

# Local Government Energy Audit: Energy Audit Report





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# Municipal Building

### Township of Woodbridge

I Main Street Woodbridge, NJ 07095

April 25, 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 savings 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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# I EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for the Municipal Building.

The goal of a LGEA is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and put you in a position to implement the ECMs. The LGEA also sets you on the path to receive financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing the ECMs.

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

# I.I Facility Summary

The Municipal Building is a four-story, 162,336 square-foot facility comprised of mostly offices, as well as a police station on the ground floor, courtroom, and mechanical spaces. The operating hours are generally from 7:30 AM–4:00 PM on weekdays excluding the police station which operates 24 hours a day, all year long. The Municipal Building also has a parking structure adjacent to it and shares a meter.

Lighting includes inefficient lighting on the interior as well as on the exterior. It is heated using gas-fired hot water boilers and cooled using rooftop packaged units (DX). 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 six projects which represent an opportunity for the Municipal Building to reduce annual energy costs by \$29,184 and annual greenhouse gas emissions by 241,740 lbs CO<sub>2</sub>e. The measures would pay for themselves in 4.24 years. The breakdown of existing and potential utility costs is illustrated in Figure 1 and Figure 2, respectively. These projects represent an opportunity to reduce the Municipal Building's annual energy use by 6.5%.













A detailed description of the Municipal Building's existing energy use can be found in Section 3.

The evaluated measures have been listed and grouped into major categories as shown in Figure 3. Brief descriptions of the categories can be found below and descriptions of the individual opportunities can be found in Section 4.

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 <sub>2</sub> e Emissions Reduction (Ibs)
	Lighting Upgrades		209,737	51.0	0.0	\$26,722.83	\$135,038.57	\$25,785.00	\$109,253.57	4.09	211,204
ECM 1	Install LED Fixtures	Yes	40,975	6.7	0.0	\$5,220.65	\$30,863.48	\$7,900.00	\$22,963.48	4.40	41,261
ECM 2	Retrofit Fixtures with LED Lamps	Yes	164,558	43.6	0.0	\$20,966.44	\$99,872.88	\$17,885.00	\$81,987.88	3.91	165,708
ECM 3	Install LED Exit Signs	Yes	4,205	0.7	0.0	\$535.74	\$4,302.20	\$0.00	\$4,302.20	8.03	4,234
Lighting Control Measures			1,798	0.4	0.0	\$229.06	\$1,160.00	\$200.00	\$960.00	4.19	1,810
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	1,798	0.4	0.0	\$229.06	\$1,160.00	\$200.00	\$960.00	4.19	1,810
Domestic Water Heating Upgrade			0	0.0	245.3	\$2,232.05	\$12,530.09	\$398.00	\$12,132.09	5.44	28,726
ECM 5	Install High Efficiency Gas Water Heater	Yes	0	0.0	40.7	\$370.01	\$11,500.21	\$398.00	\$11,102.21	30.01	4,762
ECM 6 Install Low-Flow Domestic Hot Water Devices		Yes	0	0.0	204.7	\$1,862.04	\$1,029.88	\$0.00	\$1,029.88	0.55	23,964
	TOTALS		211,535	51.4	245.3	\$29,183.94	\$150,166.26	\$26,383.00	\$123,783.26	4.24	241,740

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\* - 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 measures 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 conditions allow. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

**Domestic Water Heating** upgrade measures generally involve replacing old inefficient domestic water heating systems with modern energy efficient systems. New domestic water heating systems can provide equivalent or greater capacity as older systems, but use less energy. These measures save energy by reducing the fuel used by the domestic water heating systems due to improved efficiency or the removal of standby losses.

**Plug Load Equipment** control measures generally involve installing automation that limits the power use or operation of equipment plugged into an electrical receptacle based on occupancy.

### **Energy Efficient Practices**

TRC also identified nine low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems. Through these practices equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance costs can be reduced. Opportunities identified at the Municipal Building include:





- Close Doors and Windows
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Use Fans to Reduce Cooling Load
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Perform Proper Boiler Maintenance
- 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 the Municipal Building. Based on the configuration of the site and its loads there is a low potential for installing any PV and combined heat and power self-generation measures.

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

### **I.3** Implementation Planning

To realize the energy savings from the ECMs listed in this report, the equipment changes outlined for each ECM need to be selected and installed through project implementation. One of the first considerations is if there is capital available for project implementation. Another consideration is whether to pursue individual ECMs, a group of ECMs, or a comprehensive approach wherein all ECMs are pursued, potentially in conjunction with other facility projects or improvements.

Rebates, incentives, and financing are available from the NJBPU, NJCEP, as well as some of the state's investor-owned utilities, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any project, please review the appropriate incentive program guidelines before proceeding. This is important because in most cases you will need to submit an application for the incentives before purchasing materials and beginning installation.

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

- SmartStart
- Pay for Performance Existing Building (P4P EB)
- Energy Savings Improvement Program (ESIP)

For facilities with capital available for implementation of selected individual measures or phasing 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 design the ECM(s), select the equipment and apply for the incentive(s). Program preapproval is required for some SmartStart incentives, so only after receiving approval may the ECM(s) be installed. The incentive values listed above in Figure 3 represent the SmartStart program and will be explained further in Section 8, as well as the other programs as mentioned below.

For facilities with capital available and an interest in a comprehensive, holistic approach to energy conservation should consider participating in the P4P EB program. This program has minimum savings requirements and the incentives are based on actual measured performance savings. The application process is more involved, and requires working with an eligible contractor, but may result in more lucrative incentives up to 50% of total project cost.





For facilities without capital available 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 external project development, design, and implementation services as well as financing for implementing ECMs. This LGEA report is the first step for participating in ESIP and should help you determine next steps. Refer to Section 8.3 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a program (non-NJCEP) designed to reduce consumer electric load when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak 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 locally. By enabling grid operators to call upon Curtailment Service Providers and energy consumers 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 will receive payments whether or not their facility is called upon to curtail their load. Refer to Section 7 for additional information on this program.

Additional descriptions of all relevant incentive programs are located in Section 8 or: www.njcleanenergy.com/ci.

To ensure projects are implemented such that maximum savings and incentives are achieved, bids and specifications should be reviewed by your procurement personnel and/or consultant(s) to ensure that selected equipment coincides with LGEA recommendations, as well as applicable incentive program guidelines and requirements.





# **2** FACILITY INFORMATION AND EXISTING CONDITIONS

# 2.1 Project Contacts

#### Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #					
Customer								
Caroline Ehrlich	Executive Director	<u>caroline.ehrlich@twp.woodbrid</u> <u>ge.nj.us</u>	(732) 602-6015					
Drian Durka	Building	brian.burke@twp.woodbridge.	(732) 675-4619					
Brian Burke	Superintendent	<u>nj.us</u>						
Designated Representative								
Mike Duffy	Consultant	mduffy@gbdtoday.com	(732) 253-7717					
TRC Energy Services								
Smruti Srinivasan	Auditor	ssrinivasan@trcsolutions	(732) 855-0033					

# 2.2 General Site Information

On August 30, 2016, TRC performed an energy audit at the Municipal Building located in Woodbridge, New Jersey. TRC's auditor met with Brian Burke to review the facility operations and focus the investigation on specific energy-using systems.

The Municipal Building is a four-story, 162,336 square-foot facility constructed in 1997. It is comprised of mostly offices, as well as a police station on the ground floor, courtroom, and mechanical spaces. The operating hours are generally from 7:30 AM–4:00 PM on the weekdays, excluding the ground floor which operates 24 hours a day, all year. The Municipal Building also has a parking structure adjacent to it and shares a meter.

Lighting includes inefficient lighting on the interior as well as on the exterior. It is heated using gas-fired hot water boilers and cooled using rooftop packaged units (DX).

# 2.3 Building Occupancy

Floors 1-3 of the Municipal Building are open Monday through Friday from 7:00 AM–4:30 PM and closed on weekends. The ground floor, the police station, functions year-round. The typical schedule is presented in the table below. During a typical day, the facility is occupied by approximately 350 staff full-time staff and a varying number of visitors.

Building Name	Weekday/Weekend	<b>Operating Schedule</b>
Levels 1,2,3	Weekday	7AM - 4:30PM
Levels 1,2,3	Weekend	No occupancy
Level G	Weekday	All year, 24 hours
Level G	Weekend	All year, 24 hours





# 2.4 Building Envelope

The building is constructed with concrete block, and structural steel with a concrete block facade. It has a flat roof covered with EPDM membrane, a durable rubber-roofing material, which was found to be in good condition. The building has double pane windows and the exterior doors are constructed of aluminum. Both the doors and windows are in good condition and show little sign of excessive infiltration.



Image I Building exterior and parking structure

# 2.5 On-Site Generation

The Municipal Building does not have any on-site electric generation capacity.

# 2.6 Energy-Using Systems

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

### Lighting System

Lighting is predominately 32-Watt linear fluorescent T8 lamps with electronic ballasts, as well as recessed compact fluorescent lamps (CFLs). Most of the building spaces use 2-lamp or 3-lamp, 2-foot wide by 4-foot long troffers. Some of the offices are lit using the 2-foot U-bent 2-lamp T8 fixtures. Lighting control in the spaces is provided by occupancy sensors and wall switches.

The Municipal Building received a lighting retrofit in 2011 in conjunction with the New Jersey CEP's Direct Install Program. The contractor replaced old lighting fixtures with T8 fluorescent lamps and installed occupancy sensors in some of the offices. The occupancy sensors are mostly wall mounted.





There are a considerable amount of exterior lighting primarily consisting of high pressure sodium fixtures that are controlled with photocells. The exit signs, as stated by the site contact, are fluorescent lamp fixtures throughout the facility.



Image 2 Typical lighting fixtures

### Hot Water / Steam System

The heating hot water system consists of two HB Smith non-condensing hot water boilers with an output capacity of 1965 Mbh. The boilers have a nominal combustion efficiency of 78.6%. There are two 20 hp (rotated) pumps and one 40 hp (main) pump serving the boiler for hot water circulation. Hot water is supplied at 180°F when the outside air temperature is below 50°F and the setpoint is reset to 165°F when the outside air is above 65°F.

The boilers operate in a lead/lag configuration, however both boilers may be required to operate during cold weather. The heat is distributed through baseboard radiators and ceiling vents in the respective areas.

Although the boilers are currently well maintained and have not reached the end of their useful lives, we recommend they be replaced with high efficiency condensing boilers in a few years.



Image 3 Hot water boiler





### Air Conditioning (DX)

At the time of the site visit, the Municipal Building was in the process of replacing all rooftop AC equipment. This report addresses the units already replaced on the roof because of the billing period considered for the analysis in this report. Appendix A can be updated to reflect old and new units if data for the recently installed Johnson Controls rooftop units is provided.

At the time of the site visit, the building had four roof top packaged AC units that used DX cooling, serving various floors of the building. These were over 25 years old and the capacity ranged from 17.5 to 160 tons. There are thermostats in various zones to control the temperatures.

These four units have been replaced by five rooftop packaged units manufactured by Johnson Controls. There is one unit per floor (ranging from 60-80 tons) and one smaller unit dedicated to the courtroom (1-ton). The server or technical closet is served by a dedicated 3-ton split AC system.



Image 4 Top: Newly installed AC units Bottom: Split AC unit serving the tech closet and thermostat



### **Domestic Hot Water**

The domestic hot water system consists of one gas-fired hot water heater with an input rating of 199 Mbh and a nominal efficiency of 81%. The water heater has a 225-gallon storage tank. The unit is 22 years old and in fair condition.

### Plug Load & Vending Machines

There are 489 computer work stations throughout the facility. Approximately 90% of the computers are desktop units with LCD monitors. There is no centralized PC power management software currently installed.

The facility has one refrigerated beverage vending machine with no controls and one non-refrigerated vending machine.

Other plug loads include typical office and kitchen equipment such as printers, refrigerators, microwaves, toasters, coffee machines, etc.



Image 5 Domestic hot water heater

# 2.7 Water-Using Systems

A sampling of restrooms found that faucets are rated for 2.2 gallons per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush (gpf) and the urinals are rated at 2 gpf.









# **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/ft<sup>2</sup> and energy use/ft<sup>2</sup>. These energy use indices are indicative of the relative energy effectiveness of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy use for other facilities identified as: Office. Specific local climate conditions, daily occupancy hours of the facility, seasonal fluctuations in occupancy, daily operating hours of energy use systems, and the behavior of the occupants with regard to operating systems that impact energy use such as turning off appliances and leaving windows open. 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 usage data that was provided for each utility. The annual consumption and cost was developed from this information.

Utility Summary for Municipal Building							
Fuel	Pre-Implementation Cost						
Electricity	3,358,247 kWh	\$451,980					
Natural Gas	34,326 Therms	\$31,229					
To	otal	\$483,209					

The current utility cost for this site is \$483,209 as shown in the chart below.

Figure 7 - Energy Cost Breakdown







# 3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost (combined for commodity, transmission and distribution) for the past 12 months is \$0.127/kWh, which is the blended rate used throughout the analyses in this report. The third party electric supply for the facility is provided by Direct Energy. The monthly electricity consumption and peak demand is represented graphically in the chart below.



Figure 8 -Electric Usage & Demand

Figure 9 - Electric Usage & Demand	
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Electric Billing Data for Municipal Building								
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost			
1/31/15	30	243,839	421	\$1,516	\$31,806			
2/28/15	28	217,073	420	\$1,511	\$28,516			
3/31/15	31	236,997	451	\$1,626	\$31,076			
4/30/15	30	259,172	556	\$2,002	\$34,173			
5/31/15	31	311,492	638	\$2,299	\$40,906			
6/30/15	30	300,575	607	\$2,188	\$44,367			
7/31/15	31	334,344	642	\$2,313	\$48,904			
8/31/15	31	329,575	644	\$2,321	\$47,074			
9/30/15	30	316,837	610	\$2,209	\$45,224			
10/31/15	31	285,540	580	\$2,101	\$35,852			
11/30/15	30	253,557	563	\$2,040	\$32,052			
12/31/15	31	260,045	527	\$1,910	\$30,793			
Totals	364	3,349,046	644.1	\$24,036	\$450,742			
Annual	365	3,358,247	644.1	\$24,102	\$451,980			





# 3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is \$0.91/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is represented graphically in the chart below.



Figure 10 -Natural Gas Usage

	Gas Billing Data for Municipal Building										
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost								
1/25/16	30	7,240	\$5,310								
2/24/16	30	6,780	\$4,833								
3/24/16	29	5,042	\$6,481								
4/25/16	32	4,780	\$3,348								
5/25/16	30	3,345	\$2,530								
6/24/16	30	153	\$574								
7/26/16	32	141	\$579								
8/25/16	30	132	\$572								
9/26/16	32	137	\$597								
10/25/16	29	293	\$692								
11/23/16	29	1,103	\$1,274								
12/22/16	29	4,898	\$4,184								
Totals	362	34,044	\$30,973								
Annual	365	34,326	\$31,229								

Figure	I	I-Natural	Gas	Usage
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# 3.4 Benchmarking

This facility was benchmarked through Portfolio Manager, an online tool created and managed by the United States Environmental Protection Agency (EPA) through the ENERGY STAR<sup>®</sup> program. Portfolio Manager analyzes your building's consumption data, cost information, and operational use details and compares its performance against a yearly baseline, national medians, or similar buildings in your portfolio. Metrics used in this comparison are the Energy Use Intensity (EUI) and ENERGY STAR<sup>®</sup> score.

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 energy than similar buildings on a square foot basis or if that building performs better than the median. EUI is presented in both 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 is the raw fuel consumed to generate the energy consumed at the site, factoring in energy production and distribution losses.

Energy Use Intensity Comparison - Existing Conditions									
	Municipal Building	National Median							
	Municipal Bunding	Building Type: Office							
Source Energy Use Intensity (kBtu/ft <sup>2</sup> )	243.8	148.1							
Site Energy Use Intensity (kBtu/ft <sup>2</sup> )	91.7	67.3							

Figure	12 -	Energy	Use	Intensity	Comparison	- Existing	Conditions
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By implementing all recommended measures covered in this reporting, the building's estimated postimplementation EUI improves as shown in the table below:

Figure 13 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures								
	Municipal Building	National Median						
	Municipal Bunding	Building Type: Office						
Source Energy Use Intensity (kBtu/ft <sup>2</sup> )	228.3	148.1						
Site Energy Use Intensity (kBtu/ft <sup>2</sup> )	85.8	67.3						

Many buildings can also receive a 1–100 ENERGY STAR<sup>®</sup> score. This score 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<sup>®</sup> certification. This facility has a current score of 35.

The Portfolio Manager, Statement of Energy Performance can be found in Appendix B: ENERGY STAR<sup>®</sup> Statement of Energy Performance.

For more information on ENERGY STAR<sup>®</sup> certification go to: <u>https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.</u>

A Portfolio Manager account has been created online for your facility and you will be provided with the login information for the account. We encourage you to update your utility information in Portfolio Manager regularly, so that you can keep track of your building's performance. Free online training is





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

# 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 and determine their proportional contribution to overall building energy usage. This visual representation of energy end uses highlights systems that may benefit most from energy efficiency projects.



Figure 14 - Energy Balance (kBtu/SF, %)





# 4 ENERGY CONSERVATION MEASURES

#### Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Municipal Building 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.

	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 <sub>2</sub> e Emissions Reduction (Ibs)
	Lighting Upgrades		209,737	51.0	0.0	\$26,722.83	\$135,038.57	\$25,785.00	\$109,253.57	4.09	211,204
ECM 1	Install LED Fixtures	Yes	40,975	6.7	0.0	\$5,220.65	\$30,863.48	\$7,900.00	\$22,963.48	4.40	41,261
ECM 2	Retrofit Fixtures with LED Lamps	Yes	164,558	43.6	0.0	\$20,966.44	\$99,872.88	\$17,885.00	\$81,987.88	3.91	165,708
ECM 3	Install LED Exit Signs	Yes	4,205	0.7	0.0	\$535.74	\$4,302.20	\$0.00	\$4,302.20	8.03	4,234
	Lighting Control Measures		1,798	0.4	0.0	\$229.06	\$1,160.00	\$200.00	\$960.00	4.19	1,810
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	1,798	0.4	0.0	\$229.06	\$1,160.00	\$200.00	\$960.00	4.19	1,810
Domestic Water Heating Upgrade			0	0.0	245.3	\$2,232.05	\$12,530.09	\$398.00	\$12,132.09	5.44	28,726
ECM 5	Install High Efficiency Gas Water Heater	Yes	0	0.0	40.7	\$370.01	\$11,500.21	\$398.00	\$11,102.21	30.01	4,762
ECM 6	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	204.7	\$1,862.04	\$1,029.88	\$0.00	\$1,029.88	0.55	23,964
	TOTALS		211,535	51.4	245.3	\$29,183.94	\$150,166.26	\$26,383.00	\$123,783.26	4.24	241,740

#### Figure 15 – Summary of Recommended ECMs

\* - 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

Recommended upgrades to existing lighting fixtures are summarized in Figure 16 below.

#### Figure 16 – Summary of Lighting Upgrade ECMs

	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)**	CO₂e Emissions Reduction (Ibs)
	Lighting Upgrades		209,737	51.0	0.0	\$26,722.83	\$135,038.57	\$25,785.00	\$109,253.57	4.09	211,204
ECM 1	Install LED Fixtures	Yes	40,975	6.7	0.0	\$5,220.65	\$30,863.48	\$7,900.00	\$22,963.48	4.40	41,261
ECM 2	Retrofit Fixtures with LED Lamps	Yes	164,558	43.6	0.0	\$20,966.44	\$99,872.88	\$17,885.00	\$81,987.88	3.91	165,708
ECM 3	Install LED Exit Signs	Yes	4,205	0.7	0.0	\$535.74	\$4,302.20	\$0.00	\$4,302.20	8.03	4,234

# ECM I: 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 <sub>2</sub> e Emissions Reduction (Ibs)
Interior	0	0.0	0.0	\$0.00	\$0.00	\$0.00	\$0.00	0.00	0
Exterior	40,975	6.7	0.0	\$5,220.65	\$30,863.48	\$7,900.00	\$22,963.48	4.40	41,261

Measure Description

This measure evaluates replacing existing fixtures containing fluorescent (excluding T12), HID, and compact fluorescent lamps (CFL) with new high-performance LED light fixtures. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

Maintenance savings are anticipated since LED sources have burn hours which are generally more than twice that of a fluorescent source and more than 10 times incandescent sources. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

During planning and design for the installation of new fixtures, we recommend a holistic approach that considers both the technology of the lighting sources and how they are controlled.





### 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 <sub>2</sub> e Emissions Reduction (Ibs)
Interior	156,173	41.6	0.0	\$19,898.10	\$95,425.96	\$17,490.00	\$77,935.96	3.92	157,265
Exterior	8,385	1.9	0.0	\$1,068.34	\$4,446.92	\$395.00	\$4,051.92	3.79	8,444

#### Measure Description

This measure evaluates replacing CFL and halogen screw-in/plug-in based lamps with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed although there is a fluorescent fixture ballast in place. Other tube lamps require that fluorescent fixture ballasts be removed or replaced with LED drivers. Screw-in/plug-in LED lamps can be used as a direct replacement for most other screw-in/plug-in lamps. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

During retrofit planning and design, we recommend a holistic approach that considers both the technology of the lighting sources and how they are controlled.

#### ECM 3: Install LED Exit Signs

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Estimated Install Cost Incentive (\$) (\$)		Simple Payback Period (yrs)	CO <sub>2</sub> e Emissions Reduction (Ibs)
Interior	4,205	0.7	0.0	\$535.74	\$4,302.20	\$0.00	\$4,302.20	8.03	4,234
Exterior	0	0.0	0.0	\$0.00	\$0.00	\$0.00	\$0.00	0.00	0

Summary of Measure Economics

#### Measure Description

This measure evaluates replacing compact fluorescent lighting in exit signs with LEDs. LED sources require virtually no maintenance and LED exit signs have a life expectancy of at least 20 years. Many manufacturers can provide retrofit kits that meet fire and safety code requirements. Retrofit kits are less expensive and simpler to install than replacement signs, however, new fixtures would have a longer useful life and are therefore recommended.

A reduction in maintenance costs will be realized with the proposed retrofit because lamps will not have to be replaced as frequently.





# 4.1.1 Lighting Control Measures

Recommended upgrades to existing lighting control measures are summarized in Figure 17 below.

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 <sub>2</sub> e Emissions Reduction (Ibs)
Lighting Control Measures		1,798	0.4	0.0	\$229.06	\$1,160.00	\$200.00	\$960.00	4.19	1,810
ECM 4 Install Occupancy Sensor Lighting Controls	Yes	1,798	0.4	0.0	\$229.06	\$1,160.00	\$200.00	\$960.00	4.19	1,810

Figure 17 – Summary of Lighting Control ECMs

### ECM 4: 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 <sub>2</sub> e Emissions Reduction (Ibs)
1,798	0.4	0.0	\$229.06	\$1,160.00	\$200.00	\$960.00	4.19	1,810

#### Measure Description

This measure evaluates installing occupancy sensors to control light fixtures that are currently manually controlled in several spaces. Sensors detect occupancy using ultrasonic and/or infrared wave technologies. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Occupants will also be able to manually turn off fixtures. Energy savings result 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. Ceiling-mounted or remote-mounted sensors require the use of low voltage switching relays or a wireless signal to the switch. In general, use wall switch replacement sensors for single occupant offices and other small rooms. Install ceiling-mounted or remote mounted sensors in locations without local switching, in situations where the existing wall switches are not in the line-of-sight of the main work area, and in large spaces. We recommend a holistic design approach that considers both the technology of the lighting sources and how they are controlled.

Maintenance savings are anticipated due to reduced lamp operation however, additional maintenance costs may be incurred because the occupancy sensors may require periodic adjustment; it is anticipated that the net effect on maintenance costs will be negligible.





# 4.1.2 Domestic Water Heating Upgrade

Recommended domestic water heating upgrades are summarized in Figure 18 below.

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 <sub>2</sub> e Emissions Reduction (Ibs)
Domestic Water Heating Upgrade		0	0.0	245.3	\$2,232.05	\$12,530.09	\$398.00	\$12,132.09	5.44	28,726
ECM 5 Install High Efficiency Gas Water Heater	Yes	0	0.0	40.7	\$370.01	\$11,500.21	\$398.00	\$11,102.21	30.01	4,762
ECM 6 Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	204.7	\$1,862.04	\$1,029.88	\$0.00	\$1,029.88	0.55	23,964

Figure 18 - Summary of Domestic Water Heating ECMs

# ECM 5: Install High Efficiency Gas Water Heater

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 <sub>2</sub> e Emissions Reduction (Ibs)
0	0.0	40.7	\$370.01	\$11,500.21	\$398.00	\$11,102.21	30.01	4,762

Measure Description

This measure evaluates the savings from replacing a tank water heater with a high efficiency tank water heater. Improvements in combustion efficiency and reductions in heat loss have improved the overall efficiency of water heaters. Savings result from less gas used during combustion and less time operating during standby to maintain the water tank temperature.

### ECM 6: 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 <sub>2</sub> e Emissions Reduction (Ibs)
0	0.0	204.7	\$1,862.04	\$1,029.88	\$0.00	\$1,029.88	0.55	23,964

#### Measure Description

This measure evaluates the savings from installing low flow domestic water devices to reduce overall water flow in general and hot water flow in particular. Low flow showerheads and faucet aerators reduce the water flow, relative to standard showerheads and aerators, from the fixture. Pre-rinse spray valves often used in commercial and institutional kitchens—are designed to remove food waste from dishes prior to dishwashing. Replacing standard pre-rinse spray valves with low flow valves will reduce water use.

All of the low flow devices reduce the overall water flow from the fixture which generally reduces the amount of hot water used resulting in energy and water savings.





# **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 low or no-cost efficiency strategies. By employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance 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.

### **Close Doors and Windows**

Ensure doors and windows are closed in conditioned spaces. Leaving doors and windows open leads to a significant increase in heat transfer between conditioned spaces and the outside air. Reducing a facility's air changes per hour (ACH) can lead to increased occupant comfort as well as significant heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

### Perform Proper Lighting Maintenance

In order to sustain optimal lighting levels, lighting fixtures should undergo routine maintenance. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust on lamps, fixtures and reflective surfaces. Together, these factors can reduce total illumination by 20%-60% or more, while operating fixtures continue drawing full power. To limit this reduction, lamps, reflectors and diffusers should be thoroughly cleaned of dirt, dust, oil, and smoke film buildup approximately every 6–12 months.

### Develop a Lighting Maintenance Schedule

In addition to routine fixture cleaning, development of a maintenance schedule can both ensure maintenance is performed regularly and can reduce the overall cost of fixture re-lamping and re-ballasting. By re-lamping and re-ballasting fixtures in groups, lighting levels are better maintained and the number of site visits by a lighting technician or contractor can be minimized, decreasing the overall cost of maintenance.

### Ensure Lighting Controls Are Operating Properly

Lighting controls are very cost-effective energy efficient devices, when installed and operating correctly. As part of a lighting maintenance schedule, lighting controls should be tested annually to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight sensors, maintenance involves cleaning of sensor lenses and confirming setpoints and sensitivity are appropriately configured.

### Use Fans to Reduce Cooling Load

Utilizing ceiling fans to supplement cooling is a low-cost strategy to reduce cooling load considerably. Thermostat settings can be increased by 4°F with no change in overall occupant comfort when the wind chill effect of moving air is employed for cooling.





### 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.

#### 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.

#### 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" <u>http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.</u>

#### 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 (<u>http://www3.epa.gov/watersense/products</u>) 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 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 4.1.2 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 Low potential for installing a PV array.

In order to be cost-effective, a solar PV array generally needs a minimum of 4,000 square foot of flat or south-facing rooftop, or other unshaded space, on which to place the PV panels. In our opinion, the facility does appear not meet these minimum criteria for cost-effective PV installation.



Figure 19 - Photovoltaic Screening





Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program (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.

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

# 6.2 Combined Heat and Power

In non-industrial settings, combined heat and power (CHP) is the on-site generation of electricity and recovery of heat which is put to beneficial use. Common prime movers in CHP applications include reciprocating engines, microturbines, fuel cells, and (at large facilities) gas turbines. Electricity is typically interconnected to the sites local distribution system. Heat is recovered from the exhaust stream and the ancillary cooling system and interconnected to the existing hot water (or steam) distribution system.

CHP systems are typically used to produce a portion of the electricity needed by a facility, with the balance of electric needs satisfied by purchase from the grid. 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.

Lack of gas service, low or infrequent thermal load, and lack of space near the existing thermal generation are the most significant factors contributing to the low potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

For a list of qualified firms in NJ specializing in commercial CHP cost assessment and installation, go to: <u>http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved\_vendorsearch/.</u>





# 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 (<u>http://www.pjm.com/markets-and-operations/demand-response/csps.aspx</u>). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (<u>http://www.pjm.com/training/training%20material.aspx</u>), 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 others, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's 1999 Electricity Restructuring Law which requires all customers of investor-owned electric and gas utilities to pay this charge on their monthly energy bills. As a contributor to the fund you were able to participate in the LGEA program and are also eligible to utilize the equipment incentive programs. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 20 for a list of the eligible programs identified for each recommended ECM.

	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	х			х		
ECM 2	Retrofit Fixtures with LED Lamps	Х			Х		
ECM 3	Install LED Exit Signs				Х		
ECM 4	Install Occupancy Sensor Lighting Controls	Х			Х		
ECM 5	Install High Efficiency Gas Water Heater	х			х		
ECM 6	Install Low-Flow Domestic Hot Water Devices				Х		

Figure	20 -	ECM	Incentive	Program	Eligibility
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SmartStart is generally well suited for implementation of individual or small sets of measures, with the flexibility to install projects at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities to bundle measures and simplify participation, 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 and 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; applicants can use in-house staff or preferred contractor.

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized because it provides a consistent comparison of available incentives.

Brief descriptions of all relevant alternative financing and incentive programs are located in the sections below. You may also check the following website for further information, including most current program availability, requirements, and incentive levels: <u>www.njcleanenergy.com/ci.</u>





# 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.

#### Prescriptive Equipment Incentives Available:

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

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 the lesser of 50% of the total installed incremental project cost, or a buy down to a one-year payback. 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: <u>www.njcleanenergy.com/SSB.</u>





# 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 ESIP 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: <a href="http://www.njcleanenergy.com/P4P">www.njcleanenergy.com/P4P</a>.





# 8.3 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: <a href="https://www.njcleanenergy.com/ESIP">www.njcleanenergy.com/ESIP</a>.

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: <a href="https://www.state.nj.us/bpu/commercial/shopping.html">www.state.nj.us/bpu/commercial/shopping.html</a>.

# 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: <a href="http://www.state.nj.us/bpu/commercial/shopping.html">www.state.nj.us/bpu/commercial/shopping.html</a>.





# **Appendix A: Equipment Inventory & Recommendations**

#### Lighting Inventory & Recommendations

	Existing Co	onditions				Proposed Condition	ns						Energy Impac	t & Financial A	nalysis				
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
Ground Floor	2	Linear Fluorescent - T 8: 4' T 8 (32W) - 2L	Wall Switch	62	8,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,000	0.05	597	0.0	\$16.95	\$117.00	\$20.00	5.72
G.F. Hallway	8	Linear Fluorescent - T 8: 4' T 8 (32W) - 2L	Wall Switch	62	8,000	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,000	0.21	2,387	0.0	\$67.80	\$468.00	\$80.00	5.72
Men's Room	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,092	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	764	0.01	16	0.0	\$0.45	\$174.50	\$30.00	324.56
Women's Room	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,092	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	764	0.01	16	0.0	\$0.45	\$174.50	\$30.00	324.56
Hallway	4	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Occupancy Sensor	93	8,000	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	8,000	0.21	2,314	0.0	\$65.75	\$234.00	\$40.00	2.95
Room 18A	2	Linear Fluorescent - T 8: 4' T 8 (32W) - 2L	Occupancy Sensor	62	8,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	8,000	0.05	597	0.0	\$16.95	\$117.00	\$20.00	5.72
Room 18B	2	Linear Fluorescent - T 8: 4' T 8 (32W) - 2L	Occupancy Sensor	62	8,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	8,000	0.05	597	0.0	\$16.95	\$117.00	\$20.00	5.72
Storage	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	208	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	208	0.13	39	0.0	\$1.10	\$292.50	\$50.00	220.10
Mech Room	12	Linear Fluorescent - T 8: 4' T 8 (32W) - 2L	Wall Switch	62	2,912	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,912	0.32	1,303	0.0	\$37.02	\$702.00	\$120.00	15.72
Electrical Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,912	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,912	0.16	652	0.0	\$18.51	\$351.00	\$60.00	15.72
Records Bureau	14	Linear Fluorescent - T 8: 4' T 8 (32W) - 4L	Wall Switch	114	8,000	Relamp	No	14	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,000	0.64	7,087	0.0	\$201.35	\$1,331.87	\$280.00	5.22
Room 52 A	2	Linear Fluorescent - T 8: 4' T 8 (32W) - 4L	Occupancy Sensor	114	8,000	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	8,000	0.09	1,012	0.0	\$28.76	\$190.27	\$40.00	5.22
Room 52 B	2	Linear Fluorescent - T 8: 4' T 8 (32W) - 4L	Occupancy Sensor	114	8,000	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	8,000	0.09	1,012	0.0	\$28.76	\$190.27	\$40.00	5.22
Classroom	6	Linear Fluorescent - T 8: 4' T 8 (32W) - 4L	Wall Switch	114	1,560	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,092	0.36	776	0.0	\$22.06	\$686.80	\$140.00	24.79
Office	1	Linear Fluorescent - T 8: 4' T 8 (32W) - 4L	Wall Switch	114	8,000	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,000	0.05	506	0.0	\$14.38	\$95.13	\$20.00	5.22
Office	1	Linear Fluorescent - T 8: 2' T 8 (17W) - 2L	Wall Switch	33	8,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,000	0.00	36	0.0	\$1.03	\$58.50	\$10.00	47.21
Breakroom	2	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Wall Switch	93	4,368	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,058	0.10	617	0.0	\$17.54	\$266.40	\$50.00	12.34
Breakroom	1	Compact Fluorescent: Recessed fixture	Wall Switch	26	4,368	None	No	1	Compact Fluorescent: Recessed fixture	Wall Switch	26	4,368	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Classroom	6	Linear Fluorescent - T 8: 4' T 8 (32W) - 4L	Wall Switch	114	1,560	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,092	0.36	776	0.0	\$22.06	\$686.80	\$140.00	24.79
Hallway	13	Linear Fluorescent - T 8: 4' T 8 (32W) - 2L	Wall Switch	62	8,000	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	5,600	0.44	4,901	0.0	\$139.23	\$876.50	\$150.00	5.22
Men's Room	1	Linear Fluorescent - T 8: 2' T 8 (17W) - 2L	Wall Switch	33	1,092	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,092	0.00	5	0.0	\$0.14	\$58.50	\$10.00	345.87
Women's Room	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	1,092	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,092	0.00	5	0.0	\$0.14	\$58.50	\$10.00	345.87
investigation Room	2	Linear Fluorescent - T 8: 4' T 8 (32W) - 4L	Wall Switch	114	728	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	728	0.09	92	0.0	\$2.62	\$190.27	\$40.00	57.41
Special Investigation room	14	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Wall Switch	93	728	Relamp	No	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	728	0.56	570	0.0	\$16.20	\$1,052.80	\$210.00	52.04
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	8,000	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	8,000	0.08	895	0.0	\$25.43	\$150.40	\$30.00	4.74





	Existing C	onditions			1	Proposed Condition	ns	1			•		Energy Impac	t & Financial A	nalysis				
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
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	156	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	156	0.03	6	0.0	\$0.17	\$58.50	\$10.00	293.46
Supervisor office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,120	0.05	233	0.0	\$6.61	\$117.00	\$20.00	14.67
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	156	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	156	0.03	6	0.0	\$0.17	\$58.50	\$10.00	293.46
Office	1	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Wall Switch	93	8,000	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	8,000	0.04	447	0.0	\$12.71	\$75.20	\$15.00	4.74
Interview room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	728	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	728	0.08	81	0.0	\$2.31	\$150.40	\$30.00	52.04
Communication room	20	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Wall Switch	93	8,000	Relamp	No	20	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	8,000	0.81	8,950	0.0	\$254.26	\$1,504.00	\$300.00	4.74
Communication room	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	8,000	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	8,000	0.09	1,049	0.0	\$29.79	\$252.80	\$0.00	8.49
Hallway	17	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	17	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.68	2,967	0.0	\$84.29	\$1,278.40	\$255.00	12.14
Room 63	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.10	441	0.0	\$12.53	\$266.40	\$50.00	17.27
Room 64	6	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Wall Switch	93	3,120	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.31	1,323	0.0	\$37.59	\$567.20	\$110.00	12.16
Storage	4	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Wall Switch	93	20	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	20	0.16	4	0.0	\$0.13	\$300.80	\$60.00	1894.13
Offices	6	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.24	1,047	0.0	\$29.75	\$451.20	\$90.00	12.14
Room 68	2	Linear Fluorescent - T 8: 4' T 8 (32W) - 2L	Occupancy Sensor	62	8,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	8,000	0.05	597	0.0	\$16.95	\$117.00	\$20.00	5.72
Room 69	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	8,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	8,000	0.05	597	0.0	\$16.95	\$117.00	\$20.00	5.72
Room 69A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	8,000	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	8,000	0.05	597	0.0	\$16.95	\$117.00	\$20.00	5.72
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	156	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	156	0.03	6	0.0	\$0.17	\$58.50	\$10.00	293.46
EMS mgr	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	156	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	156	0.08	17	0.0	\$0.50	\$150.40	\$30.00	242.84
Machine room	2	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Wall Switch	93	156	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	156	0.08	17	0.0	\$0.50	\$150.40	\$30.00	242.84
Room 47	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.05	163	0.0	\$4.63	\$117.00	\$20.00	20.96
Room 46	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.05	163	0.0	\$4.63	\$117.00	\$20.00	20.96
Electrical Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	156	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	156	0.11	23	0.0	\$0.66	\$234.00	\$40.00	293.46
Telecom Room	3	Linear Fluorescent - T 8: 4' T 8 (32W) - 2L	Wall Switch	62	156	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	156	0.08	17	0.0	\$0.50	\$175.50	\$30.00	293.46
Janitor Closet	1	Compact Fluorescent: Recessed fixture	Wall Switch	26	156	None	No	1	Compact Fluorescent: Recessed fixture	Wall Switch	26	156	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Men's Locker Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	8,000	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,000	0.32	3,580	0.0	\$101.70	\$702.00	\$120.00	5.72
Bathroom	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	728	0.13	136	0.0	\$3.86	\$292.50	\$50.00	62.88





	Existing C	onditions				Proposed Condition	ns						Energy Impac	t & Financial A	nalysis				
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
Bathroom	6	Compact Fluorescent: Recessed fixture	Wall Switch	26	728	None	No	6	Compact Fluorescent: Recessed fixture	Wall Switch	26	728	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Gym	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,120	0.16	698	0.0	\$19.83	\$351.00	\$60.00	14.67
Women Locker	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,912	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,912	0.19	760	0.0	\$21.60	\$409.50	\$70.00	15.72
Women Locker	1	Compact Fluorescent: Recessed fixture	Wall Switch	26	2,912	Relamp	No	1	LED Screw-In Lamps: Recessed fixture - 1 lamp	Wall Switch	7	2,912	0.02	63	0.0	\$1.78	\$97.85	\$10.00	49.46
Weapon Supply	2	Linear Fluorescent - T 8: 8' T 8 (59W) - 2L	Wall Switch	110	1,820	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,820	0.13	333	0.0	\$9.47	\$117.00	\$20.00	10.25
Storage Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	156	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	156	0.11	23	0.0	\$0.66	\$234.00	\$40.00	293.46
Hall Entrance	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,120	0.03	116	0.0	\$3.31	\$58.50	\$10.00	14.67
Jail Cell Male	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,824	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,824	0.30	2,389	0.0	\$67.87	\$643.50	\$110.00	7.86
Room 22	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,120	0.05	233	0.0	\$6.61	\$117.00	\$20.00	14.67
Hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	8,000	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,000	0.08	895	0.0	\$25.43	\$175.50	\$30.00	5.72
Breathalizer	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,120	0.05	233	0.0	\$6.61	\$117.00	\$20.00	14.67
Women Jail	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,824	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,824	0.13	1,086	0.0	\$30.85	\$292.50	\$50.00	7.86
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	156	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	156	0.03	6	0.0	\$0.17	\$58.50	\$10.00	293.46
Prisoner Garage	6	High-Pressure Sodium: (1) 100W Lamp	Wall Switch	138	3,120	Relamp	No	6	LED Screw-In Lamps: 1 lamp	Wall Switch	14	3,120	0.61	2,623	0.0	\$74.52	\$645.92	\$30.00	8.27
Operations Planning	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,120	0.21	931	0.0	\$26.44	\$468.00	\$80.00	14.67
Records Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,456	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,456	0.12	244	0.0	\$6.94	\$225.60	\$45.00	26.02
Elevator Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	156	None	No	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	156	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Permits room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,120	0.16	698	0.0	\$19.83	\$351.00	\$60.00	14.67
Evidence Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	520	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	520	0.05	39	0.0	\$1.10	\$117.00	\$20.00	88.04
Floor 1 - Hallway	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.54	1,629	0.0	\$46.28	\$1,170.00	\$200.00	20.96
Floor 1 - hallway	16	Compact Fluorescent: Recessed fixture	Occupancy Sensor	26	2,184	Relamp	No	16	LED Screw-In Lamps: Recessed fixture - 1 lamp	Occupancy Sensor	7	2,184	0.25	750	0.0	\$21.31	\$1,565.65	\$160.00	65.95
Floor 1 - Reception	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.05	163	0.0	\$4.63	\$117.00	\$20.00	20.96
Men's Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.07	294	0.0	\$8.35	\$233.00	\$40.00	23.10
Men's Room	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,120	0.09	409	0.0	\$11.62	\$252.80	\$0.00	21.76
Women's Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.07	294	0.0	\$8.35	\$233.00	\$40.00	23.10





	Existing C	onditions				Proposed Condition	ns						Energy Impac	t & Financial A	nalysis				
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
Women's Room	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	4	LED - Linear Tubes: (1) U-Lamp	Wall Switch	17	3,120	0.15	642	0.0	\$18.23	\$158.93	\$0.00	8.72
Display Case light	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	3,120	Relamp	No	2	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	3,120	0.02	95	0.0	\$2.70	\$63.80	\$10.00	19.89
Hallway	2	Compact Fluorescent: Recessed fixture	Wall Switch	40	3,120	Relamp	No	2	LED Screw-In Lamps: 2 lamps	Wall Switch	14	3,120	0.04	183	0.0	\$5.21	\$391.41	\$40.00	67.47
Tax Collection	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.28	855	0.0	\$24.29	\$526.40	\$105.00	17.35
Office	30	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	30	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	1.21	3,665	0.0	\$104.12	\$2,256.00	\$450.00	17.35
Assistant Tax Collector	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Office 114	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Office 115	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Records	1	Compact Fluorescent: Recessed fixture	Wall Switch	26	3,120	Relamp	No	1	LED Screw-In Lamps: 1 lamp	Wall Switch	7	3,120	0.02	67	0.0	\$1.90	\$97.85	\$10.00	46.16
Municipal Clerk	19	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	19	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.77	2,321	0.0	\$65.94	\$1,428.80	\$285.00	17.35
Records	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.16	489	0.0	\$13.88	\$300.80	\$60.00	17.35
Deputy Municipal clerk	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Municipal Clerk	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Women's Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,120	0.03	116	0.0	\$3.31	\$58.50	\$10.00	14.67
Men's Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,120	0.03	116	0.0	\$3.31	\$58.50	\$10.00	14.67
Council members room	14	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.56	1,710	0.0	\$48.59	\$1,052.80	\$210.00	17.35
Council members room	20	Compact Fluorescent: Recessed fixture	Occupancy Sensor	26	2,184	Relamp	No	20	LED Screw-In Lamps: 2 lamps	Occupancy Sensor	14	2,184	0.20	592	0.0	\$16.83	\$3,914.12	\$400.00	208.83
Council members room	6	Compact Fluorescent: Wall mount fixture	Occupancy Sensor	13	2,184	Relamp	No	6	LED Screw-In Lamps: 1 lamp	Occupancy Sensor	7	2,184	0.03	89	0.0	\$2.52	\$587.12	\$60.00	208.83
Court rooms office and admin	53	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	53	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	2.13	6,475	0.0	\$183.94	\$3,985.60	\$795.00	17.35
Hallway	3	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.12	366	0.0	\$10.41	\$225.60	\$45.00	17.35
Court Director	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Conference	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Hallway	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	5	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.20	873	0.0	\$24.79	\$376.00	\$75.00	12.14
Electrical Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.08	349	0.0	\$9.92	\$150.40	\$30.00	12.14
Communication Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35





	Existing C	onditions				Proposed Condition	ns						Energy Impac	t & Financial Aı	nalysis				
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
File room 1&2	100	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	100	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	4.03	12,216	0.0	\$347.06	\$7,520.00	\$1,500.00	17.35
Waiting room	26	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	26	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	1.05	3,176	0.0	\$90.24	\$1,955.20	\$390.00	17.35
Court room	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.32	977	0.0	\$27.77	\$601.60	\$120.00	17.35
Public defender and prosecutor office	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.52	1,588	0.0	\$45.12	\$977.60	\$195.00	17.35
Public defender and prosecutor office	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.44	1,344	0.0	\$38.18	\$827.20	\$165.00	17.35
Public defender and prosecutor office	24	Compact Fluorescent: Wall mount fixture - 2 lamps	Occupancy Sensor	26	2,184	None	No	24	Compact Fluorescent: Wall mount fixture - 2 lamps	Occupancy Sensor	26	2,184	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Floor - 2 Hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.44	1,344	0.0	\$38.18	\$827.20	\$165.00	17.35
Floor - 2 Hallway	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,184	0.05	143	0.0	\$4.07	\$126.40	\$0.00	31.08
Break room	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,184	0.07	215	0.0	\$6.10	\$189.60	\$0.00	31.08
Room 281	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.05	163	0.0	\$4.63	\$117.00	\$20.00	20.96
Police Admin	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.19	570	0.0	\$16.20	\$409.50	\$70.00	20.96
Department of police director	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.11	326	0.0	\$9.26	\$234.00	\$40.00	20.96
Captain and directors office	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.13	407	0.0	\$11.57	\$292.50	\$50.00	20.96
Internal affairs	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.24	733	0.0	\$20.82	\$526.50	\$90.00	20.96
Internal affairs	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,184	0.09	286	0.0	\$8.13	\$252.80	\$0.00	31.08
Criminal Investigation	24	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	24	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.97	2,932	0.0	\$83.30	\$1,804.80	\$360.00	17.35
Criminal Investigation	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,184	0.12	358	0.0	\$10.17	\$316.00	\$0.00	31.08
Evidence Room	69	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	69	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	2.78	8,429	0.0	\$239.47	\$5,188.80	\$1,035.00	17.35
CID Commander	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.08	349	0.0	\$9.92	\$150.40	\$30.00	12.14
Transcribers	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.12	524	0.0	\$14.87	\$225.60	\$45.00	12.14
Interview 264,265,266	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.12	524	0.0	\$14.87	\$225.60	\$45.00	12.14
Bathroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,120	0.02	102	0.0	\$2.90	\$63.20	\$0.00	21.76
Community affairs	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.08	349	0.0	\$9.92	\$150.40	\$30.00	12.14
CID supervisor	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.08	349	0.0	\$9.92	\$150.40	\$30.00	12.14
CID Assignment officer	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.16	698	0.0	\$19.83	\$300.80	\$60.00	12.14





	Existing C	onditions				Proposed Condition	ns						Energy Impac	t & Financial A	nalysis				
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
Accreditation office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.08	349	0.0	\$9.92	\$150.40	\$30.00	12.14
CID conference	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.08	349	0.0	\$9.92	\$150.40	\$30.00	12.14
Interview	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Hallway	31	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	31	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	1.25	3,787	0.0	\$107.59	\$2,331.20	\$465.00	17.35
Photo lab	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.08	349	0.0	\$9.92	\$150.40	\$30.00	12.14
Photo lab	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,120	0.13	582	0.0	\$16.53	\$292.50	\$50.00	14.67
Police office	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.64	1,955	0.0	\$55.53	\$1,203.20	\$240.00	17.35
Room 223	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.12	366	0.0	\$10.41	\$225.60	\$45.00	17.35
Councelling	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.24	733	0.0	\$20.82	\$451.20	\$90.00	17.35
TV35 office	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.64	1,955	0.0	\$55.53	\$1,203.20	\$240.00	17.35
TV35 office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.16	698	0.0	\$19.83	\$300.80	\$60.00	12.14
TV35 office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.08	349	0.0	\$9.92	\$150.40	\$30.00	12.14
Men's Restroom	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,184	0.09	286	0.0	\$8.13	\$252.80	\$0.00	31.08
Women's Restroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,184	0.07	215	0.0	\$6.10	\$189.60	\$0.00	31.08
Janitor Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.04	175	0.0	\$4.96	\$75.20	\$15.00	12.14
Server room	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.56	2,443	0.0	\$69.41	\$1,052.80	\$210.00	12.14
Server room	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	5	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.20	873	0.0	\$24.79	\$376.00	\$75.00	12.14
Hallway	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.60	1,832	0.0	\$52.06	\$1,128.00	\$225.00	17.35
Room 271,232,office,272,273,27 4,	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.52	1,588	0.0	\$45.12	\$977.60	\$195.00	17.35
Room 270	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.36	1,571	0.0	\$44.62	\$676.80	\$135.00	12.14
Stairwell	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.32	1,396	0.0	\$39.66	\$601.60	\$120.00	12.14
Floor 3 - Conference room B	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.16	489	0.0	\$13.88	\$300.80	\$60.00	17.35
Office hallway	86	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	86	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	3.46	10,506	0.0	\$298.47	\$6,467.20	\$1,290.00	17.35
Printer room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Conference 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35





	Existing Conditions					Proposed Condition	ns						Energy Impac	t & Financial A	nalysis				
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
Conference 1	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.16	489	0.0	\$13.88	\$300.80	\$60.00	17.35
Room 388	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.16	489	0.0	\$13.88	\$300.80	\$60.00	17.35
Electrical subcode office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Building subcode office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Zoning office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Construction officer	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Municipal Engineer	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.16	489	0.0	\$13.88	\$300.80	\$60.00	17.35
Assisstant Engineering	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Storage Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Miliatary assisstant center	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.32	977	0.0	\$27.77	\$601.60	\$120.00	17.35
Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.12	366	0.0	\$10.41	\$225.60	\$45.00	17.35
Men's room	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.04	122	0.0	\$3.47	\$75.20	\$15.00	17.35
Hallway	4	Halogen Incandescent: 1 lamp	Wall Switch	100	3,120	Relamp	No	4	LED Screw-In Lamps: 1 lamp	Wall Switch	14	3,120	0.28	1,213	0.0	\$34.46	\$391.41	\$40.00	10.20
Hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.44	1,344	0.0	\$38.18	\$827.20	\$165.00	17.35
Hallway	11	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.44	1,344	0.0	\$38.18	\$827.20	\$165.00	17.35
Purchase department	32	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	32	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	1.29	3,909	0.0	\$111.06	\$2,406.40	\$480.00	17.35
Purchase department	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,184	0.08	244	0.0	\$6.94	\$175.50	\$30.00	20.96
Storage	5	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.20	611	0.0	\$17.35	\$376.00	\$75.00	17.35
Purchasing director, Insurance,Finance, Payroll,	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.40	1,222	0.0	\$34.71	\$752.00	\$150.00	17.35
CFO	4	Linear Fluorescent - T 8: 4' T 8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.16	489	0.0	\$13.88	\$300.80	\$60.00	17.35
Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.16	489	0.0	\$13.88	\$300.80	\$60.00	17.35
Mayor complex	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.60	1,832	0.0	\$52.06	\$1,128.00	\$225.00	17.35
Para legal	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Municipal Councelor	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Mayor's office	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.36	1,099	0.0	\$31.24	\$676.80	\$135.00	17.35





	Existing C	onditions				Proposed Condition	ns						Energy Impac	t & Financial A	nalysis				
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
Business admin	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.04	122	0.0	\$3.47	\$75.20	\$15.00	17.35
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.16	489	0.0	\$13.88	\$300.80	\$60.00	17.35
Grant's office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.12	366	0.0	\$10.41	\$225.60	\$45.00	17.35
Meeting room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.08	244	0.0	\$6.94	\$150.40	\$30.00	17.35
Women's room	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.12	366	0.0	\$10.41	\$225.60	\$45.00	17.35
Stairway	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.04	122	0.0	\$3.47	\$75.20	\$15.00	17.35
BAthroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.04	122	0.0	\$3.47	\$75.20	\$15.00	17.35
Business admin	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.12	366	0.0	\$10.41	\$225.60	\$45.00	17.35
Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.12	366	0.0	\$10.41	\$225.60	\$45.00	17.35
Women's Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,184	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.12	366	0.0	\$10.41	\$225.60	\$45.00	17.35
Bathroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,184	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,184	0.02	72	0.0	\$2.03	\$63.20	\$0.00	31.08
Exterior	16	High-Pressure Sodium: (1) 100W Lamp	Wall Switch	138	3,120	Relamp	No	16	LED Screw-In Lamps: 1 Lamp	Wall Switch	14	3,120	1.61	6,995	0.0	\$198.72	\$1,722.45	\$80.00	8.27
Exterior	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	No	5	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,120	0.20	873	0.0	\$24.79	\$376.00	\$75.00	12.14
Exterior	12	Compact Fluorescent: 2 lamps	Wall Switch	52	3,120	Relamp	No	12	LED Screw-In Lamps: 2 lamps	Wall Switch	14	3,120	0.37	1,608	0.0	\$45.67	\$2,348.47	\$240.00	46.16
Parking Garage	73	High-Pressure Sodium: (1) 100W Lamp	Wall Switch	138	4,380	Fixture Replacement	No	73	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	48	4,380	5.35	32,518	0.0	\$923.83	\$28,519.42	\$7,300.00	22.97
Parking Garage	3	High-Pressure Sodium: (1) 50W Lamp	Wall Switch	66	4,380	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	36	4,380	0.07	445	0.0	\$12.66	\$1,172.03	\$300.00	68.91
Parking Garage	1	High-Pressure Sodium: (1) 400W Lamp	Wall Switch	1,200	4,380	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	465	4,380	0.60	3,638	0.0	\$103.35	\$390.68	\$100.00	2.81
Parking Garage	2	High-Pressure Sodium: (1) 400W Lamp	Wall Switch	1,600	4,380	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	620	4,380	1.59	9,701	0.0	\$275.60	\$781.35	\$200.00	2.11
All building	40	Exit Signs: Fluorescent	Wall Switch	30	4,380	Fixture Replacement	No	40	LED Exit Signs: 2 W Lamp	Wall Switch	6	4,380	0.78	4,751	0.0	\$134.99	\$4,302.20	\$0.00	31.87





#### **Motor Inventory & Recommendations**

		Existing (	Conditions					Proposed	Conditions			Energy Impac	t & Financial A	nalysis				
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
Boiler room	Boiler	2	Other	0.8	77.0%	No	2,745	No	77.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Boiler room	Boiler water circulation	1	Heating Hot Water Pump	40.0	94.1%	Yes	4,067	No	94.1%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Boiler room	Boiler water circulation	2	Heating Hot Water Pump	20.0	93.0%	Yes	3,391	No	93.0%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Boiler Room	Air compressor	1	Air Compressor	2.0	86.5%	No	4,957	No	86.5%	No		0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

#### **Electric HVAC Inventory & Recommendations**

		Existing (	Conditions			Proposed	Condition	s						Energy Impact	& Financial A	nalysis				
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	T otal Installation Cost	T otal Incentives	Simple Payback w/ Incentives in Years
RTU 4 - Roof top	Court Room	1	Packaged AC	17.50		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
RTU 3 - Roof top	2nd and 3rd floors	1	Packaged AC	160.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
RTU 2 - Roof top	4th floor	1	Packaged AC	103.80		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
RTU 1 - Roof top	Ground floor	1	Packaged AC	63.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00
Tech closet	Tech closet	1	Split-System AC	3.00		No							No	0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00

#### Fuel Heating Inventory & Recommendations

		Existing	Conditions		Proposed	Condition	s				Energy Impac	t & Financial A	nalysis				
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
Boiler room	All building	2	Non-Condensing Hot Water Boiler	1,965.00	No						0.00	0	0.0	\$0.00	\$0.00	\$0.00	0.00





#### **DHW Inventory & Recommendations**

		Existing	Conditions	Proposed	Condition	S				Energy Impac	t & Financial A	nalysis				
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
Boiler room	All bathrooms and sinks	1	Storage Tank Water Heater (> 50 Gal)	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	95.00%	Et	0.00	0	40.7	\$322.80	\$11,500.21	\$398.00	34.39

#### Low-Flow Device Recommendations

	Recomme	edation Inputs			Energy Impac	t & Financial A	nalysis				
Location	Device Device Type Quantity		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
Police Station floor - Men's RR, Women's RR, Interview room, Break room	11	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	75.0	\$595.65	\$78.87	\$0.00	0.13
Men RR, Women RR	8	Showerhead	2.00	2.00	0.00	0	0.0	\$0.00	\$714.40	\$0.00	0.00
Jail cells - Men and Women, Floor 2 breakroom	14	Faucet Aerator (Kitchen)	2.20	2.20	0.00	0	0.0	\$0.00	\$100.38	\$0.00	0.00
Floor 1,2 - Men RR, Women RR	19	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	129.6	\$1,028.84	\$136.23	\$0.00	0.13



### Plug Load Inventory

	Existing Conditions											
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?								
Municipal building	489	Computer	150.0	Yes								
Municipal building	12	Laptop	45.0	No								
Municipal building	85	Printer - Small	20.0	Yes								
Municipal building	29	Printer - big	600.0	Yes								
Municipal building	18	paper Shredder	150.0	No								
Municipal building	11	Microwave	1,000.0	No								
Municipal building	5	Refrigerator - Small	153.0	No								
Municipal building	7	Refrigerator - Medium	156.0	No								
Municipal building	4	Refrigerator - Large	172.0	No								
Municipal building	9	Coffee Machine	900.0	No								
Municipal building	5	Toaster	850.0	No								
Municipal building	4	Portable fan	100.0	No								
Municipal building	10	TV monitor	71.0	No								
Municipal building	8	Space Heater	1,500.0	No								
Municipal building	1	Water dispenser	500.0	No								

#### Vending Machine Inventory & Recommendations

	Existing (	Conditions	<b>Proposed Conditions</b>	Energy Impac	t & Financial A	nalysis				
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
Floor 2	1	Refrigerated	No	0.00	0	0.0	\$0.00	\$718.80	\$0.00	0.00
Floor 2	1	Non-Refrigerated	No	0.00	0	0.0	\$0.00	\$718.80	\$0.00	0.00







# Appendix B: ENERGY STAR<sup>®</sup> Statement of Energy Performance

LEARN MORE AT energystar.gov	RGY STAR <sup>®</sup> St rmance	atement of Energy	
	Municipal Build	ling	
35	Primary Property Type Gross Floor Area (ft²): Built: 1997	e: Office 94,800	
ENERGY STAR® Score <sup>1</sup>	For Year Ending: March Date Generated: May 23	31, 2017 5, 2017	
1. The ENERGY STAR score is a 1-100 a climate and business activity.	ssessment of a building's energy	r efficiency as compared with similar buildings natio	onwide, adjusting for
Property & Contact Information	n		
Property Address Municipal Building	Property Owner	Primary Contact	
1 Main Street Woodbridge, New Jersey 07095	( ) -		
woodbindge, wew sersey or ooo			
Property ID: 5894593			
Energy Consumption and Energy	ergy Use Intensity (EUI)		
Site EUI Annual Energy	/ by Fuel kBtu) 11 513 364 (79%)	National Median Comparison National Median Site EUI (kBtu/ft²)	133.0
155.2 kBtu/ft <sup>2</sup> Natural Gas (kl	Btu) 3,196,784 (22%)	National Median Source EUI (kBtu/ft²)	359.6
Source EUI		% Diff from National Median Source EUI Annual Emissions	16%
416.8 kBtu/ft <sup>2</sup>		Greenhouse Gas Emissions (Metric Tons CO2e/year)	1,490

#### Signature & Stamp of Verifying Professional

1

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

Signature:	Date:	
Licensed Professional		
<u> </u>		



Professional Engineer Stamp (if applicable)