,770
HVAC System Improvements			**3,428**	**0.0**	**0**	**$396**	**$597**	**$50**	**$547**	**1.4**	**3,452**
ECM 13	Install Pipe Insulation	Yes	3,428	0.0	0	$396	$597	$50	$547	1.4	3,452
Domestic Water Heating Upgrade			**3,753**	**0.0**	**0**	**$434**	**$194**	**$97**	**$97**	**0.2**	**3,780**
ECM 14	Install Low-Flow DHW Devices	Yes	3,753	0.0	0	$434	$194	$97	$97	0.2	3,780
Food Service & Refrigeration Measures			**3,909**	**0.4**	**0**	**$452**	**$920**	**$100**	**$820**	**1.8**	**3,936**
ECM 15	Vending Machine Control	Yes	3,909	0.4	0	$452	$920	$100	$820	1.8	3,936
Custom Measures			**11,123**	**0.0**	**0**	**$1,287**	**$6,836**	**$0**	**$6,836**	**5.3**	**11,201**
ECM 16	Replace Electric Water Heater with Heat Pump Water Heater	Yes	11,123	0.0	0	$1,287	$6,836	$0	$6,836	5.3	11,201
TOTALS			**744,951**	**72.3**	**30**	**$86,353**	**$596,864**	**$53,599**	**$543,265**	**6.3**	**753,727**

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

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

Figure 6 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**302,931**	**19.7**	**-51**	**$34,630**	**$66,163**	**$12,270**	**$53,893**	**1.6**	**299,091**
ECM 1	Install LED Fixtures	70,575	0.0	0	$8,159	$25,393	$3,450	$21,943	2.7	71,068
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	6,255	0.6	-1	$712	$1,125	$170	$955	1.3	6,130
ECM 3	Retrofit Fixtures with LED Lamps	226,102	19.1	-49	$25,759	$39,646	$8,650	$30,996	1.2	221,892
Lighting Control Measures		**209,272**	**6.6**	**-19**	**$24,049**	**$80,980**	**$18,250**	**$62,730**	**2.6**	**208,536**
ECM 4	Install Occupancy Sensor Lighting Controls	55,932	4.6	-13	$6,367	$29,130	$3,690	$25,440	4.0	54,816
ECM 5	Install Photocell Controls	127,616	0.0	0	$14,753	$33,400	$0	$33,400	2.3	128,508
ECM 6	Install High/Low Lighting Controls	25,725	1.9	-6	$2,929	$18,450	$14,560	$3,890	1.3	25,212
Variable Frequency Drive (VFD) Measures		**74,814**	**10.3**	**75**	**$9,219**	**$54,453**	**$5,250**	**$49,203**	**5.3**	**84,060**
ECM 8	Install VFDs on Constant Volume (CV) Fans	62,990	10.2	0	$7,282	$41,909	$4,950	$36,959	5.1	63,431
ECM 9	Install VFDs on Kitchen Hood Fan Motors	11,823	0.1	75	$1,937	$12,545	$300	$12,245	6.3	20,630
HVAC System Improvements		**3,428**	**0.0**	**0**	**$396**	**$597**	**$50**	**$547**	**1.4**	**3,452**
ECM 13	Install Pipe Insulation	3,428	0.0	0	$396	$597	$50	$547	1.4	3,452
Domestic Water Heating Upgrade		**3,753**	**0.0**	**0**	**$434**	**$194**	**$97**	**$97**	**0.2**	**3,780**
ECM 14	Install Low-Flow DHW Devices	3,753	0.0	0	$434	$194	$97	$97	0.2	3,780
Food Service & Refrigeration Measures		**3,909**	**0.4**	**0**	**$452**	**$920**	**$100**	**$820**	**1.8**	**3,936**
ECM 15	Vending Machine Control	3,909	0.4	0	$452	$920	$100	$820	1.8	3,936
Custom Measures		**11,123**	**0.0**	**0**	**$1,287**	**$6,836**	**$0**	**$6,836**	**5.3**	**11,201**
ECM 16	Replace Electric Water Heater with Heat Pump Water Heater	11,123	0.0	0	$1,287	$6,836	$0	$6,836	5.3	11,201
TOTALS		**609,230**	**37.0**	**5**	**$70,467**	**$210,143**	**$36,017**	**$174,126**	**2.5**	**614,055**

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

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

Figure 7 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**302,931**	**19.7**	**-51**	**$34,630**	**$66,163**	**$12,270**	**$53,893**	**1.6**	**299,091**
ECM 1	Install LED Fixtures	70,575	0.0	0	$8,159	$25,393	$3,450	$21,943	2.7	71,068
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	6,255	0.6	-1	$712	$1,125	$170	$955	1.3	6,130
ECM 3	Retrofit Fixtures with LED Lamps	226,102	19.1	-49	$25,759	$39,646	$8,650	$30,996	1.2	221,892

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

ECM 1: Install LED Fixtures

Replace existing fixtures containing high-intensity discharge (HID) lamps with new LED light fixtures. This measure saves energy by installing LEDs, which use less power than other technologies with a comparable light output.

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

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

Affected Building Areas: various exterior metal halide, high pressure sodium, and quartz halogen fixtures

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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

The measure uses the existing fixture housing but replaces the electric components with more efficient lighting technology, which use less power than other lighting technologies but provides equivalent lighting output. Maintenance savings may also be achieved since LED tubes last longer than fluorescent tubes and, therefore, do not need to be replaced as often.

Affected Building Areas: all areas with fluorescent fixtures with T12 tubes

ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent, CFL, and incandescent lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as a direct replacement for most other lighting technologies. Be sure to specify replacement lamps that are compatible with existing dimming controls, where applicable. In some circumstances, you may need to upgrade your dimming system for optimum performance.

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

Affected Building Areas: all areas with fluorescent fixtures with T8 tubes; CFL and incandescent lamps

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**209,272**	**6.6**	**-19**	**$24,049**	**$80,980**	**$18,250**	**$62,730**	**2.6**	**208,536**
ECM 4	Install Occupancy Sensor Lighting Controls	55,932	4.6	-13	$6,367	$29,130	$3,690	$25,440	4.0	54,816
ECM 5	Install Photocell Controls	127,616	0.0	0	$14,753	$33,400	$0	$33,400	2.3	128,508
ECM 6	Install High/Low Lighting Controls	25,725	1.9	-6	$2,929	$18,450	$14,560	$3,890	1.3	25,212

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

ECM 4: Install Occupancy Sensor Lighting Controls

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

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

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

This measure provides energy savings by reducing the lighting operating hours.

Affected Building Areas: offices, conference rooms, lounges, dining areas, libraries, stores, residential rooms, restrooms, locker rooms, and storage rooms

ECM 5: Install Photocell Controls

Install photocells to eliminate exterior lighting use during daytime periods.

Photocells or photocell sensors are lighting controls used for dusk to dawn applications to automatically turn the fixtures on or off. Photo controls detect the amount of light outside and once the light level reaches a low point, the fixture will switch on. During the day, the photocell will detect higher amounts of light and will turn the fixture off.

Photocells may be fixture mounted or wired externally and connected by line voltage to a single light fixture or to a series of fixtures.

This measure reduces energy use in exterior areas to restrict operation to non-daylight periods. Review safety guidelines to ensure these fixtures can be safely turned off when sufficient daylight is available.

Affected Building Areas: exterior fixtures observed to be operating during daylight hours

ECM 6: Install High/Low Lighting Controls

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

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

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

For this type of measure the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage must be provided to ensure that lights turn on in each area as occupants approach the area.

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

Affected Building Areas: hallways, lobbies, and stairwells

4.3 Motors

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**1,303**	**0.2**	**0**	**$151**	**$4,368**	**$0**	**$4,368**	**29.0**	**1,313**
ECM 7	Premium Efficiency Motors	1,303	0.2	0	$151	$4,368	$0	$4,368	29.0	1,313

ECM 7: Premium Efficiency Motors

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

Affected Motors:

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Additional Motor Description
Roof	Exhaust System	2	Exhaust Fan	1.0	Exhaust Fan
Mechanical - Waiting Room Ceiling	Exhaust System - Waiting Room	2	Exhaust Fan	5.0	Exhaust Fan
Lounge - YMCA 3rd Sleep Room	Lounge - YMCA 3rd Sleep Room	2	Supply Fan	1.0	Air Handling Unit

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

4.4 Variable Frequency Drives (VFD)

#	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)
Variable Frequency Drive (VFD) Measures		**74,814**	**10.3**	**75**	**$9,219**	**$54,453**	**$5,250**	**$49,203**	**5.3**	**84,060**
ECM 8	Install VFDs on Constant Volume (CV) Fans	62,990	10.2	0	$7,282	$41,909	$4,950	$36,959	5.1	63,431
ECM 9	Install VFDs on Kitchen Hood Fan Motors	11,823	0.1	75	$1,937	$12,545	$300	$12,245	6.3	20,630

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

ECM 8: Install VFDs on Constant Volume (CV) Fans

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

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

VAV system controls should not raise the supply air temperature at the expense of the fan power. A common mistake is to reset the supply air temperature to achieve chiller energy savings, which can lead to additional air flow requirements. Supply air temperature should be kept low (e.g., 55°F) until the minimum fan speed (typically about 50%) is met. At this point, it is efficient to raise the supply air temperature as the load decreases, but not such that additional air flow and thus fan energy is required.

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coil required to prevent the coil from freezing must be determined during the final project design. The control system programming should maintain the minimum air flow whenever the compressor is operating. Prior to implementation, verify minimum fan speed in cooling mode with the manufacturer. Note that savings will vary depending on the operating characteristics of each AHU.

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

Affected Air Handlers: air handlers, forced air furnace, and package units with larger supply or exhaust fans. Refer to Appendix A for further details.

ECM 9: Install VFDs on Kitchen Hood Fan Motors

Install VFDs and sensors to control the kitchen hood fan motors. The air flow of the hood is varied based on two key inputs: temperature and smoke/cooking fumes. The VFD controls the amount of exhaust (and kitchen make-up air) based on temperature—the lower the temperature the lower the flow. If the optic sensor is triggered by smoke or cooking fumes, the speed of the fan ramps up to 100%.

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

Affected Exhaust Fans: Dunkin Donuts and food court area

4.5 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		**124,352**	**35.5**	**2**	**$14,391**	**$278,696**	**$12,582**	**$266,114**	**18.5**	**125,453**
ECM 10	Install High Efficiency Air Conditioning Units	124,352	35.5	2	$14,391	$278,696	$12,582	$266,114	18.5	125,453

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

ECM 10: Install High Efficiency Air Conditioning Units

We evaluated replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. Some of the replacement units will incorporate efficient gas furnaces. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling and heating load, and the estimated annual operating hours.

Affected Units: split systems, mini-split AC units, window AC units, and package units beyond their normal useful life. Refer to Appendix A for further details.

4.6 Electric Chillers

#	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)
Electric Chiller Replacement		**10,065**	**-0.4**	**0**	**$1,164**	**$97,782**	**$4,500**	**$93,282**	**80.2**	**10,136**
ECM 11	Install High Efficiency Chillers	10,065	-0.4	0	$1,164	$97,782	$4,500	$93,282	80.2	10,136

ECM 11: Install High Efficiency Chillers

We evaluated replacing the older inefficient electric chillers with new high efficiency chillers. The type of chiller to be installed depends on the magnitude of the cooling load and variability of the cooling load profile, for example:

- Positive displacement chillers are usually under 600 tons of cooling capacity, and centrifugal chillers generally start at 150 tons of cooling capacity.
- Constant speed chillers should be used to meet cooling loads with little or no variation, while variable speed chillers are more efficient for variable cooling load profiles.
- Water cooled chillers are more efficient than air cooled chillers but require cooling towers and additional pumps to circulate the cooling water.
- In any given size range, variable speed chillers tend to have better partial load efficiency, but worse full load efficiency, than constant speed chillers.

Energy savings result from the improvement in chiller efficiency and matching the right type of chiller to the cooling load. The energy savings are calculated based on the cooling capacity of the new chiller, the improvement in efficiency compared with the base case equipment, the cooling load profile, and the estimated annual operating hours of the chiller before and after the upgrade.

For the purposes of this analysis, we evaluated the replacement of chillers on a one-for-one basis with equipment of the same capacity. We recommend that you work with your design team to select chillers that are sized appropriately for the cooling load. In some cases, the plant energy use can be reduced by selecting multiple chillers that match the facility load profile, rather than one or two large chillers. This can also improve the chiller plant reliability through increased redundancy. Energy savings are maximized by proper selection of new equipment based on the cooling load profile.

Replacing the chillers has a long payback based on energy savings and may not be justifiable based simply on energy considerations. However, the chillers have reached the end of their normal useful life. Typically, the marginal cost of purchasing a high-efficiency chiller can be justified by the marginal savings from the improved efficiency. When the chillers are eventually replaced, consider purchasing equipment that exceed the minimum efficiency required by building codes.

4.7 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**	**24**	**$181**	**$5,875**	**$500**	**$5,375**	**29.7**	**2,770**
ECM 12	Install High Efficiency Furnaces	0	0.0	24	$181	$5,875	$500	$5,375	29.7	2,770

ECM 12: Install High Efficiency Furnaces

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

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

Affected Units: Trane forced air furnace on the roof

4.8 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		**3,428**	**0.0**	**0**	**$396**	**$597**	**$50**	**$547**	**1.4**	**3,452**
ECM 13	Install Pipe Insulation	3,428	0.0	0	$396	$597	$50	$547	1.4	3,452

ECM 13: Install Pipe Insulation

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

Affected Systems: domestic hot water piping around water heaters serving Grand Concourse, Male Conductors' Area, NJ Transit Police, contractor's area, and YMCA Building

4.9 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		**3,753**	**0.0**	**0**	**$434**	**$194**	**$97**	**$97**	**0.2**	**3,780**
ECM 14	Install Low-Flow DHW Devices	3,753	0.0	0	$434	$194	$97	$97	0.2	3,780

ECM 14: Install Low-Flow DHW Devices

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

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

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing. Additional cost savings may result from reduced water usage.

4.10 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**3,909**	**0.4**	**0**	**$452**	**$920**	**$100**	**$820**	**1.8**	**3,936**
ECM 15	Vending Machine Control	3,909	0.4	0	$452	$920	$100	$820	1.8	3,936

ECM 15: Vending Machine Control

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

#	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)
Custom Measures		**11,123**	**0.0**	**0**	**$1,287**	**$6,836**	**$0**	**$6,836**	**5.3**	**11,201**
ECM 16	Replace Electric Water Heater with Heat Pump Water Heater	11,123	0.0	0	$1,287	$6,836	$0	$6,836	5.3	11,201

ECM 16: Replace Electric Water Heater with Heat Pump Water Heater

A typical electric water heater uses electric resistance coils to heat water at a coefficient of performance (COP) of 1. Air source heat pump water heaters (HPWH) use a refrigeration cycle to transfer heat from the surrounding air to the domestic water. The typical average COP for a HPWH is about 2.5, so they require significantly less electricity to produce the same amount of hot water as a traditional electric water heater. There are two types of HPWH, those integrated with the heat pump and storage tank in the same unit, and those that are split into two sections (with the storage tank separate from the heat pump). The following addresses integrated HPWH.

HPWH reject cold air. As such, they need to be installed in an unconditioned space of about 750 cubic feet with good ventilation. Ideal locations are garages, large enclosed, unconditioned storage areas, or areas with excess heat such as a furnace or boiler room.[4] The HPWH will also produce condensate so accommodations for draining the condensate need to be provided.

Most HPWH operate effectively down to an air temperature of 40 °F. Below that temperature, an electric resistance booster heater is typically required to achieve full heating capacity. It is critical that the HPWH controls are set up so that the electric resistance heat only engages when the air temperature is too cold for the HPWH to extract heat from it. HPWHs have a slow recovery. During periods of high demand, the electric resistance heating element, if enabled, may be energized to maintain set point, thus reducing the overall efficiency of the unit. It is recommended that a careful analysis of the hot water demand be conducted to determine if the application makes economic sense, and the HPWH heating capacity and storage are properly sized.

HPWH operate most effectively when the temperature difference between the incoming and outgoing water is high. Generally, this means that cold make-up water should be piped to the bottom of the tank and return water should be piped to the top of the tank in order to maintain stratification within the storage tank. Water should be drawn from the bottom of the tank to be heated. If there is a DHW recirculation pump, it should only be operated during high hot water demand periods.

Affected Units: Grand Concourse, YMCA Building (50 gallon), food court (40 gallon). The units are judged as optimum size for replacement with sufficient surrounding space and ventilation.

[4] https://basc.pnnl.gov/code-compliance/heat-pump-water-heaters-code-compliance-brief#:~:text=HPWH%20must%20have%20unrestricted%20airflow,depending%20on%20size%20of%20system

4.12 Measures for Future Consideration

There are additional opportunities for improvement that NJ Transit Corporation may wish to consider. These potential upgrades typically require further analysis, involve substantial capital investment, and/or include significant system reconfiguration. These measures are therefore beyond the scope of this energy audit. These measures are described here to support a whole building approach to energy efficiency and sustainability.

NJ Transit Corporation 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.

Window Replacements

Energy efficient windows are an important consideration when improving the building envelope. The heat transfer through the glass panes is responsible for a significant portion of the facility's heating and cooling energy consumption. We recommend replacing single-pane windows with double-pane windows, and we recommend models that are gas-filled with low-e coatings to reduce heat loss. Windows should be selected with low U-factors to maximize energy savings. The U-factor is the rate at which the window conducts non-solar heat flow and is a key indicator of performance. The lower the U-factor, the higher the efficiency of the window. Window frames and sashes should be efficient as well. If metal frames are specified or required by code, the frame extrusions should have a thermal break to reduce conduction through the frame. As part of the installation, the window frames should be properly sealed with caulk materials to ensure the mitigation of air infiltration. Building envelopes that limit air infiltration and that have adequate fenestrations play a key role in optimizing heating and cooling efficiency, controlling moisture, and providing occupant comfort. Window system replacement is an expensive upgrade that generally involves architectural elements. This measure is recommended for further study, however, there will be additional challenges in the design and implementation of window upgrades since Hoboken Terminal is on the New Jersy and National Register of Historic Places.

Building Insulation

Heat flows from warmer to cooler areas until there is no longer a temperature difference. Heat flows directly from all heated spaces to adjacent unheated attics, garages, basements, and to the outdoors. Heat flow can also move indirectly through interior ceilings, walls, and floors—wherever there is a difference in temperature. During the cooling season, heat flows from the exterior to the building interior.

To maintain comfort, the heat lost in the winter must be replaced by your heating system. Similarly, heat gained in the summer must be removed by your cooling system. Properly insulating your building will decrease this heat flow by providing an effective resistance to the flow of heat.

An insulating material's resistance to conductive heat flow is measured or rated in terms of its thermal resistance or R-value—the higher the R-value, the greater the insulating effectiveness. The R-value depends on the type of insulation, its thickness, and its density. Installing more (and thicker) insulation increases the R-value and the resistance to heat flow.

Consider using a thermal camera to conduct a study of building heat loss to better understand where insulation will provide the greatest benefit.

Install Roof or Ceiling Insulation

Installing ceiling or roof insulation as a thermal barrier between the conditioned space and the roof will improve thermal comfort in the building and reduce the heating & cooling energy use. Commonly used insulation materials include fiberglass, cellulose, rigid foam, and polystyrene. Insulation can be blown in, applied as a layer, or sprayed on, depending on the type of material. Install insulation to levels that meet or exceed the current adopted building and energy code.

Install Exterior Wall Insulation

The installation of rigid board, blown in, or batt wall insulation on all sides of the building will improve thermal comfort in the building and reduce heating & cooling energy use.

For masonry walls generally foam board or rigid foam insulation made from polystyrene or similar materials can be added to the building exterior. The material provides high insulating value for relatively little thickness but must be properly weatherproofed. For frame walls insulation material can be blown in between the exterior and interior walls.

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.

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

Lighting Maintenance

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

In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a lighting technician or contractor, decreasing the overall cost of maintenance.

Lighting Controls

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

Motor Maintenance

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

Fans to Reduce Cooling Load

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

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°F-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

Economizer Maintenance

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

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

Chiller Maintenance

Service chillers regularly to keep them operating properly. Chillers are responsible for a substantial portion of a commercial building's overall energy usage, and when they do not work well, there is usually a noticeable increase in energy bills and increased occupant complaints. Regular diagnostics and service can save 5% to 10% of the cost of operating your chiller. If you already have a maintenance contract in place, your existing service company should be able to provide these services.

AC System Evaporator/Condenser Coil Cleaning

Dirty evaporator and condenser coils restrict air flow and restrict heat transfer. This increases the loads on the evaporator and condenser fan and decreases overall cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

HVAC Filter Cleaning and Replacement

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

Ductwork Maintenance

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

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

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

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

Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to keeping the heating system running efficiently and preventing expensive repairs. Annual tune-ups should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely 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.

Furnace Maintenance

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

Label HVAC Equipment

For improved coordination in maintenance practices, we recommend labeling or re-labeling the site HVAC equipment. Maintain continuity in labeling by following labeling conventions as indicated in the facility drawings or BAS building equipment list. Use weatherproof or heatproof labeling or stickers for permanence, but do not cover over original equipment nameplates, which should be kept clean and readable whenever possible. Besides equipment, label piping for service and direction of flow when possible. Ideally, maintain a log of HVAC equipment, including nameplate information, asset tag designation, areas served, installation year, service dates, and other pertinent information.

This investment in your equipment will enhance collaboration and communication between your staff and your contracted service providers and may help you with regulatory compliance.

Water Heater Maintenance

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

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

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

Compressed Air System Maintenance

Compressed air systems require periodic maintenance to operate at peak efficiency. A maintenance plan for compressed air systems should include:

- Inspection, cleaning, and replacement of inlet filter cartridges.
- Cleaning of drain traps.
- Daily inspection of lubricant levels to reduce unwanted friction.
- Inspection of belt condition and tension.
- Check for leaks and adjust loose connections.
- Overall system cleaning.
- Reduce pressure setting to minimum needed for air operated equipment.
- Turn off compressor if not routinely needed.
- Use low pressure blower air rather than high pressure compressed air.

Contact a qualified technician for help with setting up periodic maintenance schedule.

Refrigeration Equipment Maintenance

Preventative maintenance keeps commercial refrigeration equipment running reliably and efficiently. Commercial refrigerators and freezers are mission-critical equipment that can cost a fortune when they go down. Even when they appear to be working properly, refrigeration units can be consuming too much energy. Have walk-in refrigeration and freezer and other commercial systems serviced at least annually. This practice will allow systems to perform to their highest capabilities and will help identify system issues if they exist.

Maintaining your commercial refrigeration equipment can save between 5% and 10% on energy costs. When condenser coils are dirty, your commercial refrigerators and freezers work harder to maintain the temperature inside. Worn gaskets, hinges, door handles or faulty seals cause cold air to leak from the unit, forcing the unit to run longer and use more electricity.

Regular cleaning and maintenance also help your commercial refrigeration equipment to last longer.

Water Conservation

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

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

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

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

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

Procurement Strategies

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

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

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

6 On-site Generation

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

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

6.1 Solar Photovoltaic

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

An additional study for solar photovoltaic for the NJ Transit Hoboken Terminal provided below.

Executive Summary

This section summarizes projected energy and cost impacts, as well as design considerations, for a proposed 330 kW-DC rooftop solar photovoltaic (PV) system and 200 kWh battery energy storage system (BESS) for the NJ Transit Hoboken Terminal site located at 1 Hudson Place, Hoboken, NJ 07030. Please note this is a feasibility stage section, and all cost/savings values are solely estimates and not for design level application.

Two pieces of equipment contribute to the system:

- 330 kW Rooftop Solar PV System: The rooftop-mounted solar panels are strategically positioned to make the most efficient use of the roof space, maximizing coverage of the solar energy generation.
- 200 kWh BESS: The sizing of the battery has been optimized to ensure that the projected annual cost savings remain within a positive range for the battery installation project.

Please take note that the site's highest electricity demand for moth of March 2021 is around 1,140 kW. Opting for a larger battery to sustain the entire electric load of the facilities during a power outage is not a financially viable solution.

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[8] (yr.)
330 kW Solar PV	121	395,797	79	$36,647	$1,453,921	$799,657	$654,265	17.9
200 kWh Battery	110	0	0	$266	$245,079	$134,793	$110,285	415.0
Total	231	395,797	79	$36,912	$1,699,000	$934,450	$764,550	20.7

Project Summary Table

[8] 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
330 kW Solar PV	$1,453,921	$436,176	$363,480	$654,265
200 kWh Battery	$245,079	$73,524	$61,270	$110,285
Total	$1,699,000	$509,700	$424,750	$764,550

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

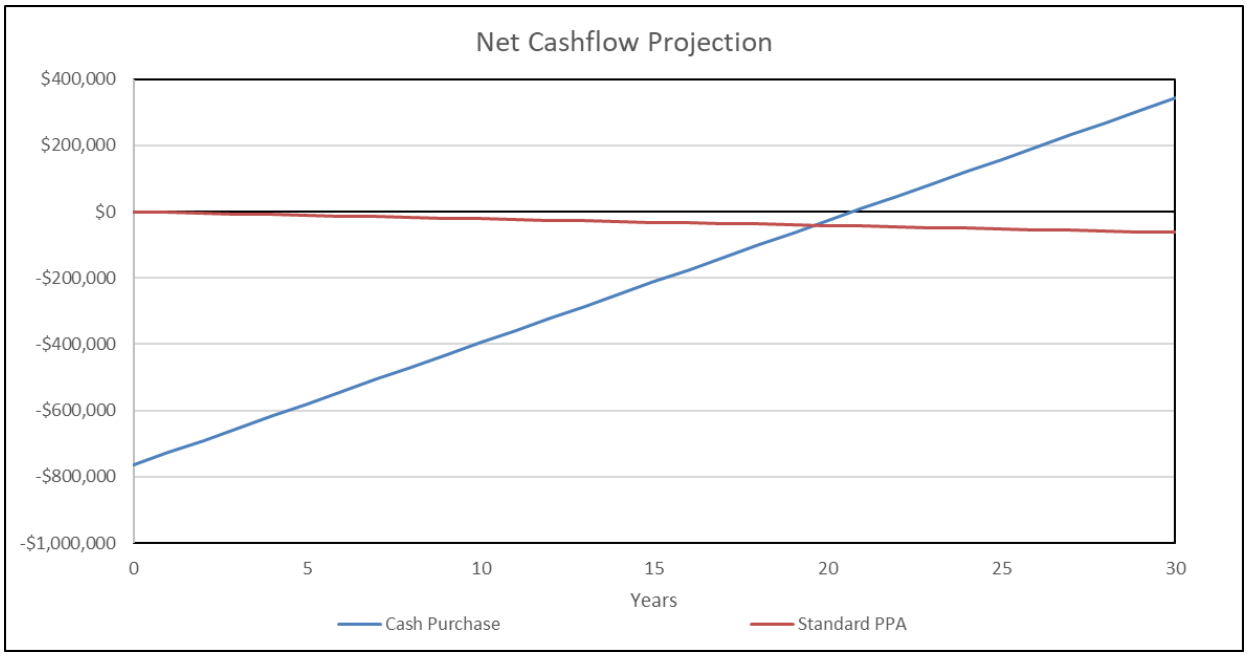
This report explores two ownership models: Cash Purchase and Power Purchase Agreement (PPA).

- 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	$1,699,000	$764,550	$36,912	$1,107,371	145%
PPA	$0	$0	($2,094)	($62,832)	-

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.



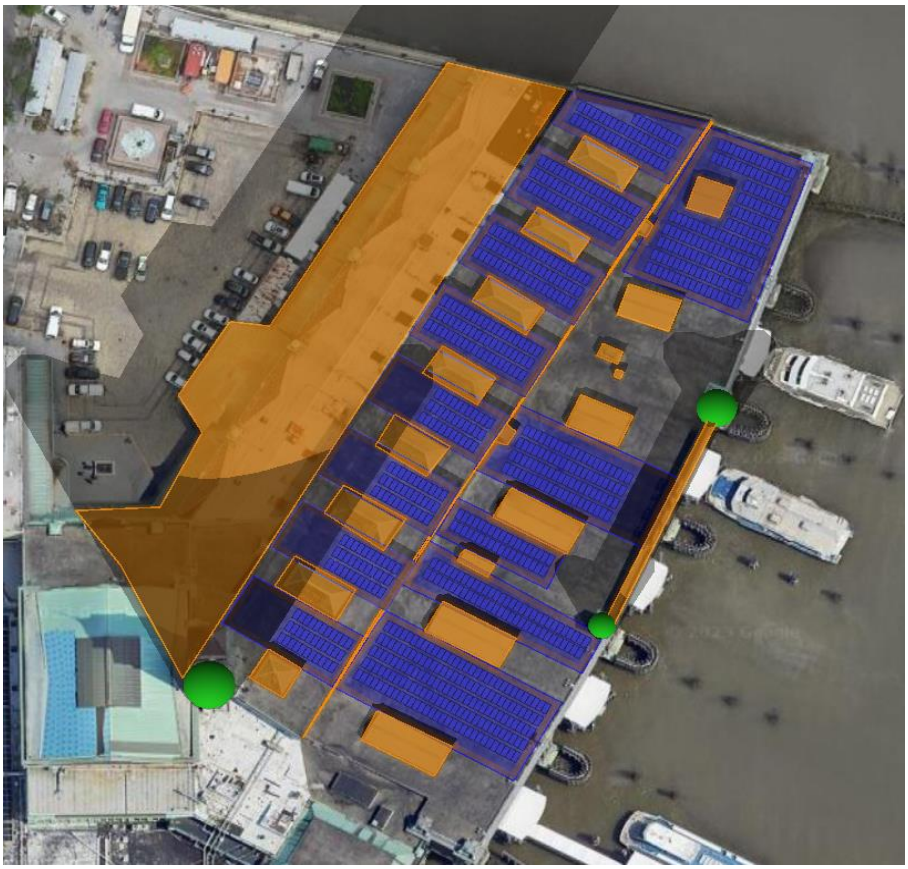
Ownership Model Life Cycle Comparison

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. Please note that the PV system has been sized for the available space on the roof of the terminal building. An additional 715 kW of PV panels are needed to achieve Net Zero Energy.

Project Coordination

As per TRC's cost analysis, some of the cost associated with installing the battery system (i.e., trenching, wiring and site preparation) can be shared with PV installation work. The cost estimate assumes the projects will be implemented concurrently.



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 generation rate structure and energy delivery rate structure are provided by different firms, ETB's estimate of baseline utility cost varied from available billing data by -30%, potentially due to rate schedule changes. 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, and an 0.25% annual maintenance cost penalty to the BESS. The ETB analysis was used to simulate BESS operation throughout the year and to calculate utility cost savings with hourly utility rate sensitivity.

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 30% 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 $4.41/Watt solar PV, and $1,225/kWh BESS, 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.

Hoboken Terminal is on New Jersy and National Register of Historic Places and solar implementation not be feasible due to certain criteria the facility must adhere to.

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

6.2 Combined Heat and Power

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

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

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

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

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

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

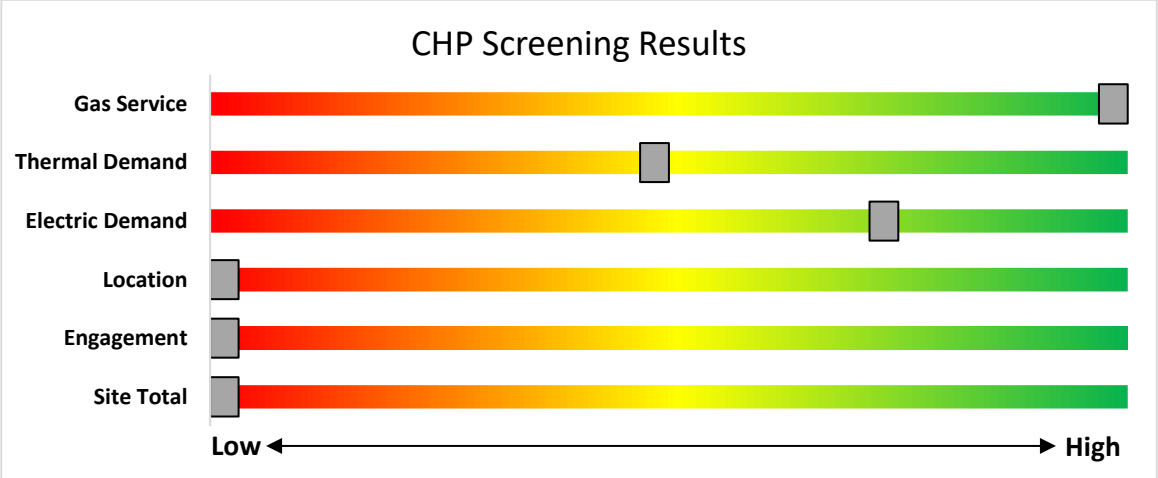


Figure 8 - Combined Heat and Power Screening

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

7 ELECTRIC VEHICLES (EV)

All electric vehicles (EVs) have an electric motor instead of an internal combustion engine. EVs function by plugging into a charge point, taking electricity from the grid, and then storing it in rechargeable batteries. Although electricity production may contribute to air pollution, the U.S. EPA categorizes 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.

7.1 Electric Vehicle Charging

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

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

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

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

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

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

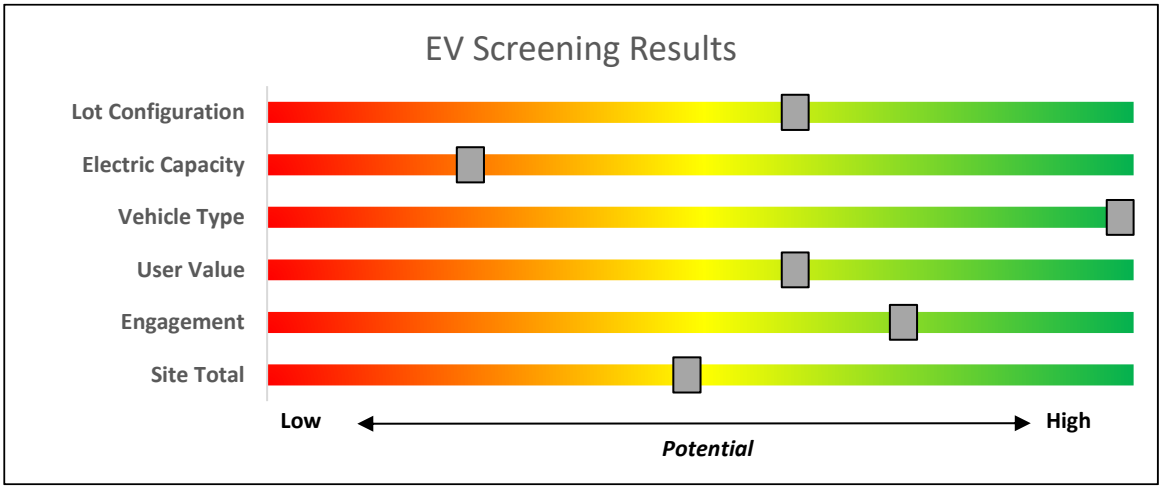


Figure 9 – EV Charger Screening

Electric Vehicle Programs Available

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

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

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

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

8 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.

8.1 Utility Energy Efficiency Programs

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

Prescriptive and Custom

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

Equipment Examples

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.

8.2 New Jersey's Clean Energy Programs

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

Large Energy Users

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

Incentives

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

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

How to Participate

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

Detailed program descriptions, instructions for applying, and applications can be found at 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

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

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

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

How to Participate

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

Successor Solar Incentive Program (SuSI)

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

Administratively Determined Incentive (ADI) Program

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

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

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

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

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

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

Competitive Solar Incentive Program

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

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

If you are considering installing solar photovoltaics on your building, visit the following link for more information: 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 into contracts to help finance building energy upgrades. Annual payments are lower than the savings projected from the energy conservation measures (ECMs), ensuring that ESIP projects are cash flow positive for the life of the contract.

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

How to Participate

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

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

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

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

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

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

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

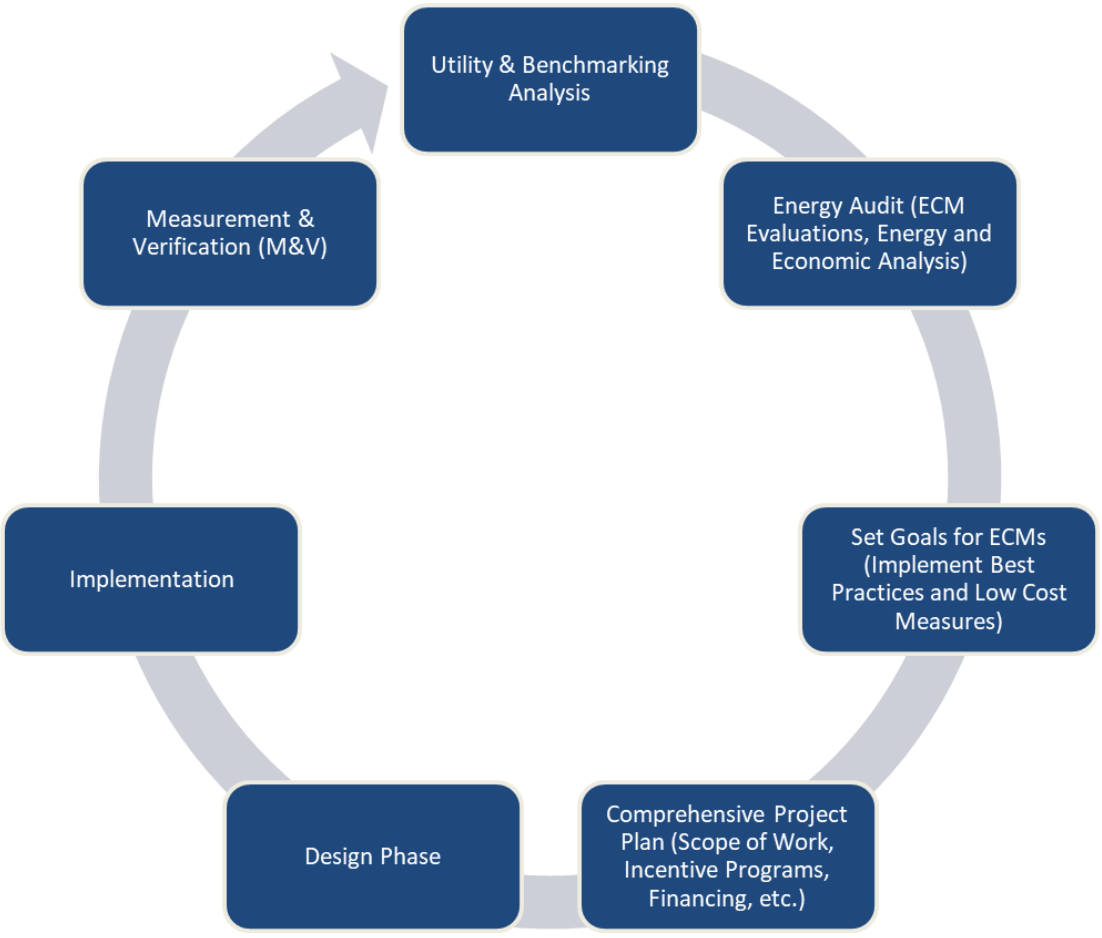


Figure 10 – Project Development Cycle

10 Energy Purchasing and Procurement Strategies

10.1 Retail Electric Supply Options

Energy deregulation in New Jersey has increased energy buyers' options by separating the function of electricity distribution from that of electricity supply. 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[9].

10.2 Retail Natural Gas Supply Options

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

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

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

A list of licensed third-party natural gas suppliers is available at the NJBPU website[10].

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

[10] 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
Conductors Male - Sleeping Quarters #1	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,190	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,511	0.2	515	0	$59	$705	$95	10.4
Conductors Male - Sleeping Quarters #2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,190	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,511	0.1	368	0	$42	$416	$75	8.1
Conference - Room 8	11	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,760	3, 4	Relamp	Yes	11	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	6,044	0.5	7,129	-2	$812	$1,073	$255	1.0
Copy Room Conductors Male	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.2	2,943	-1	$335	$562	$115	1.3
Copy Room Conductors Male	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,760	0.0	254	0	$29	$72	$10	2.2
Corridor - Boiler Room #1	4	LED - Fixtures: Wall Pack	Wall Switch	S	50	8,760	6	None	Yes	4	LED - Fixtures: Wall Pack	High/Low Control	50	6,044	0.0	543	0	$62	$225	$140	1.4
Corridor - Conductors Offices Male	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,760	3, 6	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	6,044	0.1	1,944	0	$221	$444	$165	1.3
Corridor - Engineers	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
Corridor - Engineers	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,760	6	None	Yes	1	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.0	79	0	$9	$225	$35	21.2
Corridor - Engineers	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 6	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	6,044	0.2	2,062	0	$235	$660	$270	1.7
Corridor - Ferry Substation	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 6	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.1	736	0	$84	$298	$90	2.5
Corridor - Ferry Tickets	5	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	S	40	6,028		None	No	5	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	6,028	0.0	0	0	$0	$0	$0	0.0
Corridor - Ferry Tickets	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	6,028		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,028	0.0	0	0	$0	$0	$0	0.0
Corridor - North Emergency Exit	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - North Emergency Exit	6	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	8,760	6	None	Yes	6	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	6,044	0.0	277	0	$32	$225	$210	0.5
Corridor - Ticket Office	3	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760	6	None	Yes	3	LED - Fixtures: Ambient 2x2 Fixture	High/Low Control	40	6,044	0.0	326	0	$37	$225	$105	3.2
Corridor - to Concourse	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 6	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	6,044	0.1	1,031	0	$117	$442	$135	2.6
Corridor Ferries Exit	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
Corridor Ferries Exit	6	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	8,760	6	None	Yes	6	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	6,044	0.0	277	0	$32	$225	$210	0.5
Dining Area - Food Court	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Dining Area - Food Court	70	LED Lamps: (1) 14W PAR30 Screw-In Lamp	Wall Switch	S	14	8,760	4	None	Yes	70	LED Lamps: (1) 14W PAR30 Screw-In Lamp	Occupancy Sensor	14	6,044	0.2	2,661	-1	$303	$1,350	$175	3.9
Dunkin Donuts	10	LED Lamps: (1) 11W A19 Screw-In Lamp	Wall Switch	S	11	8,760	4	None	Yes	10	LED Lamps: (1) 11W A19 Screw-In Lamp	Occupancy Sensor	11	6,044	0.0	299	0	$34	$270	$35	6.9
Dunkin Donuts	5	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760	4	None	Yes	5	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	6,044	0.0	543	0	$62	$270	$35	3.8
Dunkin Donuts	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,760	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,760	0.0	491	0	$56	$73	$20	0.9
Electrical Room - Boiler Room #1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.0	405	0	$46	$73	$20	1.2

	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
Electrical Room - Boiler Room 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.0	202	0	$23	$37	$10	1.2
Electrical Room - Conductors Male	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
Electrical Room - Conductors Male	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.0	405	0	$46	$73	$20	1.2
Electrical Room - Depot Substation	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
Electrical Room - Depot Substation	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	21	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.5	4,249	-1	$484	$767	$210	1.2
Electrical Room - Ferries Communication	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.1	809	0	$92	$146	$40	1.2
Electrical Room - Ferry 107	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.1	809	0	$92	$146	$40	1.2
Electrical Room - Ferry 111	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.0	405	0	$46	$73	$20	1.2
Electrical Room - Ferry Substation	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.1	809	0	$92	$146	$40	1.2
Electrical Room - Immigrant Building 1st #1	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Electrical Room - Immigrant Building 1st #1	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.3	2,428	-1	$276	$438	$120	1.2
Electrical Room - Immigrant Building 1st #2	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Electrical Room - Immigrant Building 1st #2	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.2	2,226	-1	$253	$402	$110	1.2
Electrical Room - Ticket Office	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	6,132	3	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	6,132	0.0	196	0	$22	$65	$12	2.4
Electrical Room #13	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	6,132	3	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	6,132	0.1	1,374	0	$156	$292	$80	1.4
Electrical Room North Exit	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.0	405	0	$46	$73	$20	1.2
Engineers Library	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	1,375	0	$156	$560	$75	3.1
Engineers Lunch Room #14	3	LED - Linear Tubes: (2) U-Lamp	Wall Switch	S	33	8,760	4	None	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.0	269	0	$31	$270	$35	7.7
Engineers Lunch Room #14	9	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	9	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.2	3,093	-1	$352	$922	$125	2.3
Engineers Phone Room	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	1,375	0	$156	$560	$75	3.1
Exterior - Bus Path	1	High-Pressure Sodium: (1) 70W Lamp	Photocell		95	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell	21	4,380	0.0	324	0	$37	$206	$50	4.2
Exterior - Bus Path	17	LED - Fixtures: Ceiling Mount	Photocell		40	4,380		None	No	17	LED - Fixtures: Ceiling Mount	Photocell	40	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior - Bus Path	4	LED - Fixtures: Wall Pack	Wall Switch		150	8,760	5	None	Yes	4	LED - Fixtures: Wall Pack	Photocell	150	4,380	0.0	2,628	0	$304	$200	$0	0.7
Exterior - Bus Path	4	LED - Fixtures: Wall Pack	Photocell		50	4,380		None	No	4	LED - Fixtures: Wall Pack	Photocell	50	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior - Incline Area	7	LED Lamps: (1) 48W Corn Bulb Screw-In Lamp	Wall Switch		48	8,760	5	None	Yes	7	LED Lamps: (1) 48W Corn Bulb Screw-In Lamp	Photocell	48	4,380	0.0	1,472	0	$170	$400	$0	2.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior - Incline Area	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	8,760	3, 5	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Photocell	29	4,380	0.0	3,329	0	$385	$692	$80	1.6
Exterior - Tracks	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
Exterior - Tracks	15	LED Lamps: (1) 11W A19 Screw-In Lamp	Wall Switch		11	8,760	5	None	Yes	15	LED Lamps: (1) 11W A19 Screw-In Lamp	Photocell	11	4,380	0.0	723	0	$84	$800	$0	9.6
Exterior - Tracks	519	LED Lamps: (1) 48W Corn Bulb Screw-In Lamp	Wall Switch		48	8,760	5	None	Yes	519	LED Lamps: (1) 48W Corn Bulb Screw-In Lamp	Photocell	48	4,380	0.0	109,115	0	$12,614	$26,000	$0	2.1
Exterior - Tracks	1	LED - Fixtures: Wall Pack	Wall Switch		50	8,760		None	No	1	LED - Fixtures: Wall Pack	Wall Switch	50	8,760	0.0	0	0	$0	$0	$0	0.0
Exterior - Tracks	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	8,760	3, 5	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Photocell	29	4,380	0.0	2,497	0	$289	$619	$60	1.9
Janitorial - Female Public	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,760	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,760	0.0	491	0	$56	$73	$20	0.9
Janitorial - Ferry 109	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	6,028	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,028	0.0	199	0	$23	$37	$10	1.2
Janitorial - Public Male Restroom	2	Linear Fluorescent - T8: 8' T8 (59W) - 2L	Wall Switch	S	110	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	6,044	0.1	1,057	0	$120	$293	$60	1.9
Janitorial - Public Male Utility	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,760	0.0	289	0	$33	$37	$10	0.8
Kitchen - Ferry Tickets	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	6,028		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,028	0.0	0	0	$0	$0	$0	0.0
Kitchen - Food Court	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Kitchen - Food Court	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	8,760	3, 4	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	6,044	0.6	8,276	-2	$942	$1,092	$260	0.9
Kitchen - Walk Ins Food Court	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 - Walk Ins Food Court	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,760	0.0	289	0	$33	$37	$10	0.8
Kitchen - Walk Ins Food Court	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	8,760	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	8,760	0.0	434	0	$49	$55	$15	0.8
Liquor Store	15	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.4	5,155	-1	$587	$1,357	$185	2.0
Lobby - Conductors Male	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,760	6	None	Yes	1	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.0	79	0	$9	$0	$0	0.0
Lobby - Conductors Male	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 6	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.1	736	0	$84	$298	$90	2.5
Lobby - EAP	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,760	0.0	289	0	$33	$37	$10	0.8
Lobby - Waiting Area	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
Lobby - Waiting Area	46	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	S	15	8,760	6	None	Yes	46	LED Lamps: (1) 15W A19 Screw-In Lamp	High/Low Control	15	6,044	0.1	1,874	0	$213	$1,800	$1,610	0.9
Lobby - Waiting Area	4	LED Lamps: (13) 15W Corn Bulb Screw-In Lamps	Wall Switch	S	195	8,760	6	None	Yes	4	LED Lamps: (13) 15W Corn Bulb Screw-In Lamps	High/Low Control	195	6,044	0.2	2,118	0	$241	$225	$140	0.4
Lobby - Waiting Area	6	LED Lamps: (1) 15W Corn Bulb Screw-In Lamp	Wall Switch	S	15	8,760	6	None	Yes	6	LED Lamps: (1) 15W Corn Bulb Screw-In Lamp	High/Low Control	15	6,044	0.0	244	0	$28	$225	$210	0.5
Lobby - Waiting Area	12	LED Lamps: (1) 15W Corn Bulb Screw-In Lamp	Wall Switch	S	15	8,760	6	None	Yes	12	LED Lamps: (1) 15W Corn Bulb Screw-In Lamp	High/Low Control	15	6,044	0.0	489	0	$56	$450	$420	0.5

	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
Lobby - Waiting Area	6	LED Lamps: (3) 15W Corn Bulb Screw-In Lamps	Wall Switch	S	45	8,760	6	None	Yes	6	LED Lamps: (3) 15W Corn Bulb Screw-In Lamps	High/Low Control	45	6,044	0.1	733	0	$83	$225	$210	0.2
Lobby - Waiting Area	18	LED Lamps: (1) 9W Plug-In Lamps	Wall Switch	S	9	8,760	6	None	Yes	18	LED Lamps: (1) 9W Plug-In Lamps	High/Low Control	9	6,044	0.0	440	0	$50	$675	$630	0.9
Lobby - Waiting Area	76	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,760	6	None	Yes	76	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	6,044	0.2	2,993	-1	$341	$2,925	$2,660	0.8
Lobby - Waiting Area	48	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	S	9	8,760	6	None	Yes	48	LED - Linear Tubes: (1) 2' Lamp	High/Low Control	9	6,044	0.1	1,108	0	$126	$1,800	$1,680	1.0
Lobby - YMCA	8	LED - Fixtures: Wall Pack	Wall Switch	S	50	8,760	6	None	Yes	8	LED - Fixtures: Wall Pack	High/Low Control	50	6,044	0.1	1,086	0	$124	$450	$280	1.4
Locker Room - Conductors Male	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Locker Room - Conductors Male	108	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,760	3, 4	Relamp	Yes	108	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,044	1.6	20,809	-5	$2,369	$4,132	$820	1.4
Locker Room - Engineers	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
Locker Room - Engineers	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	S	33	8,760	4	None	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.0	358	0	$41	$270	$35	5.8
Locker Room - Engineers	20	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	20	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.5	6,873	-2	$782	$1,989	$270	2.2
Locker Room - Female Conductors #3	12	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,760	3, 4	Relamp	Yes	12	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,044	0.2	2,312	-1	$263	$489	$95	1.5
Locker Room - Ferry Tickets	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
Locker Room - Ferry Tickets	7	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	S	40	6,028		None	No	7	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	6,028	0.0	0	0	$0	$0	$0	0.0
Locker Room - Ferry Tickets Mens	4	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760	4	None	Yes	4	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	6,044	0.0	434	0	$49	$270	$35	4.8
Locker Room - Ferry Tickets Womens	4	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760	4	None	Yes	4	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	6,044	0.0	434	0	$49	$270	$35	4.8
Locker Room - NJTPD Female	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,760	4	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.0	236	0	$27	$270	$35	8.7
Locker Room - NJTPD Female	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,760	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	8,760	0.0	140	0	$16	$33	$6	1.7
Locker Room - NJTPD Male	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,760	4	None	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.0	551	0	$63	$270	$35	3.7
Locker Room #12 TCU #1	6	Halogen Incandescent: (1) 65W PAR30 Screw-In Lamp	Wall Switch	S	65	8,760	3, 4	Relamp	Yes	6	LED Lamps: PAR30 Lamps	Occupancy Sensor	10	6,044	0.2	3,054	-1	$348	$409	$53	1.0
Locker Room #12 TCU #1	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.2	2,207	-1	$251	$489	$95	1.6
Locker Room #12 TCU #2	4	Halogen Incandescent: (1) 65W PAR30 Screw-In Lamp	Wall Switch	S	65	8,760	3, 4	Relamp	Yes	4	LED Lamps: PAR30 Lamps	Occupancy Sensor	10	6,044	0.2	2,036	0	$232	$93	$12	0.3
Locker Room #12 TCU #2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	1,471	0	$167	$416	$75	2.0
Lounge - Conductors Male	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
Lounge - Conductors Male	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	736	0	$84	$189	$40	1.8
Lounge - Conductors Male	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	1,375	0	$156	$560	$75	3.1

	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
Lounge - Engineers TV Room	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
Lounge - Engineers TV Room	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.2	2,749	-1	$313	$850	$115	2.3
Lounge - Register Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	6,044	0.2	2,592	-1	$295	$562	$115	1.5
Lounge - Ticket Office	4	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760	4	None	Yes	4	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	6,044	0.0	434	0	$49	$270	$35	4.8
Lounge #12 TCU	5	Halogen Incandescent: (1) 65W PAR30 Screw-In Lamp	Wall Switch	S	65	8,760	3, 4	Relamp	Yes	5	LED Lamps: PAR30 Lamps	Occupancy Sensor	10	6,044	0.2	2,545	-1	$290	$116	$15	0.3
Lounge #12 TCU	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,760	3, 4	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	6,044	0.3	4,536	-1	$516	$781	$175	1.2
Mechanical - Boiler Room #1	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.1	1,012	0	$115	$183	$50	1.2
Mechanical - Boiler Room #2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.1	809	0	$92	$146	$40	1.2
Mechanical - Clock Tower	5	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	6,132	2	Relamp & Reballast	No	5	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	6,132	0.3	2,637	-1	$300	$643	$100	1.8
Mechanical - Clock Tower	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.4	4,047	-1	$461	$730	$200	1.2
Mechanical - Control Center	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.1	809	0	$92	$146	$40	1.2
Mechanical - Ferry Tickets 104	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	6,132		None	No	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	6,132	0.0	0	0	$0	$0	$0	0.0
Mechanical - Ferry Tickets DHW	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.0	202	0	$23	$37	$10	1.2
Mechanical - Gas Meter	4	Compact Fluorescent: (2) 40W Biaxial Plug-In Lamps	Wall Switch	S	80	6,132	3	Relamp	No	4	LED Lamps: PL-L (Biax) Lamps	Wall Switch	56	6,132	0.1	589	0	$67	$108	$8	1.5
Mechanical - Immigrant Building Sprinkler	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	6,132	3	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	6,132	0.1	607	0	$69	$110	$30	1.2
Mechanical - Sewerage Pumps	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.1	809	0	$92	$146	$40	1.2
Mechanical - Sprinkler Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	6,132	3	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	6,132	0.1	911	0	$104	$164	$45	1.2
Mechanical - Track Electricians	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	6,132	3	Relamp	No	5	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	6,132	0.2	1,518	0	$173	$274	$75	1.2
Mechanical - Waiting Room Ceiling	8	Linear Fluorescent - T5HO: 4' T5HO (54W) - 6L	Wall Switch	S	358	6,132	3	Relamp	No	8	LED - Linear Tubes: (6) 4' T5HO (25W) Lamps	Wall Switch	153	6,132	1.1	10,056	-2	$1,145	$993	$240	0.7
Office - Conductors Male #1	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	8,760	4	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	6,044	0.1	945	0	$108	$270	$35	2.2
Office - Conductors Male #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
Office - Conductors Male #2	10	Halogen Incandescent: (1) 65W PAR30 Screw-In Lamp	Wall Switch	S	65	8,760	3, 4	Relamp	Yes	10	LED Lamps: PAR30 Lamps	Occupancy Sensor	10	6,044	0.4	5,090	-1	$579	$502	$65	0.8
Office - Conductors Male #2	6	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	8,760	4	None	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	6,044	0.1	945	0	$108	$270	$35	2.2
Office - Conductors Register Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,760	3, 4	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,044	0.0	578	0	$66	$171	$35	2.1
Office - Engineer #1	3	LED - Linear Tubes: (2) U-Lamp	Wall Switch	S	33	8,760	4	None	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.0	269	0	$31	$270	$35	7.7

	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
Office - Engineer #1	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	1,031	0	$117	$487	$65	3.6
Office - Ferry Tickets 101	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,760	4	None	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,044	0.0	158	0	$18	$0	$0	0.0
Office - Ferry Tickets 101	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,760	4	None	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.0	394	0	$45	$270	$35	5.2
Office - Ferry Tickets 105	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,760	4	None	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,044	0.0	118	0	$13	$116	$20	7.1
Office - Ferry Tickets 105	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,760	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.0	158	0	$18	$116	$20	5.4
Office - Ferry Tickets 106	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	8,760	4	None	Yes	2	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,044	0.0	79	0	$9	$116	$20	10.7
Office - Ferry Tickets 106	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,760	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.0	158	0	$18	$116	$20	5.4
Office - Lost and Found	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	1,375	0	$156	$560	$75	3.1
Office - Mail Room	4	Compact Fluorescent: (2) 40W Biaxial Plug-In Lamps	Wall Switch	S	80	8,760	3, 4	Relamp	Yes	4	LED Lamps: PL-L (Biax) Lamps	Occupancy Sensor	56	6,044	0.1	1,449	0	$165	$378	$43	2.0
Office - Mech Department #1 Room #10	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,231	0.1	772	0	$88	$380	$65	3.6
Office - Mech Department #1 Room #11	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,231	0.1	1,030	0	$117	$416	$75	2.9
Office - Mech Department #2 Room #10	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,231	0.1	772	0	$88	$380	$65	3.6
Office - Mech Department #2 Room #11	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	6,132	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,231	0.0	110	0	$13	$116	$20	7.6
Office - Mech Department #3 Room #10	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	6,132	4	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,231	0.0	165	0	$19	$270	$35	12.5
Office - Mech Department #3 Room #11	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	6,132	4	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	4,231	0.0	221	0	$25	$116	$20	3.8
Office - Mech Department Room #9	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	6,132	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	4,231	0.3	2,722	-1	$310	$708	$155	1.8
Office - NJT Customer Service #1	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Office - NJT Customer Service #1	14	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	14	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.4	4,811	-1	$548	$1,284	$175	2.0
Office - NJT Police Holding Cell	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	1,839	0	$209	$453	$85	1.8
Office - NJT Police Room #1	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.4	5,517	-1	$628	$818	$185	1.0
Office - Police Room #5	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	736	0	$84	$73	$20	0.6
Office - Police Room #5	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.2	2,575	-1	$293	$526	$105	1.4
Office - Police Room #5	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	1,471	0	$167	$416	$75	2.0
Office - Project Managers	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,760	4	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.0	158	0	$18	$116	$20	5.4
Office - Railmen for Children #16	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	1,839	0	$209	$453	$85	1.8

	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
Office - Station Department	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	1,471	0	$167	$416	$75	2.0
Office - Ticket #2	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	6,044	0.1	745	0	$85	$400	$59	4.0
Office - Ticket #3	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760	4	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	6,044	0.0	217	0	$25	$116	$20	3.9
Office - Tickets #1	9	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760	4	None	Yes	9	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	6,044	0.1	978	0	$111	$270	$35	2.1
Office - Training Room 8A	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	1,103	0	$126	$380	$65	2.5
Office - Training Room 8A	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	6,044	0.1	1,296	0	$148	$262	$60	1.4
Residential - Engineers Sleep Room #1	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,190	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,511	0.2	515	0	$59	$705	$95	10.4
Residential - Engineers Sleep Room #2	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,190	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,511	0.2	515	0	$59	$705	$95	10.4
Residential - Engineers Sleep Room #3	9	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,190	3, 4	Relamp	Yes	9	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,511	0.2	773	0	$88	$922	$125	9.1
Restroom - #12 TCU	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,760	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,760	0.0	491	0	$56	$73	$20	0.9
Restroom - Conductors Male Office #2	1	LED Lamps: (3) 11W A19 Screw-In Lamps	Wall Switch	S	33	8,760		None	No	1	LED Lamps: (3) 11W A19 Screw-In Lamps	Wall Switch	33	8,760	0.0	0	0	$0	$0	$0	0.0
Restroom - Engineers	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.2	2,749	-1	$313	$850	$115	2.3
Restroom - Female - Conductors Male	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,760	3, 4	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,044	0.0	578	0	$66	$325	$50	4.2
Restroom - Female Long Hallway	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,760		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,760	0.0	0	0	$0	$0	$0	0.0
Restroom - Female NJTPD	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	8,760		None	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,760	0.0	0	0	$0	$0	$0	0.0
Restroom - Female NJTPD	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,760	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,760	0.0	491	0	$56	$73	$20	0.9
Restroom - Female Public	9	Compact Fluorescent: (2) 42W Triple Biaxial Plug-In Lamps	Wall Switch	S	84	8,760	3, 4	Relamp	Yes	9	LED Lamps: PL-L (Biax) Lamps	Occupancy Sensor	59	6,044	0.3	3,413	-1	$389	$513	$53	1.2
Restroom - Female Public	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,760	3, 4	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	6,044	0.4	5,185	-1	$590	$854	$195	1.1
Restroom - Ferry Tickets	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	40	8,760	0.0	0	0	$0	$0	$0	0.0
Restroom - Ferry Tickets	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	6,028		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,028	0.0	0	0	$0	$0	$0	0.0
Restroom - Ferry Tickets Female	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	40	8,760	0.0	0	0	$0	$0	$0	0.0
Restroom - Ferry Tickets Female	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	6,028		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,028	0.0	0	0	$0	$0	$0	0.0
Restroom - Ferry Tickets Male	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	40	8,760	0.0	0	0	$0	$0	$0	0.0
Restroom - Ferry Tickets Male	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	S	15	6,028		None	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,028	0.0	0	0	$0	$0	$0	0.0
Restroom - Male - Conductors Male	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760		None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	40	8,760	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restroom - Male - Conductors Male	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,760	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,760	0.0	153	0	$17	$18	$5	0.8
Restroom - Male - Conductors Male	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,760	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	6,044	0.1	1,944	0	$221	$489	$95	1.8
Restroom - Male Long Hallway	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,760		None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,760	0.0	0	0	$0	$0	$0	0.0
Restroom - Male Public	12	Compact Fluorescent: (2) 42W Triple Biaxial Plug-In Lamps	Wall Switch	S	84	8,760	3, 4	Relamp	Yes	12	LED Lamps: PL-L (Biax) Lamps	Occupancy Sensor	59	6,044	0.3	4,551	-1	$518	$594	$59	1.0
Restroom - Male Public	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.4	5,150	-1	$586	$781	$175	1.0
Restroom - Mech Dept #9	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	6,132	0.0	178	0	$20	$72	$10	3.1
Restroom - NJT Police	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,760	0.0	254	0	$29	$72	$10	2.2
Restroom - NJTPD	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	687	0	$78	$261	$40	2.8
Restroom - Police Room #5	1	LED Lamps: (1) 11W A19 Screw-In Lamp	Wall Switch	S	11	8,760		None	No	1	LED Lamps: (1) 11W A19 Screw-In Lamp	Wall Switch	11	8,760	0.0	0	0	$0	$0	$0	0.0
Restroom - Station Department	1	Compact Fluorescent: (1) 23W Spiral Plug-In Lamp	Wall Switch	S	23	8,760	3	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	17	8,760	0.0	53	0	$6	$17	$1	2.7
Restroom - Ticket Office	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760	4	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	6,044	0.0	217	0	$25	$116	$20	3.9
Stairs - Control Center	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch		62	8,760	3, 6	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	6,044	0.1	1,718	0	$196	$587	$225	1.9
Stairs - Immigrant Building #1	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs - Immigrant Building #1	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	8,760	6	None	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.0	236	0	$27	$225	$105	4.5
Stairs - Immigrant Building #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
Stairs - Immigrant Building #2	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	8,760	6	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.0	158	0	$18	$225	$70	8.6
Storage - Contractors East #1	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Storage - Contractors East #1	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3, 4	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,231	0.5	4,635	-1	$528	$1,197	$180	1.9
Storage - Contractors East #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
Storage - Copy Room Conductors Male	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	6,132	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	4,231	0.2	1,545	0	$176	$489	$60	2.4
Storage - File Room Conductors Male	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	6,132	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	4,231	0.1	1,159	0	$132	$434	$45	3.0
Storage - Mech Dept #9	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	6,132	0.0	178	0	$20	$72	$10	3.1
Storage - Police Room #5	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,231	0.1	515	0	$59	$189	$20	2.9
Storage #17 TCU	2	LED Lamps: (1) 11W A19 Screw-In Lamp	Wall Switch	S	11	6,132	4	None	Yes	2	LED Lamps: (1) 11W A19 Screw-In Lamp	Occupancy Sensor	11	4,231	0.0	42	0	$5	$116	$0	24.4
Store - Fabre News	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

	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
Store - Fabre News	4	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	S	40	8,760	4	None	Yes	4	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	6,044	0.0	434	0	$49	$270	$35	4.8
Store - Fabre News	3	LED Lamps: (1) 15W Corn Bulb Screw-In Lamp	Wall Switch	S	15	8,760	4	None	Yes	3	LED Lamps: (1) 15W Corn Bulb Screw-In Lamp	Occupancy Sensor	15	6,044	0.0	122	0	$14	$0	$0	0.0
Store - Fabre News	13	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	S	9	8,760	4	None	Yes	13	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	6,044	0.0	300	0	$34	$270	$35	6.9
Store - Flowers	4	LED Lamps: (1) 11W A19 Screw-In Lamp	Wall Switch	S	11	8,760	4	None	Yes	4	LED Lamps: (1) 11W A19 Screw-In Lamp	Occupancy Sensor	11	6,044	0.0	119	0	$14	$116	$20	7.1
Warehouse - Barge Building	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
Warehouse - Barge Building	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.3	4,414	-1	$502	$708	$155	1.1
Exterior - Ferry Terminal 2nd	1	Metal Halide: (1) 175W Lamp	Wall Switch		215	8,760	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	53	8,760	0.0	1,419	0	$164	$385	$50	2.0
Corridor - Grand Concourse	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Grand Concourse	26	LED Lamps: (1) 11W A19 Screw-In Lamp	Wall Switch	S	11	8,760	6	None	Yes	26	LED Lamps: (1) 11W A19 Screw-In Lamp	High/Low Control	11	6,044	0.1	777	0	$88	$1,125	$910	2.4
Corridor - Grand Concourse	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	8,760	6	None	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.0	158	0	$18	$225	$70	8.6
Corridor - Grand Concourse	24	LED - Fixtures: Wall Pack	Wall Switch	S	50	8,760	6	None	Yes	24	LED - Fixtures: Wall Pack	High/Low Control	50	6,044	0.2	3,259	-1	$371	$900	$840	0.2
Corridor - Grand Concourse	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 6	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.1	736	0	$84	$298	$90	2.5
Corridor - Long Hallway	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
Corridor - Long Hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 6	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.3	3,678	-1	$419	$815	$450	0.9
Corridor - YMCA 2nd	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
Corridor - YMCA 2nd	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 6	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.2	2,943	-1	$335	$742	$360	1.1
Electrical Room - Immigrant Building 2nd	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
Electrical Room - Immigrant Building 2nd	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	14	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.3	2,833	-1	$323	$511	$140	1.2
Electrical Room - YMCA Main	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
Electrical Room - YMCA Main	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.3	3,035	-1	$346	$548	$150	1.2
Locker Room - Conductors Female	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	1,471	0	$167	$416	$75	2.0
Locker Room - Conductors Female #2	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,760	3, 4	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,044	0.1	1,156	0	$132	$380	$65	2.4
Locker Room - Conductors Female #2	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	8,760	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,760	0.0	491	0	$56	$73	$20	0.9
Lounge - Conductors Female #1	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.2	2,207	-1	$251	$489	$95	1.6
Office - Control Center	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	1,718	0	$196	$632	$85	2.8

	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
Office - Doctors Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	1,471	0	$167	$416	$75	2.0
Office - Examination Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	736	0	$84	$189	$40	1.8
Office - Medical Services	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.2	2,207	-1	$251	$489	$95	1.6
Residential - Female Conductors #1	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,044	0.1	771	0	$88	$343	$55	3.3
Residential - Female Conductors #2	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.2	3,310	-1	$377	$599	$125	1.3
Restroom - Conductors Female #1	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	1,375	0	$156	$560	$75	3.1
Restroom - Control Center	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,760	0.0	254	0	$29	$72	$10	2.2
Restroom - Female Conductors #2	1	Compact Fluorescent: (1) 23W Spiral Plug-In Lamp	Wall Switch	S	23	8,760	3	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	17	8,760	0.0	53	0	$6	$17	$1	2.7
Restroom - Female Conductors #3	1	Compact Fluorescent: (1) 23W Spiral Plug-In Lamp	Wall Switch	S	23	8,760	3	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	17	8,760	0.0	53	0	$6	$17	$1	2.7
Restroom - Medical Services	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	8,760	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	8,760	0.0	140	0	$16	$33	$6	1.7
Stairs - Grand Concourse East	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs - Grand Concourse East	7	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch		88	8,760	2, 6	Relamp & Reballast	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.3	4,169	-1	$475	$931	$315	1.3
Stairs - YMCA #1	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	8,760	3, 6	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.1	1,839	0	$209	$408	$225	0.9
Stairs - YMCA #1	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch		62	8,760	3, 6	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	6,044	0.0	344	0	$39	$72	$10	1.6
Stairs - YMCA #2	25	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch		40	8,760	6	None	Yes	25	LED - Fixtures: Ambient 2x2 Fixture	High/Low Control	40	6,044	0.2	2,716	-1	$309	$1,125	$875	0.8
Storage - Medical Services	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,231	0.1	515	0	$59	$189	$20	2.9
Storage - Medical Services	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	6,132	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	4,231	0.0	130	0	$15	$33	$6	1.8
Corridor - YMCA 3rd	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - YMCA 3rd	19	LED Lamps: (1) 11W A19 Screw-In Lamp	Wall Switch	S	11	8,760	6	None	Yes	19	LED Lamps: (1) 11W A19 Screw-In Lamp	High/Low Control	11	6,044	0.0	568	0	$65	$900	$665	3.6
Lounge - YMCA 3rd Break Room #1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	736	0	$84	$189	$40	1.8
Lounge - YMCA 3rd Break Room #2	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	1,375	0	$156	$560	$75	3.1
Lounge - YMCA 3rd Sleep Room	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,190	3, 4	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,511	0.7	2,207	-1	$251	$1,416	$310	4.4
Residential - YMCA 3rd Sleep Room #1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,190	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,511	0.1	184	0	$21	$189	$40	7.1
Residential - YMCA 3rd Sleep Room #2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,190	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,511	0.1	184	0	$21	$189	$40	7.1
Residential - YMCA 3rd Sleep Room #3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,190	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,511	0.1	184	0	$21	$189	$40	7.1

	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
Residential - YMCA 3rd Sleep Room #4	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,190	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,511	0.1	184	0	$21	$189	$40	7.1
Restroom - Male 3rd YMCA #1	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,760	0.0	254	0	$29	$72	$10	2.2
Restroom - Male 3rd YMCA #2	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	687	0	$78	$261	$40	2.8
Restroom - Male 4th YMCA #1	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	687	0	$78	$261	$40	2.8
Conference 4th YMCA	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,760	0.0	289	0	$33	$37	$10	0.8
Conference 4th YMCA	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	1,375	0	$156	$560	$75	3.1
Corridor - YMCA 4th	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - YMCA 4th	18	LED Lamps: (1) 11W A19 Screw-In Lamp	Wall Switch	S	11	8,760	6	None	Yes	18	LED Lamps: (1) 11W A19 Screw-In Lamp	High/Low Control	11	6,044	0.0	538	0	$61	$675	$630	0.7
Mechanical Room - YMCA 4th	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	6,132	3	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	6,132	0.0	215	0	$24	$37	$10	1.1
Mechanical Room - YMCA 4th	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.0	202	0	$23	$37	$10	1.2
Electrical Room - 4th YMCA Communications	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
Electrical Room - 4th YMCA Communications	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.4	3,642	-1	$415	$657	$180	1.2
Electrical Room - 4th YMCA Communications	7	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	7	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	6,132	0.1	1,245	0	$142	$507	$70	3.1
Electrical Room - Battery Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	6,132	3	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	6,132	0.1	687	0	$78	$146	$40	1.4
Electrical Room - Battery Room	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	6	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	6,132	0.1	1,067	0	$121	$435	$60	3.1
Electrical Room - YMCA 4th IT	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,132	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,132	0.0	405	0	$46	$73	$20	1.2
Janitorial 4th YMCA	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	687	0	$78	$261	$40	2.8
Office - 4th YMCA NJTPD #1	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	687	0	$78	$261	$40	2.8
Office - 4th YMCA NJTPD #2	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,044	0.1	687	0	$78	$261	$40	2.8
Office - Communications 4th YMCA	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	8,760	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,044	0.1	736	0	$84	$189	$40	1.8
Storage - YMCA 4th Hall	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	S	58	6,132	4	None	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	4,231	0.0	331	0	$38	$270	$0	7.2
Exterior - Brick Alley	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Exterior - Brick Alley	16	LED Lamps: (1) 28W Corn Bulb Screw-In Lamp	Wall Switch		28	8,760	5	None	Yes	16	LED Lamps: (1) 28W Corn Bulb Screw-In Lamp	Photocell	28	4,380	0.0	1,962	0	$227	$800	$0	3.5
Exterior - Depot Substation	1	High-Pressure Sodium: (1) 150W Lamp	Timeclock		188	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	45	4,380	0.0	626	0	$72	$346	$50	4.1
Exterior - Depot Substation	1	High-Pressure Sodium: (1) 70W Lamp	Timeclock		95	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	21	4,380	0.0	324	0	$37	$206	$50	4.2

	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
Exterior - Ferry Slips	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
Exterior - Ferry Slips	56	High-Pressure Sodium: (1) 150W Lamp	Photocell		188	4,380	1	Fixture Replacement	No	56	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell	45	4,380	0.0	35,075	0	$4,055	$19,366	$2,800	4.1
Exterior - Ferry Slips	1	High-Pressure Sodium: (1) 400W Lamp	Wall Switch		465	8,760	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	120	8,760	0.0	3,022	0	$349	$555	$50	1.4
Exterior - Ferry Slips	75	LED Lamps: (1) 11W A19 Screw-In Lamp	Photocell		11	4,380		None	No	75	LED Lamps: (1) 11W A19 Screw-In Lamp	Photocell	11	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior - Ferry Slips	61	LED Lamps: (1) 28W Corn Bulb Screw-In Lamp	Wall Switch		28	8,760	5	None	Yes	61	LED Lamps: (1) 28W Corn Bulb Screw-In Lamp	Photocell	28	4,380	0.0	7,481	0	$865	$3,200	$0	3.7
Exterior - Ferry Slips	22	Linear Fluorescent - T5HO: 4' T5HO (54W) - 1L	Wall Switch		62	8,760	3, 5	Relamp	Yes	22	LED - Linear Tubes: (1) 4' T5HO (25W) Lamp	Photocell	26	4,380	0.0	9,491	0	$1,097	$1,922	$110	1.7
Exterior - Immigration Building	10	LED Lamps: (1) 11W A19 Screw-In Lamp	Photocell		11	4,380		None	No	10	LED Lamps: (1) 11W A19 Screw-In Lamp	Photocell	11	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior - Parking Lot	10	LED Lamps: (1) 15W Corn Bulb Screw-In Lamp	Timeclock		15	4,380		None	No	10	LED Lamps: (1) 15W Corn Bulb Screw-In Lamp	Timeclock	15	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior - Parking Lot	2	LED Lamps: (1) 40W Corn Bulb Screw-In Lamp	Timeclock		40	4,380		None	No	2	LED Lamps: (1) 40W Corn Bulb Screw-In Lamp	Timeclock	40	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior - Roof	8	Halogen Incandescent: (1) 1000W Screw-in Lamps	Photocell		1,000	4,380	1	Fixture Replacement	No	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell	150	4,380	0.0	29,784	0	$3,443	$4,330	$400	1.1

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
Mechanical - Boiler Room #1	Boilers #1 & #2	2	Combustion Air Fan	2.0	85.5%	No			W	2,745		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Boiler Room #2	Boilers #3 & #4	2	Combustion Air Fan	2.0	85.5%	No			W	2,745		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Boiler Room #1	Heating System	2	Heating Hot Water Pump	5.0	89.5%	Yes			W	3,431		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Boiler Room #2	Heating System	2	Heating Hot Water Pump	3.0	89.5%	Yes			W	3,431		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Boiler Room #1	Mechanical - Boiler Room #1	1	Exhaust Fan	0.3	65.0%	No			W	5,475		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Boiler Room #2	Mechanical - Boiler Room #2	1	Exhaust Fan	0.3	65.0%	No			W	5,475		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor - Engineers	Domestic Hot Water	1	DHW Circulation Pump	0.0	60.0%	No	Taco		W	8,760		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Ferry Tickets DHW	Domestic Hot Water	1	DHW Circulation Pump	0.0	60.0%	No	Armstrong		W	8,760		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior - Brick Alley	Exhaust System	2	Exhaust Fan	0.3	62.5%	No			B	5,475		No	62.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Exhaust System	1	Exhaust Fan	0.8	78.0%	No			B	5,475		No	78.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Exhaust System	8	Exhaust Fan	0.3	62.5%	No			B	5,475		No	62.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Exhaust System	2	Exhaust Fan	1.0	82.5%	No			B	5,475	7	Yes	85.5%	No		0.0	261	0	$30	$1,174	$0	39.0
Roof	Exhaust System	1	Exhaust Fan	0.1	60.0%	No			B	5,475		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Exhaust System	2	Exhaust Fan	0.5	75.0%	No			B	5,475		No	75.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Dunkin Donuts	1	Kitchen Hood Exhaust Fan	2.0	84.0%	No			B	5,250	9	No	86.5%	Yes	1	0.0	5,351	15	$733	$4,182	$100	5.6
Roof	Food Court	2	Kitchen Hood Exhaust Fan	2.0	84.0%	No			B	2,625	9	No	86.5%	Yes	2	0.1	6,472	60	$1,205	$8,363	$200	6.8
Mechanical - Sprinkler Room	Ferry Cleaning Hoses	5	Air Compressor	2.5	86.5%	No	Airtech		W	800		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Ferry Tickets 104	Emergency Sump Pumps	2	Process Pump	2.0	84.0%	No			W	800		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Janitorial - Ferry 109	Emergency Sump Pumps	2	Process Pump	2.0	84.0%	No			W	800		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Boiler Room #1	Sump Pump	1	Process Pump	0.5	75.0%	No			W	800		No	75.0%	No		0.0	0	0	$0	$0	$0	0.0

		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
Exterior - Incline Area	Ejector Pump	1	Process Pump	5.0	87.5%	No			W	2,745		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Sewerage Pumps	Sewerage Pumps	2	Process Pump	7.5	88.5%	No			W	3,391		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
Exterior - Parking Lot	Sewerage Pumps	2	Process Pump	7.5	88.5%	No			W	3,391		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
Exterior - Ferry Slips	Boat Ramp	5	Other	7.5	88.5%	No			W	800		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
Exterior - Parking Lot	Trash Compactor	1	Other	2.0	84.0%	No			W	800		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Various	Unit Heaters	10	Supply Fan	0.1	60.0%	No			W	5,475		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Waiting Room Ceiling	Exhaust System - Waiting Room	2	Exhaust Fan	5.0	87.5%	No			B	5,475	7	Yes	89.5%	No		0.1	782	0	$90	$2,019	$0	22.3
Roof	Hoboken Terminal	1	Supply Fan	2.0	84.0%	No	Johnson Controls		B	5,475	8	No	86.5%	Yes	1	0.6	3,836	0	$444	$4,182	$100	9.2
Roof	Hoboken Terminal	1	Exhaust Fan	0.8	78.0%	No	Johnson Controls		B	5,475	8	No	81.1%	Yes	1	0.2	1,442	0	$167	$3,308	$50	19.5
Roof	Hoboken Terminal	1	Supply Fan	0.1	60.0%	No	Trane		B	5,475		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Dining Area - Food Court	Food Court	1	Supply Fan	7.5	88.5%	No			B	5,475	8	No	91.0%	Yes	1	2.2	13,622	0	$1,575	$5,945	$1,000	3.1
Dining Area - Food Court	Food Court Bar	1	Supply Fan	5.0	87.5%	No			B	5,475	8	No	89.5%	Yes	1	1.5	9,104	0	$1,052	$5,028	$900	3.9
Janitorial - Public Male Restroom	Restroom - Male Public	1	Supply Fan	1.0	82.5%	No			W	5,475		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Lobby - EAP	Medical Services / EAP	1	Supply Fan	1.0	82.5%	No	Trane		W	5,475		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Locker Room - Conductors Male	Locker Room - Conductors Male	1	Supply Fan	5.0	87.5%	No			B	5,475	8	No	89.5%	Yes	1	1.5	9,104	0	$1,052	$5,028	$900	3.9
Mechanical - Control Center	Control Center	1	Supply Fan	2.0	84.0%	No			B	5,475	8	No	86.5%	Yes	1	0.6	3,836	0	$444	$4,182	$100	9.2
Storage - Contractors East #2	Storage - Contractors East #2	1	Supply Fan	1.5	84.0%	No	Greenheck		W	5,475		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Lounge - YMCA 3rd Sleep Room	Lounge - YMCA 3rd Sleep Room	2	Supply Fan	1.0	82.5%	No	Edpac		B	5,475	7	Yes	85.5%	No		0.0	261	0	$30	$1,174	$0	39.0
Corridor - YMCA 4th	YMCA Building - Unit 1 AHU2	1	Supply Fan	2.0	84.0%	No			W	5,475	8	No	86.5%	Yes	1	0.6	3,836	0	$444	$4,182	$100	9.2
Corridor - YMCA 4th	YMCA Building - Unit 2 AHU3	1	Supply Fan	5.0	87.5%	No			W	5,475	8	No	89.5%	Yes	1	1.5	9,104	0	$1,052	$5,028	$900	3.9

		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
Corridor - YMCA 4th	YMCA Building - Unit 3 AHU1	1	Supply Fan	1.0	82.5%	No			W	5,475		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Electrical Room - 4th YMCA Communications	Electrical Room - 4th YMCA Communications	1	Supply Fan	0.8	78.0%	No	Nordyne		W	5,475		No	78.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Hoboken Terminal	1	Supply Fan	5.0	87.5%	No	Trane		B	5,475	8	No	89.5%	Yes	1	1.5	9,104	0	$1,052	$5,028	$900	3.9
Roof	Immigrant Building Area	1	Supply Fan	2.0	84.0%	No	AAON		W	5,475		No	84.0%	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
Conference - Room 8	Conference - Room 8	1	Window AC	2.00		10.30		Friedrich	CP24G30B	W		No							0.0	0	0	$0	$0	$0	0.0
Copy Room Conductors Male	Copy Room Conductors Male	1	Window AC	1.13		10.00		GE	APHA14NXMBN1	W		No							0.0	0	0	$0	$0	$0	0.0
Locker Room - Female Conductors #3	Locker Room - Female Conductors #3	1	Window AC	1.50		10.70		Frigidaire		W		No							0.0	0	0	$0	$0	$0	0.0
Locker Room - NJTPD Male	Locker Room - NJTPD Male	1	Window AC	1.29		11.80		Friedrich	CP15G10B	W		No							0.0	0	0	$0	$0	$0	0.0
Locker Room #12 TCU #1	Locker Room #12 TCU #1	1	Window AC	1.00		9.60		GE	AKCQ12ACAW1	W		No							0.0	0	0	$0	$0	$0	0.0
Locker Room #12 TCU #2	Locker Room #12 TCU #2	1	Window AC	1.58		11.80		Friedrich	CP18G30B-A	W		No							0.0	0	0	$0	$0	$0	0.0
Lounge - Register Room	Lounge - Register Room	2	Window AC	1.54		11.20		Frigidaire	FFRE1833Q22	W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical - Track Electricians	Mechanical - Track Electricians	1	Window AC	1.29		11.80		Friedrich	CP15G10B	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Conductors Male #1	Office - Conductors Male #1	1	Window AC	0.83		10.00		LG	LP1015WNRY7	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Conductors Male #2	Office - Conductors Male #2	2	Window AC	0.83		10.00		LG	LP1015WNRY7	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Lost and Found	Office - Lost and Found	1	Window AC	0.65		10.80		Friedrich	CP08G10	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Mech Department #2 Room #10	Office - Mech Department #2 Room #10	1	Window AC	0.65		11.20		Friedrich	CP08G10A-A	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Mech Department #2 Room #11	Office - Mech Department #2 Room #11	1	Window AC	1.00		9.80		Frigidaire	FFTA1233Q12	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Mech Department #3 Room #10	Office - Mech Department #3 Room #10	1	Window AC	1.25		11.20		Friedrich	CP15G10A	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Mech Department #3 Room #11	Office - Mech Department #3 Room #11	1	Window AC	1.50		10.70		Friedrich		W		No							0.0	0	0	$0	$0	$0	0.0
Office - Mech Department Room #9	Office - Mech Department Room #9	1	Window AC	1.50		10.70		Friedrich	CP18F30	W		No							0.0	0	0	$0	$0	$0	0.0
Office - NJT Police Holding Cell	Office - NJT Police Holding Cell	1	Window AC	1.54		10.70		Frigidaire	FAM186R2A	W		No							0.0	0	0	$0	$0	$0	0.0
Office - NJT Police Room #1	Office - NJT Police Room #1	1	Window AC	0.83		9.80		Movin Cool		W		No							0.0	0	0	$0	$0	$0	0.0
Office - NJT Police Room #1	Office - NJT Police Room #1	1	Window AC	1.00		9.60		GE		W		No							0.0	0	0	$0	$0	$0	0.0
Office - Railmen for Children #16	Office - Railmen for Children #16	1	Window AC	1.25		11.20		Friedrich	CP15G10	W		No							0.0	0	0	$0	$0	$0	0.0

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Office - Station Department	Office - Station Department	1	Window AC	0.67		10.80		Sharp	AF-Q80RX	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Training Room 8A	Office - Training Room 8A	1	Window AC	1.00		9.60		GE		B	10	Yes	1	Window AC	1.00		12.00		0.1	439	0	$51	$943	$0	18.6
Office - Training Room 8A	Office - Training Room 8A	1	Window AC	1.00		10.50		Friedrich		B	10	Yes	1	Window AC	1.00		12.00		0.1	250	0	$29	$942	$0	32.6
Restroom - Female NJTPD	Restroom - Female NJTPD	1	Window AC	0.83		9.80		Movin Cool	10SFU-1	W		No							0.0	0	0	$0	$0	$0	0.0
Store - Flowers	Store - Flowers	1	Window AC	1.17		10.00		Honeywell		W		No							0.0	0	0	$0	$0	$0	0.0
Locker Room - Conductors Female	Locker Room - Conductors Female	1	Window AC	1.17		10.00		LG	LP1419IVSM	W		No							0.0	0	0	$0	$0	$0	0.0
Lounge - Conductors Female #1	Lounge - Conductors Female #1	1	Window AC	1.00		10.00		LG	LP1217GSR	W		No							0.0	0	0	$0	$0	$0	0.0
Residential - Female Conductors #1	Residential - Female Conductors #1	1	Window AC	1.50		10.70		Friedrich		W		No							0.0	0	0	$0	$0	$0	0.0
Residential - Female Conductors #2	Residential - Female Conductors #2	1	Window AC	1.29		11.80		Friedrich	CP15G10B	W		No							0.0	0	0	$0	$0	$0	0.0
Electrical Room - 4th YMCA Communications	Electrical Room - 4th YMCA Communications	1	Window AC	2.08		9.80		Frigidaire	FFRE2533Q2	W		No							0.0	0	0	$0	$0	$0	0.0
Electrical Room - 4th YMCA Communications	Electrical Room - 4th YMCA Communications	1	Window AC	0.83		9.80		Movin Cool	10SFU-1	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Food Court	1	Split-System	26.67		8.60		Carrier	38AKS034	B	10	Yes	1	Split-System	26.67		12.50		5.8	20,316	0	$2,349	$50,274	$2,267	20.4
Roof	Food Court Bar	1	Split-System	26.67		8.60		Carrier	38AKS034	B	10	Yes	1	Split-System	26.67		12.50		5.8	20,316	0	$2,349	$50,274	$2,267	20.4
Exterior - Incline Area	Office - Mail Room	1	Ductless Mini-Split HP	2.85	37.00	14.00	9.3 HSPF	Mitsubishi	PKA-A36KA4	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior - Brick Alley	Electrical Room - Ticket Office	1	Ductless Mini-Split HP	3.00	36.00	14.00	8.2 HSPF	Daikin	4MXS36NMVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior - Brick Alley	Lounge - Ticket Office	1	Ductless Mini-Split AC	2.50		14.50		EMI	E-Verter	B	10	Yes	1	Ductless Mini-Split AC	2.50		18.00		0.2	704	0	$81	$4,044	$0	49.7
Roof	Electrical Room - Ferry 107	1	Ductless Mini-Split AC	1.00		20.80		Mitsubishi	PUY-A12NKA7	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Hoboken Terminal	1	Ductless Mini-Split AC	0.63		10.00		Samsung	US07A6MA	B	10	Yes	1	Ductless Mini-Split AC	0.63		18.00		0.2	583	0	$67	$2,144	$0	31.8
Roof	Hoboken Terminal	1	Ductless Mini-Split AC	0.63		10.00		Samsung	US07A6MA	B	10	Yes	1	Ductless Mini-Split AC	0.63		18.00		0.2	583	0	$67	$2,144	$0	31.8
Roof	Office - Control Center	1	Ductless Mini-Split HP	1.50	21.60	19.00	9 HSPF	Fujitsu	AOU18RLXFW1	W		No							0.0	0	0	$0	$0	$0	0.0

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Roof	Electrical Room - YMCA 4th IT	1	Ductless Mini-Split AC	1.50		19.00		Fujitsu	AOU18CL	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Electrical Room - Battery Room	1	Ductless Mini-Split AC	2.00		18.00		Daikin	RK24NMVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Conference - Room 8	Conference - Room 8	1	Electric Resistance Heat		25.59		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Copy Room Conductors Male	Copy Room Conductors Male	2	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Dining Area - Food Court	Dining Area - Food Court	1	Electric Resistance Heat		25.59		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Electrical Room - Ferries Communication	Electrical Room - Ferries Communication	1	Electric Resistance Heat		11.26		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Electrical Room - Immigrant Building 1st #1	Electrical Room - Immigrant Building 1st #1	6	Electric Resistance Heat		25.59		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Electrical Room - Immigrant Building 1st #2	Electrical Room - Immigrant Building 1st #2	5	Electric Resistance Heat		25.59		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Electrical Room North Exit	Electrical Room North Exit	1	Electric Resistance Heat		11.26		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Engineers Lunch Room #14	Engineers Lunch Room #14	2	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Locker Room - Engineers	Locker Room - Engineers	6	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Locker Room - NJTPD Female	Locker Room - NJTPD Female	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Locker Room - NJTPD Male	Locker Room - NJTPD Male	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Locker Room #12 TCU #1	Locker Room #12 TCU #1	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Locker Room #12 TCU #2	Locker Room #12 TCU #2	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Lounge - Conductors Male	Lounge - Conductors Male	2	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Lounge - Engineers TV Room	Lounge - Engineers TV Room	2	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Lounge #12 TCU	Lounge #12 TCU	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical - Immigrant Building Sprinkler	Mechanical - Immigrant Building Sprinkler	1	Electric Resistance Heat		25.59		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical - Sprinkler Room	Mechanical - Sprinkler Room	2	Electric Resistance Heat		34.12		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0

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Mechanical - Track Electricians	Mechanical - Track Electricians	1	Electric Resistance Heat		3.41		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Conductors Male #1	Office - Conductors Male #1	4	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Conductors Male #2	Office - Conductors Male #2	4	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Lost and Found	Office - Lost and Found	1	Electric Resistance Heat		13.65		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Mail Room	Office - Mail Room	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Mech Department #1 Room #11	Office - Mech Department #1 Room #11	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Mech Department #2 Room #10	Office - Mech Department #2 Room #10	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Mech Department #2 Room #11	Office - Mech Department #2 Room #11	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Mech Department #3 Room #10	Office - Mech Department #3 Room #10	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Mech Department #3 Room #11	Office - Mech Department #3 Room #11	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Mech Department Room #9	Office - Mech Department Room #9	1	Electric Resistance Heat		27.30		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - NJT Police Holding Cell	Office - NJT Police Holding Cell	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - NJT Police Room #1	Office - NJT Police Room #1	1	Electric Resistance Heat		27.30		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - NJT Police Room #1	Office - NJT Police Room #1	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Police Room #5	Office - Police Room #5	2	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Police Room #5	Office - Police Room #5	1	Electric Resistance Heat		27.30		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Railmen for Children #16	Office - Railmen for Children #16	2	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Office - Training Room 8A	Office - Training Room 8A	2	Electric Resistance Heat		4.27		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Residential - Engineers Sleep Room #2	Residential - Engineers Sleep Room #2	2	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Residential - Engineers Sleep Room #3	Residential - Engineers Sleep Room #3	2	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0

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Restroom - #12 TCU	Restroom - #12 TCU	1	Electric Resistance Heat		4.27		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Restroom - Female Long Hallway	Restroom - Female Long Hallway	1	Electric Resistance Heat		4.27		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Restroom - Female NJTPD	Restroom - Female NJTPD	1	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Restroom - Male Long Hallway	Restroom - Male Long Hallway	1	Electric Resistance Heat		4.27		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Stairs - Control Center	Stairs - Control Center	1	Electric Resistance Heat		3.41		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Storage - File Room Conductors Male	Storage - File Room Conductors Male	1	Electric Resistance Heat		10.24		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Warehouse - Barge Building	Warehouse - Barge Building	1	Electric Resistance Heat		25.59		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Electrical Room - Immigrant Building 2nd	Electrical Room - Immigrant Building 2nd	6	Electric Resistance Heat		25.59		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Electrical Room - YMCA Main	Electrical Room - YMCA Main	4	Electric Resistance Heat		102.36		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Electrical Room - YMCA Main	Electrical Room - YMCA Main	1	Electric Resistance Heat		25.59		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Lounge - Conductors Female #1	Lounge - Conductors Female #1	1	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Restroom - Conductors Female #1	Restroom - Conductors Female #1	2	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Restroom - Conductors Female #1	Restroom - Conductors Female #1	1	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Stairs - YMCA #2	Stairs - YMCA #2	9	Electric Resistance Heat		3.41		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Stairs - YMCA #2	Stairs - YMCA #2	5	Electric Resistance Heat		6.82		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Lounge - YMCA 3rd Sleep Room	Lounge - YMCA 3rd Sleep Room	1	Electric Resistance Heat		34.12		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Residential - YMCA 3rd Sleep Room #1	Residential - YMCA 3rd Sleep Room #1	1	Electric Resistance Heat		4.27		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Residential - YMCA 3rd Sleep Room #2	Residential - YMCA 3rd Sleep Room #2	1	Electric Resistance Heat		4.27		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Residential - YMCA 3rd Sleep Room #3	Residential - YMCA 3rd Sleep Room #3	1	Electric Resistance Heat		4.27		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Residential - YMCA 3rd Sleep Room #4	Residential - YMCA 3rd Sleep Room #4	1	Electric Resistance Heat		4.27		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0

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Corridor - YMCA 4th	YMCA Building	1	Electric Resistance Heat		25.59		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Corridor - YMCA 4th	YMCA Building	1	Electric Resistance Heat		85.30		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Corridor - YMCA 4th	YMCA Building	1	Electric Resistance Heat		37.53		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Exterior - Ferry Slips	Exterior - Ferry Slips	19	Electric Resistance Heat		17.06		1 COP			W		No							0.0	0	0	$0	$0	$0	0.0
Exterior - Incline Area	Hoboken Terminal	1	Split-System	5.00		10.00				W		No							0.0	0	0	$0	$0	$0	0.0
Exterior - Brick Alley	Ticket Office	1	Split-System	5.00		10.00				W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Hoboken Terminal	1	Split-System	5.00		9.00		York	CMB06011A	B	10	Yes	1	Split-System	5.00		16.00		1.5	5,104	0	$590	$9,943	$525	16.0
Roof	Hoboken Terminal	1	Package Unit	10.00	39.31	8.60	1 COP	Trane		B	10	Yes	1	Package Unit	10.00	39.31	14.00	1 COP	2.7	9,419	0	$1,089	$21,856	$790	19.3
Roof	Hoboken Terminal	1	Split-System	10.00		8.60		Carrier	38AK-012	B	10	Yes	1	Split-System	10.00		14.00		2.7	9,419	0	$1,089	$15,894	$790	13.9
Roof	Hoboken Terminal	1	Split-System	5.00		13.00		Thermal Zone	TZAA-360-2A757	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Hoboken Terminal	1	Split-System	7.50		9.00		Trane	TTA090A300FA	B	10	Yes	1	Split-System	7.50		14.00		1.8	6,250	0	$723	$12,597	$593	16.6
Roof	Medical Room	1	Split-System	7.50		9.00		Trane		B	10	Yes	1	Split-System	7.50		14.00		1.8	6,250	0	$723	$12,597	$593	16.6
Roof	Hoboken Terminal	1	Package Unit	6.50	144.00	11.70	0.8 Et	Johnson Controls	J06ZHN15	B	10	Yes	1	Package Unit	6.50	144.00	14.00	0.82 Et	0.5	1,917	2	$237	$14,123	$514	57.5
Roof	Office - NJT Customer Service #1	1	Ductless Mini-Split AC	2.67		10.00		Sanyo	Tri Zone	B	10	Yes	1	Ductless Mini-Split AC	2.67		18.00		0.7	2,489	0	$288	$4,085	$0	14.2
Roof	Hoboken Terminal	1	Split-System	15.00		9.00		Trane	TTA180B300FA	B	10	Yes	1	Split-System	15.00		14.00		3.6	12,500	0	$1,445	$23,502	$1,335	15.3
Roof	Hoboken Terminal	2	Split-System Air-Source HP	8.00	108.00	11.95	3.52 COP	Mitsubishi	PUHY-HP96TJMU-A-BS	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Hoboken Terminal	1	Split-System	15.00		9.00		Carrier	38AE-016	B	10	Yes	1	Split-System	15.00		14.00		3.6	12,500	0	$1,445	$23,502	$1,335	15.3
Roof	Electrical Room - 4th YMCA Communications	1	Split-System	5.00		13.00		Nortek	JS4BD-060KB	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	YMCA Building	3	Split-System	5.00		9.00		Edpac		B	10	Yes	3	Split-System	5.00		16.00		4.4	15,313	0	$1,770	$29,830	$1,575	16.0
Exterior HVAC	Office - Tickets #1	1	Ductless Mini-Split HP	1.50	21.60	20.30	11 HSPF	Daikin	FTXS18LVJU	W		No							0.0	0	0	$0	$0	$0	0.0

		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 (kBtu/hr)	Cooling Mode Efficiency (SEER/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
Mechanical - Clock Tower	Mechanical - Clock Tower	1	Package Unit	0.33	4.44	9.00	1 COP	nVent	N280416G211P2YP	W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical - Control Center	Control Center AHU	1	Electric Resistance Heat		34.12		1 COP	Carrier		B		No							0.0	0	0	$0	$0	$0	0.0
Roof	Hoboken Terminal	1	Forced Air Furnace		240.00		0.8 Et	Trane	GRAA30	B	12	Yes	1	Forced Air Furnace		240.00		0.97 AFUE	0.0	0	24	$181	$5,875	$500	29.7
Corridor - YMCA 4th	YMCA Building - Unit 1 AHU2	1	Electric Resistance Heat		68.24		1 COP	Brasch	BH-101-337882	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Immigrant Building Area	1	Split-System	7.00		14.00		AAON		W		No							0.0	0	0	$0	$0	$0	0.0

Electric Chiller Inventory & Recommendations

		Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Roof - YMCA Building	YMCA Building	2	Air-Cooled Scroll Chiller	25.00	Trane	CGAC-C25	B	11	Yes	2	Air-Cooled Scroll Chiller	Variable	25.00	1.24	0.74	-0.4	10,065	0	$1,164	$97,782	$4,500	80.2

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
Mechanical - Boiler Room #1	Boilers #1 & #2 - Hoboken Terminal	2	Condensing Hot Water Boiler	1,880	Aerco	BMK 2000	W		No						0.0	0	0	$0	$0	$0	0.0
Mechanical - Boiler Room #2	Boilers #3 & #4 - Locker Rooms & Offices	2	Condensing Hot Water Boiler	1,880	Aerco	BMK 2000	W		No						0.0	0	0	$0	$0	$0	0.0

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
Janitorial - Public Male Utility	Domestic Hot Water - Grand Concourse	13	25	0.50	0.0	1,714	0	$198	$298	$25	1.4
Office - Conductors Male #1	Domestic Hot Water - Male Conductors Area	13	5	0.50	0.0	343	0	$40	$60	$5	1.4
Restroom - NJT Police	Domestic Hot Water - NJ Transit Police	13	5	0.50	0.0	343	0	$40	$60	$5	1.4
Storage - Contractors East #1	Domestic Hot Water - Contractors Area	13	10	0.50	0.0	686	0	$79	$119	$10	1.4
Corridor - YMCA 4th	Domestic Hot Water - YMCA Building	13	5	0.50	0.0	343	0	$40	$60	$5	1.4

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
Corridor - Engineers	Engineers Area	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith	DRE-52 100	N		No						0.0	0	0	$0	$0	$0	0.0
Dunkin Donuts	Dunkin Donuts	1	Storage Tank Water Heater (≤ 50 Gal)	Bradford White	RE240L6	W		No						0.0	0	0	$0	$0	$0	0.0
Janitorial - Public Male Utility	Grand Concourse	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith	ECS 50 210	W		No						0.0	0	0	$0	$0	$0	0.0
Kitchen - Food Court	Food Court	1	Storage Tank Water Heater (≤ 50 Gal)	Rheem	XE38S06ST45U1	W		No						0.0	0	0	$0	$0	$0	0.0
Kitchen - Walk Ins Food Court	Food Court	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith	ECT 40 200	W		No						0.0	0	0	$0	$0	$0	0.0
Lobby - Conductors Male	Male Conductors Area	1	Storage Tank Water Heater (≤ 50 Gal)			W		No						0.0	0	0	$0	$0	$0	0.0
Locker Room - NJTPD Male	NJ Transit Police	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith	ENT-30 100	N		No						0.0	0	0	$0	$0	$0	0.0
Mechanical - Control Center	Control Center	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith		W		No						0.0	0	0	$0	$0	$0	0.0
Mechanical - Ferry Tickets DHW	Ferry Ticket Office	1	Storage Tank Water Heater (> 50 Gal)	AO Smith	DRE-120 100	W		No						0.0	0	0	$0	$0	$0	0.0
Office - Conductors Male #1	Male Conductors Area	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith	ENS-40 110	W		No						0.0	0	0	$0	$0	$0	0.0
Restroom - NJT Police	NJ Transit Police	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith	EJCS-20 200	W		No						0.0	0	0	$0	$0	$0	0.0
Storage - Contractors East #1	Contractors Area	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith	EJCS-20 200	W		No						0.0	0	0	$0	$0	$0	0.0
Corridor - Grand Concourse	Female Conductors Area	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith		W		No						0.0	0	0	$0	$0	$0	0.0
Electrical Room - YMCA Main	YMCA Building	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith	ENT-50 130	N		No						0.0	0	0	$0	$0	$0	0.0
Restroom - Medical Services	Medical Services	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith	EJC 6 200	W		No						0.0	0	0	$0	$0	$0	0.0
Corridor - YMCA 4th	YMCA Building	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith	EJCS-20 200	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Terminal and Yard Hoboken	14	27	Faucet Aerator (Lavatory)	2.20	0.50	0.0	3,753	0	$434	$194	$97	0.2

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions				Proposed Conditions				Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Manufacturer	Model	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	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
Flower Store	1	Cooler (35F to 55F)				No	No	No	0.0	0	0	$0	$0	$0	0.0

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Dunkin Donuts	1	Stand-Up Freezer, Solid Door (>50 cu. ft.)	Norlake	NF522SSS/0	Yes		No	0.0	0	0	$0	$0	$0	0.0
Dunkin Donuts	2	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)			Yes		No	0.0	0	0	$0	$0	$0	0.0
Dunkin Donuts	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)			Yes		No	0.0	0	0	$0	$0	$0	0.0
Liquor Store	3	Stand-Up Refrigerator, Glass Door (>50 cu. ft.)			No		No	0.0	0	0	$0	$0	$0	0.0
Liquor Store	5	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)			No		No	0.0	0	0	$0	$0	$0	0.0
Store - Fabre News	1	Stand-Up Refrigerator, Glass Door (31 - 50 cu. ft.)	True	GDM33-LD	No		No	0.0	0	0	$0	$0	$0	0.0
Store - Fabre News	1	Stand-Up Refrigerator, Solid Door (≤15 cu. ft.)	True	GDM-12	No		No	0.0	0	0	$0	$0	$0	0.0

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Dunkin Donuts	1	Ice Making Head (<450 lbs/day), Continuous	Scotsman		Yes		No	0.0	0	0	$0	$0	$0	0.0
Corridor - Grand Concourse	2	Ice Making Head (≥450 lbs/day), Continuous	Hoshizaki	KM-1301SAH	Yes		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Dunkin Donuts	2	Electric Convection Oven (Half Size)			No		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	**Quantity**	**Equipment Description**	**Energy Rate (W)**	**ENERGY STAR Qualified?**	**Manufacturer**	**Model**
Terminal and Yard Hoboken	19	Coffee Machine	500	No		
Terminal and Yard Hoboken	53	Desktop	120	No		
Terminal and Yard Hoboken	24	Microwave	1,000	No		
Terminal and Yard Hoboken	4	Paper Shredder	146	No		
Terminal and Yard Hoboken	21	Printer (Medium/Small)	450	No		
Terminal and Yard Hoboken	8	Printer/Copier (Large)	600	No		
Terminal and Yard Hoboken	14	Refrigerator (Mini)	175	No		
Terminal and Yard Hoboken	12	Refrigerator (Residential)	340	No		
Terminal and Yard Hoboken	1	Serving Table (Chilled/Heated)	3,000	No		
Terminal and Yard Hoboken	49	Television	224	No		
Terminal and Yard Hoboken	1	Toaster	600	No		
Terminal and Yard Hoboken	4	Toaster Oven	600	No		
Terminal and Yard Hoboken	5	Water Cooler	192	No		
Terminal and Yard Hoboken	1	Ice Cream Machine	2,400	No		
Terminal and Yard Hoboken	1	Server UPS	3,266	No		
Terminal and Yard Hoboken	3	ATM	500	No		
Terminal and Yard Hoboken	4	Ticket Machine	500	No		
Terminal and Yard Hoboken	1	Electric Stove	2,000	No		
Terminal and Yard Hoboken	2	Server	4,000	No		

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Corridor - Grand Concourse	2	Non-Refrigerated	15	Yes	0.1	685	0	$79	$460	$0	5.8
Corridor - Grand Concourse	2	Refrigerated	15	Yes	0.4	3,224	0	$373	$460	$100	1.0

Custom (High Level) Measure Analysis

Electric Tank Water Heater to HPWH

NOTE: HPWH calculation should not be used for existing water heaters with a storage capacity greater than 120 gal.

Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis										
Description	Area(s)/System(s) Served	SF of Area Served	Fuel Type	Input Capacity per Unit (kW)	Tank Capacity per Unit (Gal)	Description	COP	Tank Capacity per Unit (Gal)	Estimated Unit Cost	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Base Incentives	Enhanced Incentives	Total Incentives	Total Net Cost	Payback w/o Incentives in Years	Payback w/ Incentives in Years
Storage Tank Water Heater (≤50 Gal)	Grand Concourse	10,000	Electric	4.5	50	Heat Pump Water Heater	2.5	50	$2,383.17	0.00	4,045	0	$468	$2,383	$0	$0	$0	$2,383	5.09	5.09
Storage Tank Water Heater (≤50 Gal)	Food Court	7,500	Electric	4.5	40	Heat Pump Water Heater	2.5	40	$2,069.90	0.00	3,033	0	$351	$2,070	$0	$0	$0	$2,070	5.90	5.90
Storage Tank Water Heater (≤50 Gal)	YMCA Building	10,000	Electric	4.5	50	Heat Pump Water Heater	2.5	50	$2,383.17	0.00	4,045	0	$468	$2,383	$0	$0	$0	$2,383	5.09	5.09

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.

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ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

2010 - Terminal & Yard Hoboken

Primary Property Type: Transportation Terminal/Station
Gross Floor Area (ft²): 278,000
Built: 1907

For Year Ending: December 31, 2021
Date Generated: August 03, 2023

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
2010 - Terminal & Yard Hoboken 1 Hudson Place Hoboken, New Jersey 07030	NJ Transit 1 Penn Plaza Newark, NJ 07015 (973) 491-4140	Erin Hill One Penn Plaza East 8th Floor Newark, NJ 07015 (973) 491-4140 erhill@njtransit.com

Property ID: 24629172

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
49.8 kBtu/ft²

Source EUI
115.9 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	10,104,768 (73%)
Natural Gas (kBtu)	3,746,455 (27%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	48.1
National Median Source EUI (kBtu/ft²)	112
% Diff from National Median Source EUI	4%
Annual Emissions	
Total (Location-Based) GHG Emissions (Metric Tons CO2e/year)	1,079

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

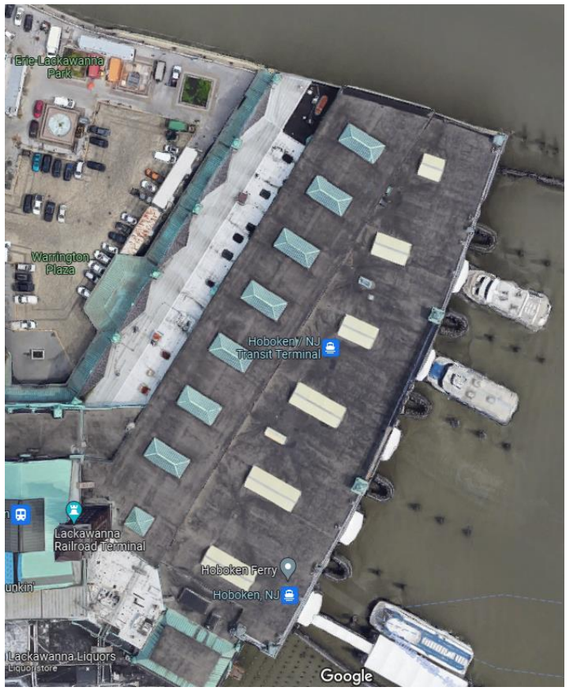
Solar kW: 330 | Battery kWh: 200

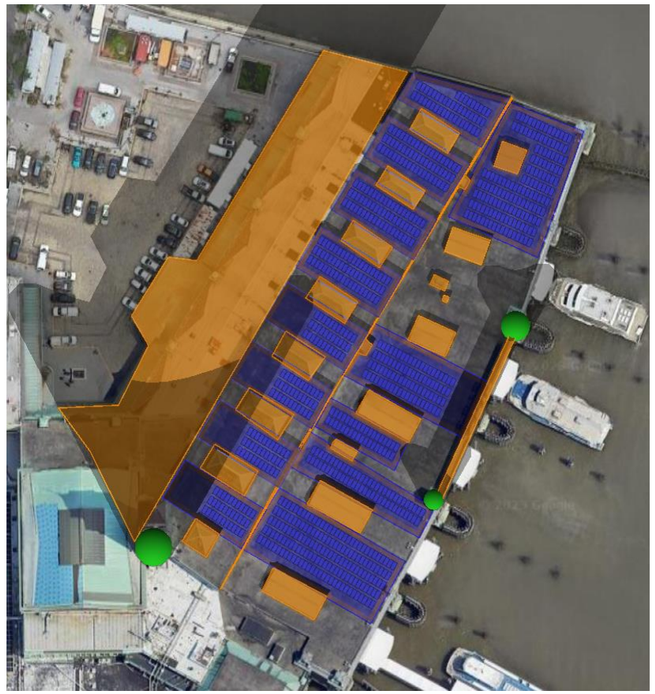
DER	Gross Project Cost ($)	Energy Generation (kWh)	Demand Reduction (kW)	GHG Reduction (MT CO2)	Total Annual Utility Cost Savings ($/yr)	New Maintenance Penalty ($/yr)	Net Annual Cost Savings ($/yr)	Incentives (FTC) ($)	Depreciation (MACRS) ($)	Net Project Cost ($)	Net Simple Payback (yr)
330 kW Solar PV	$1,453,921	395,797	121	78.8	$43,916	$7,270	$36,647	$436,176	$363,480	$654,265	17.9
200 kWh Battery	$245,079	0	110	0.0	$878	$613	$266	$73,524	$61,270	$110,285	415.0
Total	$1,699,000	395,797	231	78.8	$44,795	$7,882	$36,912	$509,700	$424,750	$764,550	20.7

PPA Alternative:	-$2,094

Annual Utility Savings

Baseline kWh	1,252,161
Saved kWh	395,797
% NZE	32%
NZE Solar Size kW	1044





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 (yr)
330 kW Solar PV	121	395,797	79	$36,647	$1,453,921	$799,657	$654,265	17.9
200 kWh Battery	110	0	0	$266	$245,079	$134,793	$110,285	415.0
Total	231	395,797	79	$36,912	$1,699,000	$934,450	$764,550	20.7

Ownership Plan	Upfront Cost	Year 1 Cost After Rebates	Annual Savings	Lifetime 30-Year Cost Savings ($)	30-Year ROI
Cash Purchase	$1,699,000	$764,550	$36,912	$1,107,371	145%
PPA	$0	$0	($2,094)	($62,832)	-

Equipment	Estimated Gross Project Cost ($)	ITC Rebate	MACRS Rebate	Net Project Cost
330 kW Solar PV	$1,453,921	$436,176	$363,480	$654,265
200 kWh Battery	$245,079	$73,524	$61,270	$110,285
Total	$1,699,000	$509,700	$424,750	$764,550

New PV + BESS

System Description	QTY	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)	330,000	Watts DC			$ 0.45	$ 148,500	$ -	$ -	$ 148,500	PV size from ETB, cost from NREL report	https://www.nrel.gov/docs/fy22osti/83586.pdf
Inverter, 24 kW	11	Ea.		$ 400	$ 4,300	$ 47,300	$ -	$ 17,618	$ 64,918	Inverter size from Helioscope - Cost from online quote Labor - 4 Hrs. Electrician per unit	https://sunwatts.com/24kw-fronius-symo-advanced-24-0-3-480v-3-phase-string-inverter/
PV Mounting Cost/Labor/Installation	330,000	Watts DC		$ 1.21	$ 0.20	$ 66,000	$ -	$ 399,663	$ 465,663	Energy ToolBase	Cost associated to core structural upgrades not considered under PV mounting cost.
Carport Structure and Racking Cost/Labor/Installation	0	Watts DC		$ 1.21	$ 1.00	$ -	$ -	$ -	$ -	Energy ToolBase	
PV String Combiner Panels	7	Ea.		$ 100.10	$ 568	$ 3,908	$ -	$ 1,376	$ 5,284	Online Quote Labor - 1 Hrs. Electrician per unit	https://www.solaris-shop.com/sma-cu1000-us-11-string-combiner-w-disconnect/ Each 1000V combiner box with disconnect switch can accommodate 8 strings total Project site has up to 55 strings
Electrical BOS Roof mounted	4,200	m^2	$ -	$ -	$ 38.00	$ 159,600	$ -	$ -	$ 159,600	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	4,200	m^2	$ 3.95	$ -	$ -	$ -	$ 16,590	$ -	$ 16,590	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
Battery Storage System											
Li-ion Battery + cabinet	200	kWh		$ -	$ 393	$ 78,600	$ -	$ -	$ 78,600	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
Battery Installation - Labor and equipment	200	kWh		$ 265	$ -	$ -	$ -	$ 53,000	$ 53,000	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 2.91 hrs. @ RS Means labor rate
Electrical BOS	200	kWh	$ -	$ -	$ 69	$ 13,833	$ -	$ -	$ 14,000	https://www.nrel.gov/docs/fy22osti/83586.pdf	
Trenching/Site Prep and Wiring											
Schedule 80 PVC Piping 6" Diameter	0	LF	$ -	$ 45	$ 53.00	$ -	$ -	$ -	$ -	RS means - 221113742560	
Trenching and Backfill 12" wide, 36" Deep	0	Day.	$ 425	$ 1,836.40	$ -	$ -	$ -	$ -	$ -	Includes B-54 Crew - reference 312316142850	(5) Days of work (2) Laborers (1) 40 HP Chain Trencher (1) Light Equip Operator
Soil Excavation, Removal, loading, and hauling	0	L.C.Y	$ 6.80	$ 6.15	$ -	$ -	$ -	$ -	$ -	Includes B-34D Crew - reference 312323204304	Includes (1) Truck Driver (1) Truck Tractor (1) Dump Trailer

Backfill and Asphalt Paving 8" Thick	0	Day.	$ 3,428	$ 6,777.20	$ 30.00	$ 3,213	$ -	$ -	$ 3,213	Includes B-25 Crew - reference 32 11 26 13 0560	0.5 Day of Filling Trench and Repaving Asphalt Includes (1) Labor Foreman (7) Laborers (3) Equipment Operators (1) Asphalt Paver, 130 H.P. (1) Tandem Roller, 10 Ton (1) Roller, Pneum. Wheel, 12 Ton
Other Costs											
New ATS - 1200 Amp	1	Ea.		$ 1,182.00	$ 23,339.20	$ 23,339	$ -	$ 1,182	$ 24,521	RS means - 263623100070	
Permitting, inspection, and interconnection	1	Ea.	$ 4,251	$ -			$ 4,251	$ -	$ 4,251	https://www.nrel.gov/docs/fy22osti/83586.pdf	For construction permits fee, interconnection study fees for existing substation, testing, and commissioning For standalone systems - (Rooftop - $105/kW-DC, Ground mount - $46/kW-DC, Battery - $13.6/kWh) For PV+Storage combined - Battery PII*1.02 = $20.84/kWh*1.02
User Training	8	Hr.	$ -	$ 150	$ -	$ -	$ -	$ 1,200	$ 1,200		
Total						**$ 548,300**	**$ 20,800**	**$ 478,000**	**$ 1,039,340**		

Markup	Cost
System Cost	$1,039,340
Tax (6.625%)	$36,325
O&P Cost (10%)	$103,934
EPC Markup (10%)	$103,934
Contingency (30%)	$311,802
2023 Inflation Markup (10%)	$103,934
Total Cost	$1,699,000

Battery Cost	$238,011	
Solar Cost	$1,411,993	
Electrical Upgrades, Permitting and Misc…	$48,996	
Battery Cost with Elec Upgrades	$245,079	$1,225.39
Solar Cost with Elec Upgrades	$1,453,921	$4.41

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	-$764,550	$0	$0	-$764,550	$0	$0
1	$36,912	-$2,094	-$2,094	-$727,638	-$2,094	-$2,094
2	$36,912	-$2,094	-$2,094	-$690,725	-$4,189	-$4,189
3	$36,912	-$2,094	-$2,094	-$653,813	-$6,283	-$6,283
4	$36,912	-$2,094	-$2,094	-$616,900	-$8,378	-$8,378
5	$36,912	-$2,094	-$2,094	-$579,988	-$10,472	-$10,472
6	$36,912	-$2,094	-$2,094	-$543,076	-$12,566	-$12,566
7	$36,912	-$2,094	-$2,094	-$506,163	-$14,661	-$14,661
8	$36,912	-$2,094	-$2,094	-$469,251	-$16,755	-$16,755
9	$36,912	-$2,094	-$2,094	-$432,339	-$18,850	-$18,850
10	$36,912	-$2,094	-$2,094	-$395,426	-$20,944	-$20,944
11	$36,912	-$2,094	-$393,742	-$358,514	-$23,038	-$414,686
12	$36,912	-$2,094	$36,912	-$321,601	-$25,133	-$377,774
13	$36,912	-$2,094	$36,912	-$284,689	-$27,227	-$340,861
14	$36,912	-$2,094	$36,912	-$247,777	-$29,322	-$303,949
15	$36,912	-$2,094	$36,912	-$210,864	-$31,416	-$267,037
16	$36,912	-$2,094	$36,912	-$173,952	-$33,510	-$230,124
17	$36,912	-$2,094	$36,912	-$137,040	-$35,605	-$193,212
18	$36,912	-$2,094	$36,912	-$100,127	-$37,699	-$156,300
19	$36,912	-$2,094	$36,912	-$63,215	-$39,794	-$119,387
20	$36,912	-$2,094	$36,912	-$26,302	-$41,888	-$82,475
21	$36,912	-$2,094	$36,912	$10,610	-$43,982	-$45,562
22	$36,912	-$2,094	$36,912	$47,522	-$46,077	-$8,650
23	$36,912	-$2,094	$36,912	$84,435	-$48,171	$28,262
24	$36,912	-$2,094	$36,912	$121,347	-$50,266	$65,175
25	$36,912	-$2,094	$36,912	$158,259	-$52,360	$102,087
26	$36,912	-$2,094	$36,912	$195,172	-$54,454	$138,999
27	$36,912	-$2,094	$36,912	$232,084	-$56,549	$175,912
28	$36,912	-$2,094	$36,912	$268,997	-$58,643	$212,824
29	$36,912	-$2,094	$36,912	$305,909	-$60,738	$249,737
30	$36,912	-$2,094	$36,912	$342,821	-$62,832	$286,649

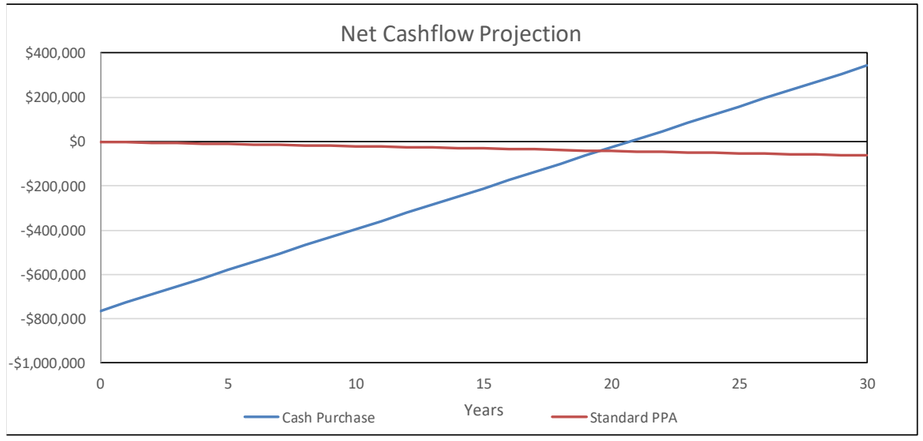
Cash Purchase	
Gross Project Cost	$1,699,000
Rebates	-$509,700
85% Depreciation	-$424,750
n/a	$0
Final Cost	$764,550
Utility Savings	$36,912
Payback	20.7
Financial Life (yr)	30
ROI (Over EUL)	145%

Battery Cost: $245,079
Solar Cost: $1,453,921

Standard PPA	
Gross Project Cost	$1,699,000
Rebates	-$509,700
85% Depreciation	-$424,750
n/a	$0
Final Cost	$764,550
Financial Life (yr)	30
Interest Rate	3.0%
Annual Income from Loan	$39,007
Utility Savings	$36,912
Annual Savings	-$2,094

Battery Cost: $245,079
Solar Cost: $1,453,921

PPA with Year 10 Buyout	
Gross Project Cost	$1,699,000
Rebates	-$509,700
85% Depreciation	-$424,750
n/a	$0
Final Cost	$764,550
Financial Life (yr)	30
Interest Rate	3.0%
Years 1-10	
Annual Income from Loan	$39,007
Utility Savings	$36,912
Customer Savings	-$2,094
Years 11-30	
Contractor O&P	15%
Buyout Cost	$430,655
Utility Savings	$36,912
Year 11-25 Payback	11.7
Lifetime Savings	$717,304
ROI (Over RUL)	167%



ETB Outputs

							Raw Utility Info				-30% Cost Markup				
Bill Date Ranges			Energy Before PV/ESS (kWh)		Max Demand Before PV/ESS (kW)		Charges Before PV/ESS ($)				Charges Before PV/ESS ($)				Energy Before PV/ESS (kWh)
Start Date	End Date	Season	On Peak	Off Peak	NC / Max	On Peak	Other	Energy	Demand	Total	Other	Energy	Demand	Total	Total
1/1/2021	2/1/2021	W	124390	198836	602	0	2038.02	44355.2	723.66	47116.88	1426.614	31048.64	506.562	32981.82	323226
2/1/2021	3/1/2021	W	167961	232574	738	0	2038.02	51149.67	887.15	54074.84	1426.614	35804.77	621.005	37852.39	400535
3/1/2021	4/1/2021	W	139188	162153	1142	0	2038.02	38932.12	1372.8	42342.94	1426.614	27252.48	960.96	29640.06	301341
4/1/2021	5/1/2021	W	101565	136789	975	0	2038.02	30343.86	1172.05	33553.93	1426.614	21240.7	820.435	23487.75	238354
5/1/2021	6/1/2021	W	79179	125006	580	0	2038.02	25177.24	697.22	27912.47	1426.614	17624.07	488.054	19538.73	204185
6/1/2021	7/1/2021	S	84869	110893	660	660	2038.02	25030.39	3661.35	30729.76	1426.614	17521.27	2562.945	21510.83	195762
7/1/2021	8/1/2021	S	89504	123922	620	620	2038.02	31107.17	3613.27	36758.45	1426.614	21775.02	2529.289	25730.92	213426
8/1/2021	9/1/2021	S	88931	117041	602	602	2038.02	42029.19	3591.63	47658.84	1426.614	29420.43	2514.141	33361.19	205972
9/1/2021	10/1/2021	S	86447	106376	554	554	2038.02	30633.42	3533.93	36205.37	1426.614	21443.39	2473.751	25343.76	192823
10/1/2021	11/1/2021	W	75814	115016	617	0	2038.02	28407.33	741.7	31187.05	1426.614	19885.13	519.19	21830.94	190830
11/1/2021	12/1/2021	W	97644	136030	759	0	2038.02	35141.85	912.39	38092.26	1426.614	24599.3	638.673	26664.58	233674
12/1/2021	1/1/2022	W	116669	155168	723	0	2038.02	63221.71	869.12	66128.84	1426.614	44255.2	608.384	46290.19	271837
Subtotal			1252161	1719804			24456.24	445529.14	21776.26	491761.64	17119.368	311870.4	15243.382	344233.1	2971965
Adjustments							0	0	0	0	0	0	0	0	
Total			1252161	1719804			24456.24	445529.14	21776.26	491761.64	17119.368	311870.4	15243.382	344233.1	2971965
Bill Date Ranges			Energy After PV & Before ESS (kWh)		Max Demand After PV & Before ESS (kW)		Charges After PV & Before ESS ($)				Charges After PV & Before ESS ($)				Energy After PV & Before ESS (kWh)
Start Date	End Date	Season	On Peak	Off Peak	NC / Max	On Peak	Other	Energy	Demand	Total	Other	Energy	Demand	Total	Total
1/1/2021	2/1/2021	W	113324	193123	555	0	2038.02	42062.57	667.17	44767.76	1426.614	29443.8	467.019	31337.43	306447
2/1/2021	3/1/2021	W	151280	224999	706	0	2038.02	48017.55	848.68	50904.25	1426.614	33612.29	594.076	35632.98	376279
3/1/2021	4/1/2021	W	113306	151079	1021	0	2038.02	34235.78	1227.34	37501.15	1426.614	23965.05	859.138	26250.81	264385
4/1/2021	5/1/2021	W	72454	126484	812	0	2038.02	25313.56	976.11	28327.68	1426.614	17719.49	683.277	19829.38	198938
5/1/2021	6/1/2021	W	48529	108947	526	0	2038.02	19431.25	632.3	22101.57	1426.614	13601.88	442.61	15471.1	157476
6/1/2021	7/1/2021	S	48822	96253	545	397	2038.02	18424.13	2953.86	23416.02	1426.614	12896.89	2067.702	16391.21	145075
7/1/2021	8/1/2021	S	57838	107762	529	529	2038.02	23701.6	2934.63	28674.25	1426.614	16591.12	2054.241	20071.98	165600
8/1/2021	9/1/2021	S	60085	104134	447	410	2038.02	32613.67	2836.06	37487.75	1426.614	22829.57	1985.242	26241.43	164219
9/1/2021	10/1/2021	S	60174	95500	467	417	2038.02	24685.07	2860.1	29583.19	1426.614	17279.55	2002.07	20708.23	155674
10/1/2021	11/1/2021	W	59404	106086	590	0	2038.02	24647.8	709.24	27395.05	1426.614	17253.46	496.468	19176.54	165490
11/1/2021	12/1/2021	W	86432	131432	640	0	2038.02	32758.42	769.34	35565.79	1426.614	22930.89	538.538	24896.05	217864
12/1/2021	1/1/2022	W	107549	151172	662	0	2038.02	60465.86	795.79	63299.67	1426.614	42326.1	557.053	44309.77	258721
Subtotal			979197	1596971			24456.24	386357.26	18210.62	0	17119.368	270450.1	12747.434	0	2576168
Adjustments							0	0	0	0	0	0	0	0	
Total			979197	1596971			24456.24	386357.26	18210.62	429024.12	17119.368	270450.1	12747.434	300316.9	2576168
Bill Date Ranges			Energy After PV/ESS (kWh)		Max Demand After PV/ESS (kW)		Charges After PV/ESS ($)				Charges After PV/ESS ($)				Energy After PV/ESS (kWh)
Start Date	End Date	Season	On Peak	Off Peak	NC / Max	On Peak	Other	Energy	Demand	Total	Other	Energy	Demand	Total	Total
1/1/2021	2/1/2021	W	114341	192677	523	0	2038.02	42143.44	628.7	44810.16	1426.614	29500.41	440.09	31367.11	307018
2/1/2021	3/1/2021	W	152052	224757	674	0	2038.02	48087.6	810.22	50935.83	1426.614	33661.32	567.154	35655.08	376809
3/1/2021	4/1/2021	W	113316	151114	911	0	2038.02	34241.32	1095.11	37374.45	1426.614	23968.92	766.577	26162.12	264430
4/1/2021	5/1/2021	W	72468	126488	729	0	2038.02	25315.88	876.33	28230.23	1426.614	17721.12	613.431	19761.16	198956
5/1/2021	6/1/2021	W	48547	109019	441	0	2038.02	19441.75	530.13	22009.9	1426.614	13609.23	371.091	15406.93	157566
6/1/2021	7/1/2021	S	48822	96317	513	397	2038.02	18429.93	2728.54	23196.49	1426.614	12900.95	1909.978	16237.54	145139
7/1/2021	8/1/2021	S	57853	107823	486	486	2038.02	23708.35	2696.09	28442.45	1426.614	16595.85	1887.263	19909.72	165676
8/1/2021	9/1/2021	S	60180	104227	415	410	2038.02	32634.1	2610.74	37282.86	1426.614	22843.87	1827.518	26098	164407
9/1/2021	10/1/2021	S	60199	95588	438	417	2038.02	24699.19	2638.38	29375.6	1426.614	17289.43	1846.866	20562.92	155787
10/1/2021	11/1/2021	W	59425	106182	482	0	2038.02	24662.09	579.41	27279.52	1426.614	17263.46	405.587	19095.66	165607
11/1/2021	12/1/2021	W	86457	131517	612	0	2038.02	32773.47	735.69	35547.18	1426.614	22941.43	514.983	24883.03	217974
12/1/2021	1/1/2022	W	107648	151282	626	0	2038.02	60494.04	752.51	63284.58	1426.614	42345.83	526.757	44299.21	258930
Subtotal			981308	1596991			24456.24	386631.15	16681.84	0	17119.368	270641.8	11677.288	0	2578299
Adjustments							0	0	0	0	0	0	0	0	
Total			981308	1596991			24456.24	386631.15	16681.84	427769.24	17119.368	270641.8	11677.288	299438.5	2578299

PV SYSTEM DETAILS

GENERAL INFORMATION

Facility: Meter #1
Address: 1 Hudson Pl Hoboken NJ 07030

SOLAR PV EQUIPMENT DESCRIPTION

Solar Panels: (824) LG Electronics LG400N2W-V5_R12
Inverters: (11) SMA Sunny Tripower 24000TL-US STPTL-US12-30-DUS173127

SOLAR PV EQUIPMENT TYPICAL LIFESPAN

Solar Panels: Greater than 30 Years
Inverters: 15 Years

Solar PV System Cost and Incentives

Solar PV System Cost	$1,522,537
Net Solar PV System Cost	**$1,522,537**

SOLAR PV SYSTEM RATING

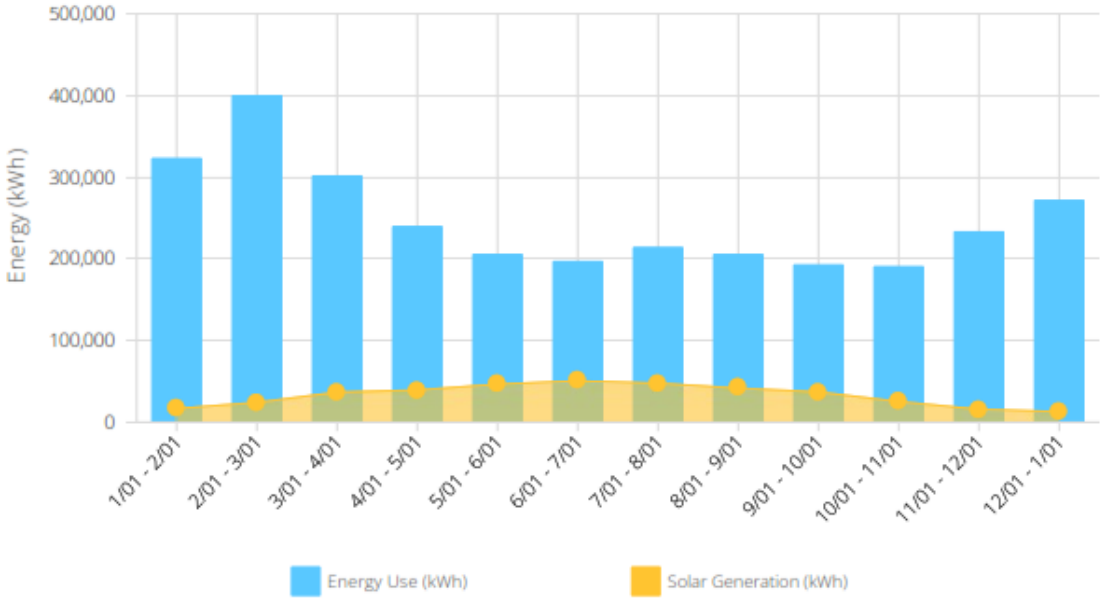
Power Rating: 329,600 W-DC
Power Rating: 281,182 W-AC-CEC

ENERGY CONSUMPTION MIX

Annual Energy Use: 2,971,964 kWh

Utility 2,576,168 kWh (86.68%)
Solar PV 395,796 kWh (13.32%)

MONTHLY ENERGY USE VS SOLAR GENERATION



energy toolbase

ENERGY STORAGE SYSTEM (ESS) DETAILS

GENERAL INFORMATION

Facility: Meter #1
Address: Hoboken NJ 07030

ESS EQUIPMENT DESCRIPTION

Battery Banks: 200kw/200kWh Energy Storage System
Inverters: 200kw/200kWh Energy Storage System

ESS EQUIPMENT TYPICAL LIFESPAN

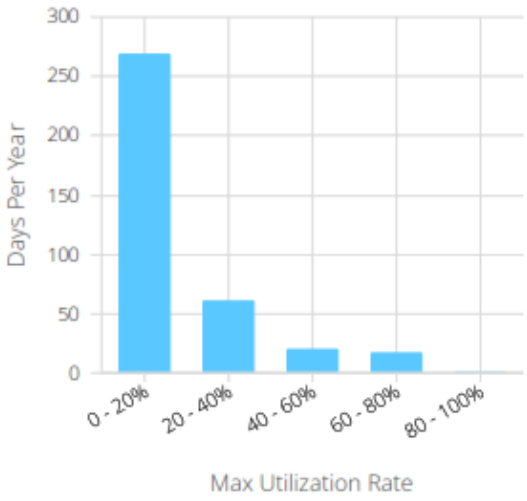
Battery Banks: 15 Years
Inverters: 15 Years

ESS Cost and Incentives	
ESS Cost	$320,853
Net ESS Cost	**$320,853**

ESS SYSTEM RATINGS

Energy Capacity: 200.0 kWh
Power Rating: 200.0 kW

ENERGY STORAGE ANNUAL UTILIZATION



Energy Output and Demand Savings From Solar PV and Energy Storage				
Date Range	ESS Energy Discharge (kWh)	Solar PV Generation (kWh)	ESS Energy as % of PV Energy	Total Demand Savings
1/1/2021 - 2/1/2021	1,485	16,779	8.85%	$95
2/1/2021 - 3/1/2021	1,381	24,256	5.69%	$77
3/1/2021 - 4/1/2021	119	36,956	0.32%	$278
4/1/2021 - 5/1/2021	50	39,417	0.13%	$296
5/1/2021 - 6/1/2021	235	46,709	0.50%	$167
6/1/2021 - 7/1/2021	166	50,687	0.33%	$933
7/1/2021 - 8/1/2021	197	47,825	0.41%	$917
8/1/2021 - 9/1/2021	491	41,753	1.18%	$981
9/1/2021 - 10/1/2021	294	37,149	0.79%	$896
10/1/2021 - 11/1/2021	307	25,340	1.21%	$162
11/1/2021 - 12/1/2021	284	15,809	1.80%	$177
12/1/2021 - 1/1/2022	542	13,116	4.13%	$117
Total	5,551	395,796	1.40%	$5,094

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:

6,202

tons of CO2 Offset

14,098,254

Miles Driven By Cars

93,012

Trees Planted

energy toolbase

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