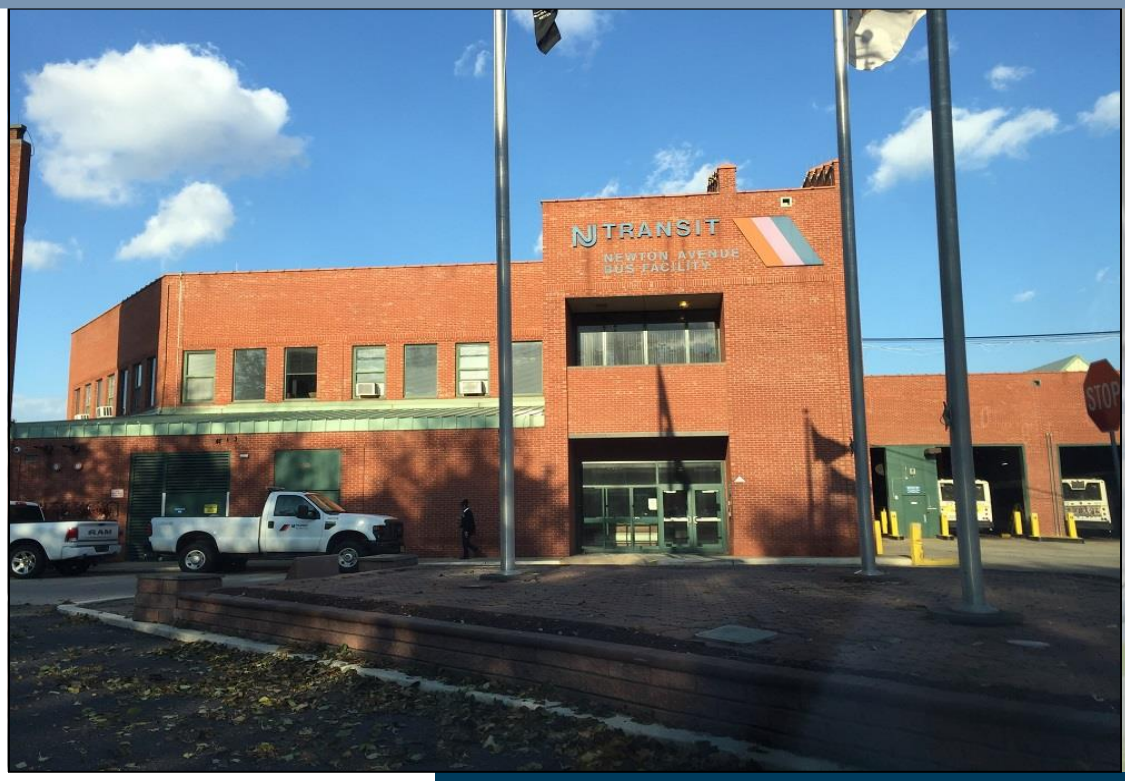
Local Government Energy Audit:
Energy Audit Report



Newton Ave Bus Garage

350 Newton Ave

Camden, NJ 08103

NJ Transit

August 20, 2018

Final Report by:

TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities and recommend upgrades to the facility's energy using equipment and systems. Approximate saving are included in this report to help make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

The energy conservation measures and estimates of energy savings have been reviewed for technical accuracy. However, estimates of final energy savings are not guaranteed, because final savings may depend on behavioral factors and other uncontrollable variables. TRC Energy Services (TRC) and New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

Estimated installation costs are based on TRC's experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from *RS Means*. The owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Since actual installed costs can vary widely for certain measures and conditions, TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

New Jersey's Clean Energy Program (NJCEP) incentive values provided in this report are estimates based on program information available at the time of the report. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. The owner of the facility should review available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Newton Ave Bus Garage.

The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey local governments in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Newton Ave Bus Garage is a 135,000 square foot facility constructed 1991. The building is a two story commercial facility including bus maintenance areas, administration control center, maintenance offices, bus bays, hallways, and locker/rest room areas.

Lighting at the facility consists mainly of LED linear lamp fixtures. LED lamps are a combination of linear 2-foot and 4-foot lamps and screw-in lamps. In addition to the LED fixtures, the facility also has a few linear fluorescent fixtures with 32-Watt T8 linear fluorescent lamps. All the exit signs are LED fixtures. Interior lighting control is primarily provided manual switches witch a few areas controlled by occupancy sensors. Exterior lighting is provided by high pressure sodium fixtures. Exterior fixture control is provided by photocells.

Heating, ventilation, and cooling is provided by a variety of gas fired heating ventilating (HV) units, hot water boilers, unit heaters, package air conditioning (AC), air handling units, chillers, and heat pump systems. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated and recommended 12 measures which together represent an opportunity for Newton Ave Bus Garage to reduce annual energy costs by roughly $75,969 and annual greenhouse gas emissions by 896,604 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in roughly 6.0 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Newton Ave Bus Garage's annual energy use by 27%.

Figure 1 – Previous 12 Month Utility Costs

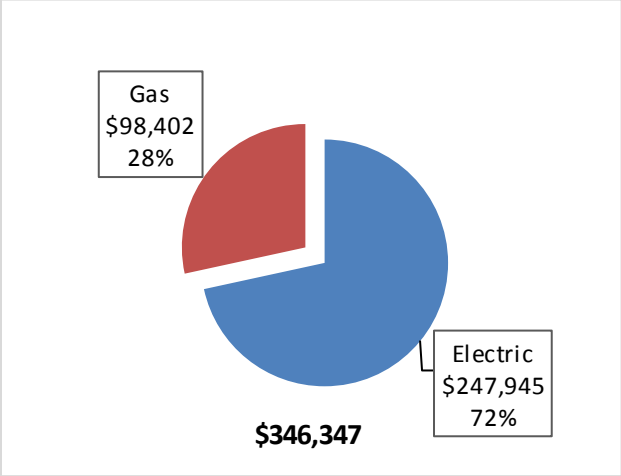
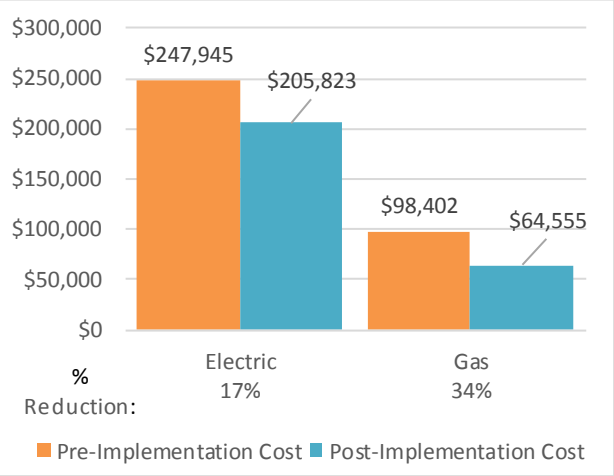


Figure 2 – Potential Post-Implementation Costs



A detailed description of Newton Ave Bus Garage's existing energy use can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. A brief description of each category can be found below and a description of savings opportunities can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**238,512**	**18.9**	**0.0**	**$23,608.58**	**$138,747.29**	**$10,715.00**	**$128,032.29**	**5.4**	**240,180**
ECM 1	Install LED Fixtures	Yes	230,951	18.3	0.0	$22,860.09	$136,881.79	$10,685.00	$126,196.79	5.5	232,565
ECM 2	Retrofit Fixtures with LED Lamps	Yes	7,562	0.6	0.0	$748.49	$1,865.50	$30.00	$1,835.50	2.5	7,615
Lighting Control Measures			**45,661**	**3.3**	**0.0**	**$4,519.69**	**$17,066.00**	**$1,905.00**	**$15,161.00**	**3.4**	**45,981**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	35,375	2.6	0.0	$3,501.50	$14,466.00	$1,905.00	$12,561.00	3.6	35,622
ECM 4	Install High/Low Lighitng Controls	Yes	10,287	0.7	0.0	$1,018.19	$2,600.00	$0.00	$2,600.00	2.6	10,358
Motor Upgrades			**0**	**0.0**	**0.0**	**$0.00**	**$37,402.68**	**$0.00**	**$37,402.68**	**0.0**	**0**
ECM 5	Premium Efficiency Motors	Yes	0	0.0	0.0	$0.00	$37,402.68	$0.00	$37,402.68	0.0	0
Variable Frequency Drive (VFD) Measures			**101,377**	**24.8**	**0.0**	**$10,034.59**	**$80,135.82**	**$14,200.00**	**$65,935.82**	**6.6**	**102,086**
ECM 6	Install VFDs on Constant Volume (CV) HVAC	Yes	90,326	23.5	0.0	$8,940.66	$68,587.40	$14,200.00	$54,387.40	6.1	90,957
ECM 7	Install VFDs on Chilled Water Pumps	Yes	4,531	0.6	0.0	$448.45	$5,640.11	$0.00	$5,640.11	12.6	4,562
ECM 8	Install VFDs on Hot Water Pumps	Yes	6,521	0.8	0.0	$645.48	$5,908.31	$0.00	$5,908.31	9.2	6,567
Electric Chiller Replacement			**37,176**	**18.3**	**0.0**	**$3,679.74**	**$51,191.05**	**$5,400.00**	**$45,791.05**	**12.4**	**37,436**
ECM 9	Install High Efficiency Chillers	Yes	37,176	18.3	0.0	$3,679.74	$51,191.05	$5,400.00	$45,791.05	12.4	37,436
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**3,971.1**	**$33,621.64**	**$163,767.21**	**$2,000.00**	**$161,767.21**	**4.8**	**464,966**
ECM 10	Install High Efficiency Furnaces	Yes	0	0.0	3,971.1	$33,621.64	$163,767.21	$2,000.00	$161,767.21	4.8	464,966
Domestic Water Heating Upgrade			**0**	**0.0**	**26.6**	**$225.27**	**$93.21**	**$0.00**	**$93.21**	**0.4**	**3,115**
ECM 11	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	26.6	$225.27	$93.21	$0.00	$93.21	0.4	3,115
Plug Load Equipment Control - Vending Machine			**2,821**	**0.0**	**0.0**	**$279.20**	**$460.00**	**$0.00**	**$460.00**	**1.6**	**2,840**
ECM 12	Vending Machine Control	Yes	2,821	0.0	0.0	$279.20	$460.00	$0.00	$460.00	1.6	2,840
TOTALS			**425,547**	**65.4**	**3,997.7**	**$75,968.71**	**$488,863.27**	**$34,220.00**	**$454,643.27**	**6.0**	**896,604**

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

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

Lighting Upgrades generally involve the replacement of existing lighting components such as lamps and ballasts (or the entire fixture) with higher efficiency lighting components. These measure save energy by reducing the power used by the lighting components due to improved electrical efficiency.

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when not needed. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

Motor Upgrades generally involve replacing older standard efficiency motors with high efficiency standard (NEMA Premium). Motors replacements generally assume the same size motors, just higher efficiency. Although occasionally additional savings can be achieved by downsizing motors to better meet current load requirements. This measure saves energy by reducing the power used by the motors, due to improved electrical efficiency.

Variable Frequency Drives (VFDs) are motor control devices. These measures control the speed of a motor so that the motor spins at peak efficiency during partial load conditions. Sensors adapt the speed to flow, temperature, or pressure settings which is much more efficient that usage a valve or damper to control flow rates, or running the motor at full speed when only partial power is needed. These measures save energy by controlling motor usage more efficiently.

Electric Chiller measures generally involve replacing older inefficient hydronic chillers with modern energy efficient systems. New chillers can provide equivalent cooling compared to older chillers at a reduced energy cost. These measures save energy by reducing chiller energy usage, due to improved electrical and heat transfer efficiency.

Gas Heating (HVAC/Process) measures generally involve replacing older inefficient hydronic heating systems with modern energy efficient systems. Gas heating systems can provide equivalent heating compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel demands for heating, due to improved combustion and heat transfer efficiency.

Domestic Hot Water upgrade measures generally involve replacing older inefficient domestic water heating systems with modern energy efficient systems. New domestic hot water heating systems can provide equivalent, or greater, water heating capacity compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel used for domestic hot water heating due to improved heating efficiency or reducing standby losses.

Plug Load Equipment control measures generally involve installing automated devices that limit the power usage or operation of equipment that is plugged into an electric outlets when not in use.

Energy Efficient Practices

TRC also identified 12 low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Newton Ave Bus Garage include:

- Perform Routine Motor Maintenance
- Install Destratification Fans
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Assess Chillers & Request Tune-Ups
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Perform Proper Boiler Maintenance
- Perform Proper Furnace Maintenance
- Perform Proper Water Heater Maintenance
- Perform Maintenance on Compressed Air Systems
- Install Plug Load Controls
- Water Conservation

For details on these energy efficient practices, please refer to Section 5.

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Newton Ave Bus Garage. Based on the configuration of the site and its loads there is a high potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	123	kW DC STC
Electric Generation	146,538	kWh/yr
Displaced Cost	$12,750	/yr
Installed Cost	$319,800	

For details on our evaluation and on-site generation potential, please refer to Section 6.

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, a project implementation plan must be developed. Available capital must be considered and decisions need to be made whether it is best to pursue individual ECMs separately, groups of ECMs, or a comprehensive approach where all ECMs are implemented together, possibly in conjunction with other facility upgrades or improvements.

Rebates, incentives, and financing are available from NJCEP, as well as other sources, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any measure, please review the relevant incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives prior to purchasing materials or commencing with installation.

The ECMs outlined in this report may qualify under the following program(s):

- SmartStart
- Pay for Performance - Existing Building (P4P)
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 are based on the SmartStart program. More details on this program and others are available in Section 8.

Larger facilities with an interest in a more comprehensive whole building approach to energy conservation should consider participating in the Pay for Performance (P4P) program. Projects eligible for this project program must meet minimum savings requirements. Final incentives are calculated based on actual measured performance achieved at the end of the project. The application process is more involved, and it requires working with a qualified P4P contractor, but the process may result in greater energy savings overall and more lucrative incentives, up to 50% of project's total cost.

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (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. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.4 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce 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. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability. By enabling grid operators to call upon commercial facilities to reduce their electric usage 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 DR programs. Program participation is voluntary and facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this program.

Additional information on relevant incentive programs is located in Section 8 or: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Steven Jenks	Manager, Energy and Sustainability	sjenks@njtransit.com	(973) 491-8589
TRC Energy Services			
Vish Nimbalkar	Auditor	VNaikNimbalkar@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On November 16, 2017, TRC performed an energy audit at Newton Ave Bus Garage located in Camden, New Jersey. TRC's team met with Frank Augusto to review the facility operations and help focus our investigation on specific energy-using systems.

Newton Ave Bus Garage is a 135,000 square foot facility constructed in 1991. The building is a two story commercial facility including bus maintenance areas, administration control center, maintenance offices, bus bays, hallways, and locker/rest room areas.

2.3 Building Occupancy

The typical schedule is presented in the table below.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Newton Ave Bus Garage	Weekday	12:00AM to 12:00AM
Newton Ave Bus Garage	Weekend	12:00AM to 12:00AM

2.4 Building Envelope

New Jersey Transit Newton Ave Bus Garage is a two story building. The construction is of concrete masonry block with brick exterior and double pane tinted windows with fixed frames. The flat roof is constructed of built-up roofing material.

Figure 7 – Building Façade

2.5 On-Site Generation

Newton Ave Bus Garage does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

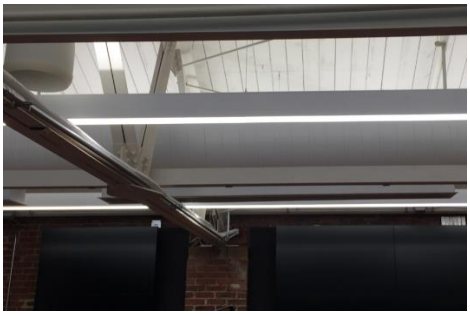
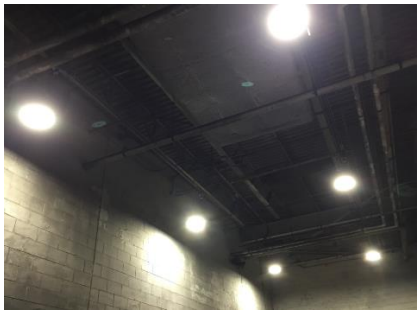
Please see Appendix A: Equipment Inventory & Recommendations for an inventory of the facility's equipment.

Lighting System

Lighting consists mainly of LED fixtures. Interior LED fixtures have linear lamps with lengths varying between 2- and 8-foot. Fixtures have 1-lamp, 2-lamp, and 4-lamp configurations. In addition to the LED fixtures, the facility also has a few linear fluorescent fixtures with 32-Watt T8 linear fluorescent lamps. The facility also has a significant quantity of 150-Watt, 250-Watt, and 400-Watt HPS fixtures, primarily in the shop areas. All the exit signs are LED fixtures. Interior lighting control is provided primarily with manual switches with occupancy sensors in some locations.

Exterior lighting is provided by a combination of 150-Watt HPS, LED and CFL sources. Exterior fixture control is provided by photocells.

Figure 8 - Building Lighting Systems

Linear LED Fixtures	*High Pressure Sodium Fixtures*
	

Chilled Water System

The facility is served by two chilled water systems. One chiller is a 60-ton air cooled scroll chilled with constant speed compressors and second chiller is a 5-ton air cooled scroll chiller. Both the chiller provide chilled water to the air handling units.

Chilled water is circulated by a combination of 0.5 hp, 1.5 hp, and 3 hp chilled water pumps that operate at constant speed.

Figure 9 – Building Chiller Systems

60-Ton Air Cooled Scroll Chiller	*5-Ton Air Cooled Scroll Chiller*
	

Hot Water Heating System

The hot water system consists of two Cleaver Brooks 1,255 kBtu/hr capacity, non-condensing hot water boilers. The boilers have a nominal combustion efficiency of 85%. The boilers are configured in a constant flow primary distribution with a combination of four hot water pumps of sizes 0.8 hp, 1 hp, 1.5 hp, and 5 hp. The boilers provide hot water to air handlers and unit heaters.

The boilers are in good condition and well maintained.

Figure 10 – Hot Water System

Hot Water Boilers	*Hot Water Pump*
	

Air Handling Units

The facility has several air handling units with supply fans and return fans. These units provide cooling with chilled water coils and heating with hot water coils.

Figure 11 – Air Handling Unit

Heating Ventilation and Unit Heater Systems

The facility has several natural gas fired rooftop heating ventilation (HV) units. The HV units operate using 100% outside air and are predominantly used in high bay areas and maintenance spaces with high outside air (ventilation) requirements. The gas fired furnaces at Newton Ave. bus garage have capacities between 365 MBH and 2,045 MBH with operating efficiencies of approximately 78% on average.

There are also several unit heaters at the facility that receive hot water from the boilers for heating the spaces. Unit heater capacities range between 11 MBH and 59 MBH.

Figure 12 – Air Side Heating System

Heating Ventilation Unit	*Unit Heater*
	

Direct Expansion Air Conditioning System (DX)

Selected areas of the facility are served by a rooftop package unit and several split system air source heat pumps. The package unit has a capacity of 4-ton and includes and outside air economizing section. The split systems have capacities between 1.5-ton and 3-ton. Split systems use 100% return air.

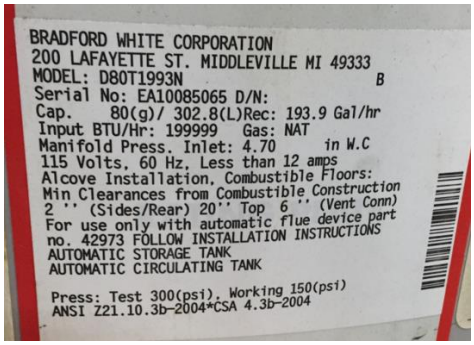
Figure 13 – Direct Expansion AC System

Rooftop Package Unit	*Split Systems*
	

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of one Bradford White gas fired hot water heater with an input rating of 200 kBtu/hr and a nominal efficiency of 80%. The water heater has a 80 gallon storage tank.

Figure 14 – Domestic Hot Water System

Domestic Hot Water Heater	*Water Heater Nameplate*
	

Building Plug Load

Facility has several large process equipment used for bus maintenance and repairs. This includes four air compressors with a combined capacity of 70 hp. Notably, one of the large air compressors is equipped with variable speed drive and controls that provide the means for reduced energy use when operating at part load.

In addition to the air compressors, the facility also has other process equipment such as dryers, blowers, process pumps, process fans, and water supply pumps. All the process equipment combined contributes significantly to the building energy use.

Figure 15 – Process Equipment

Air Compressor	*Air Dryer*
	

2.7 Water-Using Systems

The facility has 20 faucet aerators with a flow capacity of 2.2 gallons per minute (gpm).

3 Site Energy Use and Costs

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. In addition, data for electricity and natural gas was evaluated to determine the annual energy performance metrics for the building in energy cost per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

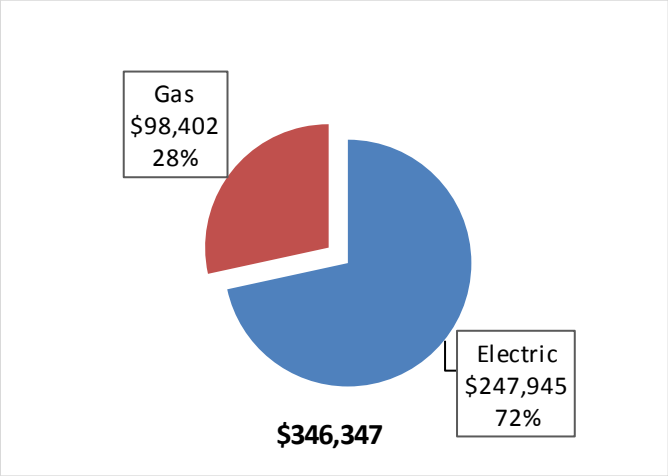
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 16 - Utility Summary

Utility Summary for Newton Ave Bus Garage		
Fuel	**Usage**	**Cost**
Electricity	2,504,935 kWh	$247,945
Natural Gas	116,224 Therms	$98,402
Total		**$346,347**

The current annual energy cost for this facility is $346,347 as shown in the chart below.

Figure 17 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.099/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 18 Electric Usage & Demand

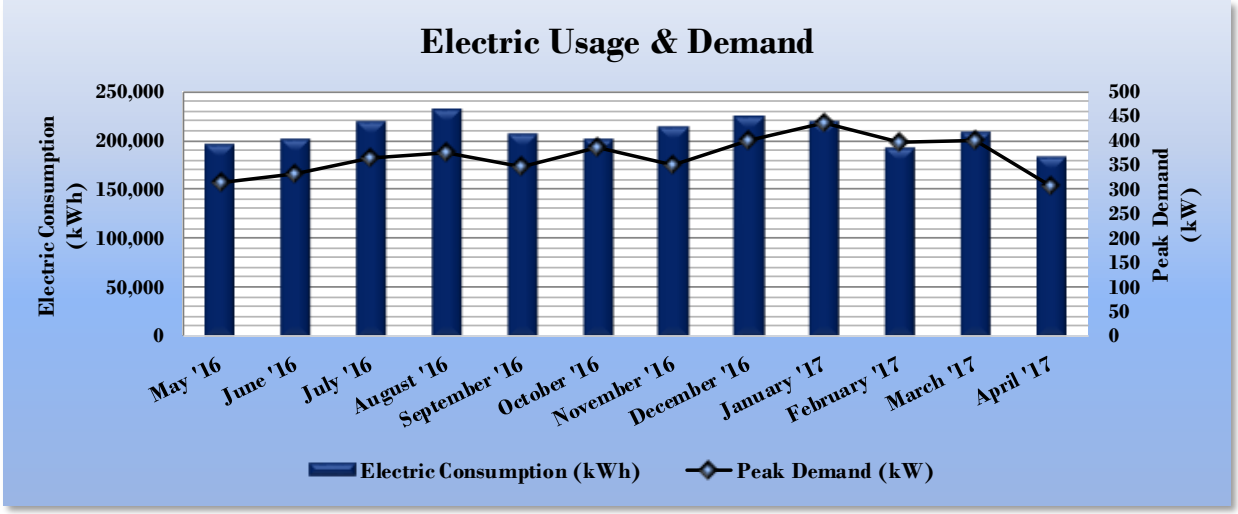


Figure 19 - Electric Usage & Demand

Electric Billing Data for Newton Ave Bus Garage					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost	TRC Estimated Usage?
5/31/16	31	196,245	313	$18,460	No
6/30/16	30	201,312	333	$22,146	No
7/31/16	31	219,948	364	$24,166	No
8/31/16	31	232,017	376	$25,370	No
9/30/16	30	207,143	346	$22,868	No
10/31/16	31	202,332	386	$18,644	No
11/30/16	30	215,052	350	$19,682	No
12/31/16	31	224,505	400	$20,961	No
1/31/17	31	220,570	435	$20,704	No
2/28/17	28	192,602	396	$18,101	No
3/31/17	31	208,734	400	$19,575	No
4/30/17	30	184,475	308	$17,270	No
Totals	**365**	**2,504,935**	**434.9**	**$247,945**	0
Annual	**365**	**2,504,935**	**434.9**	**$247,945**	

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.847/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 20 - Natural Gas Usage

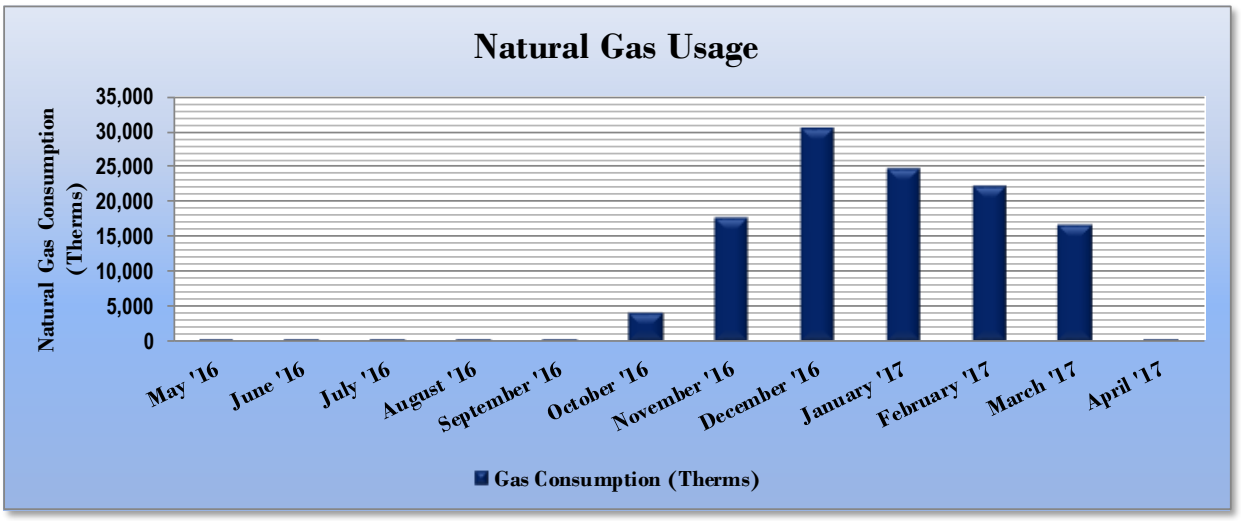


Figure 21 - Natural Gas Usage

Gas Billing Data for Newton Ave Bus Garage			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
6/3/16	30	342	$287
7/5/16	32	47	$132
8/4/16	30	48	$132
9/2/16	29	38	$127
10/3/16	31	43	$130
11/1/16	29	4,050	$6,599
12/2/16	31	17,618	$15,333
1/4/17	33	30,520	$23,647
2/2/17	29	24,707	$19,916
3/6/17	32	22,128	$18,303
4/4/17	29	16,645	$13,768
5/5/17	31	357	$298
Totals	**366**	**116,543**	**$98,672**
Annual	**365**	**116,224**	**$98,402**

3.4 Benchmarking

The facility was benchmarked using *Portfolio Manager®*, an online tool created and managed by the United States Environmental Protection Agency (EPA) through the ENERGY STAR® program. Portfolio Manager® analyzes your building's consumption data, cost information, and operational use details and then compares its performance against a national median for similar buildings of its type. Metrics provided by this analysis are Energy Use Intensity (EUI) and an ENERGY STAR® score for select building types.

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. There is no Statement of Energy Performance (SEP) for this property based on the applicant's request. NJ Transit is working with a 3rd party utility manager to update their web-based platform to include dashboard metrics for each individual building account which can track EUIs over time and other key energy metrics.

The EUI is a measure of a facility's energy consumption per square foot, and it is the standard metric for comparing buildings' energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more or less energy than similar buildings of its type on a square foot basis. 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.

Figure 22 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Newton Ave Bus Garage	National Median Building Type: Garage
Source Energy Use Intensity (kBtu/ft^2)	289.2	123.1
Site Energy Use Intensity (kBtu/ft^2)	149.4	78.8

Implementation of all recommended measures in this report would improve the building's estimated EUI significantly, as shown in the table below:

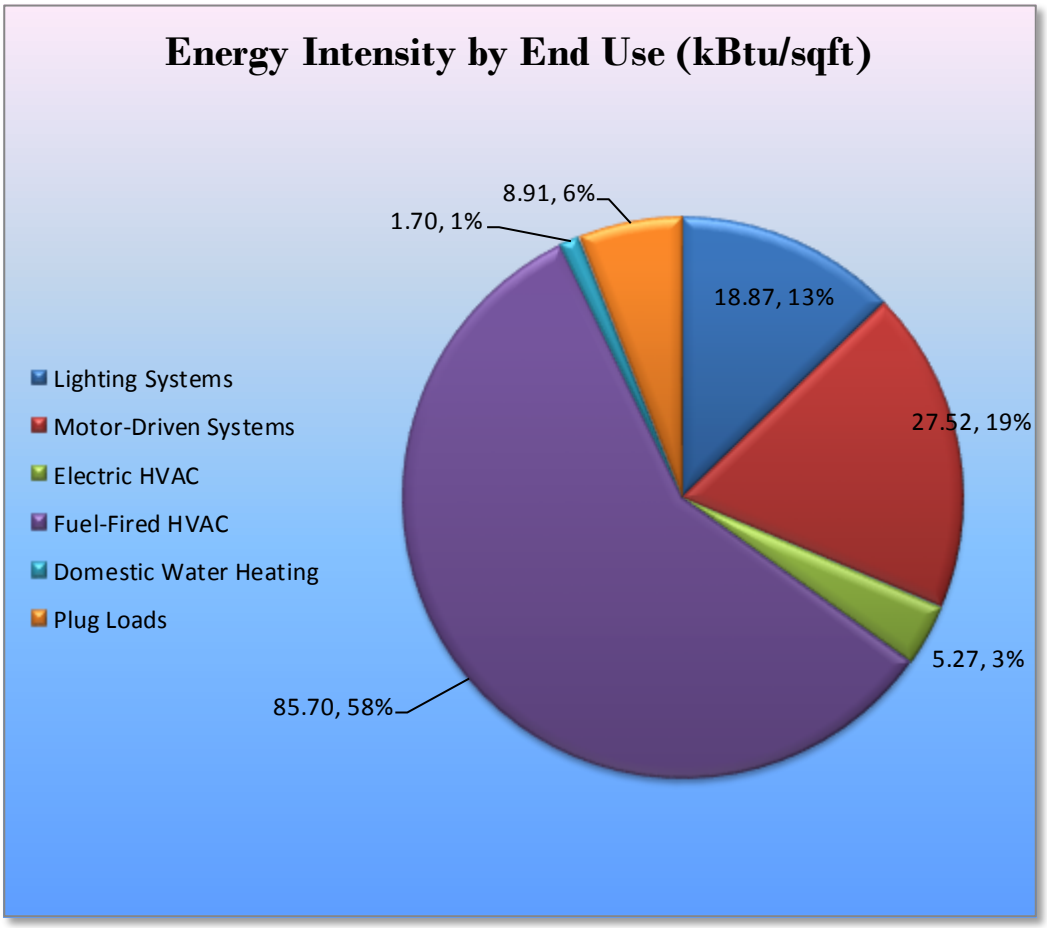
Figure 23 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Newton Ave Bus Garage	National Median Building Type: Garage
Source Energy Use Intensity (kBtu/ft^2)	224.3	123.1
Site Energy Use Intensity (kBtu/ft^2)	109.0	78.8

3.5 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across building systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found in a building to determine their proportional contribution to overall building energy usage. This chart of energy end uses highlights the relative contribution of each equipment category to total energy usage. This can help determine where the greatest benefits might be found from energy efficiency measures.

Figure 24 - Energy Balance (% and kBtu/SF)



4 Energy Conservation Measures

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Newton Ave Bus Garage regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

The measures below have been evaluated by the auditor and are recommended for implementation at the facility.

Figure 25 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**238,512**	**18.9**	**0.0**	**$23,608.58**	**$138,747.29**	**$10,715.00**	**$128,032.29**	**5.4**	**240,180**
ECM 1	Install LED Fixtures	230,951	18.3	0.0	$22,860.09	$136,881.79	$10,685.00	$126,196.79	5.5	232,565
ECM 2	Retrofit Fixtures with LED Lamps	7,562	0.6	0.0	$748.49	$1,865.50	$30.00	$1,835.50	2.5	7,615
Lighting Control Measures		**45,661**	**3.3**	**0.0**	**$4,519.69**	**$17,066.00**	**$1,905.00**	**$15,161.00**	**3.4**	**45,981**
ECM 3	Install Occupancy Sensor Lighting Controls	35,375	2.6	0.0	$3,501.50	$14,466.00	$1,905.00	$12,561.00	3.6	35,622
ECM 4	Install High/Low Lighitng Controls	10,287	0.7	0.0	$1,018.19	$2,600.00	$0.00	$2,600.00	2.6	10,358
Motor Upgrades		**0**	**0.0**	**0.0**	**$0.00**	**$37,402.68**	**$0.00**	**$37,402.68**	**0.0**	**0**
ECM 5	Premium Efficiency Motors	0	0.0	0.0	$0.00	$37,402.68	$0.00	$37,402.68	0.0	0
Variable Frequency Drive (VFD) Measures		**101,377**	**24.8**	**0.0**	**$10,034.59**	**$80,135.82**	**$14,200.00**	**$65,935.82**	**6.6**	**102,086**
ECM 6	Install VFDs on Constant Volume (CV) HVAC	90,326	23.5	0.0	$8,940.66	$68,587.40	$14,200.00	$54,387.40	6.1	90,957
ECM 7	Install VFDs on Chilled Water Pumps	4,531	0.6	0.0	$448.45	$5,640.11	$0.00	$5,640.11	12.6	4,562
ECM 8	Install VFDs on Hot Water Pumps	6,521	0.8	0.0	$645.48	$5,908.31	$0.00	$5,908.31	9.2	6,567
Electric Chiller Replacement		**37,176**	**18.3**	**0.0**	**$3,679.74**	**$51,191.05**	**$5,400.00**	**$45,791.05**	**12.4**	**37,436**
ECM 9	Install High Efficiency Chillers	37,176	18.3	0.0	$3,679.74	$51,191.05	$5,400.00	$45,791.05	12.4	37,436
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**3,971.1**	**$33,621.64**	**$163,767.21**	**$2,000.00**	**$161,767.21**	**4.8**	**464,966**
ECM 10	Install High Efficiency Furnaces	0	0.0	3,971.1	$33,621.64	$163,767.21	$2,000.00	$161,767.21	4.8	464,966
Domestic Water Heating Upgrade		**0**	**0.0**	**26.6**	**$225.27**	**$93.21**	**$0.00**	**$93.21**	**0.4**	**3,115**
ECM 11	Install Low-Flow Domestic Hot Water Devices	0	0.0	26.6	$225.27	$93.21	$0.00	$93.21	0.4	3,115
Plug Load Equipment Control - Vending Machine		**2,821**	**0.0**	**0.0**	**$279.20**	**$460.00**	**$0.00**	**$460.00**	**1.6**	**2,840**
ECM 12	Vending Machine Control	2,821	0.0	0.0	$279.20	$460.00	$0.00	$460.00	1.6	2,840
TOTALS		**425,547**	**65.4**	**3,997.7**	**$75,968.71**	**$488,863.27**	**$34,220.00**	**$454,643.27**	**6.0**	**896,604**

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

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

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 26 below.

Figure 26 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**238,512**	**18.9**	**0.0**	**$23,608.58**	**$138,747.29**	**$10,715.00**	**$128,032.29**	**5.4**	**240,180**
ECM 1	Install LED Fixtures	230,951	18.3	0.0	$22,860.09	$136,881.79	$10,685.00	$126,196.79	5.5	232,565
ECM 2	Retrofit Fixtures with LED Lamps	7,562	0.6	0.0	$748.49	$1,865.50	$30.00	$1,835.50	2.5	7,615

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	207,571	15.0	0.0	$20,545.97	$118,540.80	$8,400.00	$110,140.80	5.4	209,023
Exterior	23,379	3.4	0.0	$2,314.13	$18,340.99	$2,285.00	$16,055.99	6.9	23,543

Measure Description

We recommend replacing existing fixtures containing high pressure sodium lamps with new high performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a high pressure sodium lamp.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	7,562	0.6	0.0	$748.49	$1,865.50	$30.00	$1,835.50	2.5	7,615
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing T8 linear fluorescent and U-type fluorescent lighting technologies with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tube.

4.1.2 Lighting Control Measures

Our recommendations for lighting control measures are summarized in Figure 27 below.

Figure 27 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**45,661**	**3.3**	**0.0**	**$4,519.69**	**$17,066.00**	**$1,905.00**	**$15,161.00**	**3.4**	**45,981**
ECM 3	Install Occupancy Sensor Lighting Controls	35,375	2.6	0.0	$3,501.50	$14,466.00	$1,905.00	$12,561.00	3.6	35,622
ECM 4	Install High/Low Lighitng Controls	10,287	0.7	0.0	$1,018.19	$2,600.00	$0.00	$2,600.00	2.6	10,358

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
35,375	2.6	0.0	$3,501.50	$14,466.00	$1,905.00	$12,561.00	3.6	35,622

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in all training rooms, storage, locker rooms, offices areas, etc. Lighting sensors detect occupancy using ultrasonic and/or infrared sensors. For most spaces, we recommend lighting controls use dual technology sensors, which can eliminate the possibility of any lights turning off unexpectedly. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Some controls also provide dimming options and all modern occupancy controls can be easily over-ridden by room occupants to allow them to manually turn fixtures on or off, as desired. Energy savings results from only operating lighting systems when they are required.

Occupancy sensors may be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are recommended for single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in locations without local switching or where wall switches are not in the line-of-sight of the main work area and in large spaces. We recommend a comprehensive approach to lighting design that upgrades both the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 4: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
10,287	0.7	0.0	$1,018.19	$2,600.00	$0.00	$2,600.00	2.6	10,358

Measure Description

We recommend installing 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. Typical areas for such lighting control are stairwells, interior corridors, parking lots, and parking garages.

Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. The lighting systems are switched to full lighting levels whenever an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period of time. Energy savings results from only providing full lighting levels when it is required.

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

Additional savings from reduced lighting maintenance may also result from this measure, due to reduced lamp operation.

4.1.3 Motor Upgrades

Our recommendations for motor upgrade measures are summarized in Figure 28 below.

Figure 28 – Summary of Motor Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**0**	**0.0**	**0.0**	**$0.00**	**$37,402.68**	**$0.00**	**$37,402.68**	**0.0**	**0**
ECM 5	Premium Efficiency Motors	0	0.0	0.0	$0.00	$37,402.68	$0.00	$37,402.68	0.0	0

ECM 5: Premium Efficiency Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	0.0	$0.00	$37,402.68	$0.00	$37,402.68	0.0	0

Measure Description

We recommend replacing standard efficiency motors with *NEMA Premium™* efficiency motors. Our evaluation assumes that existing motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor's current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016)*. Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

4.1.4 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 29 below.

Figure 29 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**101,377**	**24.8**	**0.0**	**$10,034.59**	**$80,135.82**	**$14,200.00**	**$65,935.82**	**6.6**	**102,086**
ECM 6	Install VFDs on Constant Volume (CV) HVAC	90,326	23.5	0.0	$8,940.66	$68,587.40	$14,200.00	$54,387.40	6.1	90,957
ECM 7	Install VFDs on Chilled Water Pumps	4,531	0.6	0.0	$448.45	$5,640.11	$0.00	$5,640.11	12.6	4,562
ECM 8	Install VFDs on Hot Water Pumps	6,521	0.8	0.0	$645.48	$5,908.31	$0.00	$5,908.31	9.2	6,567

ECM 6: Install VFDs on Constant Volume (CV) HVAC

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
90,326	23.5	0.0	$8,940.66	$68,587.40	$14,200.00	$54,387.40	6.1	90,957

Measure Description

We recommend installing variable frequency drives (VFDs) to control supply fan motor speeds to convert 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 will cause the VFD to modulate fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature. Energy savings results from reducing fan speed (and power) when there is a reduced load required for the zone. The magnitude of energy savings is based on the estimated amount of time that fan motors operate at partial load.

VAV systems should not be controlled such that the supply air temperature is raised 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.

ECM 7: Install VFDs on Chilled Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
4,531	0.6	0.0	$448.45	$5,640.11	$0.00	$5,640.11	12.6	4,562

Measure Description

We recommend installing a variable frequency drives (VFD) to control chilled water pumps. This measure requires that chilled water coils be served by 2-way valves and that a differential pressure sensor be installed in the chilled water loop. As the chilled water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as chilled water valves close. The magnitude of energy savings is based on the estimated amount of time that the system operates at reduced loads.

For systems with variable chilled water flow through the chiller, the minimum flow to prevent the chiller from tripping off will have to be determined during the final project design. The control system should be programmed to maintain the minimum flow through the chiller and to prevent pump cavitation.

ECM 8: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
6,521	0.8	0.0	$645.48	$5,908.31	$0.00	$5,908.31	9.2	6,567

Measure Description

We recommend installing a variable frequency drives (VFD) to control a hot water pumps. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.1.5 Electric Chiller Replacement

Our recommendations for electric chiller replacement measures are summarized in Figure 30 below.

Figure 30 – Summary of Electric Chiller Replacement ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Chiller Replacement		**37,176**	**18.3**	**0.0**	**$3,679.74**	**$51,191.05**	**$5,400.00**	**$45,791.05**	**12.4**	**37,436**
ECM 9	Install High Efficiency Chillers	37,176	18.3	0.0	$3,679.74	$51,191.05	$5,400.00	$45,791.05	12.4	37,436

ECM 9: Install High Efficiency Chillers

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
37,176	18.3	0.0	$3,679.74	$51,191.05	$5,400.00	$45,791.05	12.4	37,436

Measure Description

We recommend replacing 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. 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.

The savings result from the improvement in chiller efficiency and matching the right type of chiller to the cooling load. The energy savings associated with this measure is 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. Energy savings are maximized by proper selection of new equipment based on the cooling load profile.

4.1.6 Gas-Fired Heating System Replacements

Our recommendations for gas-fired heating system replacements are summarized in Figure 31 below.

Figure 31 - Summary of Gas-Fired Heating Replacement ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**3,971.1**	**$33,621.64**	**$163,767.21**	**$2,000.00**	**$161,767.21**	**4.8**	**464,966**
ECM 10	Install High Efficiency Furnaces	0	0.0	3,971.1	$33,621.64	$163,767.21	$2,000.00	$161,767.21	4.8	464,966

ECM 10: Install High Efficiency Furnaces

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	3,971.1	$33,621.64	$163,767.21	$2,000.00	$161,767.21	4.8	464,966

Measure Description

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

4.1.7 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 32 below.

Figure 32 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**26.6**	**$225.27**	**$93.21**	**$0.00**	**$93.21**	**0.4**	**3,115**
ECM 11	Install Low-Flow Domestic Hot Water Devices	0	0.0	26.6	$225.27	$93.21	$0.00	$93.21	0.4	3,115

ECM 11: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	26.6	$225.27	$93.21	$0.00	$93.21	0.4	3,115

Measure Description

We recommend installing low-flow domestic hot water devices to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators can reduce hot water usage, relative to standard aerators, which saves energy.

Low-flow devices reduce the overall water flow from the fixture, while still adequate pressure for washing. This reduces the amount of water used per day resulting in energy and water savings.

4.1.8 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment control measures are summarized in Figure 33 below.

Figure 33 - Summary of Plug Load Equipment Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine		**2,821**	**0.0**	**0.0**	**$279.20**	**$460.00**	**$0.00**	**$460.00**	**1.6**	**2,840**
ECM 12	Vending Machine Control	2,821	0.0	0.0	$279.20	$460.00	$0.00	$460.00	1.6	2,840

ECM 12: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
2,821	0.0	0.0	$279.20	$460.00	$0.00	$460.00	1.6	2,840

Measure Description

Vending machines operate continuously, even during non-business hours. It is recommended to install occupancy sensor controls to reduce the energy use. These controls power down vending machines when the vending machine area has been vacant for some time, then power up at regular intervals, as needed, to turn machine lights on or keep the product cool. Energy savings are a dependent on vending machine and activity level in the area surrounding the machines.

5 ENERGY EFFICIENT PRACTICES

In addition to the quantifiable savings estimated in Section 4, a facility's energy performance can also be improved through application of many low cost or no-cost energy efficiency strategies. By employing certain behavioral and operational changes and performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and energy and O&M costs can be reduced. The recommendations below are provided as a framework for developing a whole building maintenance plan that is customized to your facility. Consult with qualified equipment specialists for details on proper maintenance and system operation.

Perform Routine Motor Maintenance

Motors consist of many moving parts whose collective degradation can contribute to a significant loss of motor efficiency. In order to prevent damage to motor components, routine maintenance should be performed. This maintenance consists of 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.

Install Destratification Fans

Allowing air to thermally stratify in spaces with high ceilings results in additional energy consumption by requiring the heating system to heat a volume of space much larger than the actual occupied space. Additional inefficiencies also occur because there are higher temperatures at the ceiling level than at the floor level. Higher temperatures at the ceiling accelerate heat loss through the roof, requiring additional energy consumption by the heating equipment in order to compensate for the accelerated heat transfer.

Destratification fans are specially designed to deliver a columnar, laminar flow of air balancing the air temperature from floor to ceiling. In addition to fuel savings, the use of destratification fans will reduce the recovery time necessary to warm the space after nightly temperature setbacks and will increase the comfort level of the occupants.

Practice Proper Use of Thermostat Schedules and Temperature Resets

Ensure thermostats are correctly set back. By employing proper set back temperatures and schedules, facility heating and cooling costs can be reduced dramatically during periods of low or no occupancy. As such, thermostats should be programmed for a setback of 5-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced further 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.

Assess Chillers & Request Tune-Ups

Chillers are responsible for a substantial portion of a commercial building's overall energy usage. When components of a chiller are not optimized, this can quickly result in a noticeable increase in energy bills. Chiller diagnostics can produce a 5% to 10% cost avoidance potential from discovery and implementation of low/no cost optimization strategies.

Clean Evaporator/Condenser Coils on AC Systems

Dirty evaporators and condensers coils cause a restriction to air flow and restrict heat transfer. This results in increased evaporator and condenser fan load and a decrease in cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

Clean and/or Replace HVAC Filters

Air filters work to reduce the amount of indoor air pollution and increase occupant comfort. Over time, filters become less and less effective as particulate buildup increases. In addition to health concerns related to clogged filters, filters that have reached saturation also restrict air flow through the facility's air conditioning or heat pump system, increasing the load on the distribution fans and decreasing occupant comfort levels. Filters should be checked monthly and cleaned or replaced when appropriate.

Perform Proper Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to retain proper functionality and efficiency of the heating system. Fuel burning equipment should undergo yearly tune-ups to ensure they are operating as safely and efficiently as possible from a combustion standpoint. A tune-up should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely. Buildup of dirt, dust, or deposits on the internal surfaces of a boiler can greatly affect its heat transfer efficiency. These deposits can accumulate on the water side or fire side of the boiler. Boilers should be cleaned regularly according to the manufacturer's instructions to remove this build up in order to sustain efficiency and equipment life.

Perform Proper Furnace Maintenance

Preventative furnace 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 include tasks such as checking for gas / carbon monoxide leaks; changing the air and fuel filters; checking components for cracks, corrosion, dirt, or debris build-up; ensuring the ignition system is working properly; testing and adjusting operation and safety controls; inspecting the electrical connections; and ensuring proper lubrication for motors and bearings.

Perform Proper Water Heater Maintenance

At least once a year, 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. Once a year check for any leaks or heavy corrosion on the pipes and valves. For gas water heaters, check the draft hood and make sure it is placed properly, with a few inches of air space between the tank and where it connects to the vent. Look for any 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 any 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 over three to four years old have a technician inspect the sacrificial anode annually.

Perform Maintenance on Compressed Air Systems

Like all electro-mechanical equipment, compressed air systems require periodic maintenance to operate at peak efficiency. A maintenance plan should be developed for process related compressed air systems to 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, checking for system leaks and adjustment of loose connections, and overall system cleaning. Contact a qualified technician for help with setting up periodic maintenance schedule.

Plug Load Controls

There are a variety of ways to limit the energy use of plug loads including increasing occupant awareness, removing under-utilized equipment, installing hardware controls, and using software controls. Some control steps to take are to enable the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips. For additional information refer to "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.

Water Conservation

Installing low-flow faucets or faucet aerators, low-flow showerheads, and kitchen sink pre-rinse spray valves saves both energy and water. These devices save energy by reducing the overall amount of hot water used hence reducing the energy used to heat the water. The flow ratings for EPA WaterSense™ (http://www3.epa.gov/watersense/products) labeled devices are 1.5 gpm for bathroom faucets, 2.0 gpm for showerheads, and 1.28 gpm for pre-rinse spray valves.

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. 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. The EPA WaterSense™ ratings for urinals is 0.5 gallons per flush (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

Refer to Section 4.1.7 for any low-flow ECM recommendations.

6 On-Site Generation Measures

On-site generation measure options include both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) on-site technologies that generate power to meet all or a portion of the electric energy needs of a facility, often repurposing any waste heat where applicable. Also referred to as distributed generation, these systems contribute to Greenhouse Gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, resulting in the electric system reliability through improved transmission and distribution system utilization.

The State of New Jersey's Energy Master Plan (EMP) encourages new distributed generation of all forms and specifically focuses on expanding use of combined heat and power (CHP) by reducing financial, regulatory and technical barriers and identifying opportunities for new entries. The EMP also outlines a goal of 70% of the State's electrical needs to be met by renewable sources by 2050.

Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at 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.

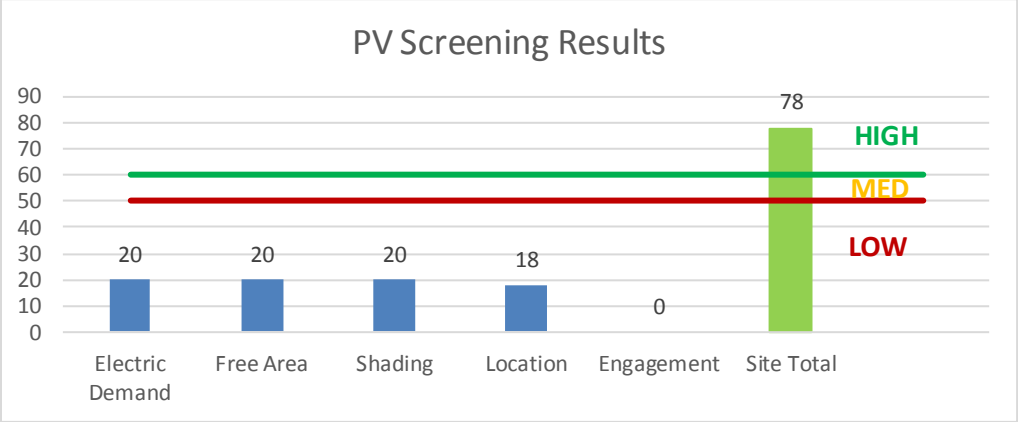
6.1 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility's electrical distribution system. The amount of unobstructed area available determines how large of a solar array can be installed. The size of the array combined with the orientation, tilt, and shading elements determines the energy produced.

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

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the high potential for PV at the site. A PV array located on the roof of the building may be feasible. If Newton Ave Bus Garage is interested in pursuing the installation of PV, we recommended a full feasibility

Figure 34 - Photovoltaic Screening



Potential	High	
System Potential	123	kW DC STC
Electric Generation	146,538	kWh/yr
Displaced Cost	$12,750	/yr
Installed Cost	$319,800	

Solar projects must register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about developed new solar projects and insight into future SREC pricing. Refer to Section 8.3 for additional information.

For more information on solar PV technology and commercial solar markets in New Jersey, or to find a qualified solar installer, who can provide a more detailed assessment of the specific costs and benefits of solar develop of the site, please visit the following links below:

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

6.2 Combined Heat and Power

Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for the purpose of space cooling. The key criteria used for screening, however, is the amount of time the system operates at full load and the facility's ability to use the recovered heat. Facilities with continuous use 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 a Low potential for installing a cost-effective CHP system.

7 DEMAND RESPONSE

Demand Response (DR) is a program designed to reduce the electric load of commercial facilities when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. Demand Response service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability.

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities to reduce electric usage 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 DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail their electric usage.

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

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

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

The first step toward participation in a DR program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (http://www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR program information.

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

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 35 for a list of the eligible programs identified for each recommended ECM.

Figure 35 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	X			X		
ECM 2	Retrofit Fixtures with LED Lamps	X			X		
ECM 3	Install Occupancy Sensor Lighting Controls	X			X		
ECM 4	Install High/Low Lighitng Controls				X		
ECM 5	Premium Efficiency Motors				X		
ECM 6	Install VFDs on Constant Volume (CV) HVAC	X			X		
ECM 7	Install VFDs on Chilled Water Pumps	X			X		
ECM 8	Install VFDs on Hot Water Pumps	X			X		
ECM 9	Install High Efficiency Chillers	X			X		
ECM 10	Install High Efficiency Furnaces	X			X		
ECM 11	Install Low-Flow Domestic Hot Water Devices				X		
ECM 12	Vending Machine Control	X			X		

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities that can bundle multiple ECMs together. This can greatly simplify participation and may lead to higher incentive amounts, but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption. LEUP applicants can use in-house staff or a preferred contractor.

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized because it provides a consistent basis for comparison of available incentives for various measures, though in many cases incentive amounts may be higher through participation in other programs.

Brief descriptions of all relevant financing and incentive programs are located in the sections below. Further information, including most current program availability, requirements, and incentive levels can be found at: www.njcleanenergy.com/ci.

8.1 SmartStart

Overview

The SmartStart program offers incentives for installing prescriptive and custom energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives from year to year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers
Electric Unitary HVAC
Gas Cooling
Gas Heating
Gas Water Heating
Ground Source Heat Pumps
Lighting
Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment
Variable Frequency Drives

Most equipment sizes and types are served by this program. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades.

Incentives

The SmartStart prescriptive incentive program provides fixed incentives for specific energy efficiency measures, whereas the custom SmartStart program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentive offerings for specific devices.

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, capped at 50% of the total installed incremental project cost, or a project cost buy down to a one year payback (whichever is less). Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

To participate in the SmartStart program you will need to submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. Applicants may work with a contractor of their choosing and can also utilize internal personnel, which provides added flexibility to the program. Using internal personnel also helps improve the economics of the ECM by reducing the labor cost that is included in the tables in this report.

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

8.2 Pay for Performance - Existing Buildings

Overview

The Pay for Performance – Existing Buildings (P4P EB) program is designed for larger customers with a peak demand over 200 kW in any of the preceding 12 months. Under this program the minimum installed scope of work must include at least two unique measures resulting in at least 15% energy savings, where lighting cannot make up the majority of the savings. P4P is a generally a good option for medium to large sized facilities looking to implement as many measures as possible under a single project in order to achieve deep energy savings. This program has an added benefit of evaluating a broad spectrum of measures that may not otherwise qualify under other programs. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also utilize the P4P program.

Incentives

Incentives are calculated based on estimated and achieved energy savings ranging from $0.18-$0.22/kWh and $1.80-$2.50/therm, capped at the lesser of 50% total project cost, or $1 million per electric account and $1 million per natural gas account, per fiscal year, not to exceed $2 million per project. An incentive of $0.15/square foot is also available to offset the cost of developing the Energy Reduction Plan (see below) contingent on the project moving forward with measure installation.

How to Participate

To participate in the P4B EB program you will need to contact one of the pre-approved consultants and contractors ("Partners"). Under direct contract to you, the Partner will help further evaluate the measures identified in this report through development of the Energy Reduction Plan (ERP), assist you in implementing selected measures, and verify actual savings one year after the installation. At each of these three milestones your Partner will also facilitate securing program incentives.

Approval of the final scope of work is required by the program prior to installation completion. Although installation can be accomplished by a contractor of your choice (some P4P Partners are also contractors) or by internal personnel, the Partner must remain involved to ensure compliance with the program guidelines and requirements.

Detailed program descriptions, instructions for applying, applications and list of Partners can be found at: www.njcleanenergy.com/P4P.

8.3 SREC Registration Program

The SREC (Solar Renewable Energy Certificate) Registration Program (SRP) is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SRP prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about the pipeline of anticipated new solar capacity and insight into future SREC pricing.

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number which enables it to generate New Jersey SRECs. SREC's are generated once the solar project has been authorized to be energized by the Electric Distribution Company (EDC).

Each time a solar installation generates 1,000 kilowatt-hours (kWh) of electricity, an SREC is earned. Solar project owners report the energy production to the SREC Tracking System. This reporting allows SREC's to be placed in the customer's electronic account. SRECs can then be sold on the SREC Tracking System, providing revenue for the first 15 years of the project's life.

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar RPS. One way they can meet the RPS requirements is by purchasing SRECs. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period can and will fluctuate depending on supply and demand.

Information about the SRP can be found at: www.njcleanenergy.com/srec.

8.4 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. An ESIP is a type of "performance contract," whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. This is done in a manner that ensures that annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive in year one, and every year thereafter. 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 can be leveraged to help further reduce the total project cost of eligible measures.

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 utilized for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

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

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

Please note that ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you may utilize NJCEP incentive programs to help further reduce costs when developing the ESP. You should refer to the ESIP guidelines at the link above for further information and guidance on next steps.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third party (i.e. non-utility) energy supplier.

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

If your facility is not purchasing electricity from a third party supplier, consider shopping for a reduced rate from third party electric suppliers. If your facility is purchasing electricity from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party electric suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

9.2 Retail Natural Gas Supply Options

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

A customer's decision about whether to buy natural gas from a retail supplier is typically dependent upon whether a customer seeks 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 is not purchasing natural gas from a third party supplier, consider shopping for a reduced rate from third party natural gas suppliers. If your facility is purchasing natural gas from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party natural gas suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: 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	Watts per Fixture	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Maintenance Area	4	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	8,760	None	Yes	4	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	6,132	0.06	787	0.0	$77.91	$270.00	$35.00	3.02
Maintenance Area	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,760	None	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,132	0.01	79	0.0	$7.85	$270.00	$35.00	29.95
Boiler Room	12	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	8,736	None	No	12	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Maintenance Lobby	8	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,760	None	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,132	0.05	722	0.0	$71.42	$270.00	$35.00	3.29
Closet	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Stairwell	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	10	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,115	0.06	790	0.0	$78.24	$200.00	$0.00	2.56
Interview Room	7	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	7	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.05	630	0.0	$62.32	$270.00	$35.00	3.77
Hallway	23	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	23	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,115	0.13	1,818	0.0	$179.95	$400.00	$0.00	2.22
Hallway	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Men's Locker Room	22	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	22	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Men's Locker 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	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Men's Locker Room Hallway	9	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	9	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	6,115	0.06	810	0.0	$80.13	$200.00	$0.00	2.50
Women's Locker Room	22	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	22	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Women's Locker 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	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Women's Locker Room Hallway	9	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	9	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	6,115	0.06	810	0.0	$80.13	$200.00	$0.00	2.50
Hallway Room 430	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway Room 430	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 431 Training	16	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	16	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.10	1,439	0.0	$142.45	$540.00	$70.00	3.30
Electrical Room	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,736	None	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,115	0.01	158	0.0	$15.65	$270.00	$35.00	15.02
Room 428 Safety Office	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 419 Training	17	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	17	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.11	1,529	0.0	$151.35	$540.00	$70.00	3.11
Room 420 Storage	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Locker Room	11	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	11	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.07	989	0.0	$97.93	$540.00	$70.00	4.80
Driver Break Room	49	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	49	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Driver Break Room 416	12	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	12	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.08	1,079	0.0	$106.84	$540.00	$70.00	4.40

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Quiet Room	6	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.04	540	0.0	$53.42	$270.00	$35.00	4.40
Ladies R.R.	5	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.03	450	0.0	$44.52	$270.00	$35.00	5.28
Ladies R.R.	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,115	0.01	79	0.0	$7.82	$270.00	$35.00	30.04
Men's Restroom	9	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	9	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.06	810	0.0	$80.13	$270.00	$35.00	2.93
Men's Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,115	0.01	79	0.0	$7.82	$270.00	$35.00	30.04
Conference Rom 404	8	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.05	720	0.0	$71.22	$270.00	$35.00	3.30
Supervisor Room 403	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Open Office	25	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	25	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Men's R.R.	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,736	None	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Electrical Room	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	8,736	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.15	2,121	0.0	$209.90	$495.20	$20.00	2.26
Vault Room	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Manager Room 402	6	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.04	540	0.0	$53.42	$270.00	$35.00	4.40
Server Room	9	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	8,736	Relamp	No	9	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.17	2,371	0.0	$234.72	$568.80	$0.00	2.42
Stairwell Lunch Room	16	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	16	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	6,115	0.10	1,439	0.0	$142.45	$200.00	$0.00	1.40
Stairwell Lunch Room	1	LED Screw-In Lamps: Screw-In (100W) 1L	Wall Switch	100	8,736	None	Yes	1	LED Screw-In Lamps: Screw-In (100W) 1L	High/Low Control	100	6,115	0.02	273	0.0	$26.98	$200.00	$0.00	7.41
Uniform Storage Room 315	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	6,115	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,115	0.06	630	0.0	$62.32	$175.50	$30.00	2.33
Foreman Office	20	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	20	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.13	1,799	0.0	$178.06	$232.00	$40.00	1.08
Hallway	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	11	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,115	0.06	869	0.0	$86.06	$200.00	$0.00	2.32
Men's Restroom	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	None	No	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Women's Restroom	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	None	No	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Foreman Locker Room	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage Room 320	1	Linear Fluorescent - T8: 8' T8 (59W) - 2L	Wall Switch	110	8,736	Relamp	Yes	1	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	6,115	0.04	541	0.0	$53.60	$226.00	$20.00	3.84
Lunch Room	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,115	0.06	790	0.0	$78.24	$270.00	$35.00	3.00
Radio Room	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,115	0.07	949	0.0	$93.89	$540.00	$70.00	5.01
Radio Room	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 326	8	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.05	720	0.0	$71.22	$270.00	$35.00	3.30
Stairwell	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,115	0.07	1,028	0.0	$101.71	$200.00	$0.00	1.97
Shop Floor Inspection Area	13	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,115	None	No	13	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,115	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Shop Floor Inspection Area	6	LED Screw-In Lamps: Screw-In (100W) 1L	Wall Switch	100	8,736	None	No	6	LED Screw-In Lamps: Screw-In (100W) 1L	Wall Switch	100	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Shop Floor Inspection Area	28	High-Pressure Sodium: (1) 250W Lamp	Wall Switch	295	8,736	Fixture Replacement	No	28	LED - Fixtures: Parking Garage Fixture	Wall Switch	89	8,736	3.79	52,532	0.0	$5,199.76	$39,513.60	$2,800.00	7.06
Shop Floor Inspection Area	50	High-Pressure Sodium: (1) 400W Lamp	Wall Switch	465	8,736	Fixture Replacement	No	50	LED - Fixtures: Parking Garage Fixture	Wall Switch	140	8,736	10.66	147,866	0.0	$14,636.12	$70,560.00	$5,000.00	4.48
Shop Floor Pit	42	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	42	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Bus Bay A	22	LED - Linear Tubes: (1) 5' Lamp	Wall Switch	200	8,736	None	No	22	LED - Linear Tubes: (1) 5' Lamp	Wall Switch	200	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Bus Bay B, C, D	52	LED - Linear Tubes: (1) 5' Lamp	Wall Switch	200	8,736	None	No	52	LED - Linear Tubes: (1) 5' Lamp	Wall Switch	200	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Wash Area	22	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,736	None	No	22	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Wash Area	6	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	8,736	Fixture Replacement	No	6	LED - Fixtures: Parking Garage Fixture	Wall Switch	56	8,736	0.52	7,174	0.0	$710.09	$8,467.20	$600.00	11.08
Water Reclaim	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,115	0.05	632	0.0	$62.59	$270.00	$35.00	3.75
Water Separator	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Vault Room	12	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	12	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.08	1,079	0.0	$106.84	$540.00	$70.00	4.40
Restroom	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Foreman Room	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	8,736	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.15	2,121	0.0	$209.90	$495.20	$20.00	2.26
Steam Room	6	LED - Fixtures: High-Bay	Wall Switch	100	8,736	None	No	6	LED - Fixtures: High-Bay	Wall Switch	100	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Oil Room	4	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	8,736	None	Yes	4	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	6,115	0.06	785	0.0	$77.70	$270.00	$35.00	3.02
Tool Room	4	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	8,736	None	No	4	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Parts Room	45	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	8,736	None	No	45	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Parts Room	4	LED - Linear Tubes: (2) 3' Lamps	Wall Switch	21	8,736	None	No	4	LED - Linear Tubes: (2) 3' Lamps	Wall Switch	21	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Stairwell	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,115	0.02	316	0.0	$31.30	$200.00	$0.00	6.39
Admin AHU Room	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,115	0.10	1,423	0.0	$140.83	$540.00	$70.00	3.34
Admin Stairway	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,115	0.04	553	0.0	$54.77	$200.00	$0.00	3.65

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Admin Office Room 215	6	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.04	540	0.0	$53.42	$116.00	$20.00	1.80
Admin Lunch Room	14	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	14	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.09	1,259	0.0	$124.64	$540.00	$70.00	3.77
Admin Hallway 2nd Floor	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,115	0.07	1,028	0.0	$101.71	$200.00	$0.00	1.97
Admin Hallway 2nd Floor	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Hallway 2nd Floor	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	8,736	None	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Control Room 219	4	LED - Fixtures: Other	Wall Switch	100	8,736	None	No	4	LED - Fixtures: Other	Wall Switch	100	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin 219C	9	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	100	8,736	None	Yes	9	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	100	6,115	0.18	2,453	0.0	$242.81	$270.00	$35.00	0.97
Admin 219D	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	100	8,736	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	100	6,115	0.04	545	0.0	$53.96	$270.00	$35.00	4.36
Admin 219D	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	8,736	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.08	1,054	0.0	$104.32	$252.80	$0.00	2.42
Admin 219A	7	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	7	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.05	630	0.0	$62.32	$270.00	$35.00	3.77
Admin Men's Restroom	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Men's Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin File Room	3	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	3	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Women's Restroom	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Women's Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Claims Dept.	14	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	14	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.09	1,259	0.0	$124.64	$540.00	$70.00	3.77
Admin Claims Dept.	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,115	0.07	949	0.0	$93.89	$540.00	$70.00	5.01
Admin Room 211A	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,736	None	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Conference Rom	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Control Center	12	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	12	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Control Center	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Room 118	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Room 118	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Room 121	12	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	12	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.08	1,079	0.0	$106.84	$540.00	$70.00	4.40
Admin Room 119	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Admin Bernice Office	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Bernice Office	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Hallway	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,115	0.04	553	0.0	$54.77	$200.00	$0.00	3.65
Admin Hallway	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Men's Restroom2	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Men's Restroom2	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Women's Restroom2	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Women's Restroom2	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Telephone Room 122	13	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	13	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.08	1,169	0.0	$115.74	$540.00	$70.00	4.06
Admin Janitor Office	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Director Office	10	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	10	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.06	899	0.0	$89.03	$270.00	$35.00	2.64
Admin Maintenance Director Office	9	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	9	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.06	810	0.0	$80.13	$270.00	$35.00	2.93
Admin Transportation Director Office	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Transportation Director Office	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin File Storage Room	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Medical Services Room	8	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	8	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Medical Services Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Office Room 101	15	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	15	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.10	1,349	0.0	$133.55	$540.00	$70.00	3.52
Admin Office Room 101	2	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	100	8,736	None	Yes	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	100	6,115	0.04	545	0.0	$53.96	$270.00	$35.00	4.36
Admin Office Room 101	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Office Room 101	3	LED Screw-In Lamps: PAR LED	Wall Switch	100	8,736	None	Yes	3	LED Screw-In Lamps: PAR LED	Occupancy Sensor	100	6,115	0.06	818	0.0	$80.94	$270.00	$35.00	2.90
Admin Office Room 101 P2	11	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	Yes	11	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	6,115	0.07	989	0.0	$97.93	$540.00	$70.00	4.80
Admin Office Room 101 P3	5	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	None	No	5	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,736	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	7	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	4,380	Fixture Replacement	No	7	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	56	4,380	0.60	4,196	0.0	$415.36	$2,734.74	$700.00	4.90
Shoebox Wall Pack	15	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	4,380	Fixture Replacement	No	15	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	56	4,380	1.29	8,992	0.0	$890.05	$5,860.16	$1,500.00	4.90

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Pole Lights 1L	7	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	4,380	Fixture Replacement	No	7	LED - Fixtures: Outdoor Post-Mount	Wall Switch	56	4,380	0.60	4,196	0.0	$415.36	$4,013.10	$35.00	9.58
Pole Lights 2L	10	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	4,380	Fixture Replacement	No	10	LED - Fixtures: Outdoor Post-Mount	Wall Switch	56	4,380	0.86	5,995	0.0	$593.37	$5,733.00	$50.00	9.58

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?	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Sector 3	F-1A and F-10	2	Exhaust Fan	10.0	91.0%	No	3,391	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 2, 4, 5, and 6	F-2A - F2E	5	Exhaust Fan	20.0	91.0%	No	3,391	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 4, 5, 6	F-3A - F-3D	4	Exhaust Fan	1.5	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 7,8,9	F-4A - F-4D	4	Exhaust Fan	3.0	89.5%	No	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Steam Cleaning Rm 336	F-5	1	Exhaust Fan	1.5	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cyclone Rm 344	F-6	1	Exhaust Fan	0.5	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Water Reclaimation Rm 345	F-7	1	Exhaust Fan	0.5	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 1	F-8	1	Exhaust Fan	0.5	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 1	F-9	1	Exhaust Fan	0.2	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 1	F-10	1	Exhaust Fan	7.5	91.0%	No	3,391	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 1	F-11	1	Exhaust Fan	0.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 1	F-12	1	Exhaust Fan	0.3	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 429 430	F-13	1	Exhaust Fan	0.1	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 1	F-14	1	Exhaust Fan	0.5	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Vehicle Exhaust Sector 2 4	F-15	1	Exhaust Fan	10.0	91.7%	No	3,391	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
PIT Exhaust Sector 4	F-16	1	Exhaust Fan	10.0	91.0%	No	3,391	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin 1 Fl. Toilet Jan Closet	F-17	1	Exhaust Fan	0.2	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin 2 Fl. Toiler Jan Closet	F-18	1	Exhaust Fan	0.2	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elec Panel Rm 440	F-19	1	Exhaust Fan	0.2	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Battery Charging Rm	F-20	1	Exhaust Fan	0.3	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		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?	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Clearstory Sect 3 5 6 7 9	F-21	1	Exhaust Fan	0.2	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Toilet 341	F-22	1	Exhaust Fan	0.1	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Toilets 317 316	F-23	1	Exhaust Fan	0.1	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elec Rm 337	F-24	1	Exhaust Fan	0.2	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
-	F-25	1	Exhaust Fan	7.5	91.0%	No	3,391	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
UH 1A - 1R	UH 1A - 1R	18	Supply Fan	0.2	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
UH 1-31	UH 1-31	31	Supply Fan	0.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
UH 2A-2P	UH 2A-2P	16	Supply Fan	0.3	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
UH 3A-3K	UH 3A-3K	11	Supply Fan	0.1	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CUH 4A	CUH 4A	1	Supply Fan	0.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CUH 4B	CUH 4B	1	Supply Fan	0.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CUH-324	CUH-324	1	Supply Fan	0.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CUH-444	CUH-444	1	Supply Fan	0.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CUH-6A	CUH-6A	1	Supply Fan	0.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CUH-6B	CUH-6B	1	Supply Fan	0.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
UH 4A-4H	UH 4A-4H	8	Supply Fan	0.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Admin Bldg	AC-1	1	Supply Fan	25.0	93.0%	No	4,067	Yes	93.0%	Yes	1	3.25	14,681	0.0	$1,453.12	$12,131.69	$2,000.00	6.97
Admin Bldg	AC-2	1	Supply Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 1	ACU-1A - 1E	5	Supply Fan	0.6	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 1	ACU-2	1	Supply Fan	15.0	91.7%	No	3,391	Yes	91.7%	Yes	1	1.98	7,448	0.0	$737.26	$7,889.21	$1,200.00	9.07

		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?	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Admin Bldg	AC-1	1	Return Fan	10.0	91.0%	No	3,391	Yes	91.0%	Yes	1	1.33	5,004	0.0	$495.29	$5,785.59	$800.00	10.07
Admin Bldg	AC-2	1	Return Fan	0.5	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 1	ACU-1A - 1E	5	Return Fan	0.5	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sector 1	ACU-2	1	Return Fan	3.0	89.5%	No	2,745	Yes	89.5%	Yes	1	0.41	1,236	0.0	$122.30	$4,076.22	$240.00	31.37
Boiler Rm	PGH-1	1	Heating Hot Water Pump	1.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm	PGH-2	1	Heating Hot Water Pump	1.5	86.5%	No	2,745	Yes	86.5%	Yes	1	0.20	1,545	0.0	$152.90	$3,380.15	$0.00	22.11
Boiler Rm	PGH-3	1	Heating Hot Water Pump	0.8	85.5%	No	2,745	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Rm	PGH-4	1	Heating Hot Water Pump	5.0	89.5%	No	2,745	Yes	89.5%	Yes	1	0.63	4,976	0.0	$492.58	$4,196.91	$0.00	8.52
Admin Bldg	PAC-1	1	Chilled Water Pump	1.5	86.5%	No	2,745	Yes	86.5%	Yes	1	0.20	1,545	0.0	$152.90	$3,380.15	$0.00	22.11
Admin Bldg	PAC-2	1	Chilled Water Pump	0.5	85.5%	No	2,745	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Chiller	PGC-1	1	Chilled Water Pump	3.0	89.5%	No	2,745	Yes	89.5%	Yes	1	0.38	2,986	0.0	$295.55	$3,812.49	$0.00	12.90
1-1ST FLR	HV-1A	1	Supply Fan	15.0	91.7%	No	3,391	Yes	91.7%	Yes	1	1.98	7,448	0.0	$737.26	$7,889.21	$1,200.00	9.07
1-MEZZ	HV-1B	1	Supply Fan	2.0	88.5%	No	2,745	Yes	88.5%	Yes	1	0.27	833	0.0	$82.45	$3,493.46	$160.00	40.43
2	HV-2A	1	Supply Fan	15.0	91.7%	No	3,391	Yes	91.7%	Yes	1	1.98	7,448	0.0	$737.26	$7,889.21	$1,200.00	9.07
4	HV-2B	1	Supply Fan	15.0	91.7%	No	3,391	Yes	91.7%	Yes	1	1.98	7,448	0.0	$737.26	$7,889.21	$1,200.00	9.07
43199	HV-3A - 3G	7	Supply Fan	10.0	91.0%	No	3,391	Yes	91.0%	Yes	7	9.30	35,026	0.0	$3,467.01	$40,499.13	$5,600.00	10.07
3	HV-4A	1	Supply Fan	7.5	91.0%	No	3,391	Yes	91.0%	Yes	1	1.00	3,753	0.0	$371.47	$5,225.88	$600.00	12.45
1	1	2	Process Blower	5.5	89.5%	No	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
24 thru 20	24 thru 20	3	Process Blower	5.0	89.5%	No	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		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?	Annual Operating Hours	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
3a and 3b	3a and 3b	3	Process Blower	5.5	89.5%	No	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
3c	3c	3	Process Blower	5.5	89.5%	No	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
4a-4k	4a-4k	4	Process Blower	5.5	89.5%	No	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
4b-h'	4b-h'	4	Process Blower	5.5	89.5%	No	2,745	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Air Compressor 1	1	Air Compressor	20.0	93.0%	No	4,957	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Air Compressor 2	1	Air Compressor	0.8	85.5%	No	4,957	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Air Compressor 3	1	Air Compressor	40.0	94.1%	Yes	4,957	No	94.1%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Air Compressor 4	1	Air Compressor	10.0	86.5%	No	4,957	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Air Dryer	1	Other	5.5	85.5%	No	2,745	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric 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 (kBtu/hr)	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 (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Roof AV-1B	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	HP-1	1	Split-System Air-Source HP	2.00	27.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	HP-2	1	Split-System Air-Source HP	3.00	38.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	HP-3	1	Split-System Air-Source HP	3.00	40.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	HP-4	1	Split-System Air-Source HP	3.00	38.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AC-3	1	Split-System AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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)	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Rooftop	Newton Bus Garage	1	Air-Cooled Scroll Chiller	60.00	Yes	1	Air-Cooled Centrifugal Chiller	Variable	60.00	1.24	0.74	18.31	37,176	0.0	$3,679.74	$51,191.05	$5,400.00	12.44
Rooftop	Newton Bus Garage	1	Air-Cooled Scroll Chiller	5.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating 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)	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Whole Building	2	Non-Condensing Hot Water Boiler	1,255.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
1-1ST FLR	HV-1A	1	Furnace	2,045.00	Yes	1	Furnace	2,045.00	95.00%	AFUE	0.00	0	150.9	$1,277.58	$46,334.25	$400.00	35.95
1-MEZZ	HV-1B	1	Furnace	365.00	Yes	1	Furnace	365.00	95.00%	AFUE	0.00	0	50.3	$425.86	$8,269.93	$400.00	18.48
2	HV-2A	1	Furnace	1,909.00	Yes	1	Furnace	1,909.00	95.00%	AFUE	0.00	0	213.1	$1,804.10	$43,252.85	$400.00	23.75
4	HV-2B	1	Furnace	1,909.00	Yes	1	Furnace	1,909.00	95.00%	AFUE	0.00	0	213.1	$1,804.10	$43,252.85	$400.00	23.75
43199	HV-3A - 3G	7	Furnace	1,000.00	Yes	1	Furnace	1,000.00	95.00%	AFUE	0.00	0	3,343.7	$28,310.01	$22,657.33	$400.00	0.79
3	HV-4A	1	Furnace	640.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
4	HV-4	1	Furnace	640.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Entire Facility	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Newton Garage	13	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	26.6	$225.27	$93.21	$0.00	0.41

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Newton Bus Garage	59	Computer	75.0	No
Newton Bus Garage	5	Printer Small	20.0	No
Newton Bus Garage	14	Printer Medium	20.0	No
Newton Bus Garage	3	Printer Big	515.0	No
Newton Bus Garage	12	Microwave	1,000.0	No
Newton Bus Garage	6	Refrigerator Medium	50.0	No
Newton Bus Garage	5	Refrigerator Large	600.0	No
Newton Bus Garage	5	Coffee Machine	400.0	No
Newton Bus Garage	2	Toaster	850.0	No
Newton Bus Garage	2	Oven	1,200.0	No
Newton Bus Garage	5	Ceiling Fan	100.0	No
Newton Bus Garage	1	Portable Fan	100.0	No
Newton Bus Garage	5	Television 24"	12.0	No
Newton Bus Garage	1	Television 42" Plasma	220.0	No
Newton Bus Garage	3	Television 42" LED	100.0	No
Newton Bus Garage	4	Television 50" LCD	150.0	No
Newton Bus Garage	2	Lab Dispenser	500.0	No
Newton Bus Garage	1	Miscellaneous Bus Maintenance Load	35,000.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Newton Garage	1	Glass Fronted Refrigerated	Yes	0.00	1,209	0.0	$119.66	$230.00	$0.00	1.92
Newton Garage	1	Refrigerated	Yes	0.00	1,612	0.0	$159.54	$230.00	$0.00	1.44

Appendix B: ENERGY STAR® Statement of Energy Performance

There is no Statement of Energy Performance (SEP) for this property based on the applicant's request. NJ Transit is working with a 3rd party utility manager to update their web-based platform to include dashboard metrics for each individual building account which can track EUIs over time and other key energy metrics.