Local Government Energy Audit:
Energy Audit Report

Police and Court Building

Maplewood, Township of

1618 Springfield Avenue
Maplewood, NJ 07040

November 16, 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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1 EXECUTIVE SUMMARY

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

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

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

1.1 Facility Summary

The Police and Court Building at Maplewood Township is located at 1618 Springfield Avenue. The facility is a three-story building totaling 39,000 square feet and constructed in 2008. It is comprised of various space types including the Township police department, municipal court, administrative offices, conference rooms, garages and mechanical spaces. The building is occupied year-round and the police department section of the building is open continuously.

The building has a black membrane covering a center flat roof housing 64 photovoltaic (PV) arrays, and surrounded by asphalt shingles covering pitched roofs. The exterior walls are finished with brick veneer. The windows are double pane glazed with aluminum frames. The exterior doors are a combination of a glass with aluminum frames and metal frames.

The building's interior lighting consists of a combination of linear fluorescent fixtures and compact fluorescent lamps with electronic ballasts. Lighting is controlled throughout the building by a combination of occupancy sensors and manual wall switches. The exterior lighting system consists mainly of metal halide lamps and a few compact fluorescent lamps (CFL). Exterior lighting is controlled with photocells.

Cooling is provided by two small modular water-cooled chillers and split system air conditioners (ACs) while the heating system consists of two condensing hot water boilers. The building also houses two air handlers and two energy recovery ventilation units (ERV).

Air is exhausted from some common areas through the ceiling-mounted exhausters.

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 five measures and recommends four measures which together represent an opportunity for the Police and Court Building to reduce annual energy costs by $15,478 and annual greenhouse gas emissions by 114,156 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 3.7 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce the Police and Court Building's annual energy use by 9%.

Figure 1 – Previous 12 Month Utility Costs

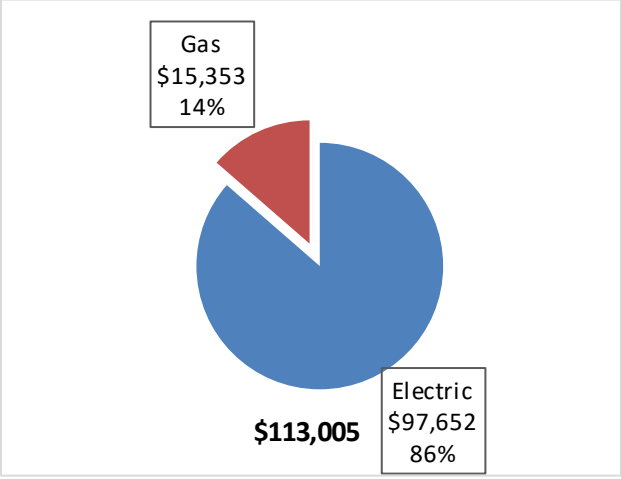
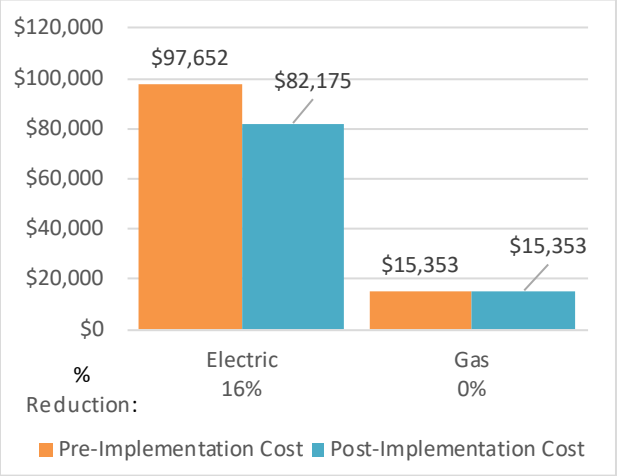


Figure 2 – Potential Post-Implementation Costs



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

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

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			105,366	24.1	0.0	$14,385.85	$61,602.39	$9,665.00	$51,937.39	3.6	106,103
ECM 1	Install LED Fixtures	Yes	30,477	5.5	0.0	$4,161.05	$10,950.00	$3,485.00	$7,465.00	1.8	30,690
ECM 2	Retrofit Fixtures with LED Lamps	Yes	74,889	18.6	0.0	$10,224.80	$50,652.39	$6,180.00	$44,472.39	4.3	75,413
Lighting Control Measures			7,998	1.8	0.0	$1,091.92	$6,580.00	$620.00	$5,960.00	5.5	8,053
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	4,475	1.3	0.0	$611.00	$4,980.00	$620.00	$4,360.00	7.1	4,506
ECM 4	Install High/Low Lighitng Controls	Yes	3,522	0.5	0.0	$480.92	$1,600.00	$0.00	$1,600.00	3.3	3,547
Electric Unitary HVAC Measures			2,430	1.3	0.0	$331.77	$20,198.97	$1,242.00	$18,956.97	57.1	2,447
	Install High Efficiency Electric AC	No	2,430	1.3	0.0	$331.77	$20,198.97	$1,242.00	$18,956.97	57.1	2,447
TOTALS FOR HIGH PRIORITY MEASURES			113,363	25.9	0.0	$15,477.77	$68,182.39	$10,285.00	$57,897.39	3.7	114,156
TOTALS FOR ALL EVALUATED MEASURES			115,793	27.2	0.0	$15,809.55	$88,381.36	$11,527.00	$76,854.36	4.9	116,603

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

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

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

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

Electric Unitary HVAC measures generally involve replacing older inefficient air conditioning systems with modern energy efficient systems. New air conditioning systems can provide equivalent cooling to older air condition systems at a reduced energy cost. These measures save energy by reducing the power used by the air conditioning systems, due to improved electrical efficiency.

Energy Efficient Practices

TRC also identified 11 low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at the Police and Court Building include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Turn Off Unneeded Motors
- Perform Routine Motor Maintenance
- Assess Chillers & Request Tune-Ups
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- 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 Police and Court Building. Based on the configuration of the site and its loads there is a low potential for installing any additional PV and combined heat and power self-generation measures.

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Direct Install
- Energy Savings Improvement Program (ESIP)

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

This facility may also qualify for the Direct Install program which can provide turnkey installation of multiple measures, through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70% of the cost of selected measures, although measure eligibility will have to be assessed and be verified by the designated Direct Install contractor and, in most cases, they will perform the installation work.

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.3 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability. By enabling grid operators to call upon commercial facilities to reduce their electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this program.

Additional information on relevant incentive programs is located in Section 8. You may also check the following website for more details: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Joseph Manning	Business Administrator	Joseph F. Manning <twpadmin@twp.maplewood.nj.us	973-762-8120 ex. 2000
Designated Representative			
Joe Pukatch	Maintenance Personnel		973-762-8120 ex. 2000
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On May 08, 2018, TRC performed an energy audit at the Police and Court Building located in Maplewood, New Jersey. TRC's team met with Joe Pukatch, Maintenance Personnel to review the facility operations and help focus our investigation on specific energy-using systems.

The Police and Court Building at Maplewood Township is located at 1618 Springfield Avenue. The facility is a three-story building totaling 39,000 square feet and constructed in 2008. It is comprised of various space types including the Township police department, municipal court, administrative offices, conference rooms, garages and mechanical spaces. The building is occupied year-round and the PD section of the building is open continuously.

Image 1: Court Room

2.3 Building Occupancy

The section of the building occupied by the Town Police Department is open continuously. The remaining sections, occupied by the Town municipal court and administrative offices, are open Monday to Friday. Typically, 150 to 200 people occupy the facility during normal operating hours. The typical schedule is presented in the table below.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Police Department Section	Weekday	12:00:00 AM
Police Department Section	Weekend	12:00:00 AM
Municipal Offices & Court	Weekday	8:30:00 AM
Municipal Offices & Court	Weekend	4:30:00 AM

2.4 Building Envelope

The building has a concrete foundation with exterior walls are constructed of brick veneer. The roofing system consists of a pitched asphalt shingled roof on the perimeter and a membrane type roof on the center of the building. They are in good condition. The windows are glazed double pane with insulated panes set in aluminum frames. The exterior doors are a combination of glass with aluminum frames and metal frames. The front entry doors are fully glazed roll up type with aluminum frames. The garages located at the rear of the building have three motorized metal rollup doors. Windows, shading devices, sills, related flashing and caulking were inspected (as accessibility allowed) for signs of moisture, air-leakage and other issues. Overall, the windows appeared to be in good condition with no signs of uncontrolled moisture, air-leakage and other energy-compromising issues.

Image 2: Building Envelope

Image 3: Front Entry Doors

2.5 On-Site Generation

The Police and Court Building has 64 photovoltaic (PV) arrays installed on the center flat roof. On-site solar production meets approximately 10% of the building's annual electricity requirements. There is one diesel Cummins emergency backup generator located on the ground floor at the back of the building.

Image 4: Solar PV Arrays

2.6 Energy-Using Systems

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

Lighting System

The interior lighting in the Maplewood Township Police and Court Building consists mostly of 32-Watt linear fluorescent T8 fixtures with electronic ballasts and 26-Watt and 32-Watt fixtures using 4-pin compact fluorescent lamps (CFL). Most of the linear fluorescent fixtures are 2-lamp or 3-lamp, 4-foot long troffers with diffusers. The main lobby is primarily illuminated with 26-Watt and 32-Watt CFLs, and 1-lamp, 4-foot long fluorescent T5 lamps while the corridors, PD administrative offices and firing range in the basement are illuminated with 32-Watt CFLs. The locker rooms and restrooms are lit with a combination of linear fluorescent fixtures and 32-Watt CFLs. A small number of linear fluorescent T5 fixtures are found in the training room and the firing range. Remaining spaces are mostly illuminated with 32-Watt linear fluorescent lamps. The exit signs throughout the building are LED. Lighting is controlled throughout the building by a combination of occupancy sensors and manual wall switches.

Most exterior lighting around the building perimeter and in parking lot areas consists of metal halide with a few CFL lamps. The typical wattage of exterior CFLs is 26-Watt, while 70-Watt and 250-Watt metal halide fixtures provide perimeter lighting and 400-Watt metal halide illuminate the parking lot areas. Exterior fixtures are controlled with photocells.

Image 5: Typical Interior Lighting

Image 6: LED Exit Sign & Wall Mounted Occupancy Sensors

Image 7: Typical Exterior Perimeter Light

Chilled Water System

The Police and Court Building is served by two CLIMACOOL modular water-cooled chillers, one 30 ton and one 50 ton. The chillers use positive displacement scroll compressor technology. The chillers are configured in a primary distribution. Chilled water is distributed to chilled water coils in two McQuay air handler units (AHUs) by two 10 hp variable flow pumps. Condenser water is supplied to the chillers by two 7.5 hp constant speed pumps. The chillers are enabled locally or remotely from enable/disable contact provided by the building energy management system (BEMS) via a selector switch on face of the "Master Control Panel." The chillers start when proof of flow is established in both the chilled water and condenser water lines. The chilled water supply (CHWS) temperature sensor located in the discharge line of chillers is used to cycle compressor stages sequentially to maintain setpoint of 45°F (adjustable from the LCD display on the face of the "Master Control Panel," or remotely via the BEMS system. Chillers will be disabled until chilled water return (CHWR) temperature sensor is below 90°F and condenser water supply (CWS) temperature sensor is above 65°F.

A BAC cooling tower located in the rear of the ground floor of the building provides cooling for the modular chillers. It has a 10 hp fan which is controlled with variable frequency drive (VFD). The site maintenance contractor has expressed interest in replacing the cooling tower as it is not fulfilling its design intent. Most of its interior is corroded. It is recommended to engage the services of a local cooling engineer to establish a basis of design for an optimal cooling tower. The chillers are original to building and appear in good condition.

Image 8: Chilled Water System

Image 9: Chilled Water Supply Pumps & VFDs

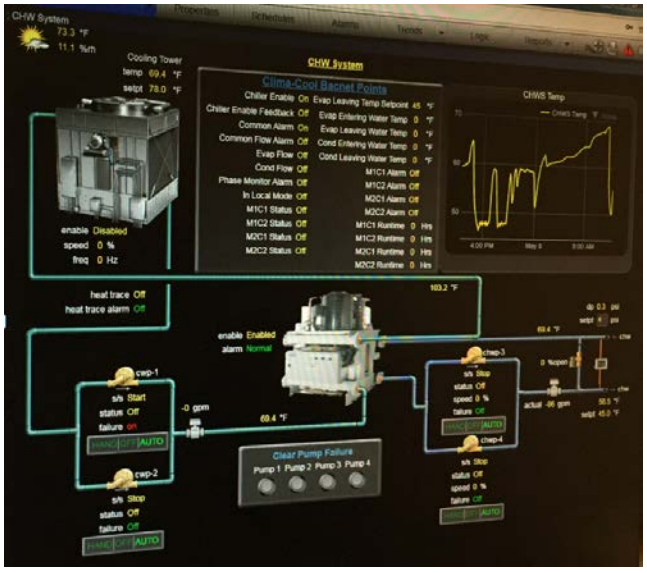


Image 10: Chilled Water Web Control System

Hot Water Heating System

Heating hot water for the building is provided by two P-K condensing hot water boilers that are also original to building. Each boiler has an output capacity of 1,275 MBh and a nominal combustion efficiency of 85%. Boilers are automatically rotated based on run time. They may run simultaneously depending on the outside air temperature. Heating hot water is circulated throughout the facility via two 7.5 hp supply pumps and two 2 hp return pumps. The supply pumps operate in a lead/lag configuration at variable speed. They distribute heating hot water to the McQuay AHUs, Clean Air heating recovery units equipped with hot water coils, and to hot water unit heaters located in the storage and mechanical spaces. The AHUs are variable air volume (VAV) systems with terminal reheat coils located above the ceiling in individual rooms. The hot water system is enabled based upon outside air temperature. The heating hot water system is controlled via an Automated Logic Web control (WebCTRL®) energy management system. The typical space temperature setpoints are 70°F during occupied periods and 65°F during unoccupied heating periods. However, thermostats located in spaces can be used to vary the temperature. The system can maintain up to 180°F supply water at 40°F outdoor air or below. The boilers are well maintained.

Image 11: Heating Hot Water System

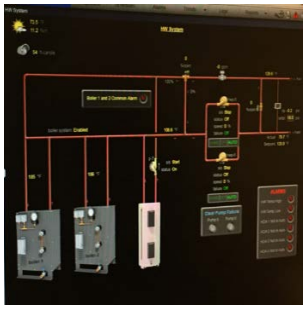


Image 12: Heating Control System

Image 13: Hot Water Unit Heater & Local Control Thermostat

Air Handlers and Energy Recovery Ventilation Systems

There are two McQuay AHUs (AHU1, AHU2) located on the third floor and equipped with chilled and hot water coils for cooling and heating. The units are variable air volume with terminal reheat coils located above the ceiling in individual rooms. Tempered air is supplied by a single 25 hp supply fan and a single 7.5 return fan for each AHU. The cold supply air temperature is reset based on outside air temperature. Cold air is supplied at 55°F when the outside temperature is above 65°F and is reset to 70°F when the outside air temperature is below 60°F. Hot air is supplied at 70°F and the heating coil is locked when the outside air temperature is above 75°F. The units are controlled with the BEMS system and in good condition.

Image 14: McQuay AHU

Two Cleanair heating recovery ventilation units located in the garages equipped with hot water coils provide heat to the garage and other areas. Each has a 20 hp supply fan and three 0.3 hp exhaust fans. The units are controlled with the BEMS system and in good condition.

Image 15: Cleanair HRV Units

Direct Expansion Air Conditioning System (DX)

The DX system consists of five split air conditioners of various size. They all appear to be original to building and are near the end of their useful life service. We recommend that the Township develop a plan for their replacement in the relatively near future. The units utilize scroll compressors and direct-expansion coils. Refer to the table below for the observed condition of the units. They are all located on the center flat roof. They are controlled with the BEMS system and programmable thermostats are for temperature adjustment.

System Type	Quantity	Capacity (Ton)	Areas Served	Manufacturer	Age (Years)	Condition
Split System AC	1	4	Server Room	Witt Scottsboro	10	Good
Split System AC	1	3	PD Dispatch Room	Mitsubishi	10	Good
Split System AC	1	2	Watch Command	Mitsubishi	10	Good
Split System AC	1	3	CAC5	Mitsubishi	10	Good
Split System AC	1	1.5	Telecom Room	Mitsubishi	10	Good

Image 16: Split System AC

Building Energy Management System (BEMS)

The HVAC and interior lighting systems include a web control (WebCTRL®) Building Automation System made by United Technologies. The system includes electronic controls for actuators and control valves. The front-end controller has the capability to monitor and control all schedules, thermostat temperatures and set points. The control system automates the on/off control and temperature setbacks based on outside air temperature. The building is equipped with carbon dioxide sensors for a better demand control ventilation and all the sensors are incorporated in the web control platform.

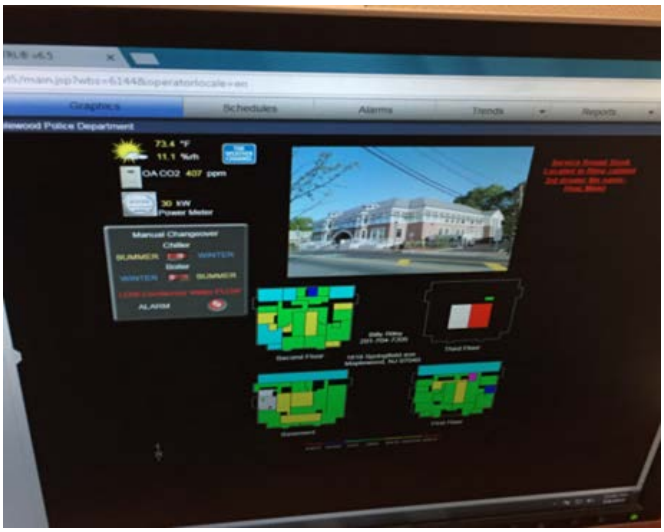


Image 17: Web Control Building Automation system

Domestic Hot Water Heating System

Image 18: Domestic Water Heater

Domestic hot water for the building consists of one PIVI industries gas-fired water heater. The heater also works in conjunction with the boilers for the reheat system. It is located in the mechanical room and has an input rating of 360 MBh and a combustion efficiency of 80%. It has a 225 gallon storage tank. One 3 hp pump is used for domestic hot water recirculation and hot water supply to VAV reheat coils. The Township maintenance personnel said that the heater capacity is greater than its service requirements. They want to replace the heater with a reduced capacity heater. For this measure, we recommended the Township engage the services of a local heating engineer to establish the basis of design for an optimal domestic water heater system. The heater appears in good condition.

Building Plug Load

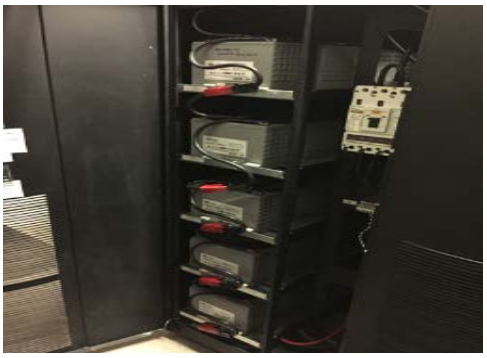


Image 19 UPS Batteries Cabinet

There are 67 computer work stations with mostly desktop units with LCD monitors throughout the facility. There is a centralized PC power management software installed.

There is one main server room and one room that contains an UPS battery cabinet for data protection. Cooling for that area is provided by a dedicated split system air conditioner. We also counted six copy machines, 31 printers, 11 flat screen TV monitors, four microwaves and three water coolers. The facility has no vending machines.

2.7 Water-Using Systems

There are several restrooms at this facility. A sampling of restrooms found that the faucets are rated as low flow.

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

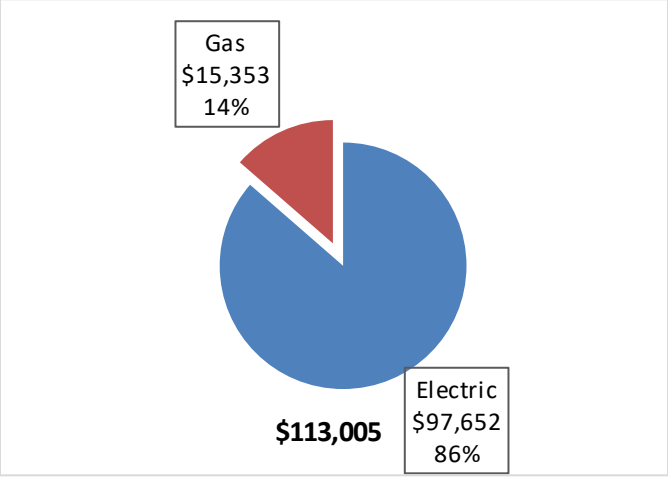
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Police/Court (Municipal Building)		
Fuel	Usage	Cost
Electricity	715,232 kWh	$97,652
Natural Gas	17,606 Therms	$15,353
Total		$113,005

The current annual energy cost for this facility is $113,005 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G with a minimal contribution by the roof top solar PV. The average electric cost over the past 12 months was $0.137/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below. The electricity use profile reflects high cooling loads in the summer months.

Figure 8 - Electric Usage & Demand

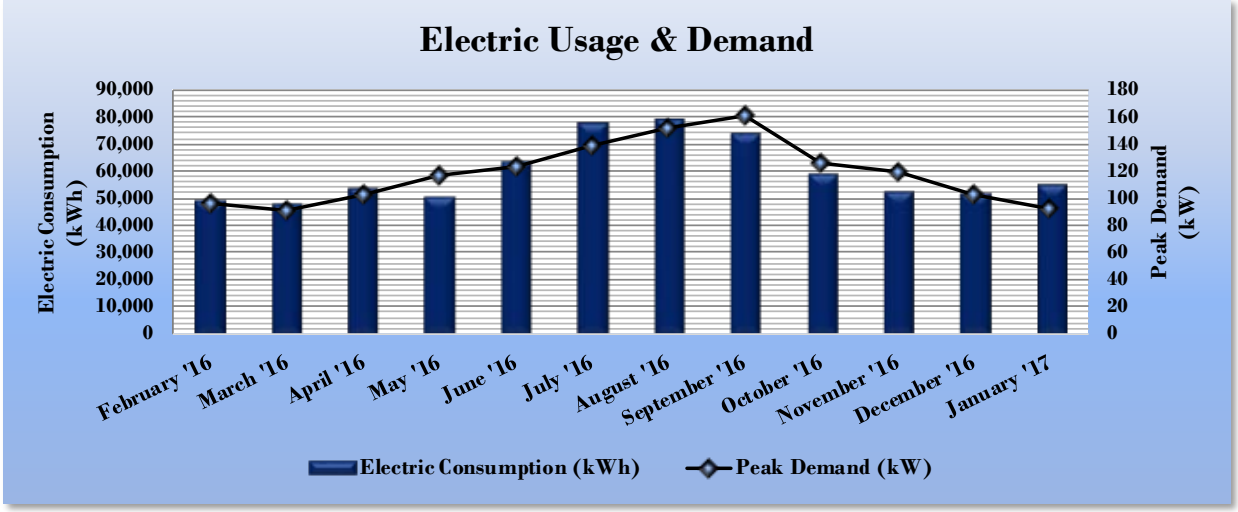


Figure 9 - Electric Usage & Demand

Electric Billing Data for Police/Court (Municipal Building)					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
2/19/16	28	49,108	96	$348	$6,500
3/18/16	31	47,797	91	$330	$6,250
4/18/16	30	53,899	103	$378	$7,009
5/18/16	31	50,816	118	$431	$6,655
6/17/16	30	63,523	124	$453	$9,235
7/20/16	31	78,024	139	$510	$11,183
8/18/16	31	79,078	152	$557	$11,474
9/16/16	30	74,212	161	$594	$11,039
10/17/16	31	59,376	126	$470	$7,686
11/19/16	30	52,428	120	$447	$6,265
12/16/16	31	51,648	103	$384	$6,900
1/18/17	31	55,323	93	$345	$7,456
Totals	365	715,232	160.7	$5,246	$97,652
Annual	365	715,232	160.7	$5,246	$97,652

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.872/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below. The gas use profile is typical for a facility with a significant heating load relative to other end uses.

Figure 10 - Natural Gas Usage

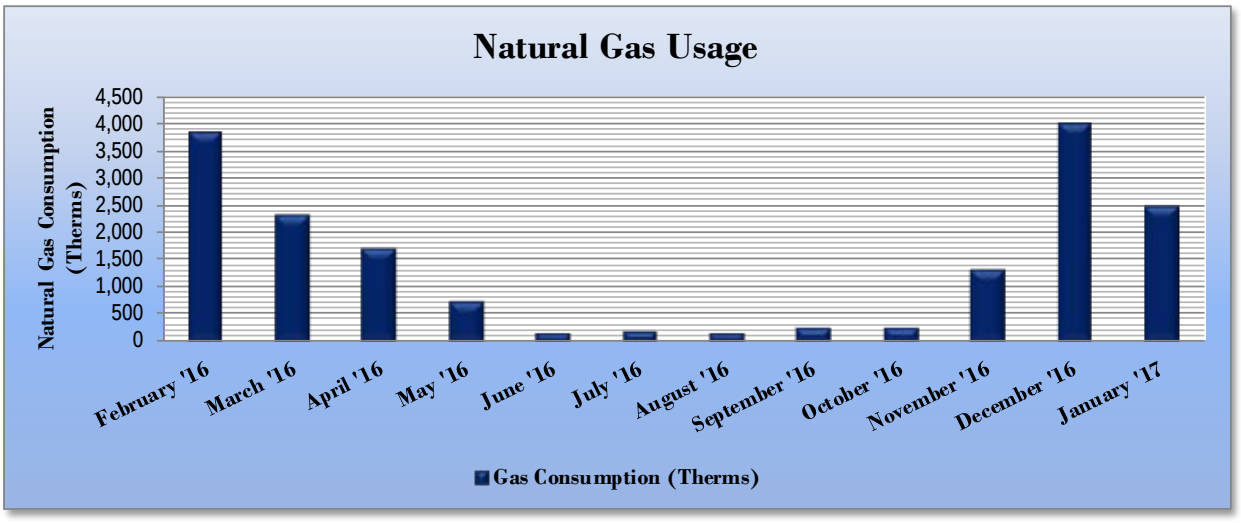


Figure 11 - Natural Gas Usage

Gas Billing Data for Police/Court (Municipal Building)			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
2/19/16	28	3,867	$2,969
3/18/16	31	2,339	$1,925
4/18/16	30	1,717	$957
5/18/16	31	748	$489
6/17/16	30	184	$201
7/20/16	31	193	$218
8/18/16	31	182	$216
9/16/16	30	258	$262
10/17/16	31	267	$272
11/19/16	30	1,325	$1,587
12/16/16	31	4,020	$3,603
1/18/17	31	2,507	$2,653
Totals	365	17,606	$15,353
Annual	365	17,606	$15,353

3.4 Benchmarking

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

The EUI is a measure of a facility's energy consumption per square foot, and it is the standard metric for comparing buildings' energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more or less energy than similar buildings of its type on a square foot basis. EUI is presented in terms of "site energy" and "source energy." Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Police/Court (Municipal Building)	National Median Building Type: Municipal
Source Energy Use Intensity (kBtu/ft^2)	243.9	148.1
Site Energy Use Intensity (kBtu/ft^2)	107.7	67.3

Implementation of all recommended measures in this report would improve the building's estimated EUI significantly, 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		
	Police/Court (Municipal Building)	National Median Building Type: Municipal
Source Energy Use Intensity (kBtu/ft^2)	212.7	148.1
Site Energy Use Intensity (kBtu/ft^2)	97.8	67.3

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75% of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This building is not eligible to receive a score because the property type falls under Police Station type, which is currently not being rated by ENERGY STAR® score

A Portfolio Manager® Statement of Energy Performance (SEP) was generated for this facility, see **Appendix B: ENERGY STAR® Statement of Energy Performance**.

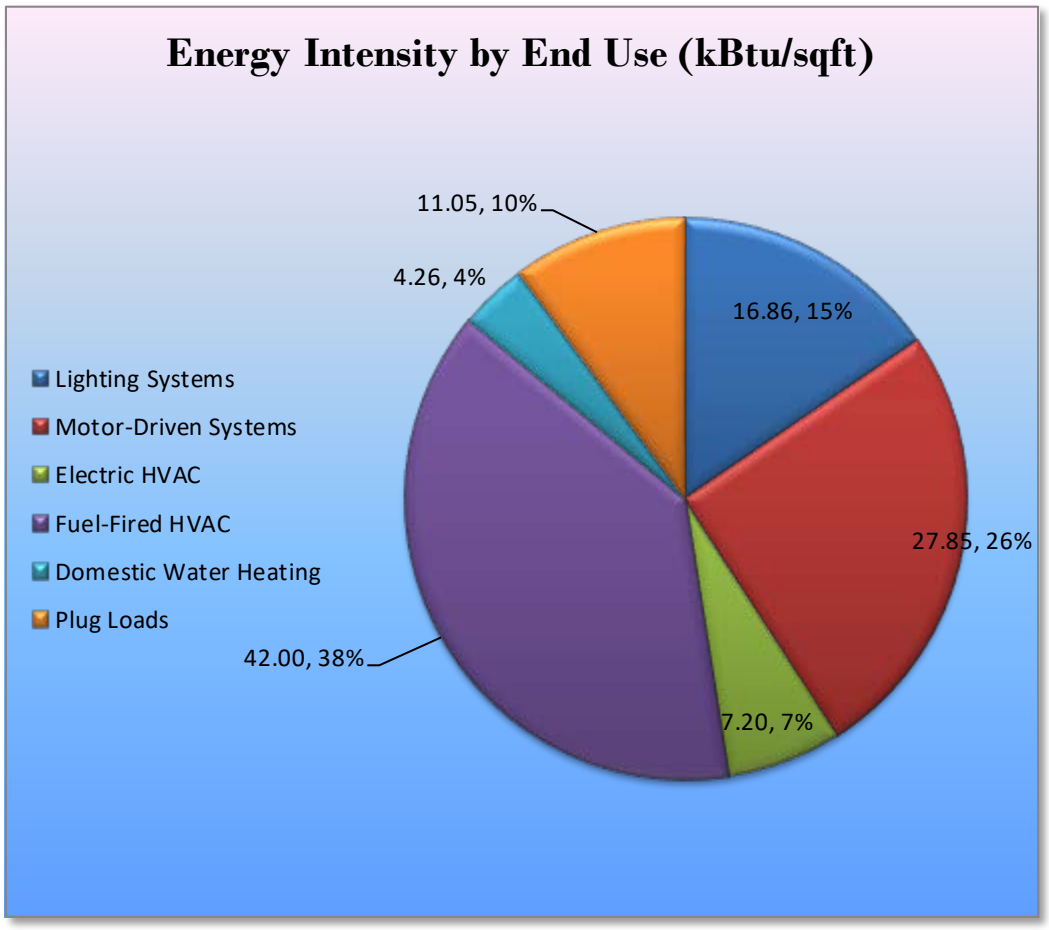
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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® Portfolio Manager® to track your building's performance at: https://www.energystar.gov/buildings/training.

3.5 Energy End-Use Breakdown

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

Figure 14 - Energy Balance (% and 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 Police and Court 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.

Figure 15 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		105,366	24.1	0.0	$14,385.85	$61,602.39	$9,665.00	$51,937.39	3.6	106,103
ECM 1	Install LED Fixtures	30,477	5.5	0.0	$4,161.05	$10,950.00	$3,485.00	$7,465.00	1.8	30,690
ECM 2	Retrofit Fixtures with LED Lamps	74,889	18.6	0.0	$10,224.80	$50,652.39	$6,180.00	$44,472.39	4.3	75,413
Lighting Control Measures		7,998	1.8	0.0	$1,091.92	$6,580.00	$620.00	$5,960.00	5.5	8,053
ECM 3	Install Occupancy Sensor Lighting Controls	4,475	1.3	0.0	$611.00	$4,980.00	$620.00	$4,360.00	7.1	4,506
ECM 4	Install High/Low Lighitng Controls	3,522	0.5	0.0	$480.92	$1,600.00	$0.00	$1,600.00	3.3	3,547
TOTALS		113,363	25.9	0.0	$15,477.77	$68,182.39	$10,285.00	$57,897.39	3.7	114,156

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

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

4.1.1 Lighting Upgrades

Our recommendations for to existing lighting fixtures upgrades are summarized in Figure 16 below.

Figure 16 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		105,366	24.1	0.0	$14,385.85	$61,602.39	$9,665.00	$51,937.39	3.6	106,103
ECM 1	Install LED Fixtures	30,477	5.5	0.0	$4,161.05	$10,950.00	$3,485.00	$7,465.00	1.8	30,690
ECM 2	Retrofit Fixtures with LED Lamps	74,889	18.6	0.0	$10,224.80	$50,652.39	$6,180.00	$44,472.39	4.3	75,413

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

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	4,553	1.3	0.0	$621.58	$2,550.00	$85.00	$2,465.00	4.0	4,584
Exterior	25,924	4.3	0.0	$3,539.47	$8,400.00	$3,400.00	$5,000.00	1.4	26,105

Measure Description

We recommend replacing interior main lobby metal halide lighting and exterior building and pole mounted metal halide fixtures with new high performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of metal halide lamps.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	71,977	17.6	0.0	$9,827.24	$48,897.16	$6,070.00	$42,827.16	4.4	72,481
Exterior	2,912	1.0	0.0	$397.55	$1,755.23	$110.00	$1,645.23	4.1	2,932

Measure Description

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

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

4.1.2 Lighting Control Measures

Our recommendations for to existing lighting control upgrades are summarized in Figure 17 below.

Figure 17 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		7,998	1.8	0.0	$1,091.92	$6,580.00	$620.00	$5,960.00	5.5	8,053
ECM 3	Install Occupancy Sensor Lighting Controls	4,475	1.3	0.0	$611.00	$4,980.00	$620.00	$4,360.00	7.1	4,506
ECM 4	Install High/Low Lighitng Controls	3,522	0.5	0.0	$480.92	$1,600.00	$0.00	$1,600.00	3.3	3,547

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

ECM 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
4,475	1.3	0.0	$611.00	$4,980.00	$620.00	$4,360.00	7.1	4,506

Measure Description

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

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

ECM 4: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
3,522	0.5	0.0	$480.92	$1,600.00	$0.00	$1,600.00	3.3	3,547

Measure Description

We recommend installing occupancy sensors to provide dual level lighting control for lighting fixtures in corridors that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Typical areas for such lighting control are stairwells, interior corridors, parking lots, and parking garages.

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

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

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

4.2 ECMs Evaluated but Not Recommended

The measures below have been evaluated by the auditor but are not recommended for implementation at the facility. Reasons for exclusion can be found in each measure description section.

Figure 18 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures	2,430	1.3	0.0	$331.77	$20,198.97	$1,242.00	$18,956.97	57.1	2,447
Install High Efficiency Electric AC	2,430	1.3	0.0	$331.77	$20,198.97	$1,242.00	$18,956.97	57.1	2,447
TOTALS	2,430	1.3	0.0	$331.77	$20,198.97	$1,242.00	$18,956.97	57.1	2,447

* - 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).

Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
2,430	1.3	0.0	$331.77	$20,198.97	$1,242.00	$18,956.97	57.1	2,447

Measure Description

We evaluated replacing the standard efficiency split system air conditioning units with high efficiency split system air conditioning units. There have been significant improvements in both compressor and fan motor efficiencies over the past several years. Therefore, electricity savings can be achieved by replacing older units with new high efficiency units. A higher EER or SEER rating indicates a more efficient cooling system. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

Reasons for not Recommending

The simple payback of this measure exceeds the expected useful life of the equipment and is therefore not recommended on the basis of energy savings alone. The split system units appear to be original to building and are near the end of their useful life service. We recommend that the Township develop a plan for their replacement in the near future.

5 ENERGY EFFICIENT PRACTICES

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

Perform 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.

Turn Off Unneeded Motors

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Reducing run hours for these motors can result in significant energy savings. Whenever possible, use automatic devices such as twist timers or occupancy sensors to ensure that motors are turned off when not needed.

Perform Routine Motor Maintenance

Motors consist of many moving parts whose collective degradation can contribute to a significant loss of motor efficiency. In order to prevent damage to motor components, routine maintenance should be performed. This maintenance consists of cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

Assess Chillers & Request Tune-Ups

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

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Perform Proper Boiler Maintenance

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

Perform Proper Water Heater Maintenance

At least once a year, drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Once a year check for any leaks or heavy corrosion on the pipes and valves. For gas water heaters, check the draft hood and make sure it is placed properly, with a few inches of air space between the tank and where it connects to the vent. Look for any corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional. For electric water heaters, look for any signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank. For water heaters over three to four years old have a technician inspect the sacrificial anode annually.

Water Conservation

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

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. Any reduction in water use does however ultimately reduce grid level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users. The EPA WaterSense™ ratings for urinals is 0.5 gallons per flush (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

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.

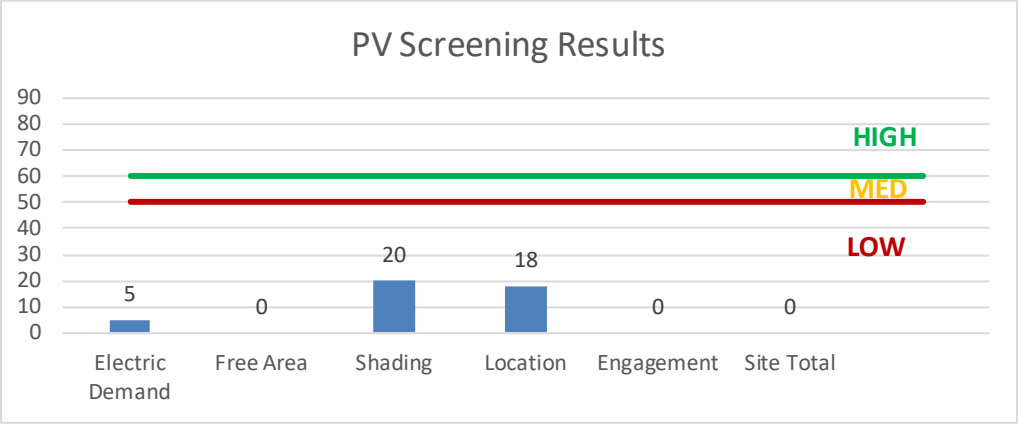
Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection,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

Figure 19 - Photovoltaic Screening



6.2 Combined Heat and Power

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

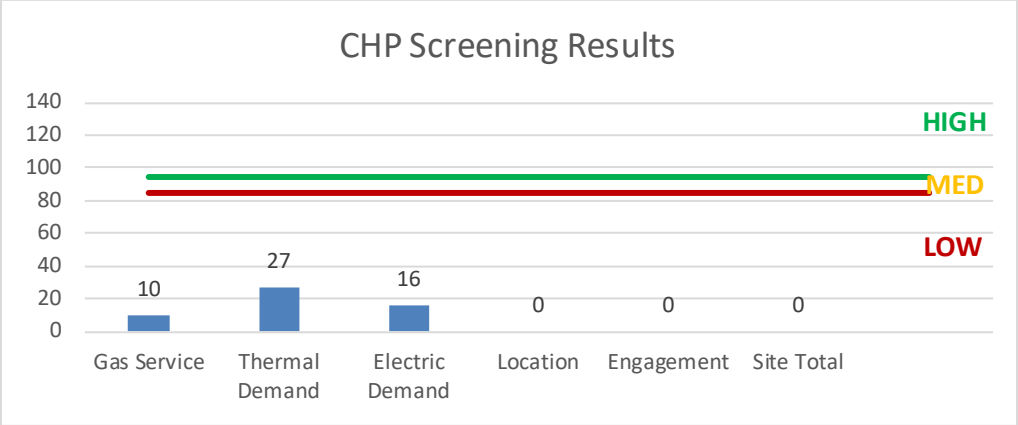
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a Low potential for installing a cost-effective CHP system.

Low or infrequent thermal load, and lack of space near the existing boilers 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 New Jersey specializing in commercial CHP cost assessment and installation, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/.

Figure 20 - Combined Heat and Power Screening



7 DEMAND RESPONSE

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

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities to reduce electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail their electric usage.

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

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

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

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

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

In our opinion, the facility has a moderate potential for DR curtailment.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund, your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 21 for a list of the eligible programs identified for each recommended ECM.

Figure 21 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	X		X			
ECM 2	Retrofit Fixtures with LED Lamps	X		X			
ECM 3	Install Occupancy Sensor Lighting Controls	X		X			
ECM 4	Install High/Low Lighitng Controls						

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

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Direct Install

Overview

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

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Each entity is limited to incentives up to $250,000 per fiscal year.

How to Participate

To participate in Direct Install, you will need to contact the participating contractor assigned to the region of the state where your facility is located. A complete list of Direct Install program partners is provided on the Direct Install website linked below. The contractor will be paid the measure incentives directly by the program which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the program, subject to program caps and eligibility, while the remaining 30% of the cost is paid to the contractor by the customer.

Detailed program descriptions and applications can be found at: www.njcleanenergy.com/DI.

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 description and application can be found at: www.njcleanenergy.com/ESIP.

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Wall Pack	11	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	4,368	Fixture Replacement	No	11	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	75	4,368	1.74	10,571	0.0	$1,443.22	$2,750.00	$1,100.00	1.14
Exterior Wall Pack	5	Compact Fluorescent: CFL 2-pin	Daylight Dimming	26	4,368	Relamp	No	5	LED Screw-In Lamps: LED Screw-In Lamps	Daylight Dimming	13	4,368	0.05	321	0.0	$43.80	$220.26	$0.00	5.03
Pole Lighting	7	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	4,368	Fixture Replacement	No	7	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	125	4,368	1.90	11,505	0.0	$1,570.86	$2,450.00	$700.00	1.11
Exterior Front Entrance	16	Metal Halide: (1) 70W Lamp	Daylight Dimming	95	4,368	Fixture Replacement	No	16	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	21	4,368	0.96	5,844	0.0	$797.90	$3,200.00	$1,600.00	2.01
Exterior Front Entrance	8	Compact Fluorescent: CFL 4-pin	Daylight Dimming	26	4,368	Relamp	No	8	LED Screw-In Lamps: LED Screw-In Lamps	Daylight Dimming	13	4,368	0.08	513	0.0	$70.09	$352.41	$0.00	5.03
Main Lobby	48	Compact Fluorescent: CFL 4-pin	Wall Switch	32	2,600	Relamp	No	48	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	13	2,600	0.74	2,679	0.0	$365.83	$2,114.45	$0.00	5.78
Main Lobby	17	Metal Halide: (1) 100W Lamp	Wall Switch	128	2,600	Fixture Replacement	No	17	LED - Fixtures: Downlight Surface Mount	Wall Switch	25	2,600	1.42	5,144	0.0	$702.38	$2,550.00	$85.00	3.51
Main Lobby	15	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,600	Relamp	No	15	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,600	0.19	683	0.0	$93.26	$538.50	$75.00	4.97
Main Lobby	16	Compact Fluorescent: CFL 4-pin	Wall Switch	26	2,600	Relamp	No	16	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	13	2,600	0.17	611	0.0	$83.44	$704.82	$0.00	8.45
Main Lobby	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conference Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,080	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.13	388	0.0	$52.95	$292.50	$50.00	4.58
Conference Room	2	Compact Fluorescent: CFL 2-pin	Occupancy Sensor	26	2,080	Relamp	No	2	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	13	2,080	0.02	61	0.0	$8.34	$88.10	$0.00	10.56
Men Restroom	5	Compact Fluorescent: CFL 4-pin	Occupancy Sensor	26	2,080	Relamp	No	5	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	13	2,080	0.05	153	0.0	$20.86	$220.26	$0.00	10.56
Men Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	2,080	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,080	0.01	38	0.0	$5.13	$48.20	$10.00	7.44
Women Restroom	5	Compact Fluorescent: CFL 4-pin	Occupancy Sensor	26	2,080	Relamp	No	5	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	13	2,080	0.05	153	0.0	$20.86	$220.26	$0.00	10.56
Women Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	62	2,080	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,080	0.04	106	0.0	$14.44	$48.20	$10.00	2.65
Violation Offices	11	Compact Fluorescent: CFL 4-pin	Wall Switch	32	2,340	Relamp	Yes	11	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	19	1,638	0.17	544	0.0	$74.26	$754.56	$35.00	9.69
Violation Offices	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Violation Offices	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,638	0.54	1,764	0.0	$240.87	$1,206.00	$195.00	4.20
Lunch Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,638	0.07	221	0.0	$30.11	$233.00	$20.00	7.07
Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,820	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,820	0.02	60	0.0	$8.14	$63.20	$0.00	7.76
Court Adm Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,340	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,340	0.11	349	0.0	$47.65	$234.00	$40.00	4.07
File Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.05	175	0.0	$23.83	$117.00	$20.00	4.07
Judges Chamber Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,340	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,340	0.11	349	0.0	$47.65	$234.00	$40.00	4.07
Corridor	8	Compact Fluorescent: CFL 4-pin	Wall Switch	32	2,600	Relamp	Yes	8	LED Screw-In Lamps: LED Screw-In Lamps	High/Low Control	19	1,820	0.12	440	0.0	$60.01	$552.41	$0.00	9.21

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Court Room	32	Compact Fluorescent: CFL 4-pin	Wall Switch	32	1,820	Relamp	No	32	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	19	1,820	0.34	856	0.0	$116.81	$1,409.63	$0.00	12.07
Court Room	10	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	1,820	Relamp	No	10	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,820	0.13	319	0.0	$43.52	$359.00	$50.00	7.10
Court Room	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Court Room	18	Compact Fluorescent: CFL 4-pin	Wall Switch	26	1,820	Relamp	No	18	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	13	1,820	0.19	481	0.0	$65.71	$792.92	$0.00	12.07
Corridor - Record Room	19	Compact Fluorescent: CFL 4-pin	Wall Switch	32	2,340	Relamp	Yes	19	LED Screw-In Lamps: LED Screw-In Lamps	High/Low Control	19	1,638	0.29	939	0.0	$128.27	$1,236.97	$0.00	9.64
Corridor - Record Room	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Police Department	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.11	582	0.0	$79.42	$234.00	$40.00	2.44
Police Department	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.03	141	0.0	$19.25	$96.40	$20.00	3.97
911 Call Center	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	6,115	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	6,115	0.21	1,824	0.0	$249.07	$468.00	$80.00	1.56
911 Call Center	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	6,115	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	6,115	0.03	221	0.0	$30.19	$96.40	$20.00	2.53
Report Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.05	175	0.0	$23.83	$117.00	$20.00	4.07
Server Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,340	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,340	0.05	175	0.0	$23.83	$117.00	$20.00	4.07
PD Record Room	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,340	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,340	0.43	1,396	0.0	$190.62	$936.00	$160.00	4.07
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,080	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.03	78	0.0	$10.59	$58.50	$10.00	4.58
Electrical Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,080	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.08	233	0.0	$31.77	$175.50	$30.00	4.58
Electrical Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator Room1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,080	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.03	78	0.0	$10.59	$58.50	$10.00	4.58
Elevator Room2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,080	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.03	78	0.0	$10.59	$58.50	$10.00	4.58
3rd Floor Mechanical Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,080	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.05	155	0.0	$21.18	$117.00	$20.00	4.58
Court Yard	16	Halogen Incandescent: Screw in	Wall Switch	65	2,080	Relamp	No	16	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	10	2,080	0.72	2,068	0.0	$282.40	$860.05	$80.00	2.76
Storage Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,080	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.03	78	0.0	$10.59	$58.50	$10.00	4.58
3rd Floor	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,638	0.54	1,764	0.0	$240.87	$1,206.00	$195.00	4.20
3rd Floor	11	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	11	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	6	Halogen Incandescent: Screw in	Wall Switch	65	1,040	Relamp	No	6	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	10	1,040	0.27	388	0.0	$52.95	$322.52	$30.00	5.52

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Garage	22	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,820	Relamp	No	22	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,820	0.89	2,240	0.0	$305.78	$1,654.40	$330.00	4.33
Garage	11	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,820	Relamp	No	11	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,820	0.14	362	0.0	$49.42	$530.20	$110.00	8.50
PD Garage	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	1,820	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,820	0.40	1,018	0.0	$138.99	$752.00	$150.00	4.33
PD Garage	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	1,820	Relamp	No	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,820	0.07	165	0.0	$22.46	$241.00	$50.00	8.50
Interview Room1	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.04	218	0.0	$29.78	$75.20	$15.00	2.02
Interview Room2	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.01	71	0.0	$9.63	$48.20	$10.00	3.97
Cooridor - Cells	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	5	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,900	0.12	639	0.0	$87.25	$316.00	$0.00	3.62
Cooridor - Cells	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.36	1,963	0.0	$268.06	$676.80	$135.00	2.02
Cooridor - Cells	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Women Cells	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.08	436	0.0	$59.57	$150.40	$30.00	2.02
Women Cells	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,900	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,900	0.32	1,745	0.0	$238.27	$601.60	$120.00	2.02
Line Up Room	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,340	Relamp	No	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,340	0.30	960	0.0	$131.05	$643.50	$110.00	4.07
ACC1 Room	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,340	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,340	0.01	42	0.0	$5.78	$48.20	$10.00	6.61
PD Lunch Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,340	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,340	0.05	175	0.0	$23.83	$117.00	$20.00	4.07
Stairwell	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	8,736	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.08	977	0.0	$133.43	$175.50	$30.00	1.09
Custodian	1	Compact Fluorescent: CFL 4-pin	Wall Switch	26	1,820	Relamp	No	1	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	13	1,820	0.01	27	0.0	$3.65	$44.05	$0.00	12.07
Electrical Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,820	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,820	0.05	136	0.0	$18.53	$117.00	$20.00	5.23
Elevators	12	Compact Fluorescent: Screw in	Occupancy Sensor	14	2,340	Relamp	No	12	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	9	2,340	0.05	159	0.0	$21.66	$645.04	$0.00	29.78
Restroom - Basement	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,080	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,080	0.04	116	0.0	$15.88	$75.20	$15.00	3.79
Stairwell	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	8,736	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,736	0.05	652	0.0	$88.96	$117.00	$20.00	1.09
Basement - Corridor	8	Compact Fluorescent: CFL 4-pin	Wall Switch	32	3,120	Relamp	Yes	8	LED Screw-In Lamps: LED Screw-In Lamps	High/Low Control	19	2,184	0.12	527	0.0	$72.01	$552.41	$0.00	7.67
Basement - Corridor	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Firing Range	12	Compact Fluorescent: CFL 4-pin	Wall Switch	32	2,340	Relamp	No	12	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	19	2,340	0.13	412	0.0	$56.32	$528.61	$0.00	9.39
Firing Range	2	Linear Fluorescent - T5: 2' T5 (14W) - 2L	Wall Switch	34	2,340	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,340	0.03	90	0.0	$12.27	$96.40	$20.00	6.22
Firing Range	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Firing Range	27	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,340	Relamp	No	27	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,340	1.09	3,534	0.0	$482.50	$2,030.40	$405.00	3.37
Armory	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.11	349	0.0	$47.65	$234.00	$40.00	4.07
Firing Range Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.11	349	0.0	$47.65	$234.00	$40.00	4.07
Finger Print Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,340	0.02	77	0.0	$10.47	$63.20	$0.00	6.04
PD Basement -Corridor	43	Compact Fluorescent: CFL 4-pin	Wall Switch	32	8,736	Relamp	Yes	43	LED Screw-In Lamps: LED Screw-In Lamps	High/Low Control	19	6,115	0.65	7,938	0.0	$1,083.77	$2,494.19	$0.00	2.30
PD Basement -Corridor	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Men Locker Room	16	Compact Fluorescent: CFL 4-pin	Wall Switch	32	2,600	Relamp	Yes	16	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	19	1,820	0.24	879	0.0	$120.02	$974.82	$35.00	7.83
Men Locker Room	14	Linear Fluorescent - T8: 8' T8 (59W) - 1L	Wall Switch	58	2,600	Relamp	Yes	14	LED - Linear Tubes: (1) 8' Lamp	Occupancy Sensor	36	1,820	0.37	1,349	0.0	$184.20	$1,051.20	$20.00	5.60
Men Locker Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,600	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	0.27	980	0.0	$133.82	$738.00	$115.00	4.66
Exercice Room	26	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	Yes	26	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,638	0.88	2,867	0.0	$391.42	$2,061.00	$330.00	4.42
Exercice Room	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Male Bunk Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,600	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	0.07	245	0.0	$33.45	$233.00	$20.00	6.37
Female Bunk Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,600	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	0.07	245	0.0	$33.45	$233.00	$20.00	6.37
Storage Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,080	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,456	0.20	588	0.0	$80.29	$467.00	$60.00	5.07
Female Locker Room	8	Compact Fluorescent: CFL 4-pin	Wall Switch	32	2,600	Relamp	Yes	8	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	19	1,820	0.12	440	0.0	$60.01	$622.41	$35.00	9.79
Female Locker Room	7	Linear Fluorescent - T8: 8' T8 (59W) - 1L	Wall Switch	58	2,600	Relamp	Yes	7	LED - Linear Tubes: (1) 8' Lamp	Occupancy Sensor	36	1,820	0.19	675	0.0	$92.10	$583.60	$20.00	6.12
Female Locker Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,600	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	0.14	490	0.0	$66.91	$504.00	$75.00	6.41
Stairwell	24	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	8,736	Relamp	No	24	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	8,736	1.09	13,268	0.0	$1,811.45	$2,283.20	$480.00	1.00
Stairwell	9	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	9	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
2nd Floor Corridor	39	Compact Fluorescent: CFL 4-pin	Wall Switch	32	3,900	Relamp	Yes	39	LED Screw-In Lamps: LED Screw-In Lamps	High/Low Control	19	2,730	0.59	3,214	0.0	$438.82	$1,917.99	$0.00	4.37
2nd Floor Corridor	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Training Room	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,638	0.51	1,654	0.0	$225.82	$1,147.50	$185.00	4.26
Training Room	4	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	60	2,340	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,340	0.10	328	0.0	$44.77	$234.00	$40.00	4.33
Training Room	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lieutenants Office	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,340	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,638	0.46	1,489	0.0	$203.24	$792.80	$155.00	3.14

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Special Services. Office	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,080	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,080	0.36	1,047	0.0	$142.96	$676.80	$135.00	3.79
Auxiliary Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,340	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,638	0.10	331	0.0	$45.16	$266.40	$50.00	4.79
Detective Bureau	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,080	Relamp	No	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,080	0.64	1,862	0.0	$254.16	$1,203.20	$240.00	3.79
Detective Bureau	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	2,080	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,080	0.05	150	0.0	$20.54	$192.80	$40.00	7.44
Detective Bureau	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conference Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,080	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,080	0.16	465	0.0	$63.54	$300.80	$60.00	3.79
Interview Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,080	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,080	0.16	465	0.0	$63.54	$300.80	$60.00	3.79
Interview Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,080	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,080	0.02	68	0.0	$9.31	$63.20	$0.00	6.79
Women Restroom	3	Compact Fluorescent: CFL 4-pin	Occupancy Sensor	32	2,080	Relamp	No	3	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	19	2,080	0.03	92	0.0	$12.52	$132.15	$0.00	10.56
Women Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,080	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,080	0.08	233	0.0	$31.77	$150.40	$30.00	3.79
Telecom Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,080	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,080	0.04	116	0.0	$15.88	$75.20	$15.00	3.79
Closet	1	Compact Fluorescent: Screw in	Wall Switch	13	1,820	Relamp	No	1	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	7	1,820	0.00	12	0.0	$1.68	$53.75	$0.00	31.91
PD Adm Offices	16	Compact Fluorescent: CFL 4-pin	Wall Switch	32	2,340	Relamp	Yes	16	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	19	1,638	0.24	791	0.0	$108.02	$1,244.82	$70.00	10.88
PD Adm Offices	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
PD Chief Assistant Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,340	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,638	0.15	496	0.0	$67.75	$341.60	$65.00	4.08
Captain Office	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,080	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,080	0.48	1,396	0.0	$190.62	$902.40	$180.00	3.79
Chief Office	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,080	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,080	0.32	931	0.0	$127.08	$601.60	$120.00	3.79
Chief Office	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,080	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,080	0.02	68	0.0	$9.31	$63.20	$0.00	6.79
Captain Assistant Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,340	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,638	0.15	496	0.0	$67.75	$341.60	$65.00	4.08
Staff Restroom	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,080	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,456	0.07	198	0.0	$27.08	$308.80	$40.00	9.92
Electrical Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,820	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,820	0.04	102	0.0	$13.90	$75.20	$15.00	4.33
Training Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,080	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,080	0.24	698	0.0	$95.31	$451.20	$90.00	3.79
Incident Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,340	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,638	0.61	1,985	0.0	$270.98	$1,018.40	$200.00	3.02
Tech Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,340	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,638	0.10	331	0.0	$45.16	$266.40	$50.00	4.79
YAB	5	Compact Fluorescent: CFL 4-pin	Occupancy Sensor	32	2,080	Relamp	No	5	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	19	2,080	0.05	153	0.0	$20.86	$220.26	$0.00	10.56

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
YAB	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
YAB	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,080	Relamp	No	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,080	0.64	1,862	0.0	$254.16	$1,203.20	$240.00	3.79
YAB	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	2,080	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,080	0.05	150	0.0	$20.54	$192.80	$40.00	7.44
YAB Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,340	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,638	0.10	331	0.0	$45.16	$266.40	$50.00	4.79
West Conference Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,340	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,638	0.20	662	0.0	$90.33	$416.80	$80.00	3.73
Video Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,080	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,080	0.08	233	0.0	$31.77	$150.40	$30.00	3.79
Men Restroom	6	Compact Fluorescent: CFL 4-pin	Occupancy Sensor	32	2,080	Relamp	No	6	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	19	2,080	0.06	183	0.0	$25.03	$264.31	$0.00	10.56
Main Conference Room	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,080	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,080	0.60	1,745	0.0	$238.27	$1,128.00	$225.00	3.79
Main Conference Room	4	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Occupancy Sensor	60	2,080	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.10	291	0.0	$39.79	$234.00	$40.00	4.88
Main Conference Room	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Cooling Tower	Cooling System	1	Cooling Tower Fan	10.0	94.0%	Yes	1,680	No	94.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Heating System	2	Heating Hot Water Pump	7.5	91.7%	Yes	1,680	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Heating System	2	Heating Hot Water Pump	2.0	88.7%	No	1,820	No	88.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Chilled Water System	2	Chilled Water Pump	10.0	91.7%	Yes	1,680	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Condenser Water System	2	Condenser Water Pump	7.5	91.7%	No	1,680	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Mechanical Room (EF4)	1	Exhaust Fan	5.0	86.0%	Yes	2,184	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Mechanical Room	2	Process Fan	3.0	84.0%	No	1,092	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Mechanical Room (EF3)	1	Exhaust Fan	1.5	84.0%	No	2,184	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator Room1	Elevator	1	Process Fan	20.0	86.0%	No	1,092	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Elevator Room2	Elevator	1	Process Fan	20.0	86.0%	No	1,092	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
3rd Floor	3rd Floor (EF1)	1	Exhaust Fan	1.5	86.0%	No	2,184	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
3rd Floor	3rd Floor (EF2)	1	Exhaust Fan	1.6	86.0%	No	2,184	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU1	1	Supply Fan	25.0	94.3%	Yes	2,912	No	94.3%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU1	1	Return Fan	7.5	91.7%	Yes	2,912	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU2	1	Supply Fan	25.0	94.3%	Yes	2,912	No	94.3%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU2	1	Return Fan	7.5	91.7%	Yes	2,912	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
3rd Floor	3rd Floor	1	Heating Hot Water Pump	0.8	78.0%	No	1,820	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage	PD Firing range	1	Exhaust Fan	5.0	86.0%	Yes	2,184	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage	ERV-1A	3	Exhaust Fan	0.3	78.0%	No	2,184	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage	ERV-1A	1	Supply Fan	20.0	94.7%	Yes	2,912	No	94.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Garage	ERV-1B	3	Exhaust Fan	0.3	78.0%	No	2,184	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage	ERV-1B	1	Supply Fan	20.0	94.7%	Yes	2,912	No	94.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage	Metalic Door	3	Other	1.0	84.0%	No	728	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage	PD Firing range	1	Exhaust Fan	5.0	86.0%	Yes	2,184	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Domestic Hot Water Recirculation System	1	Heating Hot Water Pump	3.0	86.0%	No	2,184	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Server Room CAC1	1	Split-System AC	4.00		Yes	1	Split-System AC	4.00		14.00		No	0.38	720	0.0	$98.30	$5,984.88	$368.00	57.14
Roof	Dispatch Room CAC2	1	Split-System AC	3.00		Yes	1	Split-System AC	3.00		14.00		No	0.29	540	0.0	$73.73	$4,488.66	$276.00	57.14
Roof	CU3	1	Split-System AC	2.00		Yes	1	Split-System AC	2.00		14.00		No	0.19	360	0.0	$49.15	$2,992.44	$184.00	57.14
Roof	CAC5	1	Split-System AC	3.00		Yes	1	Split-System AC	3.00		14.00		No	0.29	540	0.0	$73.73	$4,488.66	$276.00	57.14
Roof	Telecom Room - CU4	1	Split-System AC	1.50		Yes	1	Split-System AC	1.50		14.00		No	0.14	270	0.0	$36.86	$2,244.33	$138.00	57.14

Electric Chiller Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	PD/Court Building	1	Water-Cooled Scroll Chiller	30.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	PD/Court Building	1	Water-Cooled Scroll Chiller	50.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Heating Hot Water System	2	Condensing Hot Water Boiler	1,275.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Heating Hot Water System	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
PD/Court Building	6	Copy Machine	650.0	Yes
PD/Court Building	67	Computer with LCD Monitor	191.0	Yes
PD/Court Building	2	Refrigerator	175.0	Yes
PD/Court Building	4	Microwave	800.0	No
PD/Court Building	8	Coffee Machine	700.0	No
PD/Court Building	31	Printer	85.0	Yes
PD/Court Building	11	TVs	212.0	Yes
PD/Court Building	3	Water Coller	272.0	Yes
PD/Court Building	4	Small Freezer	45.0	Yes
PD/Court Building	1	UPS System	11,000.0	No
PD/Court Building	2	Server	450.0	No

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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N/A

ENERGY STAR® Score[1]

Maplewood Municipal Court & Police Department

Primary Property Type: Police Station
Gross Floor Area (ft²): 39,000
Built: 2008

For Year Ending: December 31, 2016
Date Generated: May 25, 2018

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Maplewood Municipal Court & Police Department 1618 Springfield Avenue Maplewood, New Jersey 07040	Township of Maplewood 574 Valley Street Maplewood, NJ 07040 (973) 762-8120	Joseph Manning 574 Valley Street Maplewood, NJ 07040 (973) 762-8120 Ext. 2000 twpadmin@twp.maplewood.nj.us

Property ID: 6359502

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
106.7 kBtu/ft²

Source EUI
238.9 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	2,369,608 (57%)
Electric - Solar (kBtu)	80,964 (2%)
Natural Gas (kBtu)	1,711,113 (41%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	68.9
National Median Source EUI (kBtu/ft²)	154.4
% Diff from National Median Source EUI	55%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	354

Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp (if applicable)