CITY OF LINDEN

CITY HALL

301 N. Wood Avenue Linden, NJ, 07036

LOCAL GOVERNMENT ENERGY AUDIT PROGRAM
FOR
NEW JERSEY
BOARD OF PUBLIC UTILITIES

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Prepared by:

6 Campus Drive
Parsippany, NJ 07054
(973) 538-2120

CHA PROJECT NO. 29743

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REPORT DISCLAIMER

This audit was conducted in accordance with the standards developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) for a Level II audit. Cost and savings calculations for a given measure were estimated to within ±20%, and are based on data obtained from the owner, data obtained during site observations, professional experience, historical data, and standard engineering practice. Cost data does not include soft costs such as engineering fees, legal fees, project management fees, financing, etc.

A thorough walkthrough of the building was performed, which included gathering nameplate information and operating parameters for all accessible equipment and lighting systems. Unless otherwise stated, model, efficiency, and capacity information included in this report were collected directly from equipment nameplates and /or from documentation provided by the owner during the site visit. Typical operation and scheduling information was obtained from interviewing staff and spot measurements taken in the field.

List of Common Energy Audit Abbreviations

- A/C – Air Conditioning
- AHS – Air Handling Unit
- BMS – Building Management System
- Btu – British thermal unit
- CDW – Condenser Water
- CFM – Cubic feet per minute
- CHW – Chilled Water
- DCV – Demand Control Ventilation
- DDC – Direct Digital Control
- DHW – Domestic Hot Water
- DX – Direct Expansion
- EER – Energy Efficiency Ratio
- EF – Exhaust Fan
- EUI – Energy Use Intensity
- Gal – Gallon
- GPD – Gallons per day
- GPF – Gallons Per Flush
- GPH – Gallons per hour
- GPM – Gallons per minute
- GPS – Gallons per second
- HHW – Heating Hot Water
- HID – High Intensity Discharge
- HP – Horsepower
- HRU – Heat Recovery Unit
- HVAC – Heating, Ventilation, Air Conditioning
- HX – Heat Exchanger
- kbtu/mbtu – One thousand (1,000) Btu
- kW – Kilowatt (1,000 watts)
- kWh – Kilowatt-hours
- LED – Light Emitting Diode
- mbh – Thousand Btu per hour
- mmbtu – One million (1,000,000) Btu
- OCC – Occupancy Sensor
- PSI – Pounds per square inch
- RTU – Rooftop Unit
- SBC – System Benefits Charge
- SF – Square foot
- UH – Unit Heater
- V – Volts
- VAV – Variable Air Volume
- VSD – Variable Speed Drive
- W – Watt

1.0 EXECUTIVE SUMMARY

This report summarizes the energy audit performed by CHA for Linden City in connection with the New Jersey Board of Public Utilities (NJBPU) Local Government Energy Audit (LGEA) Program. The purpose of this report is to identify energy savings opportunities associated with major energy consumers and inefficient practices. Low-cost and no-cost are also identified during the study. This report details the results of the energy audit conducted for the building listed below:

Building Name	Address	Square Feet	Construction Date
City Hall	301 N. Wood Avenue, Linden, NJ, 07036	54,450	1979

The potential total annual energy and cost savings for the recommended energy conservation measures (ECM) identified in the survey are shown below:

Building Name	Electric Savings (kWh)	NG Savings (therms)	# 2 Fuel Oil Savings (gallons)	Total Savings ($)	Payback (years)
City Hall	224,685	(3179)	3800	$35,883	13.1

Each individual measure's annual savings are dependent on that measure alone, there are no interactive effects calculated. There are three options shown for Lighting ECM savings; only one option can be chosen. Incentives shown (if any) are based only on the SmartStart Incentive Program. Other NJBPU or local utility incentives may also be available/ applicable and are discussed in Section 6.0.

Each measure recommended by CHA typically has a stand-alone simple payback period of 15 years or less. However, if the owner choses to pursue an Energy Savings Improvement Plan (ESIP), high payback measures could be bundled with lower payback measures which ultimately can result in a payback which is favorable for an ESIP project to proceed. Occasionally, we will recommend an ECM that has a longer payback period, based on the need to replace that piece(s) of equipment due to its age, such as a boiler for example.

The following table provides a detailed summary of each ECM for the building surveyed, including costs, savings, SmartStart incentives and payback.

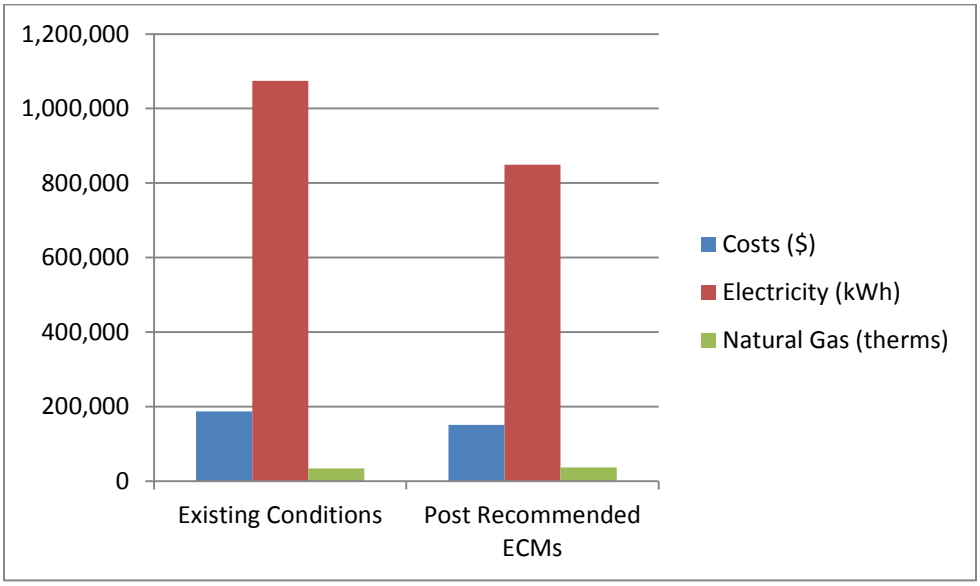
Summary of Energy Conservation Measures

ECM #	Energy Conservation Measure	Est. Costs ($)	Est. Savings ($/year)	Payback w/o Incentive	Potential Incentive ($)*	Payback w/ Incentive	Recommended
ECM-1	Add a high efficiency condensing boiler	127,418	4,321	29.5	3,000	28.8	N
ECM-2	Replace Heating water pump motors with high efficiency motors and add VFDs	27,107	1,822	14.9	0	14.9	Y
ECM-3	Replace Chilled water pump motors with high efficiency motors and VFDs	34,414	2,865	12.0	0	12.0	Y
ECM-4	Install a DDC control System	227,300	15,727	14.5	0	14.5	Y
ECM-5	Replace oil fired hot water heater with gas fired high efficiency hot water heater	16,380	6,222	2.6	50	2.6	Y
ECM-6	Replace faucets with low flow faucets	16,082	426	37.7	0	37.7	N
ECM-L1**	Lighting Replacements / Upgrades	150,864	7,492	20.1	19,615	17.5	N
ECM-L2**	Install Lighting Controls (Add Occupancy Sensors)	13,210	2,746	4.8	2,060	4.1	N
ECM-L3	Lighting Replacements with Controls (Occupancy Sensors)	164,074	9,247	17.7	21,675	15.4	Y
	Total**	**612,774**	**40,630**	**15.1**	**24,725**	**14.5**	
	Total(Recommended)	469,275	35,883	13.1	21,725	12.5	

* Incentive shown is per the New Jersey SmartStart Program.
** These ECMs are not included in the Total, as they are alternate measures not recommended.

If Linden City implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	186,657	150,774	19%
Electricity (kWh)	1,073,800	849,115	21%
Natural Gas (therms)	33,680	36,859	-9%
# 2 Fuel Oil (gallons)	3,800	0	100%
Site EUI (kbtu/SF/Yr)	129.1	120.9	



2.0 BUILDING INFORMATION AND EXISTING CONDITIONS

The following is a summary of building information related to HVAC, plumbing, building envelope, lighting, and domestic hot water systems as observed during CHAs site visit. See appendix B for detailed information on mechanical equipment, including capacities, model numbers and age. See appendix F for some representative photos of some of the existing conditions observed while onsite.

Building Name: City Hall
Address: 301 N. Wood Ave., Linden, NJ 07036
Gross Floor Area: 54,450 sq. ft.
Number of Floors: 3 floors and a sub grade floor
Year Built: 1979.

Building Envelope

Description of Spaces: This is a historic building. The building houses the civic administration offices, police department, courthouse, judges' chambers, restrooms and mechanical room.
Description of Occupancy: The facility has approximately 218 permanent employees working during the office hours. An additional 100 people are inside the building for short durations doing business with civic departments.

Number of Computers: The building has approximately 100 desktop and laptop computers.
Building Usage: The police department on the first/second floors operates 24/7. Operating hours for the other spaces in the building are typically from 7.00 AM to 5.00 PM.
Construction Materials: Stone, concrete block, and structure steel with stone facade.
Roof: The building has a flat roof covered with black membrane. The roof is being replaced with a new roof and it was under construction during the walkthrough, therefore no ECMs associated with the roof are evaluated
Windows: The building has double pane windows. Windows are in good condition and therefore no ECMs associated with window replacement were evaluated.
Exterior Doors: Exterior doors are bronze doors and in good condition except that the door seals have worn out. Door seals are recommended to be replaced as part of the operations and maintenance work.

Heating Ventilation & Air Conditioning (HVAC) Systems

Heating/Cooling: The building has a chilled water system for cooling and heating hot water system for heating. Conditioned air is supplied to the building spaces through five air handling units having chilled water and hot water coils, fan coil units with hot water reheat coils and air distribution ductwork. Additionally, there are four DX split ac systems that serve the police department.

A mechanical equipment room (MER) on the roof houses the hot water boilers, chilled and hot water recirculating pump sets, four air handling units and an emergency generator. Chilled water is generated by two Trane screw chillers model RTAA-125 each having a capacity of 106 tons. Both chillers are installed on the roof of the building. The chillers are in good working condition. Chilled water is circulated by two base mounted chilled water pump sets driven by constant speed 15 HP motors. The pump sets are old and have surpassed their useful life. Heating hot water is generated by two Weil McLain model 988, gas fired cast iron boilers each with an output rating of 2176 MBH. Boilers are in good working condition. Hot water is circulated through two base mounted hot water pump sets driven by constant speed 7 ½ HP motors. The heating pump sets are also old and have exceeded their useful life.

Four air handling units, AHU-1 thru AHU-4, are installed in the MER on the roof. Air handling units are Climatechangers manufactured by Trane. Each air handling unit is equipped with chilled water and hot water coils. AHU-1 and AHU-4 are 100% outside air units. AHU-1 provides conditioned outside air to all spaces of the building except the police department and AHU-4 provides conditioned outside air to the police department. AHU-2 and AHU-3 serve mixed conditioned air to spaces of the building. AHU-5 is located in the sub grade floor and also a Trane Climatechanger unit, however this unit has only a cooling coil and serves the Civil Defense Areas. Spaces on floors are zoned and each zone is served by a ceiling mounted fan coil unit with chilled water and hot water coils. There are 63 fan coil units installed. The air handling units and fan coil units are old and have lived their useful life. However, they are working satisfactorily. Regular maintenance like replacing filters, changing belts and general cleaning is carried out. Also, the AHU motors have been replaced.

The four DX split ac systems all serve the police department. The outdoor condensing units are installed on grade. One of the four systems is a heat pump system. All the four systems are in fair to good condition.

Entrance areas are provided with cabinet heaters with hot water coils.

There are two hot water unit heaters installed, one in the MER and another in the transport bay.

ECMs related to installing condensing boilers and chilled and hot water pump sets with premium efficiency motors and VFDs are evaluated.

Ventilation and Exhaust: The ventilation of the building is provided by the AHUs mentioned in the Heating/Cooling section. This building has multiple fractional HP exhaust fans serving restrooms and general exhaust all located on the roof. The fans are enclosed and therefore the capacities of fan motors are unknown. No ECMs are evaluated for the exhaust fans.

Controls Systems

The building does not have a central control system. Chillers are provided with self-contained Trane controls that control the operation of the chillers. The set point for chilled water supply temperature is 45 deg F. Boilers' operation is controlled by outside air temperature using a separate system. The minimum and maximum hot water supply temperature set points are 140 deg F and 200 deg F with. Air handling units and fan coil units are provided with 3 way electric control valves. Equipment is run continuously. Switching from heating to cooling and vice versa is done manually. Individual space thermostats are controlled manually by users of the spaces. The heating set points were observed to be about 72 F. Cooling set points were reported to be 72 F. Restrooms are provided with hot water fin tube radiators having self-contained temperature controls, however the thermostats are either damaged or not functional.

An ECM that evaluates the potential energy savings for installing a full Direct Digital Controls (DDC) system has been included.

Domestic Hot Water Systems

Domestic hot water is provided by a Bock oil fired water heater installed in the sub grade floor of the building. A domestic hot water recirculating pump is also provided.

ECM related to installing a gas fired water heater has been evaluated.

Kitchen Equipment

There is no kitchen in this building.

Plug Load

This building has computers, copiers, and printers which contribute to the plug load in the building. The plug load devices appear to be Energy Star devices and therefore, there is no ECM associated with plug load devices.

Plumbing Systems

The urinals and toilets appear to be high flow plumbing fixtures (3.5 GPF +). The sink faucets do not appear to have low-flow type aerators. Installing low-flow plumbing fixtures is included in the O&M section.

Lighting Systems

The building has 32W T-8 fluorescent lighting, 25W U-shape T-8s, and some compact fluorescent (CFL) lighting. Court Room, and Planning Rooms have Auditorium Globe compact fluoresce (CFL) lighting. The lights in this building are majorly controlled by manual switches. Men's and Women's restrooms, some offices, City Engineer's office and conference room and Chamber's office have occupancy sensors installed. LED lights are recommended in this study. We have provided three alternatives for the observed lighting that include adding occupancy sensors to the existing lights, replacing the lights with LED lights and a third ECM that evaluates adding occupancy sensors to the proposed LED lights.

3.0 UTILITIES

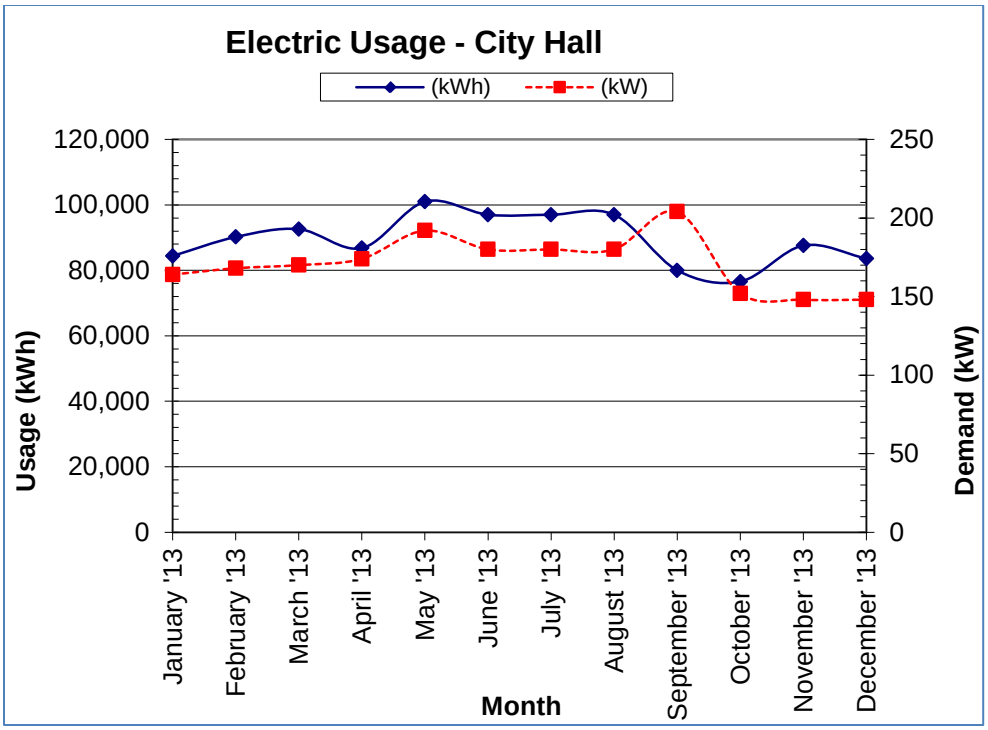
Natural gas and electricity are separately metered into this building. Utilities used by the building are delivered and supplied by the following utility companies:

	Electric	Natural Gas
Deliverer	PSE&G	Elizabethtown
Supplier	HESS	Elizabethtown

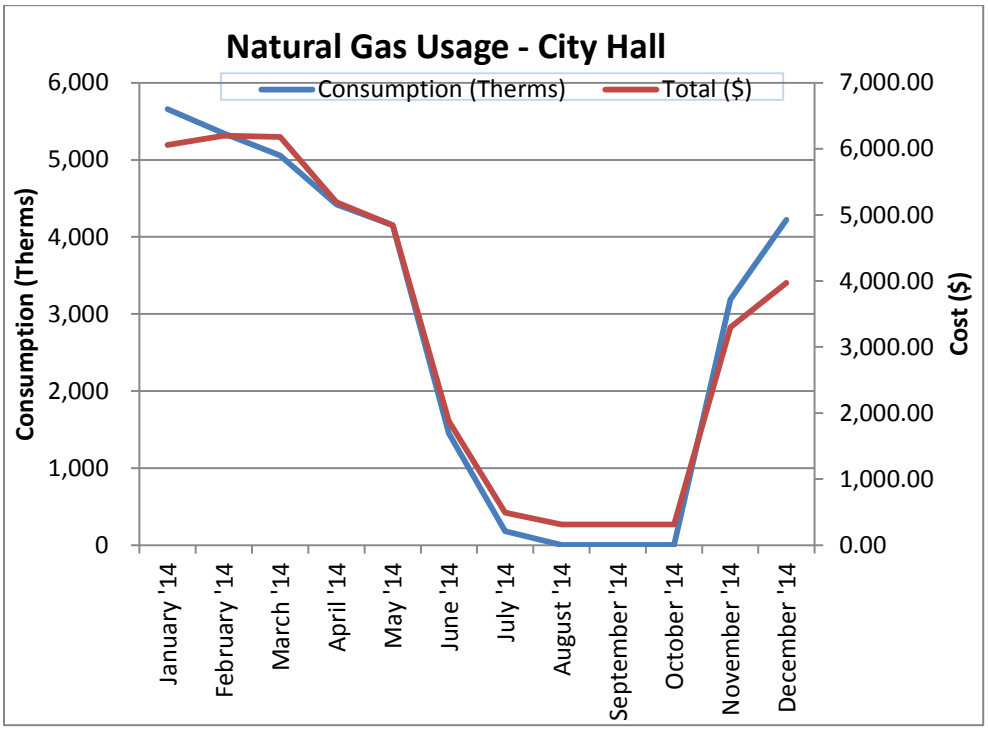
For the 12-month period ending in December 2014, the utilities usages and costs for the building were as follows:

Electric		
Annual Consumption	1,073,800	kWh
Annual Cost	136,290	$
Blended Unit Rate	0.127	$/kWh
Supply Rate	0.120	$/kWh
Demand Rate	3.55	$/kW
Peak Demand	176.4	kW
Natural Gas		
Annual Consumption	33,680	Therms
Annual Cost	39,058	$
Unit Rate	1.16	$/therm
# 2 Fuel Oil		
Annual Consumption	3800	Gallons
Annual Cost	11,309	$
Unit Rate	2.98	$/Gallon

Blended Rate: Average rate charged determined by the annual cost / annual usage
Supply Rate: Estimated
Demand Rate: Rate charged for actual electrical demand in kW (based on most recent electric bill)



The electric usage fluctuates with the building usage. The usage is slightly higher in the summer season and it appears that the cooling system runs beyond the summer months to maintain space conditions.



The natural gas in this building is used for hot water boilers. The gas usage during the heating season is correlated to winter weather conditions.

See Appendix A for utility analysis.

Under New Jersey's energy deregulation law, the supply portion of the electric (or natural gas) bill is separated from the delivery portion. The supply portion is open to competition, and customers can shop around for the best price for their energy suppliers. The electric and natural gas distribution utilities will still deliver the gas/ electric supplies through their wires and pipes – and respond to emergencies, should they arise – regardless of where those supplies are purchased. Purchasing the energy supplies from a company other than your electric or gas utility is purely an economic decision; it has no impact on the reliability or safety of the service.

Comparison of Utility Rates to NJ State Average Rates*				Recommended to Shop for Third Party Supplier?
Utility	Units	Average Rate	NJ Average Rate	
Electricity	$/kWh	$0.127	$0.13	N
Natural Gas	$/Therm	$1.16	$0.96	Y

* Per U.S. Energy Information Administration (2013 data – Electricity and Natural Gas, 2012 data – Fuel Oil)

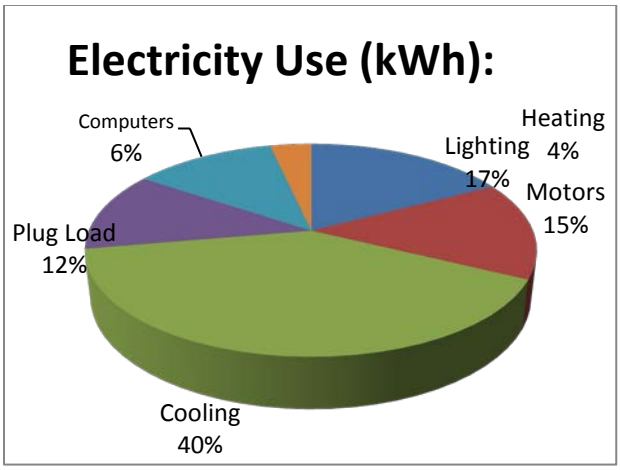
Additional information on selecting a third party energy supplier is available here:

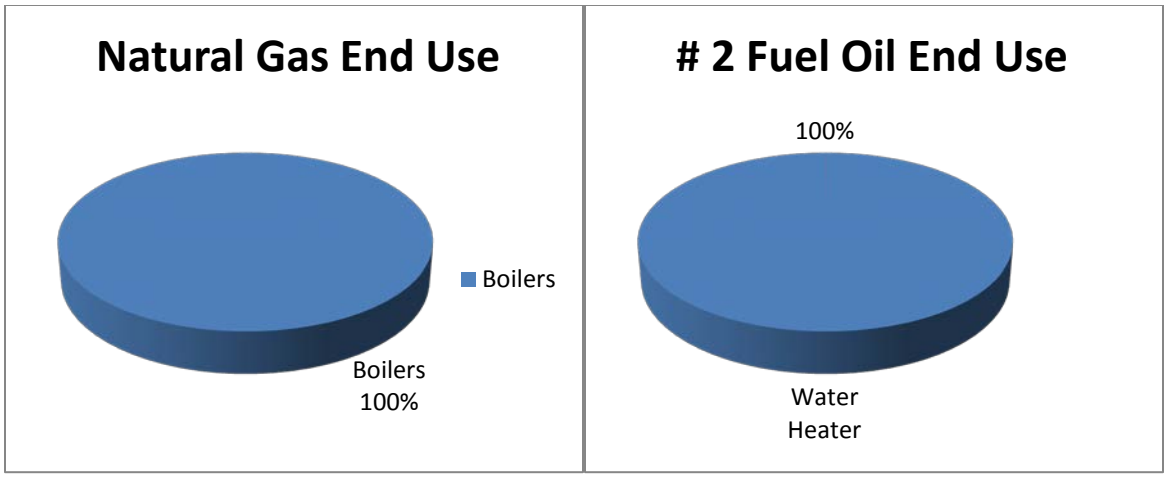
http://www.state.nj.us/bpu/commercial/shopping.html.

See Appendix A for a list of third-party energy suppliers licensed by the Board of Public Utilities to sell within the building's service area.

The charts below represent estimated utility end-use utility profiles for the building. The values used within the charts were estimated from a review of the utility analysis and the energy savings calculations.

Site End-Use Utility Profile




Natural Gas End Use
Boilers
Boilers
100%
2 Fuel Oil End Use
100%
Water
Heater

3.0 BENCHMARKING

The EPA Portfolio Manager benchmarking tool provides a site and source Energy Use Intensity (EUI), as well as an Energy Star performance rating for qualifying building types. The EUIs are provided in kBtu/ft^2/year, and the performance rating represents how energy efficient a building is on a scale of 1 to 100, with 100 being the most efficient. In order for a building to receive and Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed measures, the Energy Star rating will increase. However, the EPA does not have score for all types of buildings. The buildings that do not have energy rating now are compared with national median EUI.

The site EUI is the amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a facility in the form of primary energy, which is raw fuel burned to create heat or electricity, such as natural gas or oil; or as secondary energy, which is the product created from a raw fuel such as electricity or district steam. To provide an equitable comparison for different buildings with varying proportions of primary and secondary energy consumption, Portfolio Manager uses the convention of source EUIs. The source energy also accounts for losses incurred in production, storage, transmission, and delivery of energy to the site, which provide an equivalent measure for various types of buildings with differing energy sources. The results of the benchmarking are contained in the table below.

Site EUI kBtu/ft^2/yr	Source EUI (kBtu/ft^2/yr)	Energy Star Rating (1-100)
138.8	286.0	N/A

The building has higher EUIs than the national median EUIs (national median site EUI is 59.7 kBtu/ft^2 and national median source EUI is 123.1 kBtu/ft^2). The EUI of this building is 232% higher than national median. It is believed that the HVAC equipment condition, performance and lack of building temperature control contribute to this high EUI. The EUI could be reduced after implementing some energy conservation measures.

The EPA Portfolio Manager can be accessed with the following:

[redacted]

[redacted]

4.0 ENERGY CONSERVATION MEASURES

The following types of energy savings opportunities are identified in this section of the report:

- Energy conservation measures (ECMs) are energy savings recommendations that typically require a financial investment. For these areas of opportunity, CHA prepared detailed calculations, as summarized in this section and in Appendix C. In general, additional savings may exist from reductions in maintenance activities associated with new equipment or better controls; however for conservatism, maintenance savings are not accounted for in this report; instead the only savings which are reported are those derived directly from reductions in energy which can be tracked by the utility bills.

- Operational and Maintenance measures (O&M) consist of low- or no-cost operational opportunities, which if implemented would have positive impacts on overall building operation, comfort levels, and/or energy usage. There are no estimated savings, costs or paybacks associated with the O&M measures included as part of this study.

Energy savings were quantified in the form of:

- electrical usage (kWh=Kilowatt-hour),
- electrical demand (kW=kilowatts),
- natural gas (therms=100,000 Btu),
- propane gas (gallons=91,650 Btu),
- fuel oil (gallons =138,700 Btu), and
- water (kgal=1,000 gallons).

These recommendations are influenced by the time period that it takes for a proposed project to "break even" referred to as "Simple Payback". Simple payback is calculated by dividing the estimated cost of implementing the ECM by the energy cost savings (in dollars) of that ECM.

Another financial indicator of the performance of a particular ECM is the Return on Investment or ROI, which represents the benefit (annual savings over the life of a project) of an investment divided by the cost of the investment. The result is expressed as a percentage or ratio.

Two other financial analyses included in this report are Internal Rate of Return (IRR) and Net Present Value (NPV). Internal Rate of Return is the discount rate at which the present value of a project costs equals the present value of the project savings. Net Present Value is the difference between present value of an investment's future net cash flows and the initial investment. If the NPV equals "0", the project would equate to investing the same amount of dollars at the desired rate. NPV is sometimes referred to as Net Present Worth. These values are provided in the Summary Tab in Appendix C.

4.1 ECM-1 Add a High Efficiency Condensing Boiler

This ECM evaluates adding a high efficiency condensing gas boiler to operate as the main boiler with the existing boilers to operate as a back-up heat source. The existing boiler efficiency is 80% (observed) and the proposed boiler efficiency is 90% (average seasonal efficiency). Electrical power consumption due to the pump operation is considered to be the same for both the proposed system and the baseline system. A comprehensive boiler control system is also recommended to operate the HHW system to provide a HHW temperature reset according to the outdoor air temperature.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-1 Add a high efficiency condensing boiler

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
127,418	0	0	3,726	4,321	(0.2)	3,000	29.5	28.8

*Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is not recommended.

4.2 ECM-2 Replace Heating Hot Water Pumps With New Pumps Having High Efficiency Motors and Variable Frequency Drives

This measure evaluates replacing heating hot water pumps and motors with high efficiency pump having inverter -duty motors and adding variable frequency drives. The current motors are constant speed/ constant flow. This ECM will yield electrical energy savings as a result of slowing the pump motor speed down during low load times. Note: as only one pump operates at a time, savings are represented for one pump (lead/ lag)

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-2 Replace Heating Hot Water Pumps and add VFDs

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
27,107	0	15,049	0	1,822	0.4	0	14.9	14.9

* Incentive, if available, is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is recommended..

4.3 ECM-3 Replace chilled water pumps and motors with high efficiency motors and variable frequency drives

This measure evaluates replacing heating chilled water pumps and motors with high efficiency pump and inverter -duty motors and adding variable frequency drives . The current motors are constant speed/ constant flow. This ECM will yield electrical energy savings as a result of slowing the pump motor speed down during low load times. Note: as only one pump operates at a time, savings are represented for one pump (lead/ lag)

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-3 Replace chilled water pumps and motors with high eff. Motors and VFD

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
34,414	1	23,667	0	2,865	0.8	0	12.0	12.0

* Incentive, if available, is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is recommended.

4.4 ECM-4 Install a DDC control system

This ECM evaluates the energy savings associated with installing a wireless direct digital control system that will enable remote automatic control, monitoring and alarming of all HVAC equipment. The energy savings percentage is based on past performance of similar buildings which have a fully functioning DDC control system.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-4 Install a DDC control system

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
227,300	0	112,880	1,207	15,727	0.0	0	14.5	14.5

*There is no Incentive per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is recommended.

4.5 ECM-5 Replace oil fired water heater with high efficiency gas water heater

This ECM evaluates the energy savings associated with replacing a # 2 fuel oil fired tank type water heater with an equivalent capacity high efficiency gas fired water heater.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-5 Replace oil fired water heater with high efficiency gas water heater

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
16,380	0	0	-4,386	6,222	(5.7)	50	2.6	2.6

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is recommended.

4.6 ECM-6 Replace faucets with low flow faucets

Currently, the lavatory faucets in the building are high flow faucets. Replacing the faucets with low flow faucets will save water consumption as well as natural gas used to generate domestic hot water. This measure evaluates energy savings associated with replacing existing faucets with low flow faucets.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-6 Replace faucets with low flow faucets

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
$	kW	kWh	Therms	KGals	$		$	Years	Years
16,082	0	0	113	31	426	(0.6)	0	37.7	37.7

* Incentive, if available, is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is not recommended due to the long payback period.

4.7.1 ECM-L1 Lighting Replacement / Upgrades

The building has 32W T-8 fluorescent lighting, 25W U-shape T-8s, and some compact fluorescent (CFL) lighting. Court Room, and Planning Rooms have Auditorium Globe compact fluoresce (CFL) lighting. The lights in this building are majorly controlled by manual switches. Recent technological improvements in light emitting diode (LED) technologies have driven down the initial costs making it a viable option for installation.

Overall energy consumption can be reduced by replacing inefficient bulbs and linear fluorescent bulbs with more efficient LED technology. To compute the annual savings for this ECM, the energy consumption of the current lighting fixtures was established and compared to the proposed fixture power requirement with the same annual hours of

operation. The difference between the existing and proposed annual energy consumption was the energy savings. These calculations are based on 1 to 1 replacements of the fixtures, and do not take into account lumen output requirements for a given space. A more comprehensive engineering study should be performed to determine correct lighting levels.

Supporting calculations, including assumptions for lighting hours and annual energy usage for each fixture, are provided in Appendix C and summarized below:

ECM-L1 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
150,864	11	58,479	0	7,492	(0.2)	19,615	20.1	17.5

* LED retrofits must go through the "custom" measures incentive option under New Jersey SmartStart Program. There are no "prescriptive" incentives for LED retrofits. Projects must achieve a minimum of 75,000 kWh annual savings to qualify for "custom" incentives. See section 6.0 for other incentive opportunities

This measure is not recommended in lieu of ECM L3.

4.7.2 ECM-L2 Install Lighting Controls (Occupancy Sensors)

The majority of the interior lights are controlled by wall mounted switches. Review of the comprehensive lighting survey determined that lighting in some areas could benefit from installation of occupancy sensors to turn off lights when they are unoccupied.

This measure recommends installing occupancy sensors for the current lighting system. Using a process similar to that utilized in Section ECM-L1, the energy savings for this measure was calculated by applying the known fixture wattages in the space to the estimated existing and proposed times of operation for each fixture.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-L2 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
13,210	0	21,631	0	2,746	2.1	2,060	4.8	4.1

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is not recommended in lieu of ECM L3.

4.7.3 ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

This measure is a combination of ECM-L1 and ECM-L2; recommending replace/upgrade the current lighting fixtures to more efficient ones and installing occupancy sensors on the new lights. Interactive effects of the higher efficiency lights and occupancy sensors lead the energy and cost savings for this measure to not be cumulative or equivalent to the sum of replacing the lighting fixtures alone and installing occupancy sensors without the lighting upgrade. The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
164,074	11	73,089	0	9,247	(0.1)	21,675	17.7	15.4

* LED retrofits must go through the "custom" measures incentive option under New Jersey SmartStart Program. There are no "prescriptive" incentives for LED retrofits. Projects must achieve a minimum of 75,000 kWh annual savings to qualify for "custom" incentives. See section 6.0 for other incentive opportunities

This measure is recommended.

4.8 Additional O&M Opportunities

This list of operations and maintenance (O&M) - type measures represent low-cost or no-cost opportunities, which if implemented will have a positive impact on the overall building operations, comfort and/or energy consumption. The recommended O&M measures for this building are as follows:

- Upgrade the plumbing fixtures to low flow plumbing fixtures when needed
- Replace door seals
- Purchase ENERGY STAR® rated equipment when needed

5.0 PROJECT INCENTIVES

5.1 Incentives Overview

The following sections give detailed information on available incentive programs including New Jersey Smart Start, Direct Install, New Jersey Pay for Performance (P4P) and Energy Savings Improvement Plan (ESIP). If the city wishes to and is eligible to participate in the Energy Savings Improvement Plan (ESIP) program and/or the Pay for Performance Incentive Program (P4P), it cannot participate in either the Smart Start or Direct Install Programs. Refer to Appendix D for more information on the Smart Start program.

5.1.1 New Jersey Smart Start Program

For this energy audit, The New Jersey Smart Start Incentives are used in the energy savings calculations, where applicable. This program is intended for medium and large energy users and provides incentives for:

- Electric Chillers
- Gas Chillers
- Gas Heating
- Unitary HVAC
- Ground Source Heat Pumps
- Variable frequency Drives/ motors
- Refrigeration
- Prescriptive and performance lighting and lighting controls

The equipment is procured using a typical bid- build method, installed and paid for and then the incentives are reimbursed to the owner.

Refer to Appendix D for more information on the Smart Start program.

5.1.2 Direct Install Program

The Direct Install Program applies to smaller facilities that have a peak electrical demand of 200 kW or less in any of the previous 12 months. Buildings must be located in New Jersey and served by one of the state's public, regulated electric utility companies.

Direct Install is funded through New Jersey's Clean Energy Program and is designed to provide capital for building energy upgrade projects to fast track implementation. The program will pay up to 70% of the costs for lighting, HVAC, motors, refrigeration, and other equipment upgrades with higher efficiency alternatives. If a building is eligible for this funding, the Direct Install Program can reduce the implementation cost of energy conservation projects.

The Direct Install program has specific HVAC equipment and lighting requirements and is generally applicable only to smaller package HVAC units, small boilers and lighting retrofits.

The program pays a maximum amount of $75,000 per building, and up to $250,000 per customer per year. Installations must be completed by an approved Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website. Contractors will coordinate with the applicant to arrange installation of recommended measures identified in a previous energy assessment, such as this energy audit. The incentive is reimbursed to the Owner upon successful replacement and payment of the equipment.

The building does not qualify for this program because its electrical demand is more than the maximum peak electrical demand of 200 kW for the last 12 month period.

Refer to Appendix D for more information on this program.

5.1.3 New Jersey Pay For Performance Program (P4P)

This building may be eligible for incentives from the New Jersey Office of Clean Energy. The most significant incentives are available from the New Jersey Pay for Performance (P4P) Program. The P4P program is designed to offset the cost of energy conservation projects for facilities that pay the Societal Benefits Charge (SBC) and whose demand (kW) in any of the preceding 12 months exceeds 100 kW. This demand minimum has been waived for buildings owned by local governments or municipalities and non-profit organizations and *is not applicable to public schools*. Facilities that meet this criterion must also achieve a minimum performance target of 15% energy reduction by using the EPA Portfolio Manager benchmarking tool before and after implementation of the measure(s). Additionally, the overall return on investment (ROI) must exceed 10%. If the participant is a municipal electric company customer, and a customer of a regulated gas New Jersey Utility, only gas measures will be eligible under the Program. Available incentives are as follows:

Incentive #1: Energy Reduction Plan – This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP). The ERP must include a detailed energy audit of the desired ECMs, energy savings calculations (using building modeling software) and inputting of all utility bills into the EPA Portfolio Manager website.

- Incentive Amount: $0.10/SF
- Minimum incentive: $5,000
- Maximum Incentive: $50,000 or 50% of Facility annual energy cost

The standard incentive pays $0.10 per square foot, up to a maximum of $50,000, not to exceed 50% of facility annual energy cost, paid after approval of application. For building audits funded by the New Jersey Board of Public Utilities, which receive an initial 75% incentive toward performance of the energy audit, facilities are only eligible for an additional $0.05 per square foot, up to a maximum of $25,000, rather than the standard incentive noted above. The ERP must be completed by a Certified Energy Manager (CEM) and submitted along with the project application.

Incentive #2: Installation of Recommended Measures – This incentive is based on projected energy savings as determined in Incentive #1 (Minimum 15% savings must be achieved), and is paid upon successful installation of recommended measures.

Electric

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.
- For each % over 15% add: $0.005 per projected kWh saved.
- Maximum incentive: $0.11/ kWh per projected kWh saved.

Gas

- Base incentive based on 15% savings: $0.90/ per projected Therm saved.
- For each % over 15% add: $0.05 per projected Therm saved.
- Maximum incentive: $1.25 per projected Therm saved.

Incentive cap: 25% of total project cost

Incentive #3: Post-Construction Benchmarking Report – This incentive is paid after acceptance of a report proving energy savings over one year utilizing the Environmental Protection Agency (EPA) Portfolio Manager benchmarking tool.

Electric

- Base incentive based on 15% savings: $0.09/ per projected kWh saved.
- For each % over 15% add: $0.005 per projected kWh saved.
- Maximum incentive: $0.11/ kWh per projected kWh saved.

Gas

- Base incentive based on 15% savings: $0.90/ per projected Therm saved.
- For each % over 15% add: $0.05 per projected Therm saved.
- Maximum incentive: $1.25 per projected Therm saved.

Combining Incentives #2 and #3 will provide a total of $0.18/ kWh and $1.8/therm not to exceed 50% of total project cost. Additional Incentives for #2 and #3 are increased by $0.005/kWh and $0.05/therm for each percentage increase above the 15% minimum target to 20%, calculated with the EPA Portfolio Manager benchmarking tool, not to exceed 50% of total project cost.

For the purpose of demonstrating the eligibility of the ECM's to meet the minimum savings requirement of 15% annual savings and 10% ROI for the Pay for Performance Program, all ECM's identified in this report have been included in the incentive calculations. The results for the building are shown in Appendix C, with more detailed program information in Appendix D.

5.1.4 Energy Savings Improvement Plan

The Energy Savings Improvement Program (ESIP) allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the ESIP provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

ESIP allows local units to use "energy savings obligations" (ESO) to pay for the capital costs of energy improvements to their facilities. ESIP loans have a maximum loan term of 15 year. ESOs are not considered "new general obligation debt" of a local unit and do not count against debt limits or require voter approval. They may be issued as refunding

bonds or leases. Savings generated from the installation of energy conservation measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach. The “Local Finance Notice” outlines how local governments can develop and implement an ESIP for their facilities. The ESIP can be prepared internally if the entity has qualified staff. If not, the ESIP must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs. Refer to Appendix D for more information on this program.

5.1.5 Renewable Energy Incentive Program

The Renewable Energy Incentive Program (REIP) is part of New Jersey's efforts to reach its Energy Master Plan goals of striving to use 30 percent of electricity from renewable sources by 2020.

Incentives for sustainable bio-power projects and for energy storage projects are currently under development, with competitive solicitations for each of those technologies expected to begin in the first quarter of 2014. The wind program is currently on hold.

New solar projects are no longer eligible for REIP incentives, but can register for Solar Renewable Energy Certificates (SRECs) through the SREC Registration Program (SRP).

6.0 ALTERNATIVE ENERGY SCREENING EVALUATION

6.1 Solar

6.1.1 Photovoltaic Rooftop Solar Power Generation

The building was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The amount of available roof area determines how large of a solar array can be installed on any given roof. The table below summarizes the approximate roof area available on the building and the associated solar array size that can be installed.

Available Roof Area (Ft^2)	Potential PV Array Size (kW)
4,736	65

The PVWATTS solar power generation model was utilized to calculate PV power generation; this model is provided in Appendix E.

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey Solar Renewable Energy Certificates Program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. An alternative compliance penalty (ACP) is paid for by the high emission producers and is set each year on a declining scale of 3% per year. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. Payments that will be received by the PV producer will change from year to year dependent upon supply and demand. There is no definitive way to calculate an exact price that will be received by the PV producer for SREC credits over the next 15 years. Renewable Energy Consultants estimates an average of $200/SREC for 2015 and this number was utilized in the cash flow for this report.

The system costs for PV installations were derived from recent solar contractor budgetary pricing in the state of New Jersey and include the total cost of the system installation (PV panels, inverters, wiring, ballast, controls). The cost of installation is currently about $4.00 per watt or $4,000 per kW of installed system, for a typical system. There are other considerations that have not been included in this pricing, such as the condition of the roof and need for structural reinforcement. Photovoltaic systems can be ground mounted if the roof is not suitable, however, this installation requires a substantial amount of open property (not wooded) and underground wiring, which adds more cost. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will most likely need to be replaced during the useful life of the PV system.

The implementation cost and savings related to this ECM are presented in Appendix E and summarized as follows:

Photovoltaic (PV) Rooftop Solar Power Generation – 65 kW System

Budgetary Cost	Annual Utility Savings			Total Savings	New Jersey Renewable SREC	Payback (without SREC)	Payback (with SREC)	Recommended
	Electricity		Natural Gas					
$	kW	kWh	Therms	$	$	Years	Years	Y/N
$260,000	65.0	82,868	0	$10,524	$16,574	24.7	9.6	FS

Note: CHA typically recommends a more detailed evaluation be conducted for the installation of PV Solar arrays when the screening evaluation shows a payback of less than 20 years. Therefore, this ECM is recommended for further study. Before implementation is pursued, the city should consult with a certified solar PV contractor.

6.1.2 Solar Thermal Hot Water Generation

Active solar thermal systems use solar collectors to gather the sun's energy to heat a fluid. An absorber in the collector (usually black colored piping) converts the sun's energy into heat. The heat is transferred to circulating water, antifreeze, or air for immediate use or is storage for later utilization. Applications for active solar thermal energy include supplementing domestic hot water, heating swimming pools, space heating or preheating air in residential and commercial buildings.

A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually placed on the roof of the building, oriented south, and tilted at the same angle as the site's latitude, to maximize the amount of solar radiation collected on a yearly basis.

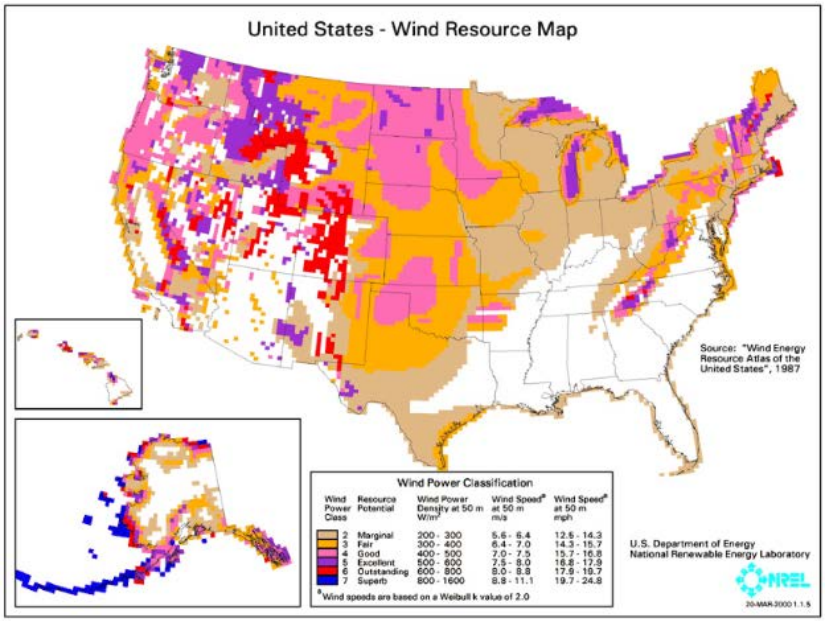
Several options exist for using active solar thermal systems for space heating. The most common method is called a passive solar hot water system involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system described above which requires pumping). The most practical system would transfer the heat from the panels to thermal storage tanks and then use the pre-heated water for domestic hot water production. DHW is presently produced by natural gas fired water heaters and, therefore, this measure would offer natural gas utility savings. Unfortunately, the amount of domestic hot water that is currently used by this building is very small. Installing a solar domestic hot water system is not recommended due to the limited amount of domestic hot water presently consumed by the building.

This measure is not recommended due to the relatively low domestic hot water usage.

6.2 Wind Powered Turbines

Wind power is the conversion of kinetic energy from wind into mechanical power that is used to drive a generator which creates electricity by means of a wind turbine. A wind turbine consists of rotor and blades connected to a gearbox and generator that are mounted onto a tower. Newer wind turbines also use advanced technology to generate

electricity at a variety of frequencies depending on the wind speed, convert it to DC and then back to AC before sending it to the grid. Wind turbines range from 50 – 750 kW for utility scale turbines down to below 50 kW for residential use. On a scale of 1 (the lowest) to 7 (the highest), Class 3 and above (wind speeds of 13 mph or greater) are generally considered "good wind resource" according to the Wind Energy Development Programmatic EIS Information Center hosted by the Bureau of Land Management. According to the map below, published by NREL, Newark, NJ is classified as Class 1 at 50m, meaning the city would not be a good candidate for wind power.



This measure is not recommended due to the location of the building.

6.3 Combined Heat and Power Plant

Combined heat and power (CHP), cogeneration, is self-production of electricity on-site with beneficial recovery of the heat byproduct from the electrical generator. Common CHP equipment includes reciprocating engine-driven, micro turbines, steam turbines, and fuel cells. Typical CHP customers include industrial, commercial, institutional, educational institutions, and multifamily residential facilities. CHP systems that are commercially viable at the present time are sized approximately 50 kW and above, with numerous options in blocks grouped around 300 kW, 800 kW, 1,200 kW and larger. Typically, CHP systems are used to produce a portion of the electricity needed by a facility some or all of the time, with the balance of electric needs satisfied by purchase from the grid.

Any proposed CHP project will need to consider many factors, such as existing system load, use of thermal energy produced, system size, natural gas fuel availability, and proposed plant location. The building has sufficient need for electrical generation and the ability to use most of the thermal byproduct during the winter; however thermal usage during the summer months does not exist. Thermal energy produced by the CHP plant in the warmer months will be wasted. An absorption chiller could be installed to

utilize the heat to produce chilled water; however, there is no chilled water distribution system in the building. CHP is not recommended due to the building's limited summer thermal demand.

This measure is not recommended due to the absence of year-round thermal loads which are needed for efficiency CHP operation. However, a mini-size CHP could be an option for West Deptford Township to consider. The sizing and energy savings of the mini-size CHP require further study.

6.4 Demand Response Curtailment

Presently, electricity is delivered by PSE&G, which receives the electricity from regional power grid RFC. PSE&G is the regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia including the State of New Jersey.

Utility Curtailment is an agreement with the utility provider's regional transmission organization and an approved Curtailment Service Provider (CSP) to shed electrical load by either turning major equipment off or energizing all or part of a facility utilizing an emergency generator; therefore, reducing the electrical demand on the utility grid. This program is to benefit the utility company during high demand periods and utility provider offers incentives to the CSP to participate in this program. Enrolling in the program will require program participants to drop electrical load or turn on emergency generators during high electrical demand conditions or during emergencies. Part of the program also will require that program participants reduce their required load or run emergency generators with notice to test the system.

A pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program. From January 2014 through December 2014 the following table summarizes the electricity load profile for the building.

Building Electric Load Profile

Peak Demand kW	Min Demand kW	Avg Demand kW	Onsite Generation Y/N	Eligible? Y/N
204	152	176.4	Y	Y

*the demand is estimated from one month bill

This measure is recommended for further evaluation.

7.0 CONCLUSIONS & RECOMMENDATIONS

The following section summarizes the LGEA energy audit conducted by CHA for the Fire House#1 at Linden City.

The following projects should be considered for implementation:

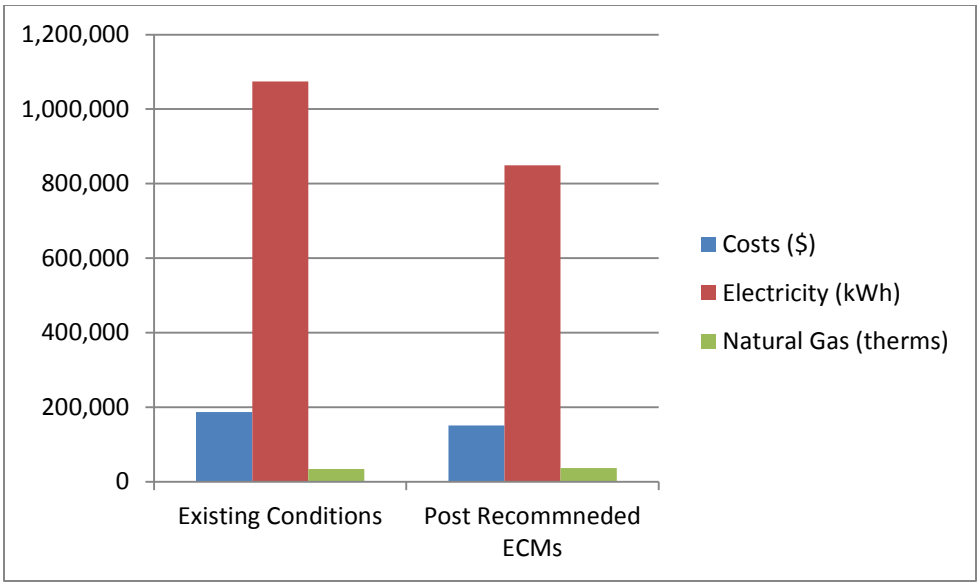
- Add condensing boiler
- Replace hot water pumps with high efficiency pumps, inverter duty motors and VFD.
- Replace chilled water pumps with high efficiency pumps, inverter duty motors and VFD
- Install a DDC system
- Replace oil fired water heater with high efficiency gas fired water heater
- Lighting Replacements with Controls (Occupancy Sensors)

The potential annual energy and cost savings for the recommended ECMs are shown in the following table.

Electric Savings (kWh)	Natural Gas Savings (therms)	#2 Fuel Oil Savings (gallons)	Total Savings ($)	Payback (years)
224,685	(3179)	3800	$35,883	13.1

If the Linden City implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommneded ECMs	Percent Savings
Costs ($)	186,657	150,774	19%
Electricity (kWh)	1,073,800	849,115	21%
Natural Gas (therms)	33,680	36,859	-9%
# 2 Fuel Oil (gallons)	3,800	0	100%
Site EUI (kbtu/SF/Yr)	129.1	120.9	



Next Steps: This energy audit has identified several areas of potential energy savings. Linden City can use this information to pursue incentives offered by the NJBPU's NJ Clean Energy Program. Additional meetings will be scheduled with city staff members to review possible options.

APPENDIX A

Utility Usage Analysis and Alternate Utility Suppliers

City Hall
301 N. Wood Ave. Linden, NJ

City Hall

Annual Utilities

12-month Summary

Electric		
Annual Usage	1,073,800	kWh/yr
Annual Cost	136,290	$
Blended Rate	0.127	$/kWh
Consumption Rate	0.120	$/kWh
Demand Rate	3.55	$/kW
Peak Demand	204.0	kW
Min. Demand	152.0	kW
Avg. Demand	176.4	kW
Natural Gas		
Annual Usage	33,680	Therms/yr
Annual Cost	39,058	$
Rate	1.160	$/Therm
Water		
Annual Usage	583,440	gallons/yr
Annual Cost	5,559	$
Rate	0.010	$/gallon
#2 Fuel Oil		
Annual Usage	3,800	gallons/yr
Annual Cost	$ 11,309	$
Rate	$ 2.98	$/gallon

City Hall
301 N. Wood Ave. Linden, NJ

Utility Bills: Account Numbers

Account Number	Building	Location	Type	Notes
42123030000	City Hall	301 N. Wood Ave. Linden, NJ	Electricity	
1616510010	City Hall	301 N. Wood Ave. Linden, NJ	Natural Gas	

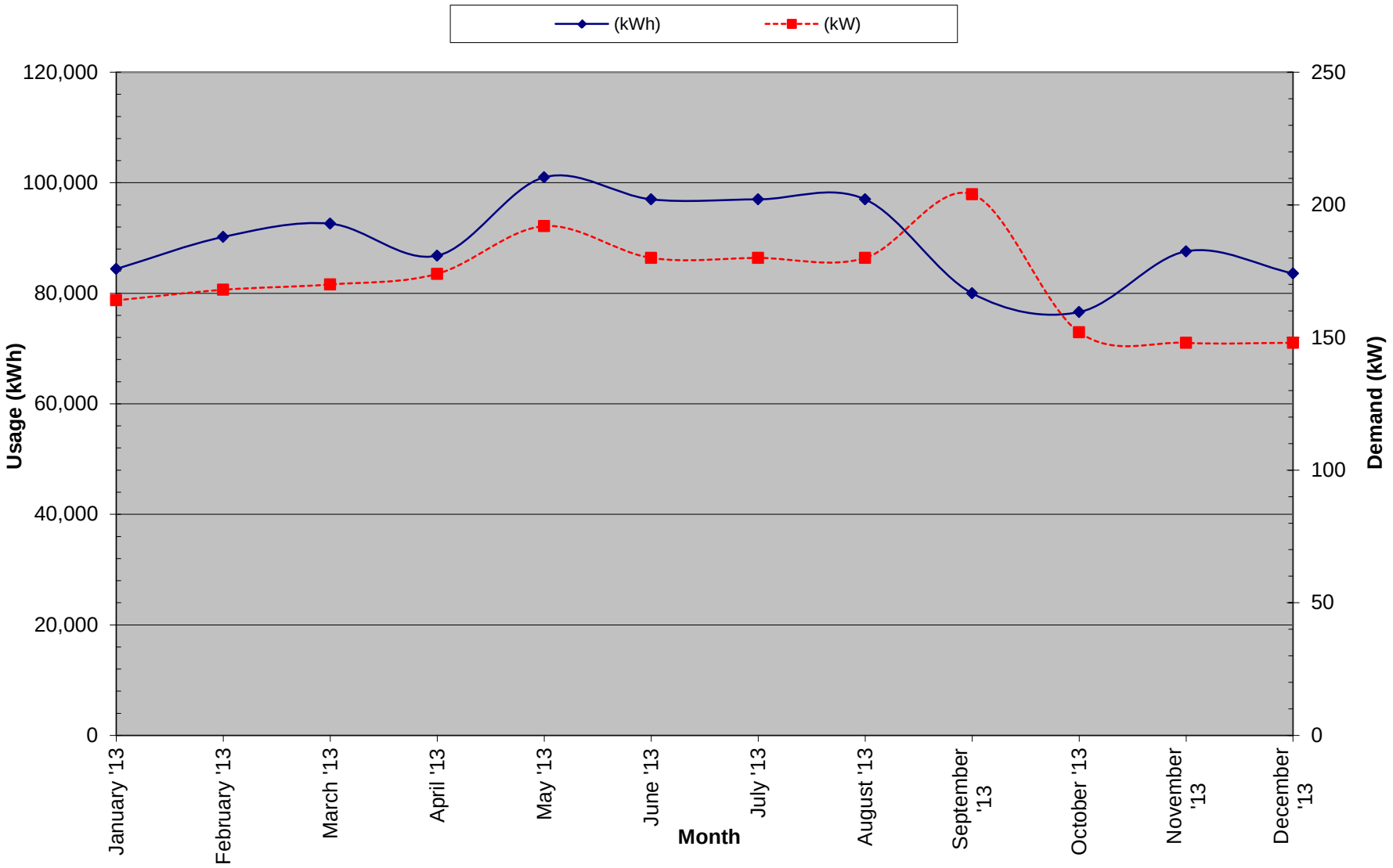
City Hall
301 N. Wood Ave. Linden, NJ

For Service at: **City Hall**
Account No.: **42123030000** **Delivery -** PSE&G
Meter No.: **778018391** **Supplier -** HESS
Electric Service

			Provider Charges			Usage (kWh) vs. Demand (kW) Charges		Unit Costs		
Month	**Consumption (kWh)**	**Demand (kW)**	**Delivery ($)**	**Supplier ($)**	**Total ($)**	**Consumption ($)**	**Demand ($)**	**Blended Rate ($/kWh)**	**Consumption Rate ($/kWh)**	**Demand ($/kW)**
January '13	84,400	164.0	$ 3,492.70	$ 6,625.40	$10,118.10	$ 9,536.82	$ 581.28	$ 0.12	$ 0.11	$ 3.54
February '13	90,200	168.0	$ 3,732.72	$ 7,080.70	$10,813.42	$ 10,217.97	$ 595.45	$ 0.12	$ 0.11	$ 3.54
March '13	92,600	170.0	$ 3,584.75	$ 8,504.83	$12,089.58	$ 11,487.03	$ 602.55	$ 0.13	$ 0.12	$ 3.54
April '13	86,800	174.0	$ 3,435.59	$ 8,266.71	$11,702.30	$ 11,085.57	$ 616.73	$ 0.13	$ 0.13	$ 3.54
May '13	101,000	192.0	$ 5,544.41	$ 9,326.20	$14,870.61	$ 14,190.08	$ 680.53	$ 0.15	$ 0.14	$ 3.54
June '13	97,000	180.0	$ 3,755.00	$ 7,614.50	$11,369.50	$ 10,729.50	$ 640.00	$ 0.12	$ 0.11	$ 3.56
July '13	97,000	180.0	$ 3,755.00	$ 7,614.50	$11,369.50	$ 10,729.50	$ 640.00	$ 0.12	$ 0.11	$ 3.56
August '13	97,000	180.0	$ 3,755.00	$ 7,614.50	$11,369.50	$ 10,729.50	$ 640.00	$ 0.12	$ 0.11	$ 3.56
September '13	80,000	204.0	$ 3,511.99	$ 7,493.29	$11,005.28	$ 10,282.22	$ 723.06	$ 0.14	$ 0.13	$ 3.54
October '13	76,600	152.0	$ 3,232.39	$ 7,064.05	$10,296.44	$ 9,757.69	$ 538.75	$ 0.13	$ 0.13	$ 3.54
November '13	87,600	148.0	$ 3,551.24	$ 7,712.09	$11,263.33	$ 10,738.76	$ 524.57	$ 0.13	$ 0.12	$ 3.54
December '13	83,600	148.0	$ 3,460.00	$ 6,562.60	$10,022.60	$ 9,498.03	$ 524.57	$ 0.12	$ 0.11	$ 3.54
Total (last 12-months)	**1,073,800**	**204.00**	**$44,810.79**	**$91,479.37**	**$136,290.16**	**$128,982.67**	**$7,307.49**	**$ 0.127**	**$ 0.120**	**$ 3.547**
Notes	1	2	3	4	5	6	7	8	9	10

1.) Supplier's bills not available. Based on HESS bills for other buildings reckoned a rate of $ 0.0785/kWH.
2.) Data shown in RED are approximate values since bills were not available for these months.

Electric Usage - City Hall

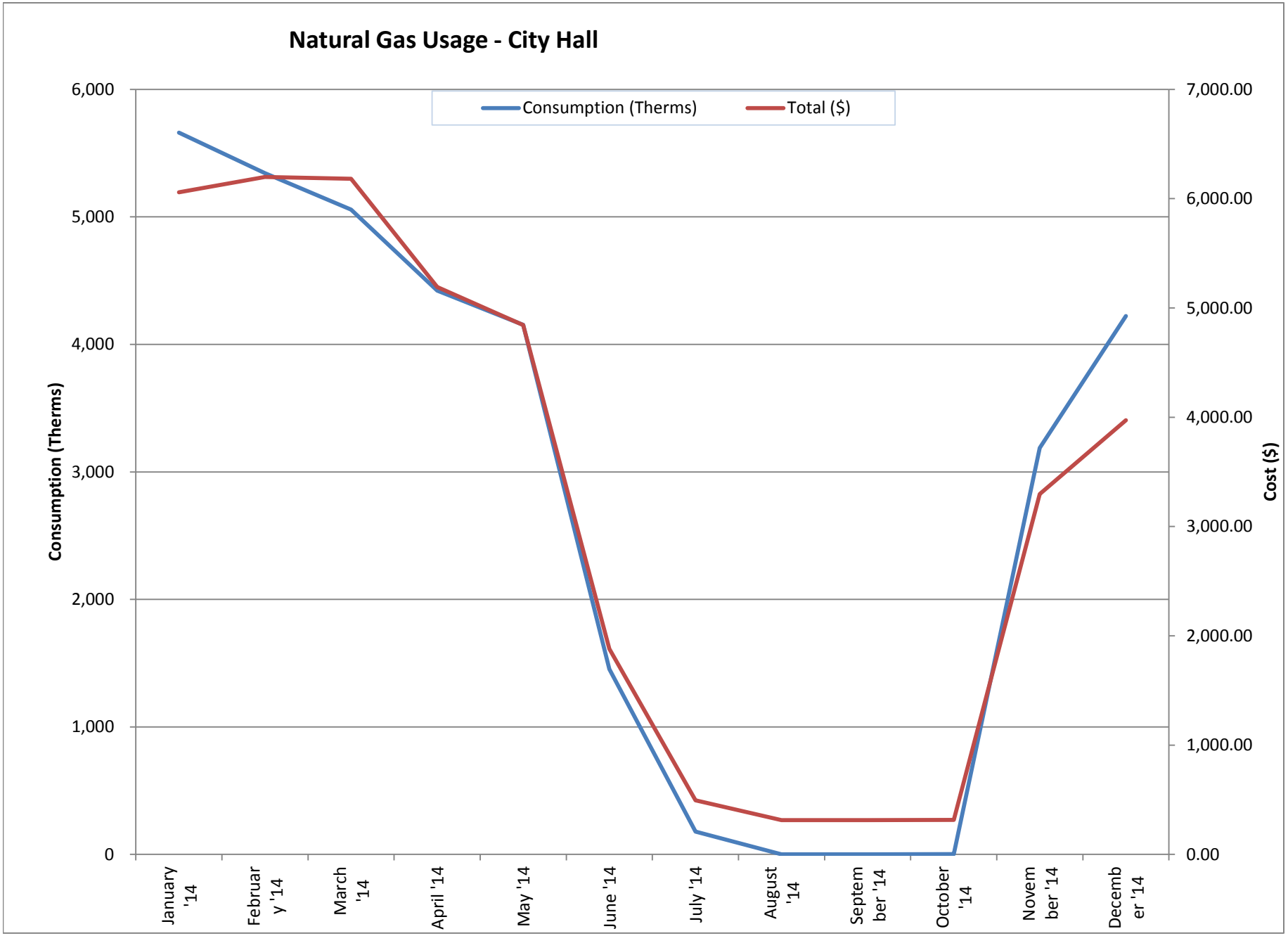


Utility Data -City Hall.xlsx
Electric Graph

City Hall
301 N. Wood Ave. Linden, NJ

For Service at: City Hall
Account No.: 1616510010
Meter No.: 9546009
Natural Gas Service
Delivery - Elizabethtown Gas
Supplier - Elizabethtown Gas

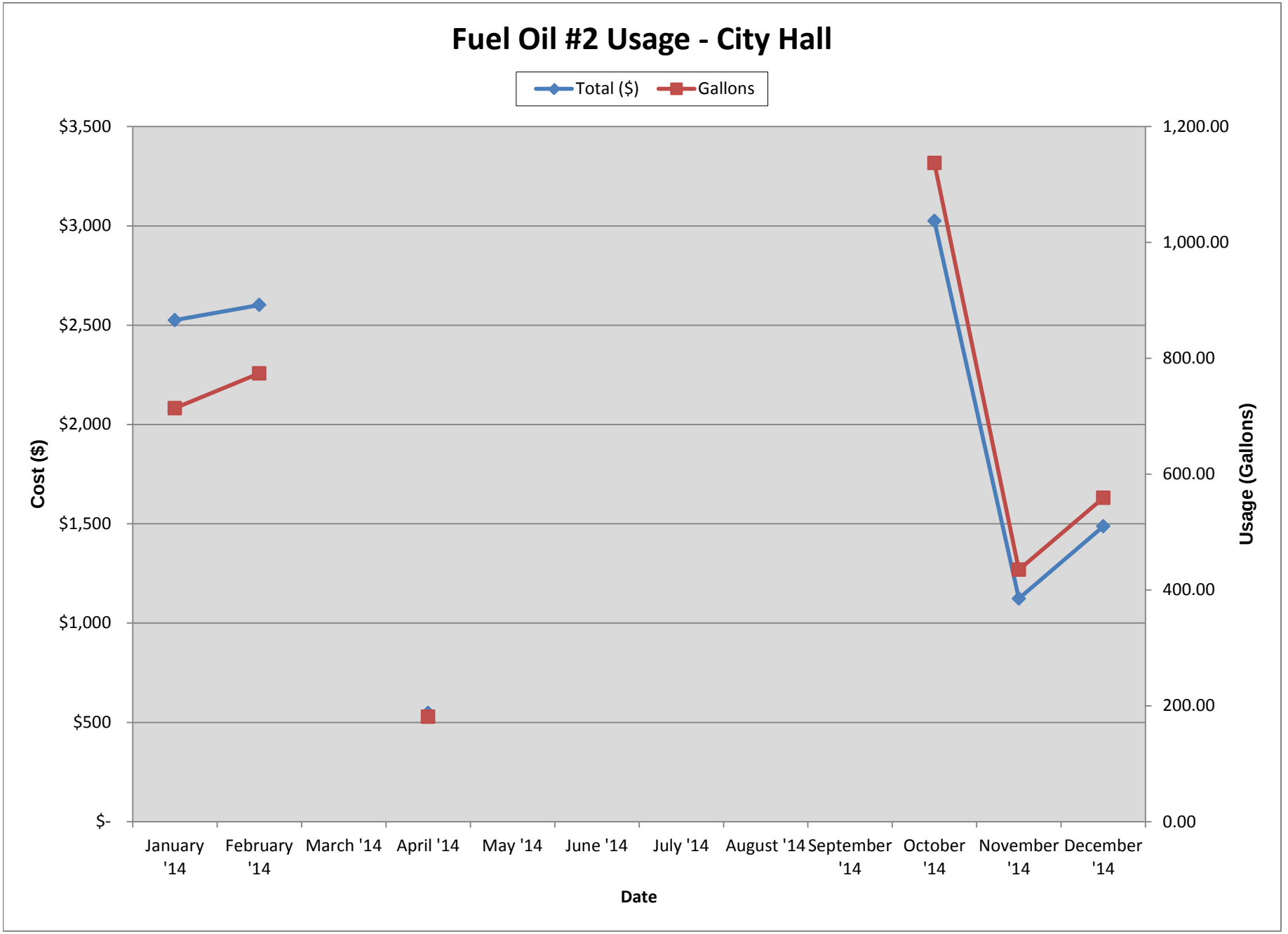
		Charges			Unit Costs		
Month	**Consumption (Therms)**	**Delivery ($)**	**Supply ($)**	**Total ($)**	**Delivery ($/Therm)**	**Supply ($/Therm)**	**Total ($/Therm)**
January '14	5,660	$ 6,059		$ 6,059	$ 1.07	$ -	$ 1.07
February '14	5,343	$ 6,198	$ -	$ 6,198	$ 1.16	$ -	$ 1.16
March '14	5,056	$ 6,182	$ -	$ 6,182	$ -	$ -	$ -
April '14	4,421	$ 5,191	$ -	$ 5,191	$ -	$ -	$ -
May '14	4,153	$ 4,844	$ -	$ 4,844	$ 1.17	$ -	$ 1.17
June '14	1,454	$ 1,880	$ -	$ 1,880	$ 1.29	$ -	$ 1.29
July '14	180	$ 495	$ -	$ 495	$ 2.75	$ -	$ 2.75
August '14	1	$ 313	$ -	$ 313	$ 312.77	$ -	$ 312.77
September '14	1	$ 313	$ -	$ 313	$ 312.77	$ -	$ 312.77
October '14	2	$ 315	$ -	$ 315	$ 143.12	$ -	$ 143.12
November '14	3,188	$ 3,298	$ -	$ 3,298	$ 1.03	$ -	$ 1.03
December '14	4,221	$ 3,972	$ -	$ 3,972	$ 0.94	$ -	$ 0.94
Total (12 - Month)	**33,680**			**$ 39,057.98**			**$ 1.160**


Natural Gas Usage - City Hall
Consumption (Therms)
Total ($)
Consumption (Therms)
Cost ($)
6,000
5,000
4,000
3,000
2,000
1,000
0
7,000.00
6,000.00
5,000.00
4,000.00
3,000.00
2,000.00
1,000.00
0.00
January '14
Februar y '14
March '14
April '14
May '14
June '14
July '14
August '14
Septem ber '14
October '14
Novem ber '14
Decemb er '14

City Hall
301 N. Wood Ave. Linden, NJ

For Service at: **City Hall**
Account No.: **433262**
Fuel Oil Service
Delivery - **Allied Oil LLC**
Supplier - **Allied Oil LLC**

Month	Total ($)	Gallons	$/Gallon
January '14	$ 2,525.27	714.00	$ 3.54
February '14	$ 2,601.60	774.00	$ 3.36
March '14			
April '14	$ 547.43	181.00	$ 3.02
May '14			
June '14			
July '14			
August '14			
September '14			
October '14	$ 3,024.75	1,137.00	$ 2.66
November '14	$ 1,123.16	435.00	$ 2.58
December '14	$ 1,486.88	559.00	$ 2.66
Total	**$ 11,309.09**	**3,800.00**	**$ 2.98**


Fuel Oil #2 Usage - City Hall
Total ($)
Gallons
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$-
Cost ($)
1,200.00
1,000.00
800.00
600.00
400.00
200.00
0.00
Usage (Gallons)
January '14
February '14
March '14
April '14
May '14
June '14
July '14
August '14
September '14
October '14
November '14
December '14
Date

PSE&G ELECTRIC SERVICE TERRITORY
Last Updated: 10/24/12

***CUSTOMER CLASS - R – RESIDENTIAL C – COMMERCIAL I –INDUSTRIAL**

Supplier	Telephone & Web Site	*Customer Class
AEP Energy, Inc. 309 Fellowship Road, Fl. 2 Mount Laurel, NJ 08054	(866) 258-3782 www.aepenergy.com	**C/I** **ACTIVE**
Alpha Gas and Electric, LLC 641 5th Street Lakewood, NJ 08701	(855) 553-6374 www.alphagasandelectric.com	**R/C** **ACTIVE**
Ambit Northeast, LLC 103 Carnegie Center Suite 300 Princeton, NJ 08540	(877)-30-AMBIT (877) 302-6248 www.ambitenergy.com	**R/C** **ACTIVE**
American Powernet Management, LP 437 North Grove St. Berlin, NJ 08009	(877) 977-2636 www.americanpowernet.com	**C** **ACTIVE**
Amerigreen Energy, Inc. 1463 Lamberton Road Trenton, NJ 08611	888-423-8357 www.amerigreen.com	**R/C** **ACTIVE**
AP Gas & Electric, LLC 10 North Park Place, Suite 420 Morristown, NJ 07960	(855) 544-4895 www.apge.com	**R/C/I** **ACTIVE**
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	(201) 384-5552 www.astralenergyllc.com	**R/C/I** **ACTIVE**
Barclays Capital Services, Inc. 70 Hudson Street Jersey City, NJ 07302-4585	(888) 978-9974 www.group.barclays.com	**C** **ACTIVE**
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	(888) 651-4121 www.greateasternenergy.com	**C/I** **ACTIVE**
Champion Energy Services, LLC 72 Avenue L Newark, NJ 07105	(877) 653-5090 www.championenergyservices.com	**R/C/I** **ACTIVE**

Choice Energy, LLC 4257 US Highway 9, Suite 6C Freehold, NJ 07728	888-565-4490 www.4choiceenergy.com	**R/C** **ACTIVE**
Clearview Electric, Inc. 505 Park Drive Woodbury, NJ 08096	(888) CLR-VIEW (800) 746-4702 www.clearviewenergy.com	**R/C/I** **ACTIVE**
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07446	1-866-587-8674 www.commerceenergy.com	**R** **ACTIVE**
ConEdison Solutions Cherry Tree Corporate Center 535 State Highway Suite 180 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com	**C/I** **ACTIVE**
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(866) 237-7693 www.constellation.com	**R/C/I** **ACTIVE**
Constellation Energy 900A Lake Street, Suite 2 Ramsey, NJ 07446	(877) 997-9995 www.constellation.com	**R** **ACTIVE**
Credit Suisse, (USA) Inc. 700 College Road East Princeton, NJ 08450	(212) 538-3124 www.creditsuisse.com	**C** **ACTIVE**
Direct Energy Business, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(888) 925-9115 www.directenergybusiness.com	**C/I** **ACTIVE**
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 348-4193 www.directenergy.com	**R** **ACTIVE**
Discount Energy Group, LLC 811 Church Road, Suite 149 Cherry Hill, New Jersey 08002	(800) 282-3331 www.discountenergygroup.com	**R/C** **ACTIVE**
Dominion Retail, Inc. **d/b/a Dominion Energy Solutions** 395 Route #70 West Suite 125 Lakewood, NJ 08701	(866) 275-4240 www.dom.com/products	**R/C** **ACTIVE**

DTE Energy Supply, Inc. One Gateway Center, Suite 2600 Newark, NJ 07102	(877) 332-2450 www.dtesupply.com	**C/I** **ACTIVE**
Energy.me Midwest LLC 90 Washington Blvd Bedminster, NJ 07921	(855) 243-7270 www.energy.me	**R/C/I** **ACTIVE**
Energy Plus Holdings LLC 309 Fellowship Road East Gate Center, Suite 200 Mt. Laurel, NJ 08054	(877) 866-9193 www.energypluscompany.com	**R/C** **ACTIVE**
Ethical Electric Benefit Co. d/b/a Ethical Electric 100 Overlook Center, 2nd Fl. Princeton, NJ 08540	(888) 444-9452 www.ethicalelectric.com	**R/C** **ACTIVE**
FirstEnergy Solutions 300 Madison Avenue Morristown, NJ 07962	(800) 977-0500 www.fes.com	**C/I** **ACTIVE**
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com	**R/C/I** **ACTIVE**
GDF SUEZ Energy Resources NA, Inc. 333 Thornall Street Sixth Floor Edison, NJ 08837	(866) 999-8374 www.gdfsuezenergyresources.com	**C/I** **ACTIVE**
Glacial Energy of New Jersey, Inc. 75 Route 15 Building E Lafayette, NJ 07848	(888) 452-2425 www.glacialenergy.com	**C/I** **ACTIVE**
Global Energy Marketing LLC 129 Wentz Avenue Springfield, NJ 07081	(800) 542-0778 www.globalp.com	**C/I** **ACTIVE**
Green Mountain Energy Company 211 Carnegie Center Drive Princeton, NJ 08540	(866) 767-5818 www.greenmountain.com/commercial-home	**C/I** **ACTIVE**

Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com	**C/I** **ACTIVE**
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	(888) 264-4908 www.hikoenergy.com	**R/C** **ACTIVE**
HOP Energy, LLC d/b/a Metro Energy, HOP Fleet Fueling, HOP Energy Fleet Fueling 1011 Hudson Avenue Ridgefield, NJ 07657	(877) 390-7155 www.hopenergy.com	**R/C/I** **ACTIVE**
Hudson Energy Services, LLC 7 Cedar Street Ramsey, New Jersey 07446	(877) Hudson 9 www.hudsonenergyservices.com	**C** **ACTIVE**
IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	(877) 887-6866 www.idtenergy.com	**R/C** **ACTIVE**
Independence Energy Group, LLC 3711 Market Street, 10th Fl. Philadelphia, PA 19104	(877) 235-6708 www.chooseindependence.com	**R/C** **ACTIVE**
Integrys Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrysenergy.com	**C/I** **ACTIVE**
Keil & Sons, Inc. **d/b/a Systrum Energy** 1 Bergen Blvd. Fairview, NJ 07022	(877) 797-8786 www.systrumenergy.com	**R/C/I** **ACTIVE**
Liberty Power Delaware, LLC 1973 Highway 34, Suite 211 Wall, NJ 07719	(866) 769-3799 www.libertypowercorp.com	**C/I** **ACTIVE**
Liberty Power Holdings, LLC 1973 Highway 34, Suite 211 Wall, NJ 07719	(866) 769-3799 www.libertypowercorp.com	**C/I** **ACTIVE**

Linde Energy Services 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.linde.com	**C/I** **ACTIVE**
Marathon Power LLC 302 Main Street Paterson, NJ 07505	(888) 779-7255 www.mecny.com	**R/C/I** **ACTIVE**
MXenergy Electric Inc. 900 Lake Street Ramsey, NJ 07446	(800) 785-4374 www.mxenergy.com	**R/C/I** **ACTIVE**
NATGASCO, Inc. 532 Freeman St. Orange, NJ 07050	(973) 678-1800 x. 251 www.supremeenergyinc.com	**R/C** **ACTIVE**
NextEra Energy Services New Jersey, LLC 651 Jernee Mill Road Sayreville, NJ 08872	(877) 528-2890 Commercial (800) 882-1276 Residential www.nexteraenergyservices.com	**R/C/I** **ACTIVE**
New Jersey Gas & Electric 1 Bridge Plaza fl. 2 Fort Lee, NJ 07024	(866) 568-0290 www.NJGandE.com	**R/C** **ACTIVE**
Noble Americas Energy Solutions The Mac-Cali Building 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.noblesolutions.com	**C/I** **ACTIVE**
North American Power and Gas, LLC 222 Ridgedale Avenue Cedar Knolls, NJ 07927	(888) 313-9086 www.napower.com	**R/C/I** **ACTIVE**
Palmco Power NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	(877) 726-5862 www.PalmcoEnergy.com	**R/C/I** **ACTIVE**
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) ENERGY-9 (363-7499) www.pepco-services.com	**C/I** **ACTIVE**
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	(855) 32-POWER (76937) www.plymouthenergy.com	**R/C/I** **ACTIVE**

PPL Energy Plus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com	**C/I** **ACTIVE**
Public Power & Utility of New Jersey, LLC 39 Old Ridgebury Rd. Suite 14 Danbury, CT 06810	(888) 354-4415 www.ppandu.com	**R/C/I** **ACTIVE**
Reliant Energy 211 Carnegie Center Princeton, NJ 08540	(877) 297-3795 (877) 297-3780 www.reliant.com/pjm	**R/C/I** **ACTIVE**
ResCom Energy LLC 18C Wave Crest Ave. Winfield Park, NJ 07036	(888) 238-4041 http://rescomenergy.com	**R/C/I** **ACTIVE**
Respond Power LLC 10 Regency CT Lakewood, NJ 08701	(877) 973-7763 www.respondpower.com	**R/C/I** **ACTIVE**
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 266-6020 www.southjerseyenergy.com	**C/I** **ACTIVE**
Sperian Energy Corp. 1200 Route 22 East, Suite 2000 Bridgewater, NJ 08807	(888) 682-8082	**R/C/I** **ACTIVE**
S.J. Energy Partners, Inc. 208 White Horse Pike, Suite 4 Barrington, N.J. 08007	(800) 695-0666 www.sjnaturalgas.com	**R/C** **ACTIVE**
Spark Energy, L.P. 2105 CityWest Blvd., Ste 100 Houston, Texas 77042	(800) 441-7514 www.sparkenergy.com	**R/C/I** **ACTIVE**
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	(800) 225-1560 www.spragueenergy.com	**C/I** **ACTIVE**
Starion Energy PA Inc. 101 Warburton Avenue Hawthorne, NJ 07506	(800) 600-3040 www.starionenergy.com	**R/C/I** **ACTIVE**
Stream Energy 309 Fellowship Rd., Suite 200 Mt. Laurel, NJ 08054	(877) 39-8150 www.streamenergy.net	**R** **ACTIVE**

UGI Energy Services, Inc. d/b/a GASMARK 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com	**C/I** **ACTIVE**
Verde Energy USA, Inc. 50 East Palisades Avenue Englewood, NJ 07631	(800) 388-3862 www.lowcostpower.com	**R/C/I** **ACTIVE**
Viridian Energy 2001 Route 46, Waterview Plaza Suite 310 Parsippany, NJ 07054	(866) 663-2508 www.viridian.com	**R/C/I** **ACTIVE**
Xoom Energy New Jersey, LLC 744 Broad Street Newark, NJ 07102	(888) 997-8979 www.xoomenergy.com	**R/C/I** **ACTIVE**
YEP Energy 89 Headquarters Plaza North #1463 Morristown, NJ 07960	(855) 363-7736 www.yepenergyNJ.com	**R/C/I** **ACTIVE**
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	(855) 732-2493 www.thisisyourenergy.com	**R/C/I** **ACTIVE**

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ELIZABETHTOWN GAS CO. SERVICE TERRITORY
Last Updated: 12/11/14

***CUSTOMER CLASS** - R – RESIDENTIAL C – COMMERCIAL I – INDUSTRIAL

Supplier	Telephone & Web Site	*Customer Class
Abest Power & Gas of NJ, LLC 202 Smith Street Perth Amboy, NJ 08861	(888) 987-6937 www.AbestPower.com	**R/C/I** **ACTIVE**
Alpha Gas and Electric, LLC 641 5th Street Lakewood, NJ 08701	855-553-6374 www.alphagasandelectric.com	**R/C** **ACTIVE**
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	201-384-5552 www.astralenergyllc.com	**R/C/I** **ACTIVE**
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	888-651-4121 www.greateasternenergy.com	**C** **ACTIVE**
Choice Energy, LLC 4257 US Highway 9, Suite 6C Freehold, NJ 07728	(888) 565-4490 www.4choiceenergy.com	**R/C/I**
Clearview Electric Inc. **d/b/a Clearview Gas** 1744 Lexington Ave. Pennsauken, NJ 08110	800-746-4720 www.clearviewenergy.com	**R/C** **ACTIVE**
Colonial Energy, Inc. 83 Harding Road Wyckoff, NJ 07481	845-429-3229 www.colonialgroupinc.com	**C/I** **ACTIVE**
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07746	888-817-8572 www.commerceenergy.com	**R** **ACTIVE**
Compass Energy Services, Inc. 33 Wood Avenue South, Suite 610 Iselin, NJ 08830	866-867-8328 www.compassenergy.net	**C/I** **ACTIVE**
ConocoPhillips Company 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	800-646-4427 www.conocophillips.com	**C/I** **ACTIVE**
Consolidated Edison Solutions, Inc. Cherry Tree Corporate Center 535 State Highway 38, Suite 140	888-665-0955	**C/I**

Cherry Hill, NJ 08002	www.conedsolutions.com	**ACTIVE**
Constellation NewEnergy-Gas Division, LLC 116 Village Boulevard, Suite 200 Princeton, NJ 08540	800-785-4373 www.constellation.com	**C/I** **ACTIVE**
Constellation Energy Gas Choice, Inc. 116 Village Blvd., Suite 200 Princeton, NJ 08540	800-785-4373 www.constellation.com	**R/C/I** **ACTIVE**
Direct Energy Business Marketing, LLC (fka Hess Energy Marketing, LLC) One Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 http://www.business.directenergy.com/	**C/I** **ACTIVE**
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	866-547-2722 www.directenergy.com	**R/C/I** **INACTIVE**
Direct Energy Small Business, LLC(fka Hess Small Business Services, LLC) One Hess Plaza Woodbridge, NJ 07095	(888) 464-4377 http://www.business.directenergy.com/	**C/I** **ACTIVE**
Energy Plus Natural Gas LP 309 Fellowship Road, East Gate Center Suite 200 Mt. Laurel, NJ 08054	877-866-9193 www.energypluscompany.com	**R/C** **ACTIVE**
UGI Energy Services, Inc. **d/b/a GASMARK** 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	856-273-9995 www.ugienergyservices.com	**C/I** **ACTIVE**
Gateway Energy Services Corporation 120 Wood Avenue, Suite 611 Iselin, NJ 08830	800-313-8333 Residential 800-715-8777 Commercial www.gesc.com	**R/C** **ACTIVE**
Glacial Energy of New Jersey, Inc. 21 Pine Street, Suite 237 Rockaway, NJ 07866	1-888-452-2425 www.glacialenergy.com	**C/I** **ACTIVE**
Global Energy Marketing LLC 129 Wentz Avenue Springfield, NJ 07081	800-542-0778 www.globalp.com	**C/I** **ACTIVE**
Great Eastern Energy 116 Village Blvd., Suite 200 Princeton, NJ 08540	888-651-4121 www.greateastern.com	**C/I** **ACTIVE**
Greenlight Energy 330 Hudson Street, Suite 4	718-204-7467	**C**

Hoboken, NJ 07030	www.greenlightenergy.us	**ACTIVE**
Hess Energy, Inc. One Hess Plaza Woodbridge, NJ 07095	800-437-7872 www.hess.com	**C/I** **ACTIVE**
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	888-264-4908 www.hikoenergy.com	**R/C/I** **ACTIVE**
Infinite Energy dba Intelligent Energy 1200 Route 22 East Suite 2000 Bridgewater, NJ 08807-2943	(800) 927-9794 www.InfiniteEnergy.com	**R/C/I** **ACTIVE**
Marathon Power LLC 302 Main Street Paterson, NJ 07505	888-779-7255 www.mecny.com	**R/C/I** **ACTIVE**
Metromedia Energy, Inc. 6 Industrial Way Eatontown, NJ 07724	1-877-750-7046 www.metromediaenergy.com	**C/I** **ACTIVE**
NATGASCO (Supreme Energy, Inc.) 532 Freeman Street Orange, NJ 07050	800-840-4427 www.supremeenergyinc.com	**R/C** **ACTIVE**
Naughton Energy Corporation 1898 Route 940, Box 709 Pocono Pines, PA 18350	800-372-6942 www.naughtonenergy.com	**C/I** **ACTIVE**
New Energy Services LLC 101 Neptune Ave. Deal, NJ 07723`	800-660-3643 www.newenergyservicesllc.com	**R/C/I** **ACTIVE**
North Eastern States, Inc. d/b/a Entrust Energy 90 Washington Valley Road Bedminster, NJ 07921	(888) 535-6340 www.entrustenergy.com	**R/C/I** **ACTIVE**
Palmco Energy NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	877-726-5862 www.PalmcoEnergy.com	**R/C/I** **ACTIVE**
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	855-32-POWER (76937) www.plymouthenergy.com	**R/C/I** **ACTIVE**
Power Management Co., LLC d/b/a PMC Lightsavers Limited Liability Company 1600 Moseley Road Victor, NY 14564	(585) 249-1360 www.powermanagementco.com	**C/I** **ACTIVE**

PPL EnergyPlus, LLC **Shrewsbury Executive Offices** 788 Shrewsbury Avenue Suite 2200 Tinton Falls, NJ 07724	(732) 741-0505 www.pplenergyplus.com	**C/I** **ACTIVE**
PPL EnergyPlus Retail, LLC Shrewsbury Executive Offices 788 Shrewsbury Avenue, Suite 220 Tinton Falls, NJ 07724	(732) 741-0505 – 2000 www.pplenergyplus.com	**C/I** **ACTIVE**
Progressive Energy Consulting, LLC PO Box 4582 Wayne, New Jersey 07474	(917) 837-7400 Progressivenrg@optionline.net	**R/C/I** **ACTIVE**
Prospect Resources, Inc. Incorp. Services Inc. 208 W. State Street Trenton, NJ 08608-1002	(847) 673-1959 www.prospectresources.com	**C** **ACTIVE**
Residents Energy, LLC 550 Broad Street Newark, NJ 07102	(888) 828-7374 www.residentsenergy.com	**R/C**
Respond Power LLC 1001 East Lawn Drive Teaneck, NJ 07666	877-973-7763 www.respondpower.com	**R/C/I** **ACTIVE**
RTE Enterprises, LLC 8 Gary Lane Califon, NJ 07830	N/A www.RTEenterprises.net	**C/I** **ACTIVE**
Save on Energy, LLC 1101 Red Ventures Drive Fort Mill, SC 29707	1 (877) 658-3183 www.saveonenergy.com	**R/C** **ACTIVE**
SIMEC, LLC 116 Village Blvd. Suite 200 Princeton, NJ 08540	(917) 620-0249 www.simecenergy.com	**R/C/I**
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	800-266-6020 www.southjerseyenergy.com	**R/C/I** **ACTIVE**
Sperian Energy Corp. Bridgewater Center 1200 Route 22 East Bridgewater, NJ 08807	888-682-8082 www.sperianenergy.com	**R/C/I** **ACTIVE**
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	855-466-2842 www.spragueenergy.com	**C/I** **ACTIVE**
Stream Energy New Jersey, LLC 309 Fellowship Road, Suite 200 Mt. Laurel, NJ 08054	(877) 369-8150 www.streamenergy.net	**R/C** **ACTIVE**

Summit Energy Services, Inc. 10350 Ormsby Park Place Suite 400 Louisville, KY 40223	1 (800) 90-SUMMIT www.summitenergy.com	**C/I** **ACTIVE**
Tiger Natural Gas, Inc. dba Tiger, Inc. 234 20th Avenue Brick, NJ 008724	888-875-6122 www.tigernaturalgas.com	**R/C/I** **ACTIVE**
UGI Energy Services, Inc. **dba UGI Energy Link** 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	800-427-8545 www.ugienergylink.com	**C/I** **ACTIVE**
Vista Energy Marketing, L.P. 197 State Route 18 South, Suite 3000 South Wing East Brunswick, NJ 08816	888-508-4782 www.vistaenergymarketing.com	**R/C/I** **ACTIVE**
Woodruff Energy 73 Water Street Bridgeton, NJ 08302	800-557-1121 www.woodruffenergy.com	**R/C/I** **ACTIVE**
Woodruff Energy US LLC 73 Water St., P.O. Box 777 Bridgeton, NJ 08302	856-455-1111 800-557-1121 www.woodruffenergy.com	**C/I** **ACTIVE**
XOOM Energy New Jersey, LLC 744 Broad Street. 16th Floor Newark, NJ 07102	(888) 997-8979 www.xoomenergy.com	**R/C/I** **ACTIVE**
Your Energy Holdings, LLC One International Boulevard, Suite 400 Mahwah, NJ 07495-0400	855-732-2493 www.thisisyourenergy.com	**R/C/I** **ACTIVE**

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APPENDIX B

Equipment Inventory

CHA Project # 29743
City Hall
301 N.Wood Ave. Linden, NJ 07036

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size /Efficiency	Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.	Current year	Years Old	ASHRAE life expectancy
Air Cooled Chiller	2	Trane	RTAA-125	U99H00725 and U99H00726	Air Cooled Chiller	106 tons at 95 deg amb. 55/45 deg F water temp	10.6 EER	MER on Roof	Cooling system for whole building	2008	13		2015	7	20
Boiler	2	Weil McLain	988	N/A	Gas fired HW Boiler	2713 MBH input, 2176 MBH output	80% Eff.	MER on Roof	Heating system for whole building	2008	28		2015	7	35
Chilled Water Pump/Motors	2	Marathon Elec	N/A	N/A	Pump with electric motor	360 GPM @ 85 ft. head, 15HP	N/A	MER on Roof	Cooling system for whole building	1979	-16		2015	36	20
Hot Water Pump/Motors	2	Marathon Elec	FA254TTDR7343DCWF1	N/A	Pump with electric motor	200 GPM @ 68 ft. head, 7.5HP	N/A	MER on roof	Heating system for whole building	1979	-16		2015	36	20
Air Handling Unit AHU-1 (8400 CFM)	1	Trane	Climate Changer	N/A	AHU with chilled water and hot water coils	613 MBH cooling @ 45 F EWT and 500 MBH @ 200 F EWT heating	N/A	MER on roof	Outside Air for all spaces in building	1979	-16		2015	36	20
Air Handling Unit AHU-2 (3600 CFM)	1	Trane	Climate Changer	N/A	AHU with chilled water and hot water coils	191 MBH cooling @ 45 F EWT and 78 MBH @ 200 F EWT heating	N/A	MER on Roof	Board Meeting and Conference	1979	-16		2015	36	20
Air Handling Unit AHU-3 (4000 CFM)	1	Trane	Climate Changer	N/A	AHU with chilled water and hot water coils	244 MBH cooling @ 45 F EWT and 195 MBH @ 200 F EWT heating	N/A	MER on Roof	Council Chamber	1979	-16		2015	36	20
Air Handling Unit AHU-4 (2580 CFM)	1	Trane	Climate Changer	N/A	AHU with chilled water and hot water coils	185 MBH cooling @ 45 F EWT and 142 MBH @ 200 F EWT heating	N/A	MER on Roof	Outside Air for Police areas	1979	-16		2015	36	20
Air Handling Unit AHU-5 (3000 CFM)	1	Trane	Climate Changer	N/A	AHU with chilled water coil	81 MBH cooling @ 45 F EWT	N/A	Sub Grade Floor	Civil Defense Area	1979	-16		2015	36	20
Air Handling Unit AHU-6 (660 CFM)	1	Trane	BAHB-309	N/A	AHU with DX cooling coil	19 MBH cooling @ 75/62 F EAT and 95 F ambient	N/A	First Floor	Communications area	1979	-16		2015	36	20
Air Cooled Condensing Unit	1	N/A	ACS036A2C1	L992839254	Air Cooled Condensing Unit	24 MBH Nom. Cooling Capacity	EER of 9.8	Grade	Associated with Air Handling Unit AHU-6	2005	10		2015	10	20
Air Cooled Split AC System	1	International Comfort Products	R2A330GKR2	X131265645	Air Cooled Condensing Unit	24 MBH Nom. Cooling Capacity	EER of 9.8	Grade	Police Department	2013	18	Indoor Unit info N/A	2015	2	20
Air Cooled Split AC System	1	Mitsubishi	PUL 24 EK	N/A	Air Cooled Condensing Unit	24 MBH Nom. Cooling Capacity	EER of 10.0	Grade	Police Department	2010	15	Indoor Unit info N/A	2015	5	20
Air Cooled Split Heat Pump System	1	Daikin	RXS24DVJU	E000569	Air Cooled Condensing Unit	24 MBH Nom. Cooling Capacity	EER 10.0	Grade	Police Department	2010	15	Indoor Unit info N/A	2015	5	20
Domestic Water Heater	1	Bock	71E	13083024T	Oil Fired Domestic Water Heater	177 GPH Heat Recovery @ 90 deg F Rise	N/A	Sub Grade Floor	Domestic hot water to building	2005	5		2015	10	20
Circulating Pump	1	N/A	N/A	N/A	In Line Pumpset	N/A	N/A	Sub Grade Floor	Domestic hot water to building	2005	5		2015	10	20

Energy Audit of Linden City - City Hall
CHA Project No.29743
Existing Lighting & Audit Input

Cost of Electricity: **$0.131** **$/kWh**
$3.55 **$/kW**

			EXISTING CONDITIONS									Retrofit Control	
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh			
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)		Retrofit control device	Notes
196LED	1st Floor Entrance	Storage Areas	2	W 32 C F 4 (ELE)	F44ILL	112	0.22	SW	6552	1,468		NONE	
32LED	Men's Room	Restroom	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	OCC	4680	562		NONE	
32LED	Women's Room	Restroom	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	OCC	4680	562		NONE	
205	Boiler RM	Mechanical Room	2	S 110 P F 2 (MAG) 8' T-12 Egg Crate	F82SHS	257	0.51	SW	8736	4,490		NONE	
20LED	Boiler RM	Mechanical Room	4	S 28 P F 1 (ELE)	F41ILL	31	0.12	SW	8736	1,083		NONE	
32LED	Boiler RM	Mechanical Room	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	8736	524		NONE	
32LED	Boiler RM	Mechanical Room	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	8736	3,145		OCC	
185LED	Office	Offices	2	T 40 R F 4 (ELE)	F44SE	172	0.34	SW	4680	1,610		OCC	
32LED	Office	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	
32LED	Office	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	
32LED	Main.	Storage Areas	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	6552	393		OCC	
32LED	Main.	Storage Areas	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	6552	393		OCC	
32LED	Tax Collector	Offices	8	1T 32 R F 2 (ELE)	F42LL	60	0.48	SW	4680	2,246		OCC	
32LED	Tax Assessor	Offices	8	1T 32 R F 2 (ELE)	F42LL	60	0.48	SW	4680	2,246		OCC	
32LED	Office	Offices	3	1T 32 R F 2 (ELE)	F42LL	60	0.18	SW	4680	842		OCC	
32LED	Office	Offices	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
32LED	Office	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	
32LED	Office	Offices	3	1T 32 R F 2 (ELE)	F42LL	60	0.18	SW	4680	842		OCC	
32LED	Hallway	Hallways	10	1T 32 R F 2 (ELE)	F42LL	60	0.60	SW	8736	5,242		OCC	
32LED	Hallway	Hallways	4	1T 32 R F 2 (ELE)	F42LL	60	0.24	SW	8736	2,097		OCC	
32LED	Police Dept	Offices	9	1T 32 R F 2 (ELE)	F42LL	60	0.54	SW	4680	2,527		OCC	
25	Police Dept	Offices	8	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.22	SW	4680	1,048		OCC	
5LED	Police Dept	Offices	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	4680	281		OCC	
5LED	Locker RM	Locker	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.12	SW	8736	1,048		OCC	
5LED	Police Dept Hallway	Hallways	9	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.54	SW	8736	4,717		OCC	
32LED	Office	Offices	5	1T 32 R F 2 (ELE)	F42LL	60	0.30	SW	4680	1,404		OCC	
32LED	Office	Offices	4	1T 32 R F 2 (ELE)	F42LL	60	0.24	SW	4680	1,123		OCC	
32LED	Office	Offices	4	1T 32 R F 2 (ELE)	F42LL	60	0.24	SW	4680	1,123		OCC	
32LED	Office	Offices	8	1T 32 R F 2 (ELE)	F42LL	60	0.48	SW	4680	2,246		OCC	
20LED	Office	Offices	1	S 28 P F 1 (ELE)	F41ILL	31	0.03	SW	4680	145		OCC	
5LED	Office	Offices	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	4680	281		OCC	
5LED	Entrance Office	Offices	12	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.72	SW	4680	3,370		OCC	
32LED	Office	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	4680	1,685		OCC	
5LED	Office	Offices	5	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.30	SW	4680	1,404		OCC	
32LED	Office	Offices	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
32LED	Office	Offices	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
5LED	2nd Floor Police Dept Hallway	Hallways	9	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.54	SW	8736	4,717		OCC	
32LED	Detective Bureau	Offices	15	1T 32 R F 2 (ELE)	F42LL	60	0.90	SW	4680	4,212		OCC	
32LED	Hallway	Hallways	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	8736	1,048		OCC	
32LED	Office	Offices	4	1T 32 R F 2 (ELE)	F42LL	60	0.24	SW	4680	1,123		OCC	
32LED	Office	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	4680	1,685		OCC	
5LED	Hallway	Hallways	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	8736	524		OCC	
32LED	Hallway	Hallways	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	8736	1,048		OCC	
5LED	Office	Offices	6	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.36	SW	4680	1,685		OCC	
32LED	Office	Offices	4	1T 32 R F 2 (ELE)	F42LL	60	0.24	SW	4680	1,123		OCC	
32LED	Office	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	4680	1,685		OCC	
32LED	Office	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	
32LED	Office	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	
32LED	Council Office	Offices	8	1T 32 R F 2 (ELE)	F42LL	60	0.48	SW	4680	2,246		OCC	
5LED	Men's Room	Restroom	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.12	SW	4680	562		OCC	
32LED	Mail RM	Offices	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
32LED	Planning RM	Offices	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
32LED	Mail RM	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	
32LED	Planning RM	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	
25	Lobby	Hallways	13	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.36	SW	8736	3,180		OCC	
32LED	Hallway	Hallways	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	8736	3,145		OCC	
20LED	Hallway	Hallways	12	S 28 P F 1 (ELE)	F41ILL	31	0.37	SW	8736	3,250		OCC	
32LED	Hallway	Hallways	7	1T 32 R F 2 (ELE)	F42LL	60	0.42	SW	8736	3,669		OCC	
266	Court RM	Court Room	24	Auditorium Globe CFL	CF42/4-L	188	4.51	SW	2500	11,280		OCC	
25	Court RM	Court Room	24	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.67	SW	2500	1,680		OCC	
20LED	Court RM	Court Room	56	S 28 P F 1 (ELE)	F41ILL	31	1.74	SW	2500	4,340		OCC	
32LED	Chambers Office	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	OCC	4680	562		NONE	
32LED	Chambers Office	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	
32LED	Chambers Office	Offices	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
5LED	Office	Offices	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	4680	281		OCC	
5LED	Office	Offices	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	4680	281		OCC	
32LED	Municipal Office	Offices	20	1T 32 R F 2 (ELE)	F42LL	60	1.20	SW	4680	5,616		OCC	
32LED	Vault	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	
32LED	Prosecutors Office	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	

Energy Audit of Linden City - City Hall
CHA Project No.29743
Existing Lighting & Audit Input

Cost of Electricity: **$0.131** **$/kWh**
$3.55 **$/kW**

			EXISTING CONDITIONS									Retrofit Control	
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh			
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)		Retrofit control device	Notes
32LED	Prosecutors Office	Offices	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
32LED	Lobby	Hallways	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	8736	1,048		OCC	
32LED	City Clerk	Offices	10	1T 32 R F 2 (ELE)	F42LL	60	0.60	SW	4680	2,808		OCC	
32LED	City Clerk	Offices	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
32LED	City Clerk	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	
5LED	City Clerk	Offices	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	4680	281		OCC	
32LED	Office	Offices	4	1T 32 R F 2 (ELE)	F42LL	60	0.24	SW	4680	1,123		OCC	
32LED	3rd Floor Hallway	Hallways	18	1T 32 R F 2 (ELE)	F42LL	60	1.08	SW	8736	9,435		OCC	
32LED	Engineering Office	Offices	11	1T 32 R F 2 (ELE)	F42LL	60	0.66	SW	4680	3,089		OCC	
32LED	Engineering Office	Offices	3	1T 32 R F 2 (ELE)	F42LL	60	0.18	SW	4680	842		OCC	
32LED	Secretary	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	4680	1,685		OCC	
32LED	Office	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	
32LED	City Engineer	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	OCC	4680	1,685		NONE	
32LED	Cone RM	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	OCC	4680	562		NONE	
32LED	Law Office	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	4680	1,685		OCC	
32LED	Law Office	Offices	3	1T 32 R F 2 (ELE)	F42LL	60	0.18	SW	4680	842		OCC	
32LED	Office	Offices	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
32LED	Office	Offices	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
32LED	Office	Offices	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	4680	562		OCC	
32LED	Men's Room	Restroom	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	OCC	4680	562		NONE	
32LED	Women's Room	Restroom	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	OCC	4680	562		NONE	
266	Planning RM	Offices	11	Auditorium Globe CFL	CF42/4-L	188	2.07	SW	4680	9,678		OCC	
25	Planning RM	Offices	3	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.08	SW	4680	393		OCC	
32LED	Planning RM	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	4680	1,685		OCC	
266	Planning RM	Offices	5	Auditorium Globe CFL	CF42/4-L	188	0.94	SW	4680	4,399		OCC	
5LED	Mayor	Offices	12	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.72	SW	4680	3,370		OCC	
20LED	Small Office	Offices	1	S 28 P F 1 (ELE)	F41ILL	31	0.03	SW	4680	145		OCC	
5LED	Small Office	Offices	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	4680	281		OCC	
5LED	Cubic	Offices	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	4680	281		OCC	
5LED	Cubic	Offices	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	4680	281		OCC	
5LED	Cubic	Offices	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.06	SW	4680	281		OCC	
32LED	LEDC	Offices	4	1T 32 R F 2 (ELE)	F42LL	60	0.24	SW	4680	1,123		OCC	
25	Office Hallway	Offices	3	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.08	SW	4680	393		OCC	
32LED	Secretory	Offices	5	1T 32 R F 2 (ELE)	F42LL	60	0.30	SW	4680	1,404		OCC	
32LED	Reception	Offices	4	1T 32 R F 2 (ELE)	F42LL	60	0.24	SW	4680	1,123		OCC	
32LED	Server RM	Offices	4	1T 32 R F 2 (ELE)	F42LL	60	0.24	SW	4680	1,123		OCC	
32LED	Refer RM	Offices	5	1T 32 R F 2 (ELE)	F42LL	60	0.30	SW	4680	1,404		OCC	
5LED	Refer RM	Offices	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.12	SW	4680	562		OCC	
32LED	Bathrrom	Restroom	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
32LED	Conf. RM	Conference	5	1T 32 R F 2 (ELE)	F42LL	60	0.30	SW	4500	1,350		OCC	
32LED	Purchasing Office	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	4680	1,685		OCC	
32LED	Purchasing Agent Office	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	4680	1,685		OCC	
32LED	Kitchen	Offices	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
32LED	Toilet	Restroom	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	4680	281		OCC	
32LED	Construction Code Office	Offices	16	1T 32 R F 2 (ELE)	F42LL	60	0.96	SW	4680	4,493		OCC	
32LED	Offices	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	OCC	4680	1,685		NONE	
32LED	Offices	Offices	3	1T 32 R F 2 (ELE)	F42LL	60	0.18	OCC	4680	842		NONE	
	Total		**591**				**37.52**			**185,915**			

APPENDIX C

ECM Calculations

City of Linden LGEA
CHA Project Numer: 29743

Rate of Discount (used for NPV) 3.0%

Utility Costs		Yearly Usage	Metric Ton Carbon Dioxide Equivalent	Building Area	Annual Utility Cost		
$ 0.127	$/kWh blended		0.000420205	54,450	Electric	Natural Gas	Fuel Oil
$ 0.120	$/kWh supply	1,073,800	0.000420205		$ 136,290	$ 39,058	$ 11,309
$ 3.55	$/kW	176.4	0				
$ 1.16	$/Therm	33,680	0.00533471				
$ 9.53	$/kgals	583	0				
$ 2.98	$/Gal	3,800					

City Hall

Recommend? Y or N		Item	Savings kW	kWh	therms	No. 2 Oil gal	Water kgal	$	Cost	Simple Payback	Life Expectancy	Equivalent CO_2 (Metric tons)	NJ Smart Start Incentives	Direct Install Eligible (Y/N)	Payback w/ Incentives	Simple Projected Lifetime Savings kW	kWh	therms	kgal/yr	$	ROI	NPV	IRR
N	ECM-1	Add a high efficiency condensing boiler	0.0	0	3,726	0	0	4,321	$ 127,418	29.5	25	19.9	$ 3,000	N	28.8	0.0	0	93,158	0	$ 108,034	(0.2)	($49,169)	-1.1%
Y	ECM-2	Replace Heating water pump motors with high efficiency motors and add VFDs	0.3	15,049	0	0	0	1,822	$ 27,107	14.9	20	6.3	$ -	N	14.9	6.6	300,987	0	0	$ 38,483	0.4	($4)	3.0%
Y	ECM-3	Replace Chilled water pump motors with high efficiency motors and VFDs	0.5	23,667	0	0	0	2,865	$ 34,414	12.0	20	9.9	$ -	N	12.0	10.5	473,339	0	0	$ 60,523	0.8	$8,212	5.4%
Y	ECM-4	Install a DDC control System	0.0	112,880	1,207	0	0	15,727	$ 227,300	14.5	15	53.9	$ -	N	14.5	0.0	1,693,200	18,102	0	$ 235,899	0.0	($39,557)	0.5%
Y	ECM-5	Replace oil fired hot water heater with gas fired high efficiency hot water heater	0.0	0	(4,386)	3,800	0	6,222	$ 16,380	2.6	15	-23.4	$ 50	N	2.6	0.0	0	(65,794)	0	$ (76,301)	(5.7)	$57,952	37.8%
N	ECM-6	Replace faucets with low flow faucets	0.0	0	113	0	31	426	$ 16,082	37.7	15	0.6	$ -	N	37.7	0.0	0	1,695	465	$ 6,394	(0.6)	($10,994)	-9.8%
N	ECM-L1	Lighting Replacements / Upgrades	11	58,479	0	0	0	7,492	$ 150,864	20.1	15	24.6	$ 19,615	N	17.5	164.8	877,190	0	0	$ 118,351	(0.2)	($41,809)	-1.9%
N	ECM-L2	Install Lighting Controls (Add Occupancy Sensors)	0	21,631		0	0	2,746	$ 13,210	4.8	15	9.1	$ 2,060	N	4.1	0.0	324,471	0	0	$ 41,183	2.1	$21,626	23.6%
Y	ECM-L3	Lighting Replacements with Controls (Occupancy Sensors)	11	73,089	0	0	0	9,247	$ 164,074	17.7	15	30.7	$ 21,675	N	15.4	164.8	1,096,335	0	0	$ 146,166	(0.1)	($32,009)	-0.3%
		Total	**11.8**	**224,685**	**660**	**3,800**	**31**	**$ 40,630**	**$ 612,774**	**15.1**	**17.9**	**98**	**$ 24,725**		**14.5**	**182**	**3,563,862**	**47,161**	**465**	**$ 519,198**	**(0.2)**	**(65.568)**	**1.8%**
		Recommended Measures (highlighted green above)	**11.8**	**224,685**	**(3,179)**	**3,800**	**0**	**$ 35,883**	**$ 469,275**	**13.1**	**17.0**	**77**	**$ 21,725**	**0**	**12.5**	**182**	**3,563,862**	**(47,692)**	**-**	**$ 404,771**	**(0.1)**	**(5.406)**	**3.7%**
		% of Existing	**7%**	**21%**	**-9%**	**100%**	**0**																

	City:	Newark, NJ				
	Occupied Hours/Week	168				
		Building	Auditorium	Gymnasium	Library	Classrooms
	Enthalpy	Operating	Occupied	Occupied	Occupied	Occupied
Temp	h (Btu/lb)	Bin Hours	Hours	Hours	Hours	Hours	Hours
102.5							
97.5	35.4	6	6	0	0	0	0
92.5	37.4	31	31	0	0	0	0
87.5	35.0	131	131	0	0	0	0
82.5	33.0	500	500	0	0	0	0
77.5	31.5	620	620	0	0	0	0
72.5	29.9	664	664	0	0	0	0
67.5	27.2	854	854	0	0	0	0
62.5	24.0	927	927	0	0	0	0
57.5	20.3	660	660	0	0	0	0
52.5	18.2	730	730	0	0	0	0
47.5	16.0	491	491	0	0	0	0
42.5	14.5	656	656	0	0	0	0
37.5	12.5	1,023	1,023	0	0	0	0
32.5	10.5	734	734	0	0	0	0
27.5	8.7	334	334	0	0	0	0
22.5	7.0	252	252	0	0	0	0
17.5	5.4	125	125	0	0	0	0
12.5	3.7	47	47	0	0	0	0
7.5	2.1	34	34	0	0	0	0
2.5	1.3	1	1	0	0	0	0
-2.5							
-7.5							

Multipliers	
Material:	1.027
Labor	1.246
Equipment	1.124

Heating System Efficiency	80%
Cooling Eff (kW/ton)	1.3

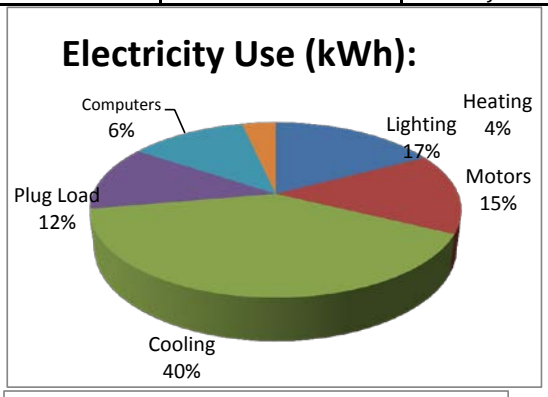
Heating		
Hours	4,427	Hrs
Weighted Avg	40	F
Avg	28	F

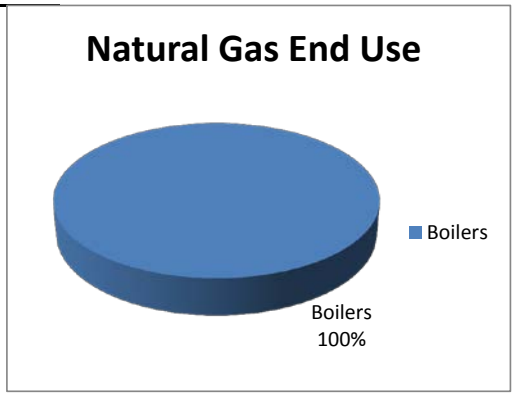
Cooling		
Hours	4,333	Hrs
Weighted Avg	68	F
Avg	78	F

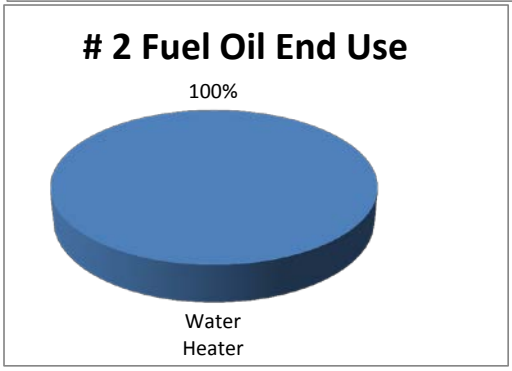
City of Linden LGEA
CHA Project Numer: 29743
City Hall

Utility End Use Analysis			
Electricity Use (kWh):		**Notes/Comments:**	
1,073,800	Total	Based on utility analysis	
186,000	Lighting	From Lighting Calculations	17%
160,000	Motors	Estimated	15%
430,000	Cooling	Estimated	40%
130,000	Plug Load	Estimated	12%
130,000	Computers	Estimated	12%
37,800	Heating	Remaining	4%
Natural Gas Use (Therms):		**Notes/Comments:**	
33,680	Total	Based on utility analysis	
33,680	Boilers	Therms/SF x Square Feet Served	100%

Fuel Oil # 2 (Gallons)		Notes/Comments	
3,800	Total	Based on utility analysis	
3800	Water Heater	Gallons/year	100%







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ECM-1 Add a high efficiency condensing boiler

Description: This ECM evaluates adding a high efficiency condensing gas boiler to operate as the main boiler with the existing boilers to operate as a back-up heat source. The existing boiler efficiency is 80% (observed) and the proposed boiler efficiency is 90% (average seasonal efficiency). Electrical power consumption due to the pump operation is considered to be the same for both the proposed system and the baseline system. A comprehensive boiler control system is also recommended to operate the HHW system to provide a HHW temperature reset according to the outdoor air temperature.

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 1.16	/ Therm	Natural Gas
Baseline Fuel Cost		/ Gal	
FORMULA CONSTANTS			
Oversize Factor	0.8		
Hours per Day	24		
Infrared Conversion Factor	1.0		1.0 if Boiler, 0.8 if Infrared Heater
EXISTING			
Capacity	3,000,000	btu/hr	Estimated Boiler Load % and Capacity
Heating Combustion Efficiency	80%		Estimated averaged Efficiency without HHW Reset
Heating Degree-Day	2,655	Degree-day	
Design Temperature Difference	57	F	
Fuel Conversion	100,000	btu/therm	
PROPOSED			
Capacity	3,000,000	btu/hr	
Efficiency	90%		Annual Average Efficiency with HHW Reset
SAVINGS			
Fuel Savings	3,726	therms	NJ Protocols Calculation
Fuel Cost Savings	$ 4,321		

Savings calculation formulas are taken from NJ Protocols document for Occupancy Controlled Thermostats

Algorithms

$$Gas\ Savings\ (Therms) = \frac{OF \times ((CAPY_{Bi} \times EFF_Q) - (CAPY_{Qi} \times EFF_B \times ICF)) \times HDD_{mod} \times 24}{\Delta T \times HC_{fuel} \times EFF_B \times ICF \times EFF_Q}$$

Definition of Variables

OF = Oversize factor of standard boiler or furnace (OF=0.8)

$CAPY_{Bi}$ = Total input capacity of the baseline furnace, boiler or heater in Btu/hour

$CAPY_{Qi}$ = Total input capacity of the qualifying furnace, boiler or heater in Btu/hour

HDD_{mod} = HDD by zone and building type

24 = Hours/Day

ΔT = design temperature difference

HC_{fuel} = Conversion from Btu to therms of gas or gallons of oil or propane (100,000 btu/therm; 138,700 btu/gal of #2 oil; 92,000 btu/gal of propane)

EFF_Q = Efficiency of qualifying heater(s) (AFUE %)

EFF_B = Efficiency of baseline heaters (AFUE %)

ICF = Infrared Compensation Factor (ICF = 0.8 for IR Heaters, 1.0 for furnaces/boilers)[2]

Furnaces and Boilers

Component	Type	Value	Source
$AFUE_q$	Variable		Application
$AFUE_b$	Fixed	Furnaces: 78% Boilers: 80% Infrared: 78%	EPACT Standard for furnaces and boilers
$CAPY_{in}$	Variable		Application
ΔT	Variable	See Table Below	1
HDD_{mod}	Fixed	See Table Below	1

Sources:

1. KEMA, *Smartstart Program Protocol Review*. 2009.
2. http://www.spaceray.com/1_space-ray_faqs.php

Adjusted Heating Degree Days by Building Type

Building Type	Heating Energy Density (kBtu/sf)	Degree Day Adjustment Factor	Atlantic City (HDD)	Newark (HDD)	Philadelphia (HDD)	Monticello (HDD)
Education	29.5	0.55	2792	2783	2655	3886
Food Sales	35.6	0.66	3369	3359	3204	4689
Food Service	39.0	0.73	3691	3680	3510	5137
Health Care	53.6	1.00	5073	5057	4824	7060
Lodging	15.0	0.28	1420	1415	1350	1976
Retail	29.3	0.55	2773	2764	2637	3859
Office	28.1	0.52	2660	2651	2529	3701
Public Assembly	33.8	0.63	3199	3189	3042	4452
Public Order/Safety	24.1	0.45	2281	2274	2169	3174
Religious Worship	29.1	0.54	2754	2745	2619	3833
Service	47.8	0.89	4524	4510	4302	6296
Warehouse/Storage	20.2	0.38	1912	1906	1818	2661

Heating Degree Days and Outdoor Design Temperature by Zone

Weather Station	HDD	Outdoor Design Temperature (F)
Atlantic City	5073	13
Newark	5057	14
Philadelphia, PA	4824	15
Monticello, NY	7060	8

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Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-1 Add a high efficiency condensing boiler - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
3,000 MBH NG Condensing Boiler	1	EA	$ 41,000	$ 9,000		$ 42,107	$ 11,214	$ -	$ 53,321	Vendor Estimate
Flue Installation	1	LS	$ 5,000.0	$2,500.00		$ 5,135	$ 3,115	$ -	$ 8,250	Vendor Estimate
Controls with HHW Reset Program	1	EA	$ 3,000.0	$ 500.00		$ 3,081	$ 623	$ -	$ 3,704	Estimated
Miscellaneous Electrical	1	LS	$ 2,000	$ 1,000		$ 2,054	$ 1,246	$ -	$ 3,300	Estimated
Miscellaneous HW Piping	1	LS	$ 5,000	$ 5,000		$ 5,135	$ 6,230	$ -	$ 11,365	Estimated
Cleaning HHW Piping	1	EA	$1,000	$5,000		$ 1,027	$ 6,230	$ -	$ 7,257	Estimated
Miscellaneous GC work	1	EA	$ 5,000	$ 5,000		$ 5,135	$ 6,230	$ -	$ 11,365	
Crane	1	EA			$ 3,000	$ -	$ -	$ 3,372	$ 3,372	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 101,934	Subtotal
$ 25,484	25% Contingency
$ 127,418	**Total**

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Replace Heating water pump motors with high efficiency motors and add VFDs

Variable Inputs

Supply Electric Rate	$0.120
Demand Rate	$3.547
Heating System "On" Point	55
VFD Efficiency	98.5%

Electric Savings		**15,049**
Demand Savings		**0.3**
Cost Savings	**$**	**1,822**

Replace Heating water pump motors with high efficiency motors and add VFDs

This measure evaluates replacing heating hot water pump motors with high efficiency inverter -duty motors and adding variable frequency drives . The current motors are constant speed/ constant flow. This ECM will yeild electrical energy savings as a result of slowing the pump motor speed down during low load times. Note: as only one pump operates at a time, savings are represented for one pump (lead/ lag)

PUMP SCHEDULE

Pump ID	Qty	HP	Total HP	Existing Motor Motor Eff.	New Motor Motor Eff.	Exist. Motor kW Note 1	New Motor kW Note 2
HHWP	**1**	**7.5**	**7.5**	**84.0%**	**89.5%**	**5.33**	**5.00**
					Total:	**5.33**	**5.00**

SAVINGS ANALYSIS

OAT - DB Avg Temp F	Annual Hours in Bin	Heating Hours Bin	Pump Load %	Existing Pump kWh	Proposed Pump kW	Speed efficiency %	Proposed Pump kWh	Proposed Savings kWh
(A) See Note 3	(B) See Note 3	(C) =IF(A>TP,0,C)	(D) =0.5+0.5*(55-A)/(55-12)) See Note 4	(E) =D*AA	(F) =BB*E^3.0/CC See Note 5	(G)	(H) =C*F/G	(I) =E-H
102.5	0	0	0%	0	0.0	0.0%	0	0
97.5	6	0	0%	0	0.0	0.0%	0	0
92.5	31	0	0%	0	0.0	0.0%	0	0
87.5	131	0	0%	0	0.0	0.0%	0	0
82.5	500	0	0%	0	0.0	0.0%	0	0
77.5	620	0	0%	0	0.0	0.0%	0	0
72.5	664	0	0%	0	0.0	0.0%	0	0
67.5	854	0	0%	0	0.0	0.0%	0	0
62.5	927	0	0%	0	0.0	0.0%	0	0
57.5	600	0	0%	0	0.0	0.0%	0	0
52.5	730	730	53%	3,891	0.8	84.3%	652	3,239
47.5	491	491	59%	2,617	1.0	89.2%	569	2,048
42.5	656	656	65%	3,496	1.4	93.2%	968	2,529
37.5	1,023	1,023	71%	5,453	1.8	96.4%	1,895	3,558
32.5	734	734	76%	3,912	2.3	98.7%	1,688	2,224
27.5	334	334	82%	1,780	2.8	100.0%	947	833
22.5	252	252	88%	1,343	3.5	100.0%	879	464
17.5	125	125	94%	666	4.2	100.0%	529	137
12.5	47	47	100%	251	5.1	99.0%	241	10
7.5	34	34	100%	181	5.1	99.0%	174	7
2.5	1	1	100%	5	5.1	99.0%	5	0
-2.5	0	0	0%	0	0.0	0.0%	0	0
-7.5	0	0	0%	0	0.0	0.0%	0	0
	8,760	**4,427**		**23,596**			**8,547**	**15,049**

Notes:
1) Existing motor power was determined using motor nameplate data. Formula: Motor HP x 0.746 x 0.8 / Exist. Motor Eff.
2) New motor power is the same as existing motor power adjusted for the new efficiency, if a new motor is proposed.
3) Weather data from NOAA for Philadephia PA
4) The pump load is estimated at 100% at 12 deg. OAT and 50% at 55 deg. OAT and varies linearly in between.
5) The required VFD motor draw is based on a 3 power relationship to load.

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Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

Replace Heating water pump motors with high efficiency motors and add VFDs - E

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
HHW Pump with Premium Efficiency 7.5 HP Motor	2	EA	$ 3,500	$ 750		$ 7,189	$ 1,869	$ -	$ 9,058	
VFD	2	EA	$ 2,100	$ 600		$ 4,313	$ 1,495	$ -	$ 5,809	RS Means 2012
Electrical - misc.	2	EA	$ 1,000	$ 1,000		$ 2,054	$ 2,492	$ -	$ 4,546	RS Means 2012
Differential Pressure Sensor	1	EA	$ 1,000	$ 1,000		$ 1,027	$ 1,246	$ -	$ 2,273	Estimated
						$ -	$ -	$ -	$ -	RS Means 2012
						$ -	$ -	$ -	$ -	RS Means 2012
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 21,686	Subtotal
$ 5,421	25% Contingency
$ 27,107	**Total**

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

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Replace Chilled water pump motors with high efficiency motors and VFDs

Variable Inputs

Supply Electric Rate	$0.120
Demand Rate	$3.547
Cooling System "On" Point	65
VFD Efficiency	98.5%

Electric Savings		**23,667**
Demand Savings		**0.5**
Cost Savings	**$**	**2,865**

Replace Chilled water pump motors with high efficiency motors and VFDs

This measure evaluates the potential energy savings for replacing the existing 15 HP chilled water pumps motors with high efficiency inverter-duty motors and adding variable frequency drives (VFD). A more detailed hydraulic calculation should be carried out to size the pump and motor properly if this measure is approved by City of Linden. Note: as only one pump operates at a time, savings are represented for one pump only (lead/lag)

PUMP SCHEDULE

Pump ID	Qty	HP	Total HP	Existing Motor Motor Eff.	New Motor Motor Eff.	Exist. Motor kW Note 1	New Motor kW Note 2
CHWP	**1**	**15.0**	**15.0**	**85.5%**	**90.0%**	**10.47**	**9.95**
					Total:	**10.47**	**9.95**

SAVINGS ANALYSIS

OAT - DB Avg Temp F	Annual Hours in Bin	Cooling Hours Bin	Pump Load %	Existing Pump kWh	Proposed Pump kW	Speed efficiency %	Proposed Pump kWh	Proposed Savings kWh
(A) See Note 3	(B) See Note 3	(C) =IF(A>TP,0,C)	(D)	(E) =D*AA	(F) =BB*E^3.0/CC See Note 5	(G)	(H) =C*F/G	(I) =E-H
102.5	0	0	0%	0	0.0	0.0%	0	0
97.5	6	6	100%	63	10.1	99.0%	61	2
92.5	31	31	93%	325	8.1	100.0%	251	74
87.5	131	131	79%	1,372	4.9	99.3%	646	725
82.5	500	500	64%	5,235	2.7	93.0%	1,443	3,792
77.5	620	620	50%	6,492	1.3	81.5%	960	5,531
72.5	664	664	50%	6,952	1.3	81.5%	1,029	5,924
67.5	854	854	50%	8,942	1.3	81.5%	1,323	7,619
62.5	927	0	0%	0	0.0	0.0%	0	0
57.5	600	0	0%	0	0.0	0.0%	0	0
52.5	730	0	0%	0	0.0	0.0%	0	0
47.5	491	0	0%	0	0.0	0.0%	0	0
42.5	656	0	0%	0	0.0	0.0%	0	0
37.5	1,023	0	0%	0	0.0	0.0%	0	0
32.5	734	0	0%	0	0.0	0.0%	0	0
27.5	334	0	0%	0	0.0	0.0%	0	0
22.5	252	0	0%	0	0.0	0.0%	0	0
17.5	125	0	0%	0	0.0	0.0%	0	0
12.5	47	0	0%	0	0.0	0.0%	0	0
7.5	34	0	0%	0	0.0	0.0%	0	0
2.5	1	0	0%	0	0.0	0.0%	0	0
-2.5	0	0	0%	0	0.0	0.0%	0	0
-7.5	0	0	0%	0	0.0	0.0%	0	0
	8,760	**2,806**		**29,379**			**5,712**	**23,667**

Notes:
1) Existing motor power was determined using motor nameplate data. Formula: Motor HP x 0.746 x 0.8 / Exist. Motor Eff.
2) New motor power is the same as existing motor power adjusted for the new efficiency, if a new motor is proposed.
3) Weather data from NOAA for Newark, NJ
4) The pump load is estimated at 100% at 95 deg. OAT and 0% at 60 deg. OAT and varies linearly in between.
5) The required VFD motor draw is based on a 3 power relationship to load.

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Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Replace Chilled water pump motors with high efficiency motors and VFDs - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Pump with Premium efficiency 15 HP motor	2	EA	$ 5,500	$ 1,000		$ 11,297	$ 2,492	$ -	$ 13,789	
VFD	2	EA	$ 2,400	$ 800		$ 4,930	$ 1,994	$ -	$ 6,923	RS Means 2012
Electrical - misc.	2	EA	$ 1,000	$ 1,000		$ 2,054	$ 2,492	$ -	$ 4,546	RS Means 2012
Differential Pressure Sensor	1	EA	$ 1,000	$ 1,000		$ 1,027	$ 1,246	$ -	$ 2,273	RS Means 2012
						$ -	$ -	$ -	$ -	RS Means 2012
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 27,531	Subtotal
$ 6,883	25% Contingency
$ 34,414	**Total**

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

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Install a DDC control System

Description: This ECM evaluates the energy savings associated with installing a wireless direct digital control system that enable remote automatic control, monitoring and alarming of all HVAC equipment. The energy savings percentage is based on past performance of similar buildings which have a fully functioning DDC control system.

Building Information:

54,450	Sq Footage	$0.13	$/kWh Blended
Y	Cooling	$1.16	$/Therm
Y	Heating		

FULL DDC - TEMPERATURE SETBACK SAVINGS CALCULATION

EXISTING CONDITIONS		
Heating		
Heating Season Facility Temp	70	F
Weekly Occupied Hours	168	hrs
Heating Season Setback Temp	65	F
Heating Season % Savings per Degree Setback	1%	
Annual Boiler Capacity	3,000	Mbtu/yr
Connected Heating Load Capacity	3,000,000	Btu/hr
Equivalent Full Load Heating Hours	200	hrs
Heating System Efficiency	80%	
Cooling		
Cooling Season Facility Temp	72	F
Weekly Occupied Hours	168	hrs
Cooling Season Setback Temp	77	F
Cooling Season % Savings per Degree Setback	1%	
Connected Cooling Load Capacity	200	Tons
Equivalent Full Load Cooling Hours	200	hrs
Cooling Equipment EER	10.0	
SAVINGS		
Natural Gas Savings	(11)	Therms
Cooling Electricity Savings	71,249	kWh

FULL DDC - ADDITIONAL CONTROLS SAVINGS CALCULATION

EXISTING CONDITIONS		
Existing Facility Total Electric usage	1,073,800	kWh
Existing Facility Total Gas usage	33,680	Therms
Existing Facility Cooling Electric usage	430,000.0	kWh[1]
Existing Facility Heating Natural Gas usage	33,680	Therms[2]
PROPOSED CONDITIONS		
Proposed Facility Cooling Electric Savings	12,900	kWh
Proposed Facility Natural Gas Savings	1,010	Therms
SAVINGS		
Electric Savings	12,900	**kWh**
Natural Gas Savings	1,010	**Therms**

Assumptions

1	40%	of facility total electricity dedicated to Cooling; based on utility information
2	100%	of facility total natural gas dedicated to Heating; based on utility information
3	3%	The building does not have a DDC system and It is estimated there would be 3% savings after upgrading the system

Nighttime Setback

EXISTING CONDITIONS		
Heating		
Heating Season Facility Temp	70	F
Weekly Occupied Hours	70	hrs
Heating Season Setback Temp	65	F
Heating Season % Savings per Degree Setback	1%	
Annual Boiler Capacity	3,000	Mbtu/yr
Connected Heating Load Capacity	3,000,000	Btu/hr
Equivalent Full Load Heating Hours	200	hrs
Heating Equipment Efficiency	80%	
Cooling		
Cooling Season Facility Temp	72	F
Weekly Occupied Hours	70	hrs
Cooling Season Setback Temp	80	F
Cooling Season % Savings per Degree Setback	1%	
Connected Cooling Load Capacity	200	Tons
Equivalent Full Load Cooling Hours	200	hrs
Cooling Equipment EER	10.0	
SAVINGS		
Natural Gas Savings	208	Therms[3]
Cooling Electricity Savings	28,731	kWh

COMBINED SAVINGS		
Natural Gas Savings	1,207	Therms
Cooling Electricity Savings	112,880	kWh
Total Cost Savings	$ 15,727	
Estimated Total Project Cost	$227,300	
Simple Payback	14.5	Yrs

Savings calculation formulas for setback are taken from NJ Protocols document for Occupancy Controlled Thermostats
Savings calculations for additional controls are estimated based on the level of control to be added and prior experience

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Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

Install a DDC control System - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
DDC Project Cost @ $ 3.0 / sq. ft.	1	LS	$ 80,000	$ 80,000		$ 82,160	$ 99,680	$ -	$ 181,840	Estimated
			$ -	$ -		$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 181,840	Subtotal
$ 45,460	25% Contingency
$ 227,300	**Total**

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ECM-5 Replace oil fired hot water heater with gas fired high efficiency hot water heater

Description: This ECM evaluates the energy savings associated with replacing a # 2 fuel oil fired tank type water heater with an equivalent capacity gas fired water heater.

Item	Value	Units	Formula/Comments
Avg. Monthly Utility Demand by Water Heater	317	Gallons/month	Calculated from utility bill
Total Annual Utility Demand by Water Heater	526,355	MBTU/yr	1 gallon # 2 Fuel Oil gives 138,500 BTU heat
Existing DHW Heater Efficiency	75%		Per manufacturer nameplate
Total Annual Hot Water Demand (w/ standby losses)	394,767	MBTU/yr	
Existing Tank Size	60	Gallons	Per manufacturer nameplate
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	120	˚F	Per building personnel
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.7	MBH	
Annual Standby Hot Water Load	5,694	MBTU/yr	
New Tank Size	60	Gallons	
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	120	˚F	
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.7	MBH	
Annual Standby Hot Water Load	5,694	MBTU/yr	
Total Annual Hot Water Demand	394,767	MBTU/yr	
Proposed Avg. Hot water heater efficiency	90%		Based on A.O Smith condensing DHW Heater
Proposed Fuel Use	4,386	Therms	
Utility Cost	$1.16	$/Therm	
Existing Operating Cost of DHW	$11,309	$/yr	
Proposed Operating Cost of DHW	$5,087	$/yr	
Annual Savings	$6,222		

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ECM-5 - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
DHW Heater Removal	1	LS		$ 500		$ -	$ 623	$ -	$ 623	RS Means 2012
High Efficiency Gas-Fired DHW Heater	1	EA	$ 3,000	$ 1,000		$ 3,081	$ 1,246	$ -	$ 4,327	Estimated based on Internet Price
Miscellaneous Electrical	1	LS	$ 300			$ 308	$ -	$ -	$ 308	RS Means 2012
Venting Kit	1	EA	$ 2,000	$ 1,000		$ 2,054	$ 1,246	$ -	$ 3,300	RS Means 2012
Miscellaneous Piping and Valves	1	LS	$ 2,000	$ 2,000		$ 2,054	$ 2,492	$ -	$ 4,546	Estimated

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 13,104	Subtotal
$ 3,276	25% Contingency
$ 16,380	**Total**

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ECM-6: Replace faucets with low flow

Description; This ECM evaluates the water savings resulting from replacing/ upgrading faucets to 0.5 gallon per minute flow

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$9.53	$ / kGal
Faucets in Building	27	
Average Uses / Faucet (per day)	18	# Uses
Average Time of Use	10.0	seconds
Average Flowrate	2.0	gpm

PROPOSED CONDITIONS		
Proposed Faucets to be Replaced	27	
Proposed Flowrate	0.5	gpm

HEATING SAVINGS		
Fuel Cost	$ 1.16	/kWh
Number of Faucets	27	
Hours per Day of Usage	0.1	hrs
Days per Year of Facility Usage	255	days
Average Flowrate	2.0	gpm
Proposed Flowrate	0.5	gpm
Heat Content of Water	8.33	Btu/gal/F
Temperature Difference (Intake and Output)	35	F
Water Heating Equipment Efficiency	80%	
Conversion Factor	100,000	Btu/Therm
SAVINGS		
Current Faucet Water Use	41.31	kGal / year
Proposed Faucet Water Use	10.33	kGal / year
Water Savings	30.98	kGal / year
Heating Savings	113	Therms
Cost Savings	$426	/ year

Savings calculation formulas are taken from NJ Protocols document for Faucet

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

City of Linden LGEA
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Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Replace Plumbing Fixtures with Low-Flow Equivalents - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
Waterless Urinal	0	EA	$ 500	$ 500	$ -	$ -	$ -	$ -	$ -	Vendor Estimate
Low-Flow Toilet	0	EA	$ 800	$ 500	$ -	$ -	$ -	$ -	$ -	Vendor Estimate
Low-Flow faucet	27	EA	$ 100	$ 300	$ -	$ 2,773	$ 10,093	$ -	$ 12,866	Vendor Estimate
						$ -	$ -	$ -	$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

$ 12,866	Subtotal
$ 3,216	25% Contingency
$ 16,082	**Total**

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New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per April, 2012. Building must have a minimum average electric demand of 100 kW. This minimum is waived for buildings owned by local governements or non-profit organizations.

At a minimum, all recommended measures were used for this calculation. To qualify for P4P incentives, the following P4P requirements must be met:

- At least 15% source energy savings
- No more than 50% savings from lighting measures
- Scope includes more than one measure
- Project has at least a 10% internal rate of return
- At least 50% of the source energy savings must come from investor-owned electricity and/or natural gas (note: exemption for fuel conversions)

Total Building Area (Square Feet)	54,450
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilites (BPU)

Incentive #1		
Audit is funded by NJ BPU	$0.05	$/sqft

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	$136,290	$39,058
Existing Usage (from utility)	1,073,800	33,680
Proposed Savings	224,685	-3,179
Existing Total MMBtus	7,033	
Proposed Savings MMBtus	449	
% Energy Reduction	**6.4%**	
Proposed Annual Savings	$35,883	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved Incentive	
	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm
Incentive #2	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.00	$0.00
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.00	$0.00

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$0
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Total All Incentives	**$0**	**$0**	**$0**

Total Project Cost	$469,275

		Allowable Incentive
% Incentives #1 of Utility Cost*	0.0%	$0
% Incentives #2 of Project Cost**	0.0%	$0
% Incentives #3 of Project Cost**	0.0%	$0
Total Eligible Incentives***	**$0**	
Project Cost w/ Incentives	$469,275	

Project Payback (years)	
w/o Incentives	w/ Incentives
13.1	13.1

* Maximum allowable incentive is 50% of annual utility cost if not funded by NJ BPU, and %25 if it is.

** Maximum allowable amount of Incentive #2 is 25% of total project cost.
Maximum allowable amount of Incentive #3 is 25% of total project cost.

*** Maximum allowable amount of Incentive #1 is $50,000 if not funded by NJ BPU, and $25,000 if it is.
Maximum allowable amount of Incentive #2 & #3 is $1 million per gas account and $1 million per electric account; maximum 2 million per project

Energy Audit of Linden City - City Hall
CHA Project No.29743
ECM-L1 Lighting Replacements

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
196LED	1st Floor Entrance	2	W 32 C F 4 (ELE)	F44ILL	112	0.2	SW	6552	1,468	2	T 74 R LED	RTLED50	50	0.1	SW	6,552	655	812	0.1	$ 111.71	$ 472.50	$0	4.2	4.2
32LED	Men's Room	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	4680	562	2	STLED4	STLED4	40	0.1	OCC	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Women's Room	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	4680	562	2	STLED4	STLED4	40	0.1	OCC	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
205	Boiler RM	2	S 110 P F 2 (MAG) 8' T-12 Egg Crate	F82SHS	257	0.5	SW	8736	4,490	2	S 110 P F 2 (MAG) 8' T-12 Egg Crate	F82SHS	257	0.5	SW	8,736	4,490	-	0.0	$ -	$ -	$0		#DIV/0!
20LED	Boiler RM	4	S 28 P F 1 (ELE)	F41ILL	31	0.1	SW	8736	1,083	4	4 ft LED Tube	200732x1	15	0.1	SW	8,736	524	559	0.1	$ 75.97	$ 580.80	$20	7.6	7.4
32LED	Boiler RM	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	8736	524	1	STLED4	STLED4	40	0.0	SW	8,736	349	175	0.0	$ 23.74	$ 356.70	$45	15.0	13.1
32LED	Boiler RM	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	8736	3,145	6	STLED4	STLED4	40	0.2	SW	8,736	2,097	1,048	0.1	$ 142.44	$ 2,140.20	$270	15.0	13.1
185LED	Office	2	T 40 R F 4 (ELE)	F44SE	172	0.3	SW	4680	1,610	2	T 74 R LED	RTLED50	50	0.1	SW	4,680	468	1,142	0.2	$ 159.99	$ 472.50	$0	3.0	3.0
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Main.	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	6552	393	1	STLED4	STLED4	40	0.0	SW	6,552	262	131	0.0	$ 18.02	$ 356.70	$45	19.8	17.3
32LED	Main.	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	6552	393	1	STLED4	STLED4	40	0.0	SW	6,552	262	131	0.0	$ 18.02	$ 356.70	$45	19.8	17.3
32LED	Tax Collector	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	4680	2,246	8	STLED4	STLED4	40	0.3	SW	4,680	1,498	749	0.2	$ 104.91	$ 2,853.60	$360	27.2	23.8
32LED	Tax Assessor	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	4680	2,246	8	STLED4	STLED4	40	0.3	SW	4,680	1,498	749	0.2	$ 104.91	$ 2,853.60	$360	27.2	23.8
32LED	Office	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	842	3	STLED4	STLED4	40	0.1	SW	4,680	562	281	0.1	$ 39.34	$ 1,070.10	$135	27.2	23.8
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Office	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	842	3	STLED4	STLED4	40	0.1	SW	4,680	562	281	0.1	$ 39.34	$ 1,070.10	$135	27.2	23.8
32LED	Hallway	10	1T 32 R F 2 (ELE)	F42LL	60	0.6	SW	8736	5,242	10	STLED4	STLED4	40	0.4	SW	8,736	3,494	1,747	0.2	$ 237.40	$ 3,567.00	$450	15.0	13.1
32LED	Hallway	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	8736	2,097	4	STLED4	STLED4	40	0.2	SW	8,736	1,398	699	0.1	$ 94.96	$ 1,426.80	$180	15.0	13.1
32LED	Police Dept	9	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	4680	2,527	9	STLED4	STLED4	40	0.4	SW	4,680	1,685	842	0.2	$ 118.02	$ 3,210.30	$405	27.2	23.8
25	Police Dept	8	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.2	SW	4680	1,048	8	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.2	SW	4,680	1,048	-	0.0	$ -	$ -	$0		#DIV/0!
5LED	Police Dept	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	SW	4,680	117	164	0.0	$ 22.95	$ 202.50	$50	8.8	6.6
5LED	Locker RM	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	8736	1,048	2	2T XX R LED	2RTLED	25	0.1	SW	8,736	437	612	0.1	$ 83.09	$ 405.00	$100	4.9	3.7
5LED	Police Dept Hallway	9	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.5	SW	8736	4,717	9	2T XX R LED	2RTLED	25	0.2	SW	8,736	1,966	2,752	0.3	$ 373.91	$ 1,822.50	$450	4.9	3.7
32LED	Office	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	SW	4680	1,404	5	STLED4	STLED4	40	0.2	SW	4,680	936	468	0.1	$ 65.57	$ 1,783.50	$225	27.2	23.8
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	SW	4,680	749	374	0.1	$ 52.45	$ 1,426.80	$180	27.2	23.8
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	SW	4,680	749	374	0.1	$ 52.45	$ 1,426.80	$180	27.2	23.8
32LED	Office	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	4680	2,246	8	STLED4	STLED4	40	0.3	SW	4,680	1,498	749	0.2	$ 104.91	$ 2,853.60	$360	27.2	23.8
20LED	Office	1	S 28 P F 1 (ELE)	F41ILL	31	0.0	SW	4680	145	1	4 ft LED Tube	200732x1	15	0.0	SW	4,680	70	75	0.0	$ 10.49	$ 145.20	$5	13.8	13.4
5LED	Office	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	SW	4,680	117	164	0.0	$ 22.95	$ 202.50	$50	8.8	6.6
5LED	Entrance Office	12	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.7	SW	4680	3,370	12	2T XX R LED	2RTLED	25	0.3	SW	4,680	1,404	1,966	0.4	$ 275.39	$ 2,430.00	$600	8.8	6.6
32LED	Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	SW	4,680	1,123	562	0.1	$ 78.68	$ 2,140.20	$270	27.2	23.8
5LED	Office	5	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.3	SW	4680	1,404	5	2T XX R LED	2RTLED	25	0.1	SW	4,680	585	819	0.2	$ 114.74	$ 1,012.50	$250	8.8	6.6
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
5LED	2nd Floor Police Dept Hallway	9	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.5	SW	8736	4,717	9	2T XX R LED	2RTLED	25	0.2	SW	8,736	1,966	2,752	0.3	$ 373.91	$ 1,822.50	$450	4.9	3.7
32LED	Detective Bureau	15	1T 32 R F 2 (ELE)	F42LL	60	0.9	SW	4680	4,212	15	STLED4	STLED4	40	0.6	SW	4,680	2,808	1,404	0.3	$ 196.70	$ 5,350.50	$675	27.2	23.8
32LED	Hallway	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	8736	1,048	2	STLED4	STLED4	40	0.1	SW	8,736	699	349	0.0	$ 47.48	$ 713.40	$90	15.0	13.1
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	SW	4,680	749	374	0.1	$ 52.45	$ 1,426.80	$180	27.2	23.8
32LED	Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	SW	4,680	1,123	562	0.1	$ 78.68	$ 2,140.20	$270	27.2	23.8
5LED	Hallway	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	8736	524	1	2T XX R LED	2RTLED	25	0.0	SW	8,736	218	306	0.0	$ 41.55	$ 202.50	$50	4.9	3.7
32LED	Hallway	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	8736	1,048	2	STLED4	STLED4	40	0.1	SW	8,736	699	349	0.0	$ 47.48	$ 713.40	$90	15.0	13.1
5LED	Office	6	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.4	SW	4680	1,685	6	2T XX R LED	2RTLED	25	0.2	SW	4,680	702	983	0.2	$ 137.69	$ 1,215.00	$300	8.8	6.6
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	SW	4,680	749	374	0.1	$ 52.45	$ 1,426.80	$180	27.2	23.8
32LED	Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	SW	4,680	1,123	562	0.1	$ 78.68	$ 2,140.20	$270	27.2	23.8
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Council Office	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	4680	2,246	8	STLED4	STLED4	40	0.3	SW	4,680	1,498	749	0.2	$ 104.91	$ 2,853.60	$360	27.2	23.8
5LED	Men's Room	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	562	2	2T XX R LED	2RTLED	25	0.1	SW	4,680	234	328	0.1	$ 45.90	$ 405.00	$100	8.8	6.6
32LED	Mail RM	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
32LED	Planning RM	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
32LED	Mail RM	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Planning RM	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
25	Lobby	13	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.4	SW	8736	3,180	13	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.4	SW	8,736	3,180	-	0.0	$ -	$ -	$0		#DIV/0!
32LED	Hallway	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	8736	3,145	6	STLED4	STLED4	40	0.2	SW	8,736	2,097	1,048	0.1	$ 142.44	$ 2,140.20	$270	15.0	13.1
20LED	Hallway	12	S 28 P F 1 (ELE)	F41ILL	31	0.4	SW	8736	3,250	12	4 ft LED Tube	200732x1	15	0.2	SW	8,736	1,572	1,677	0.2	$ 227.91	$ 1,742.40	$60	7.6	7.4
32LED	Hallway	7	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	8736	3,669	7	STLED4	STLED4	40	0.3	SW	8,736	2,446	1,223	0.1	$ 166.18	$ 2,496.90	$315	15.0	13.1
266	Court RM	24	Auditorium Globe CFL	CF42/4-L	188	4.5	SW	2500	11,280	24	Auditorium Globe CFL	CF42/4-L	188	4.5	SW	2,500	11,280	-	0.0	$ -	$ -	$0		#DIV/0!
25	Court RM	24	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.7	SW	2500	1,680	24	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.7	SW	2,500	1,680	-	0.0	$ -	$ -	$0		#DIV/0!
20LED	Court RM	56	S 28 P F 1 (ELE)	F41ILL	31	1.7	SW	2500	4,340	56	4 ft LED Tube	200732x1	15	0.8	SW	2,500	2,100	2,240	0.9	$ 331.61	$ 8,131.20	$280	24.5	23.7
32LED	Chambers Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	4680	562	2	STLED4	STLED4	40	0.1	OCC	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Chambers Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Chambers Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
5LED	Office	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	SW	4,680	117	164	0.0	$ 22.95	$ 202.50	$50	8.8	6.6
5LED	Office	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	SW	4,680	117	164	0.0	$ 22.95	$ 202.50	$50	8.8	6.6
32LED	Municipal Office	20	1T 32 R F 2 (ELE)	F42LL	60	1.2	SW	4680	5,616	20	STLED4	STLED4	40	0.8	SW	4,680	3,744	1,872	0.4	$ 262.27	$ 7,134.00	$900	27.2	23.8
32LED	Vault	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Prosecutors Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Prosecutors Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
32LED	Lobby	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	8736	1,048	2	STLED4	STLED4	40	0.1	SW	8,736	699	349	0.0	$ 47.48	$ 713.40	$90	15.0	13.1
32LED	City Clerk	10	1T 32 R F 2 (ELE)	F42LL	60	0.6	SW	4680	2,808	10	STLED4	STLED4	40	0.4	SW	4,680	1,872	936	0.2	$ 131.14	$ 3,567.00	$450	27.2	23.8
32LED	City Clerk	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
32LED	City Clerk	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
5LED	City Clerk	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	SW	4,680	117	164	0.0	$ 22.95	$ 202.50	$50	8.8	6.6
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	SW	4,680	749	374	0.1	$ 52.45	$ 1,426.80	$180	27.2	23.8
32LED	3rd Floor Hallway	18	1T 32 R F 2 (ELE)	F42LL	60	1.1	SW	8736	9,435	18	STLED4	STLED4	40	0.7	SW	8,736	6,290	3,145	0.4	$ 427.33	$ 6,420.60	$810	15.0	13.1
32LED	Engineering Office	11	1T 32 R F 2 (ELE)	F42LL	60	0.7	SW	4680	3,089	11	STLED4	STLED4	40	0.4	SW	4,680	2,059	1,030	0.2	$ 144.25	$ 3,923.70	$495	27.2	23.8
32LED	Engineering Office	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	842	3	STLED4	STLED4	40	0.1	SW	4,680	562	281	0.1	$ 39.34	$ 1,070.10	$135	27.2	23.8
32LED	Secretary	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	SW	4,680	1,123	562	0.1	$ 78.68	$ 2,140.20	$270	27.2	23.8
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	City Engineer	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	OCC	4680	1,685	6	STLED4	STLED4	40	0.2	OCC	4,680	1,123	562	0.1	$ 78.68	$ 2,140.20	$270	27.2	23.8
32LED	Cone RM	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	4680	562	2	STLED4	STLED4	40	0.1	OCC	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Law Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	SW	4,680	1,123	562	0.1	$ 78.68	$ 2,140.20	$270	27.2	23.8
32LED	Law Office	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	842	3	STLED4	STLED4	40	0.1	SW	4,680	562	281	0.1	$ 39.34	$ 1,070.10	$135	27.2	23.8
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	SW	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Men's Room	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	4680	562	2	STLED4	STLED4	40	0.1	OCC	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
32LED	Women's Room	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	4680	562	2	STLED4	STLED4	40	0.1	OCC	4,680	374	187	0.0	$ 26.23	$ 713.40	$90	27.2	23.8
266	Planning RM	11	Auditorium Globe CFL	CF42/4-L	188	2.1	SW	4680	9,678	11	Auditorium Globe CFL	CF42/4-L	188	2.1	SW	4,680	9,678	-	0.0	$ -	$ -	$0		#DIV/0!
25	Planning RM	3	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.1	SW	4680	393	3	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.1	SW	4,680	393	-	0.0	$ -	$ -	$0		#DIV/0!
32LED	Planning RM	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	SW	4,680	1,123	562	0.1	$ 78.68	$ 2,140.20	$270	27.2	23.8
266	Planning RM	5	Auditorium Globe CFL	CF42/4-L	188	0.9	SW	4680	4,399	5	Auditorium Globe CFL	CF42/4-L	188	0.9	SW	4,680	4,399	-	0.0	$ -	$ -	$0		#DIV/0!
5LED	Mayor	12	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.7	SW	4680	3,370	12	2T XX R LED	2RTLED	25	0.3	SW	4,680	1,404	1,966	0.4	$ 275.39	$ 2,430.00	$600	8.8	6.6
20LED	Small Office	1	S 28 P F 1 (ELE)	F41ILL	31	0.0	SW	4680	145	1	4 ft LED Tube	200732x1	15	0.0	SW	4,680	70	75	0.0	$ 10.49	$ 145.20	$5	13.8	13.4
5LED	Small Office	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	SW	4,680	117	164	0.0	$ 22.95	$ 202.50	$50	8.8	6.6
5LED	Cubic	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	SW	4,680	117	164	0.0	$ 22.95	$ 202.50	$50	8.8	6.6
5LED	Cubic	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	SW	4,680	117	164	0.0	$ 22.95	$ 202.50	$50	8.8	6.6
5LED	Cubic	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	SW	4,680	117	164	0.0	$ 22.95	$ 202.50	$50	8.8	6.6
32LED	LEDC	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	SW	4,680	749	374	0.1	$ 52.45	$ 1,426.80	$180	27.2	23.8
25	Office Hallway	3	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.1	SW	4680	393	3	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.1	SW	4,680	393	-	0.0	$ -	$ -	$0		#DIV/0!
32LED	Secretory	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	SW	4680	1,404	5	STLED4	STLED4	40	0.2	SW	4,680	936	468	0.1	$ 65.57	$ 1,783.50	$225	27.2	23.8
32LED	Reception	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	SW	4,680	749	374	0.1	$ 52.45	$ 1,426.80	$180	27.2	23.8
32LED	Server RM	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	SW	4,680	749	374	0.1	$ 52.45	$ 1,426.80	$180	27.2	23.8
32LED	Refer RM	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	SW	4680	1,404	5	STLED4	STLED4	40	0.2	SW	4,680	936	468	0.1	$ 65.57	$ 1,783.50	$225	27.2	23.8
5LED	Refer RM	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	562	2	2T XX R LED	2RTLED	25	0.1	SW	4,680	234	328	0.1	$ 45.90	$ 405.00	$100	8.8	6.6
32LED	Bathrrom	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
32LED	Conf. RM	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	SW	4500	1,350	5	STLED4	STLED4	40	0.2	SW	4,500	900	450	0.1	$ 63.21	$ 1,783.50	$225	28.2	24.7
32LED	Purchasing Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	SW	4,680	1,123	562	0.1	$ 78.68	$ 2,140.20	$270	27.2	23.8
32LED	Purchasing Agent Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	SW	4,680	1,123	562	0.1	$ 78.68	$ 2,140.20	$270	27.2	23.8
32LED	Kitchen	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
32LED	Toilet	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	SW	4,680	187	94	0.0	$ 13.11	$ 356.70	$45	27.2	23.8
32LED	Construction Code Office	16	1T 32 R F 2 (ELE)	F42LL	60	1.0	SW	4680	4,493	16	STLED4	STLED4	40	0.6	SW	4,680	2,995	1,498	0.3	$ 209.82	$ 5,707.20	$720	27.2	23.8
32LED	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	OCC	4680	1,685	6	STLED4	STLED4	40	0.2	OCC	4,680	1,123	562	0.1	$ 78.68	$ 2,140.20	$270	27.2	23.8
32LED	Offices	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	OCC	4680	842	3	STLED4	STLED4	40	0.1	OCC	4,680	562	281	0.1	$ 39.34	$ 1,070.10	$135	27.2	23.8
	Total	**591**				**37.5**			**185,915**	**591**			**4,851**	**26.5**			**127,436**	**58,479**	**11.0**	**$8,129**	**$150,864**	**$19,615**		

		EXISTING CONDITIONS								RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
																	Demand Savings		11.0	$468			

Energy Audit of Linden City - City Hall
CHA Project No.29743
ECM-L2 Install Occupancy Sensors

		EXISTING CONDITIONS					RETROFIT CONDITIONS			COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
196LED	1st Floor Entrance	2	W 32 C F 4 (ELE)	F44ILL	112	0.2	0.2	NONE	6552	1,467.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
32LED	Men's Room	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	NONE	4680	561.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
32LED	Women's Room	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	NONE	4680	561.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
205	Boiler RM	2	S 110 P F 2 (MAG) 8' T-12 Egg Crate	F82SHS	257	0.5	0.5	NONE	8736	4,490.3	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
20LED	Boiler RM	4	S 28 P F 1 (ELE)	F41ILL	31	0.1	0.1	NONE	8736	1,083.3	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
32LED	Boiler RM	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	NONE	8736	524.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
32LED	Boiler RM	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	OCC	8736	3,145.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
185LED	Office	2	T 40 R F 4 (ELE)	F44SE	172	0.3	0.3	OCC	3744	1,287.9	322.0	0.0	$42.18	$128.25	$20.00	3.0	2.6
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
32LED	Main.	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	4586.4	275.2	117.9	0.0	$15.45	$128.25	$20.00	8.3	7.0
32LED	Main.	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	4586.4	275.2	117.9	0.0	$15.45	$128.25	$20.00	8.3	7.0
32LED	Tax Collector	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	0.5	OCC	3744	1,797.1	449.3	0.0	$58.86	$128.25	$20.00	2.2	1.8
32LED	Tax Assessor	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	0.5	OCC	3744	1,797.1	449.3	0.0	$58.86	$128.25	$20.00	2.2	1.8
32LED	Office	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	3744	673.9	168.5	0.0	$22.07	$128.25	$20.00	5.8	4.9
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
32LED	Office	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	3744	673.9	168.5	0.0	$22.07	$128.25	$20.00	5.8	4.9
32LED	Hallway	10	1T 32 R F 2 (ELE)	F42LL	60	0.6	0.6	OCC	8736	5,241.6	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
32LED	Hallway	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	8736	2,096.6	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
32LED	Police Dept	9	1T 32 R F 2 (ELE)	F42LL	60	0.5	0.5	OCC	3744	2,021.8	505.4	0.0	$66.21	$128.25	$20.00	1.9	1.6
25	Police Dept	8	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.2	0.2	OCC	3744	838.7	209.7	0.0	$27.47	$128.25	$20.00	4.7	3.9
5LED	Police Dept	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
5LED	Locker RM	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	6988.8	838.7	209.7	0.0	$27.47	$128.25	$20.00	4.7	3.9
5LED	Police Dept Hallway	9	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.5	0.5	OCC	8736	4,717.4	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
32LED	Office	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	0.3	OCC	3744	1,123.2	280.8	0.0	$36.78	$128.25	$20.00	3.5	2.9
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	3744	898.6	224.6	0.0	$29.43	$128.25	$20.00	4.4	3.7
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	3744	898.6	224.6	0.0	$29.43	$128.25	$20.00	4.4	3.7
32LED	Office	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	0.5	OCC	3744	1,797.1	449.3	0.0	$58.86	$128.25	$20.00	2.2	1.8
20LED	Office	1	S 28 P F 1 (ELE)	F41ILL	31	0.0	0.0	OCC	3744	116.1	29.0	0.0	$3.80	$128.25	$20.00	33.7	28.5
5LED	Office	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
5LED	Entrance Office	12	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.7	0.7	OCC	3744	2,695.7	673.9	0.0	$88.28	$128.25	$20.00	1.5	1.2
32LED	Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	OCC	3744	1,347.8	337.0	0.0	$44.14	$128.25	$20.00	2.9	2.5
5LED	Office	5	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.3	0.3	OCC	3744	1,123.2	280.8	0.0	$36.78	$128.25	$20.00	3.5	2.9
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
5LED	2nd Floor Police Dept Hallway	9	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.5	0.5	OCC	8736	4,717.4	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
32LED	Detective Bureau	15	1T 32 R F 2 (ELE)	F42LL	60	0.9	0.9	OCC	3744	3,369.6	842.4	0.0	$110.35	$128.25	$20.00	1.2	1.0
32LED	Hallway	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	8736	1,048.3	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	3744	898.6	224.6	0.0	$29.43	$128.25	$20.00	4.4	3.7
32LED	Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	OCC	3744	1,347.8	337.0	0.0	$44.14	$128.25	$20.00	2.9	2.5
5LED	Hallway	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	8736	524.2	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
32LED	Hallway	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	8736	1,048.3	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
5LED	Office	6	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.4	0.4	OCC	3744	1,347.8	337.0	0.0	$44.14	$128.25	$20.00	2.9	2.5
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	3744	898.6	224.6	0.0	$29.43	$128.25	$20.00	4.4	3.7
32LED	Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	OCC	3744	1,347.8	337.0	0.0	$44.14	$128.25	$20.00	2.9	2.5
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
32LED	Council Office	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	0.5	OCC	3744	1,797.1	449.3	0.0	$58.86	$128.25	$20.00	2.2	1.8
5LED	Men's Room	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	3276	393.1	168.5	0.0	$22.07	$128.25	$20.00	5.8	4.9
32LED	Mail RM	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
32LED	Planning RM	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
32LED	Mail RM	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
32LED	Planning RM	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
25	Lobby	13	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.4	0.4	OCC	8736	3,179.9	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
32LED	Hallway	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	OCC	8736	3,145.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
20LED	Hallway	12	S 28 P F 1 (ELE)	F41ILL	31	0.4	0.4	OCC	8736	3,249.8	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
32LED	Hallway	7	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	OCC	8736	3,669.1	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
266	Court RM	24	Auditorium Globe CFL	CF42/4-L	188	4.5	4.5	OCC	2500	11,280.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
25	Court RM	24	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.7	0.7	OCC	2500	1,680.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
20LED	Court RM	56	S 28 P F 1 (ELE)	F41ILL	31	1.7	1.7	OCC	2500	4,340.0	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
32LED	Chambers Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	NONE	4680	561.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
32LED	Chambers Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
32LED	Chambers Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
5LED	Office	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
5LED	Office	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
32LED	Municipal Office	20	1T 32 R F 2 (ELE)	F42LL	60	1.2	1.2	OCC	3744	4,492.8	1,123.2	0.0	$147.14	$128.25	$20.00	0.9	0.7
32LED	Vault	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
32LED	Prosecutors Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
32LED	Prosecutors Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
32LED	Lobby	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	8736	1,048.3	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
32LED	City Clerk	10	1T 32 R F 2 (ELE)	F42LL	60	0.6	0.6	OCC	3744	2,246.4	561.6	0.0	$73.57	$128.25	$20.00	1.7	1.5
32LED	City Clerk	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
32LED	City Clerk	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
5LED	City Clerk	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	3744	898.6	224.6	0.0	$29.43	$128.25	$20.00	4.4	3.7
32LED	3rd Floor Hallway	18	1T 32 R F 2 (ELE)	F42LL	60	1.1	1.1	OCC	8736	9,434.9	0.0	0.0	$0.00	$128.25	$20.00		#DIV/0!
32LED	Engineering Office	11	1T 32 R F 2 (ELE)	F42LL	60	0.7	0.7	OCC	3744	2,471.0	617.8	0.0	$80.93	$128.25	$20.00	1.6	1.3
32LED	Engineering Office	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	3744	673.9	168.5	0.0	$22.07	$128.25	$20.00	5.8	4.9
32LED	Secretary	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	OCC	3744	1,347.8	337.0	0.0	$44.14	$128.25	$20.00	2.9	2.5
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
32LED	City Engineer	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	NONE	4680	1,684.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
32LED	Cone RM	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	NONE	4680	561.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
32LED	Law Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	OCC	3744	1,347.8	337.0	0.0	$44.14	$128.25	$20.00	2.9	2.5

Energy Audit of Linden City - City Hall
CHA Project No.29743
ECM-L2 Install Occupancy Sensors

		EXISTING CONDITIONS					RETROFIT CONDITIONS				COST & SAVINGS ANALYSIS						
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**Fixture Code**	**Watts per Fixture**	**kW/Space**	**kW/Space**	**Retrofit Control**	**Annual Hours**	**Annual kWh**	**Annual kWh Saved**	**Annual kW Saved**	**Annual $ Saved**	**Retrofit Cost**	**NJ Smart Start Lighting Incentive**	**Simple Payback With Out Incentive**	**Simple Payback**
Field Code	**Unique description of the location - Room number/Room name: Floor number (if applicable)**	**No. of fixtures before the retrofit**	**Lighting Fixture Code**	**Code from Table of Standard Fixture Wattages**	**Value from Table of Standard Fixture Wattages**	**(Watts/Fixt) * (Fixt No.)**	**(Watts/Fixt) * (Number of Fixtures)**	**Retrofit control device**	**Estimated annual hours for the usage group**	**(kW/space) * (Annual Hours)**	**(Original Annual kWh) - (Retrofit Annual kWh)**	**(Original Annual kW) - (Retrofit Annual kW)**	**(kW Saved) * ($/kWh)**	**Cost for renovations to lighting system**		**Length of time for renovations cost to be recovered**	**Length of time for renovations cost to be recovered**
32LED	Law Office	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	3744	673.9	168.5	0.0	$22.07	$128.25	$20.00	5.8	4.9
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
32LED	Men's Room	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	NONE	4680	561.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
32LED	Women's Room	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	NONE	4680	561.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
266	Planning RM	11	Auditorium Globe CFL	CF42/4-L	188	2.1	2.1	OCC	3744	7,742.6	1,935.6	0.0	$253.57	$128.25	$20.00	0.5	0.4
25	Planning RM	3	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.1	0.1	OCC	3744	314.5	78.6	0.0	$10.30	$128.25	$20.00	12.5	10.5
32LED	Planning RM	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	OCC	3744	1,347.8	337.0	0.0	$44.14	$128.25	$20.00	2.9	2.5
266	Planning RM	5	Auditorium Globe CFL	CF42/4-L	188	0.9	0.9	OCC	3744	3,519.4	879.8	0.0	$115.26	$128.25	$20.00	1.1	0.9
5LED	Mayor	12	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.7	0.7	OCC	3744	2,695.7	673.9	0.0	$88.28	$128.25	$20.00	1.5	1.2
20LED	Small Office	1	S 28 P F 1 (ELE)	F41ILL	31	0.0	0.0	OCC	3744	116.1	29.0	0.0	$3.80	$128.25	$20.00	33.7	28.5
5LED	Small Office	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
5LED	Cubic	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
5LED	Cubic	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
5LED	Cubic	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
32LED	LEDC	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	3744	898.6	224.6	0.0	$29.43	$128.25	$20.00	4.4	3.7
25	Office Hallway	3	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.1	0.1	OCC	3744	314.5	78.6	0.0	$10.30	$128.25	$20.00	12.5	10.5
32LED	Secretory	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	0.3	OCC	3744	1,123.2	280.8	0.0	$36.78	$128.25	$20.00	3.5	2.9
32LED	Reception	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	3744	898.6	224.6	0.0	$29.43	$128.25	$20.00	4.4	3.7
32LED	Server RM	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	OCC	3744	898.6	224.6	0.0	$29.43	$128.25	$20.00	4.4	3.7
32LED	Refer RM	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	0.3	OCC	3744	1,123.2	280.8	0.0	$36.78	$128.25	$20.00	3.5	2.9
5LED	Refer RM	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	0.1	OCC	3744	449.3	112.3	0.0	$14.71	$128.25	$20.00	8.7	7.4
32LED	Bathrrom	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3276	196.6	84.2	0.0	$11.04	$128.25	$20.00	11.6	9.8
32LED	Conf. RM	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	0.3	OCC	3600	1,080.0	270.0	0.0	$35.37	$128.25	$20.00	3.6	3.1
32LED	Purchasing Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	OCC	3744	1,347.8	337.0	0.0	$44.14	$128.25	$20.00	2.9	2.5
32LED	Purchasing Agent Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	OCC	3744	1,347.8	337.0	0.0	$44.14	$128.25	$20.00	2.9	2.5
32LED	Kitchen	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3744	224.6	56.2	0.0	$7.36	$128.25	$20.00	17.4	14.7
32LED	Toilet	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	0.1	OCC	3276	196.6	84.2	0.0	$11.04	$128.25	$20.00	11.6	9.8
32LED	Construction Code Office	16	1T 32 R F 2 (ELE)	F42LL	60	1.0	1.0	OCC	3744	3,594.2	898.6	0.0	$117.71	$128.25	$20.00	1.1	0.9
32LED	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	0.4	NONE	4680	1,684.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
32LED	Offices	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	0.2	NONE	4680	842.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
								0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
	Total	**591**				**37.5**	**37.5**			**164,283.68**	**21,631.39**	**0.0**	**2833.7**	**13209.8**	**2060.0**		
										Demand Savings			**0.0**	**$0**			

Energy Audit of Linden City - City Hall
CHA Project No.29743
ECM-L3 Lighting Replacements with Occupancy Sensors

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
196LED	1st Floor Entrance	2	W 32 C F 4 (ELE)	F44ILL	112	0.2	SW	6552	1,468	2	T 74 R LED	RTLED50	50	0.1	NONE	6,552	655	812	0.1	$ 111.71	$ 472.50	$ -	4.2	4.2
32LED	Men's Room	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	4680	562	2	STLED4	STLED4	40	0.1	NONE	4,680	374	187	0.0	$ 26.23	$ 713.40	$ 90	27.2	23.8
32LED	Women's Room	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	4680	562	2	STLED4	STLED4	40	0.1	NONE	4,680	374	187	0.0	$ 26.23	$ 713.40	$ 90	27.2	23.8
205	Boiler RM	2	S 110 P F 2 (MAG) 8' T-12 Egg Crate	F82SHS	257	0.5	SW	8736	4,490	2	S 110 P F 2 (MAG) 8' T-12 Egg Crate	F82SHS	257	0.5	NONE	8,736	4,490	-	0.0	$ -	$ -	$ -		
20LED	Boiler RM	4	S 28 P F 1 (ELE)	F41ILL	31	0.1	SW	8736	1,083	4	4 ft LED Tube	200732x1	15	0.1	NONE	8,736	524	559	0.1	$ 75.97	$ 580.80	$ 20	7.6	7.4
32LED	Boiler RM	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	8736	524	1	STLED4	STLED4	40	0.0	NONE	8,736	349	175	0.0	$ 23.74	$ 356.70	$ 45	15.0	13.1
32LED	Boiler RM	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	8736	3,145	6	STLED4	STLED4	40	0.2	OCC	8,736	2,097	1,048	0.1	$ 142.44	$ 2,268.45	$ 290	15.9	13.9
185LED	Office	2	T 40 R F 4 (ELE)	F44SE	172	0.3	SW	4680	1,610	2	T 74 R LED	RTLED50	50	0.1	OCC	3,744	374	1,236	0.2	$ 172.25	$ 600.75	$ 20	3.5	3.4
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
32LED	Main.	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	6552	393	1	STLED4	STLED4	40	0.0	OCC	4,586	183	210	0.0	$ 28.32	$ 484.95	$ 65	17.1	14.8
32LED	Main.	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	6552	393	1	STLED4	STLED4	40	0.0	OCC	4,586	183	210	0.0	$ 28.32	$ 484.95	$ 65	17.1	14.8
32LED	Tax Collector	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	4680	2,246	8	STLED4	STLED4	40	0.3	OCC	3,744	1,198	1,048	0.2	$ 144.15	$ 2,981.85	$ 380	20.7	18.1
32LED	Tax Assessor	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	4680	2,246	8	STLED4	STLED4	40	0.3	OCC	3,744	1,198	1,048	0.2	$ 144.15	$ 2,981.85	$ 380	20.7	18.1
32LED	Office	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	842	3	STLED4	STLED4	40	0.1	OCC	3,744	449	393	0.1	$ 54.05	$ 1,198.35	$ 155	22.2	19.3
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,744	150	131	0.0	$ 18.02	$ 484.95	$ 65	26.9	23.3
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
32LED	Office	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	842	3	STLED4	STLED4	40	0.1	OCC	3,744	449	393	0.1	$ 54.05	$ 1,198.35	$ 155	22.2	19.3
32LED	Hallway	10	1T 32 R F 2 (ELE)	F42LL	60	0.6	SW	8736	5,242	10	STLED4	STLED4	40	0.4	OCC	8,736	3,494	1,747	0.2	$ 237.40	$ 3,695.25	$ 470	15.6	13.6
32LED	Hallway	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	8736	2,097	4	STLED4	STLED4	40	0.2	OCC	8,736	1,398	699	0.1	$ 94.96	$ 1,555.05	$ 200	16.4	14.3
32LED	Police Dept	9	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	4680	2,527	9	STLED4	STLED4	40	0.4	OCC	3,744	1,348	1,179	0.2	$ 162.16	$ 3,338.55	$ 425	20.6	18.0
25	Police Dept	8	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.2	SW	4680	1,048	8	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.2	OCC	3,744	839	210	0.0	$ 27.47	$ 128.25	$ 20	4.7	3.9
5LED	Police Dept	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	OCC	3,744	94	187	0.0	$ 26.01	$ 330.75	$ 70	12.7	10.0
5LED	Locker RM	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	8736	1,048	2	2T XX R LED	2RTLED	25	0.1	OCC	6,989	349	699	0.1	$ 94.54	$ 533.25	$ 120	5.6	4.4
5LED	Police Dept Hallway	9	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.5	SW	8736	4,717	9	2T XX R LED	2RTLED	25	0.2	OCC	8,736	1,966	2,752	0.3	$ 373.91	$ 1,950.75	$ 470	5.2	4.0
32LED	Office	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	SW	4680	1,404	5	STLED4	STLED4	40	0.2	OCC	3,744	749	655	0.1	$ 90.09	$ 1,911.75	$ 245	21.2	18.5
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	OCC	3,744	599	524	0.1	$ 72.07	$ 1,555.05	$ 200	21.6	18.8
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	OCC	3,744	599	524	0.1	$ 72.07	$ 1,555.05	$ 200	21.6	18.8
32LED	Office	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	4680	2,246	8	STLED4	STLED4	40	0.3	OCC	3,744	1,198	1,048	0.2	$ 144.15	$ 2,981.85	$ 380	20.7	18.1
20LED	Office	1	S 28 P F 1 (ELE)	F41ILL	31	0.0	SW	4680	145	1	4 ft LED Tube	200732x1	15	0.0	OCC	3,744	56	89	0.0	$ 12.33	$ 273.45	$ 25	22.2	20.1
5LED	Office	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	OCC	3,744	94	187	0.0	$ 26.01	$ 330.75	$ 70	12.7	10.0
5LED	Entrance Office	12	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.7	SW	4680	3,370	12	2T XX R LED	2RTLED	25	0.3	OCC	3,744	1,123	2,246	0.4	$ 312.17	$ 2,558.25	$ 620	8.2	6.2
32LED	Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	OCC	3,744	899	786	0.1	$ 108.11	$ 2,268.45	$ 290	21.0	18.3
5LED	Office	5	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.3	SW	4680	1,404	5	2T XX R LED	2RTLED	25	0.1	OCC	3,744	468	936	0.2	$ 130.07	$ 1,140.75	$ 270	8.8	6.7
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,744	150	131	0.0	$ 18.02	$ 484.95	$ 65	26.9	23.3
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,744	150	131	0.0	$ 18.02	$ 484.95	$ 65	26.9	23.3
5LED	2nd Floor Police Dept Hallway	9	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.5	SW	8736	4,717	9	2T XX R LED	2RTLED	25	0.2	OCC	8,736	1,966	2,752	0.3	$ 373.91	$ 1,950.75	$ 470	5.2	4.0
32LED	Detective Bureau	15	1T 32 R F 2 (ELE)	F42LL	60	0.9	SW	4680	4,212	15	STLED4	STLED4	40	0.6	OCC	3,744	2,246	1,966	0.3	$ 270.27	$ 5,478.75	$ 695	20.3	17.7
32LED	Hallway	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	8736	1,048	2	STLED4	STLED4	40	0.1	OCC	8,736	699	349	0.0	$ 47.48	$ 841.65	$ 110	17.7	15.4
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	OCC	3,744	599	524	0.1	$ 72.07	$ 1,555.05	$ 200	21.6	18.8
32LED	Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	OCC	3,744	899	786	0.1	$ 108.11	$ 2,268.45	$ 290	21.0	18.3
5LED	Hallway	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	8736	524	1	2T XX R LED	2RTLED	25	0.0	OCC	8,736	218	306	0.0	$ 41.55	$ 330.75	$ 70	8.0	6.3
32LED	Hallway	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	8736	1,048	2	STLED4	STLED4	40	0.1	OCC	8,736	699	349	0.0	$ 47.48	$ 841.65	$ 110	17.7	15.4
5LED	Office	6	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.4	SW	4680	1,685	6	2T XX R LED	2RTLED	25	0.2	OCC	3,744	562	1,123	0.2	$ 156.09	$ 1,343.25	$ 320	8.6	6.6
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	OCC	3,744	599	524	0.1	$ 72.07	$ 1,555.05	$ 200	21.6	18.8
32LED	Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	OCC	3,744	899	786	0.1	$ 108.11	$ 2,268.45	$ 290	21.0	18.3
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
32LED	Council Office	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	4680	2,246	8	STLED4	STLED4	40	0.3	OCC	3,744	1,198	1,048	0.2	$ 144.15	$ 2,981.85	$ 380	20.7	18.1
5LED	Men's Room	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	562	2	2T XX R LED	2RTLED	25	0.1	OCC	3,276	164	398	0.1	$ 55.09	$ 533.25	$ 120	9.7	7.5
32LED	Mail RM	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,744	150	131	0.0	$ 18.02	$ 484.95	$ 65	26.9	23.3
32LED	Planning RM	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,744	150	131	0.0	$ 18.02	$ 484.95	$ 65	26.9	23.3
32LED	Mail RM	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
32LED	Planning RM	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
25	Lobby	13	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.4	SW	8736	3,180	13	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.4	OCC	8,736	3,180	-	0.0	$ -	$ 128.25	$ 20		
32LED	Hallway	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	8736	3,145	6	STLED4	STLED4	40	0.2	OCC	8,736	2,097	1,048	0.1	$ 142.44	$ 2,268.45	$ 290	15.9	13.9
20LED	Hallway	12	S 28 P F 1 (ELE)	F41ILL	31	0.4	SW	8736	3,250	12	4 ft LED Tube	200732x1	15	0.2	OCC	8,736	1,572	1,677	0.2	$ 227.91	$ 1,870.65	$ 80	8.2	7.9
32LED	Hallway	7	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	8736	3,669	7	STLED4	STLED4	40	0.3	OCC	8,736	2,446	1,223	0.1	$ 166.18	$ 2,625.15	$ 335	15.8	13.8
266	Court RM	24	Auditorium Globe CFL	CF42/4-L	188	4.5	SW	2500	11,280	24	Auditorium Globe CFL	CF42/4-L	188	4.5	OCC	2,500	11,280	-	0.0	$ -	$ 128.25	$ 20		
25	Court RM	24	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.7	SW	2500	1,680	24	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.7	OCC	2,500	1,680	-	0.0	$ -	$ 128.25	$ 20		
20LED	Court RM	56	S 28 P F 1 (ELE)	F41ILL	31	1.7	SW	2500	4,340	56	4 ft LED Tube	200732x1	15	0.8	OCC	2,500	2,100	2,240	0.9	$ 331.61	$ 8,259.45	$ 300	24.9	24.0
32LED	Chambers Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	4680	562	2	STLED4	STLED4	40	0.1	NONE	4,680	374	187	0.0	$ 26.23	$ 713.40	$ 90	27.2	23.8
32LED	Chambers Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
32LED	Chambers Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,744	150	131	0.0	$ 18.02	$ 484.95	$ 65	26.9	23.3
5LED	Office	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	OCC	3,744	94	187	0.0	$ 26.01	$ 330.75	$ 70	12.7	10.0
5LED	Office	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	OCC	3,744	94	187	0.0	$ 26.01	$ 330.75	$ 70	12.7	10.0
32LED	Municipal Office	20	1T 32 R F 2 (ELE)	F42LL	60	1.2	SW	4680	5,616	20	STLED4	STLED4	40	0.8	OCC	3,744	2,995	2,621	0.4	$ 360.36	$ 7,262.25	$ 920	20.2	17.6
32LED	Vault	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
32LED	Prosecutors Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
32LED	Prosecutors Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,744	150	131	0.0	$ 18.02	$ 484.95	$ 65	26.9	23.3
32LED	Lobby	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	8736	1,048	2	STLED4	STLED4	40	0.1	OCC	8,736	699	349	0.0	$ 47.48	$ 841.65	$ 110	17.7	15.4
32LED	City Clerk	10	1T 32 R F 2 (ELE)	F42LL	60	0.6	SW	4680	2,808	10	STLED4	STLED4	40	0.4	OCC	3,744	1,498	1,310	0.2	$ 180.18	$ 3,695.25	$ 470	20.5	17.9
32LED	City Clerk	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,744	150	131	0.0	$ 18.02	$ 484.95	$ 65	26.9	23.3
32LED	City Clerk	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
5LED	City Clerk	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	OCC	3,744	94	187	0.0	$ 26.01	$ 330.75	$ 70	12.7	10.0
32LED	Office	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	OCC	3,744	599	524	0.1	$ 72.07	$ 1,555.05	$ 200	21.6	18.8
32LED	3rd Floor Hallway	18	1T 32 R F 2 (ELE)	F42LL	60	1.1	SW	8736	9,435	18	STLED4	STLED4	40	0.7	OCC	8,736	6,290	3,145	0.4	$ 427.33	$ 6,548.85	$ 830	15.3	13.4
32LED	Engineering Office	11	1T 32 R F 2 (ELE)	F42LL	60	0.7	SW	4680	3,089	11	STLED4	STLED4	40	0.4	OCC	3,744	1,647	1,441	0.2	$ 198.20	$ 4,051.95	$ 515	20.4	17.8
32LED	Engineering Office	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	842	3	STLED4	STLED4	40	0.1	OCC	3,744	449	393	0.1	$ 54.05	$ 1,198.35	$ 155	22.2	19.3
32LED	Secretary	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	OCC	3,744	899	786	0.1	$ 108.11	$ 2,268.45	$ 290	21.0	18.3
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
32LED	City Engineer	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	OCC	4680	1,685	6	STLED4	STLED4	40	0.2	NONE	4,680	1,123	562	0.1	$ 78.68	$ 2,140.20	$ 270	27.2	23.8
32LED	Cone RM	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	4680	562	2	STLED4	STLED4	40	0.1	NONE	4,680	374	187	0.0	$ 26.23	$ 713.40	$ 90	27.2	23.8
32LED	Law Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	OCC	3,744	899	786	0.1	$ 108.11	$ 2,268.45	$ 290	21.0	18.3
32LED	Law Office	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	842	3	STLED4	STLED4	40	0.1	OCC	3,744	449	393	0.1	$ 54.05	$ 1,198.35	$ 155	22.2	19.3
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,744	150	131	0.0	$ 18.02	$ 484.95	$ 65	26.9	23.3
32LED	Office	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,744	150	131	0.0	$ 18.02	$ 484.95	$ 65	26.9	23.3
32LED	Office	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	562	2	STLED4	STLED4	40	0.1	OCC	3,744	300	262	0.0	$ 36.04	$ 841.65	$ 110	23.4	20.3
32LED	Men's Room	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	4680	562	2	STLED4	STLED4	40	0.1	NONE	4,680	374	187	0.0	$ 26.23	$ 713.40	$ 90	27.2	23.8
32LED	Women's Room	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	4680	562	2	STLED4	STLED4	40	0.1	NONE	4,680	374	187	0.0	$ 26.23	$ 713.40	$ 90	27.2	23.8
266	Planning RM	11	Auditorium Globe CFL	CF42/4-L	188	2.1	SW	4680	9,678	11	Auditorium Globe CFL	CF42/4-L	188	2.1	OCC	3,744	7,743	1,936	0.0	$ 253.57	$ 128.25	$ 20	0.5	0.4
25	Planning RM	3	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.1	SW	4680	393	3	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.1	OCC	3,744	314	79	0.0	$ 10.30	$ 128.25	$ 20	12.5	10.5
32LED	Planning RM	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	OCC	3,744	899	786	0.1	$ 108.11	$ 2,268.45	$ 290	21.0	18.3
266	Planning RM	5	Auditorium Globe CFL	CF42/4-L	188	0.9	SW	4680	4,399	5	Auditorium Globe CFL	CF42/4-L	188	0.9	OCC	3,744	3,519	880	0.0	$ 115.26	$ 128.25	$ 20	1.1	0.9
5LED	Mayor	12	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.7	SW	4680	3,370	12	2T XX R LED	2RTLED	25	0.3	OCC	3,744	1,123	2,246	0.4	$ 312.17	$ 2,558.25	$ 620	8.2	6.2
20LED	Small Office	1	S 28 P F 1 (ELE)	F41ILL	31	0.0	SW	4680	145	1	4 ft LED Tube	200732x1	15	0.0	OCC	3,744	56	89	0.0	$ 12.33	$ 273.45	$ 25	22.2	20.1
5LED	Small Office	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	OCC	3,744	94	187	0.0	$ 26.01	$ 330.75	$ 70	12.7	10.0
5LED	Cubic	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	OCC	3,744	94	187	0.0	$ 26.01	$ 330.75	$ 70	12.7	10.0
5LED	Cubic	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	OCC	3,744	94	187	0.0	$ 26.01	$ 330.75	$ 70	12.7	10.0
5LED	Cubic	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	281	1	2T XX R LED	2RTLED	25	0.0	OCC	3,744	94	187	0.0	$ 26.01	$ 330.75	$ 70	12.7	10.0
32LED	LEDC	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	OCC	3,744	599	524	0.1	$ 72.07	$ 1,555.05	$ 200	21.6	18.8
25	Office Hallway	3	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.1	SW	4680	393	3	R 13 C CF 2 (ELE)	CFQ13/2-L	28	0.1	OCC	3,744	314	79	0.0	$ 10.30	$ 128.25	$ 20	12.5	10.5
32LED	Secretary	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	SW	4680	1,404	5	STLED4	STLED4	40	0.2	OCC	3,744	749	655	0.1	$ 90.09	$ 1,911.75	$ 245	21.2	18.5
32LED	Reception	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	OCC	3,744	599	524	0.1	$ 72.07	$ 1,555.05	$ 200	21.6	18.8
32LED	Server RM	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	4680	1,123	4	STLED4	STLED4	40	0.2	OCC	3,744	599	524	0.1	$ 72.07	$ 1,555.05	$ 200	21.6	18.8
32LED	Refer RM	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	SW	4680	1,404	5	STLED4	STLED4	40	0.2	OCC	3,744	749	655	0.1	$ 90.09	$ 1,911.75	$ 245	21.2	18.5
5LED	Refer RM	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	4680	562	2	2T XX R LED	2RTLED	25	0.1	OCC	3,744	187	374	0.1	$ 52.03	$ 533.25	$ 120	10.2	7.9
32LED	Bathrrom	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,276	131	150	0.0	$ 20.47	$ 484.95	$ 65	23.7	20.5
32LED	Conf. RM	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	SW	4500	1,350	5	STLED4	STLED4	40	0.2	OCC	3,600	720	630	0.1	$ 86.79	$ 1,911.75	$ 245	22.0	19.2
32LED	Purchasing Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	OCC	3,744	899	786	0.1	$ 108.11	$ 2,268.45	$ 290	21.0	18.3
32LED	Purchasing Agent Office	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	4680	1,685	6	STLED4	STLED4	40	0.2	OCC	3,744	899	786	0.1	$ 108.11	$ 2,268.45	$ 290	21.0	18.3
32LED	Kitchen	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,744	150	131	0.0	$ 18.02	$ 484.95	$ 65	26.9	23.3
32LED	Toilet	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	4680	281	1	STLED4	STLED4	40	0.0	OCC	3,276	131	150	0.0	$ 20.47	$ 484.95	$ 65	23.7	20.5
32LED	Construction Code Office	16	1T 32 R F 2 (ELE)	F42LL	60	1.0	SW	4680	4,493	16	STLED4	STLED4	40	0.6	OCC	3,744	2,396	2,097	0.3	$ 288.29	$ 5,835.45	$ 740	20.2	17.7
32LED	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	OCC	4680	1,685	6	STLED4	STLED4	40	0.2	NONE	4,680	1,123	562	0.1	$ 78.68	$ 2,140.20	$ 270	27.2	23.8
32LED	Offices	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	OCC	4680	842	3	STLED4	STLED4	40	0.1	NONE	4,680	562	281	0.1	$ 39.34	$ 1,070.10	$ 135	27.2	23.8
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
S	Total	591				37.5			185,915	591				26.5			112,826		11.0	10,043	164,074	$21,675		
S																	Demand Savings			11.0	$468			
S																	kWh Savings			73,089	$9,575			

APPENDIX D

New Jersey Board of Public Utilities Incentives

i. **Smart Start**

ii. **Direct Install**

iii. **Pay for Performance (P4P)**

iv. **Energy Savings Improvement Plan (ESIP)**

I. SMART START

NJ SmartStart Buildings

Program Overview

With New Jersey SmartStart Buildings ...

... A smart start now means better performance later! Whether you're starting a commer industrial project from the ground up, renovating existing space, or upgrading equipmen unique opportunities to upgrade the energy efficiency of the project.

Special Notice

Enhanced incentives are available for NJ SmartStart Building upgrades in buildings im Hurricane Sandy. Eligible projects receive an additional 50% and new incentives have added for high efficiency food service equipment.

Visit the Sandy web page for details and important links.

New Jersey SmartStart Buildings can provide a range of support — at no cost to you — substantial energy savings, both now and for the future. Learn more about:

- Project Categories
- Custom Measures
- Incentives for Qualifying Equipment and Projects
- Program Terms and Conditions
- Find a Trade Ally

Please note: pre-approval is required for almost all energy efficiency incentives. T you must submit an application form (and applicable worksheets) and receive an approv from the program before any equipment is installed (click here for complete Terms and (Upon receipt of an approval letter, you may proceed to install the equipment listed on yc approved application. Equipment installed prior to the date of the approval letter is not e an incentive. **Any customer and/or agent who purchases equipment prior to the re incentive approval letter does so at his/her own risk.**

Getting Started

Submit your project application form as soon as you know you will be doing a constructi or replacing/adding equipment.

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Apply for pre-approval by submitting an application for the type of equipment you have c install. The application should be accompanied by a related worksheet, where applicabl manufacturer's specification sheet (refer to the specific program requirements on the ba application for specs needed for your project) for the equipment you are planning to inst (Program representatives will review your application package and approve it, reject it, a advise you of upgrades in equipment that will save energy costs and/or increase your in

Support for Custom Energy-Efficiency Measures

Custom measures allows program participants the opportunity to receive an incentive fo energy-efficiency measures that are not on the prescriptive equipment Incentive list, but project/facility specific.

Incentives for Qualifying Equipment and Projects

Financial incentives are available for large and small projects. These incentives offset s maybe even all! — of the added cost to purchase qualifying energy-efficient equipment, provides significant long-term energy savings. Ranges of incentives are available for qu equipment (depending on type, size, and efficiency) in several categories.

Find out more about equipment incentives

For specific details on equipment requirements and financial incentives, including ince equipment not listed here, contact a program representative. Fiscal year financial incent be limited to a maximum of $500,000 per customer utility account and are available as f permits.

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COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

EQUIPMENT INCENTIVES

FOOD SERVICE EQUIPMENT

APPLICATION FORMS

TOOLS AND RESOURCES

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

Home » Commercial & Industrial » Programs » NJ SmartStart Buildings

Equipment Incentives

Special Notice

Enhanced incentives are available for NJ SmartStart Building upgrades in buildings im Hurricane Sandy. Eligible projects receive an additional 50% and new incentives have added for high efficiency food service equipment.

Visit the Sandy web page for details and important links.

More reasons for a smart start on your next project!

New Jersey SmartStart Buildings provides **financial incentives for qualifying equipment**. These incentives were developed to help our customers offset some of the added cost to purchase qualifying energy-efficient equipment, which provides significant long-term energy savings. A wide range of incentives are available for qualifying equipment (depending on type, size and efficiency).

Listed below are the types of qualifying equipment and ranges of incentives. For details on equipment requirements and full listings of incentives, refer to the **online application forms**.

Please note that almost all equipment incentives require pre-approval before equipment is installed. (**click for exceptions**)To start the pre-approval process, submit an Equipment Application, and appropriate Equipment Worksheets, for the type types of equipment you are planning to install along with equipment specification sheets (refer to the specific program requirements on the back of the application for specificatic needed for your project) and a current utility bill(s).

In order to be eligible to receive financial incentives under this Program, Applicants mus receive electric and/or gas service from one of the regulated electric and/or gas utilities the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.

Electric Chillers

Water-cooled chillers ($12 - $170 per ton)
Air-cooled chillers ($8 - $52 per ton)

Gas Cooling

Gas absorption chillers ($185-$450 per ton)
Gas Engine-Driven Chillers (Calculated through Custom Measure F

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Desiccant Systems ($1.00 per cfm - gas or electric)

Electric Unitary HVAC

Unitary AC and split systems ($73 - $92 per ton)
Air-to-air heat pumps ($73 - $92 per ton)
Water-source heat pumps ($81 per ton)
Packaged terminal AC & HP ($65 per ton)
Central DX AC Systems ($40 - $72 per ton)
Dual Enthalpy Economizer Controls ($250)
Occupancy Controlled Thermostats ($75 each)
A/C Economizing Controls ($85 - $170 each)

Ground Source Heat Pumps

Closed Loop ($450-750 per ton)

Gas Heating

Gas-fired boilers < 300 MBH ($300 per unit)
Gas-fired boilers ≥ 300 MBH - 1500 MBH ($1.75 per MBH)
Gas-fired boilers ≥ 1500 MBH - ≤ 4000 MBH ($1.00 per MBH)
Gas-fired boilers > 4000 MBH (Calculated through Custom Measur
Gas furnaces ($300-$400 per unit)
Gas infrared heaters - indoor only ($300 - $500 per unit)
Boiler economizing controls ($1,200 - $2,700 per unit)

Variable Frequency Drives

Variable air volume ($65 - $155 per hp)
Chilled-water pumps ($60 per hp)
Compressors ($5,250 to $12,500 per drive)

Natural Gas Water Heating

Gas water heaters ≤ 50 gallons ($50 per unit)
Gas-fired water heaters > 50 gallons ($1.00 - $2.00 per MBH)
Tankless water heaters replacing a free standing water heater > 82 energy factor ($300 per heater)
Gas-fired booster water heaters ($17 - $35 per MBH)

Premium Motors

Three-phase motors ($45 - $700 per motor) **(Incentive was discor effective March 1, 2013 except for buildings impacted by Hurri Sandy. Approved applications will have the standard timefram year from the program commitment date to complete the instal**

Refrigerator/Freezer Case Premium Efficiency Motors (ECM)

Fractional (< 1 HP) Electronic Commutated Motors (ECM) ($40 per for replacement of existing shaded-pole motor in refrigerated/freeze

Prescriptive Lighting

New Linear Fluorescent

- T-12, HID and Incandescent to T-5 and T-8 ($25 - $200 p fixture) **(Note: T12 replacements are only available for buildings impacted by Hurricane Sandy)**
- New Induction ($70 per replaced HID fixture)
- New LED
  - Screw-in/Plug-in ($10 - $20 per lamp)
  - Refrigerator/Freezer Case ($30 - $65 per fixture)
  - Outdoor pole/arm/wall-mounted luminaires ($100 - $175 p fixture)
  - Display case ($30 per case)
  - Shelf-mounted display and task ($15 per linear foot)
  - Wall-wash, desk, recessed ($20 - $35 per fixture)
  - Parking garage luminaires ($100 per fixture)
  - Track or Mono-Point directional ($50 per fixture)
  - Stairwell and Passageway luminaires ($40 per fixture)
  - High-Bay, Low-Bay ($150 per fixture)
  - Bollard ($50 per fixture)
  - luminaires for Ambient Lighting of Interior Commercial Spa *Linear panels ($50 per fixture)*
  - Fuel pump canopy ($100 per fixture)
  - LED retrofit kits (custom measures)
- New Pulse-Start Metal Hallide ($25 per fixture)
- Linear Fluorescent Retrofit ($10 - $20 per fixture)
- Induction Retrofit ($50 per retrofitted HID fixture)
- New Construction/Complete Renovation (performance-based)

Note: Incentives for T-12 to T-5 and T-8 lamps with electronic ballast in facilities ($10 per fixture, 1-4 lamps) and T-5/T-8 high bay fixtures ($16 - per fixture) were discontinued effective March 1, 2013 for T-12 retrofits replacements except for buildings impacted by Hurricane Sandy. Appr applications will have the standard timeframe of one year from the pro commitment date to complete the installation

Lighting Controls

- Occupancy Sensors
  - Wall mounted ($20 per control)
  - Remote mounted ($35 per control)
  - Daylight dimmers ($25 per fixture controlled, $50 per fixtu office applications only)
  - Occupancy controlled hi-low fluorescent controls ($25 per controlled)
- HID or Fluorescent Hi-Bay Controls
  - Occupancy hi-low ($35 per fixture controlled)
  - Daylight dimming ($45 per fixture controlled)

Refrigeration

- Covers and Doors
  - Energy-Efficient doors for open refrigerated doors/covers per door)
  - Aluminum Night Curtains for open refrigerated cases ($3.5 linear foot)
- Controls
  - Door Heater Control ($50 per control)
  - Electric Defrost Control ($50 per control)
  - Evaporator Fan Control ($75 per control)
  - Novelty Cooler Shutoff ($50 per control)

Food Service Equipment

Cooking
- Combination Electric Oven/Steamer ($1,000 per oven)
- Combination Gas Oven/Steamer ($750 per oven)
- Electric Convection Oven ($350 per oven)
- Gas Convection Oven ($500 per oven)
- Gas Rack Oven ($1,000 single, $2,000 double)
- Gas Conveyor Oven ($500 small deck, $750 large deck)
- Electric Fryer ($200 per vat)
- Gas Fryer ($749 per vat)
- Electric Large Vat Fryer ($200 per vat)
- Gas Large Vat Fryer ($500 per vat)
- Electric Griddle ($300 per griddle)
- Gas Griddle ($125 per griddle)
- Electric Steam Cooker ($1,250 per steamer)
- Gas Steam Cooker ($2,000 per steamer)

Holding
- Full Size Insulated Cabinets ($300 per cabinet)
- Three Quarter Size Insulated Cabinets ($250 per cabinet)
- Half Size Insulated Cabinets ($200 per cabinet)

Cooling
- Glass Door Refrigerators ($75 - $150 per unit)
- Solid Door Refrigerators ($50 - $200 per unit)
- Glass Door Freezers ($200 - $1,000 per unit)
- Solid Door Freezers ($100 - $600 per unit)
- Ice Machines ($50 - $500 per unit)

Cleaning
- Dishwashers ($400 - $1,500 per unit)

Other Equipment Incentives*

- Performance Lighting ($1.00 per watt per square foot below prograi incentive threshold, currently 5% more energy efficient than ASHR/ 2007 for New Construction only.)
- Custom electric and gas equipment incentives (not prescriptive)

*Equipment incentives are calculated based on type, efficiency, size, and ap and are evaluated on a case-by-case basis. Contact us for details.

II. DIRECT INSTALL

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

PARTICIPATION STEPS

PARTICIPATING CONTRACTORS

SUSTAINABLE JERSEY

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

Direct Install

NEW JERSEY'S CLEAN ENERGY PROGRAM
DIRECT Install

Let us pay up to 70% of your energy efficiency upgrade.

Sometimes, the biggest challenge to improving energy efficiency is knowing where t and how to get through the process. Created specifically for existing small to mediun facilities, Direct Install is a turnkey solution that makes it easy and affordable to upgr high efficiency equipment. Direct Install is designed to cut your facility's energy costs replacing lighting, HVAC and other outdated operational equipment with energy effic alternatives. The program pays up to 70% of retrofit costs, dramatically improving yo payback on the project. There is a $125,000 incentive cap on each project.

ELIGIBILITY

Existing small to mid-sized commercial and industrial f with a peak electric demand that did not exceed 200 k any of the preceding 12 months are eligible to participa Direct Install. Applicants will submit the last 12 months electric utility bills indicating that they are below the de threshold and have occupied the building during that ti Buildings must be located in New Jersey and served b the state's public, regulated electric or natural gas utilit companies.

SYSTEMS & EQUIPMENT ADDRESSED BY THE PROGRAM

- Lighting
- Heating, Cooling & Ventilation (HVAC)
- Refrigeration
- Motors
- Natural Gas
- Variable Frequency Drives

Measures eligible for Direct Install are limited to specific equipment categories, type capacities. Boilers may not exceed 500,000 Btuh and furnaces may not exceed 140,

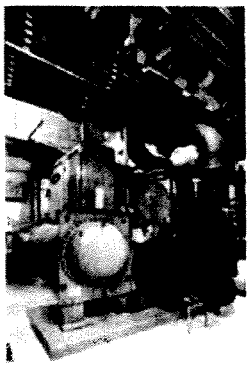
III. PAY FOR PERFORMANCE (P4P)

Pay for Performance - Existing Buildings

Download program applications and incentive forms.

The Greater the Savings, the Greater Your Incentives

Take a comprehensive, whole-building approach to saving energy in your existing facilit earn incentives that are directly linked to your savings. Pay for Performance relies on a program partners who provide technical services under direct you. Acting as your energy expert, your partner will develop a reduction plan for each project with a whole-building technica component of a traditional energy audit, a financial plan for fu energy efficient measures and a construction schedule for ins



Eligibility

Existing commercial, industrial and institutional buildings with demand over 100 kW for any of the preceding twelve months to participate including hotels and casinos, large office buildir family buildings, supermarkets, manufacturing facilities, scho shopping malls and restaurants. Buildings that fall into the fol customer classes are not required to meet the 100 kW dema to participate in the program: hospitals, public colleges and universities, 501(c)(3) non-p affordable multifamily housing, and local governmental entities. Your energy reduction p define a comprehensive package of measures capable of reducing the existing energy consumption of your building by 15% or more.

Exceptions to the 15% threshold requirement may be made for certain industrial, manuf water treatment and datacenter building types whose annual energy consumption is hea weighted on process loads. Details are available in the high energy intensity section of t page.

ENERGY STAR Portfolio Manager

Pay for Performance takes advantage of the ENERGY STAR Program with Portfolio Manager, EPA's interactive tool that allows facility managers to track and evaluate energy and water consumption across all of their buildings. The tool provides the opportunity to load in the characteristics and energy usage of your buildings and determine an energy performance benchmark score. You can then assess energy management goals over time, identify strategic opportunities for savings, and receive EPA recognition for superior energy performance.

This rating system assesses building performance by tracking and scoring energy use ir facilities and comparing it to similar buildings. That can be a big help in locating opportu cost-justified energy efficiency upgrades. And, based on our findings, you may be invite participate in the Building Performance with ENERGY STAR initiative and receive speci recognition as an industry leader in energy efficiency.

Incentives

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

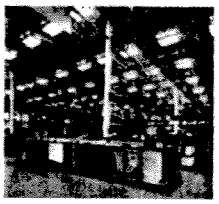
TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Pay for Performance incentives are awarded upon the satisfactory completion of three p milestones:

Incentive #1 - Submittal of complete energy reduction plan prepared by an app program partner - Contingent on moving forward, incentives will be between $5 $50,000 based on approximately $.10 per square foot, not to exceed 50% of th annual energy expense.



Incentive #2 - Installation of recommended measures - Incentives are based on the projected level of electricity and natural gas savings resulting from the installation of comprehensive energy-efficiency measures.

Incentive #3 - Completion of Post-Construction Benchmarking Report - A completed report verifying energy reductions based on one year of post-implementation results. Incentives for electricity and natural gas savings will be based on actual savings, provided that the minimum performance threshold of savings has been achieved.

A detailed Incentive Structure document is available on the applications and form

Steps to Participation

Click here for a step-by-step description of the program.

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New Jersey's Clean Energy PROGRAM
Your Power to Save
njcleanenergy.com

BPU New Jersey Board of Public Utilities

PAY FOR PERFORMANCE APPLICATION FORM

July 1, 2014 – June 30, 2015

Utility Serving Applicant: ☐ Atlantic City Electric ☐ Jersey Central Power & Light ☐ PSE&G
☐ New Jersey Natural Gas ☐ Elizabethtown Gas ☐ Rockland Electric Co. ☐ South Jersey Gas
☐ Other Electric Service Provider (please specify): _____
☐ Other Fuel Provider: _____ ☐ Oil: _____ ☐ Other (Please specify): _____

Instructions

1. Read the program material to determine project qualification.
2. Read the Participation Agreement and sign where indicated.
3. Fill out all applicable spaces on this form.
4. Provide a copy of the customer's company W-9 form.
5. Provide the most recent consecutive 12 month period of utility bills for the project for all accounts, organized in chronological order and separated by account. Utilize Utility Tool for applications with multiple accounts to organize data.
6. Provide brief description of facility, noting any special or unusual circumstances and/or site conditions.
7. Partner must submit the application package via e-mail, mail or fax DIRECTLY to the Market Manager – see back of this form.

Approval of this Application is not an approval of the project's scope of work. Scope of work is only approved upon approval of the Energy Reduction Plan. See application and program guidelines for more information.

Customer/Owner Information (payment will be made to entity entered here)

Company Name		Project Contact/Title	
Company Address	City	State	Zip
Phone/Fax	E-mail	Federal ID/SSN	

Partner Information

Company Name		Project Contact/Title	
Company Address	City	State	Zip
Phone	Fax	E-mail	

Project Information

Project Name			
Building Address	City	State	Zip
Utility Account Number(s): Electric		Gas	
* Note: Please use the back of this page for additional utility accounts if quantity exceeds space allotment.			
Annual Peak kW Demand	Building Type		Number of Buildings
Size of Building(s) (gross sq/ft)	Direct, Master or Sub Metered		

Funding

☐ Check the box if an Energy Savings Improvement Program (ESIP) will be a source of funding. ESIP allows government agencies to pay for energy related improvements using the value of the resulting energy savings.

Do you expect to receive funding under any other efficiency programs? ☐ No ☐ Yes If Yes, please specify below:

Utility Program #1 – Utility: _____ Program Name: _____
Utility Program #2 – Utility: _____ Program Name: _____
Federal Program #1 – Organization: _____ Program Name: _____
Federal Program #2 – Organization: _____ Program Name: _____
Other Program – Organization: _____ Program Name: _____

Additional Project information

Additional Utility Account(s)

Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number

Additional Comments:

Complete this application form and send it directly to the Commercial/Industrial Market Manager by e-mail, mail or fax.

New Jersey's Clean Energy Program
c/o TRC Energy Services-P4P
900 Route 9 North, Suite 404 • Woodbridge, NJ 07095

Phone: 866-657-6278 • Fax: 732-855-0422
E-mail: P4P@NJCleanEnergy.com

Visit our website: NJCleanEnergy.com/P4P

Pay For Performance-Existing Buildings

Participation Agreement

Definitions:

ADMINISTRATOR – New Jersey Board of Public Utilities (NJBPU)

APPLICATION PROCESS – The Program pays incentives in phases upon satisfactory completion of each of three Program milestones - approval of a complete Energy Reduction Plan, installation of all recommended measures per the Energy Reduction Plan, completion of Post-Construction Benchmarking Report (for incentive amounts, please refer to Incentive Amounts). In order to be eligible for Program Incentives,a Participating Customer or an agent authorized by a Customer, must submit to the Market Manager a properly completed application package – application form, Participating Customer's company W-9, twelve consecutive months of the project's utility bills and executed Participation Agreement. All components of the application package must be filled out completely, truthfully and accurately. This application package must be received on or before June 30, 2015 in order to be eligible for the Fiscal Year 2015 Incentives. The Market Manager will review the application package to determine if the project is eligible for a Program Incentive. When approved, the Participating Customer will receive an approval letter from their Case Manager with the estimated authorized first incentive amount and the date by which the Energy Reduction Plan must be submitted. Upon receipt of the approval letter, the Participating Customer and Partner may proceed with work on the Energy Reduction Plan. The Market Manager or agent thereof reserves the right to conduct a pre-inspection of the facility prior to the installation of equipment. This will be done prior to the issuance of the Energy Reduction Plan approval letter. Approval of this Application is not an approval of the project's scope of work. Scope of work is only approved upon approval of the Energy Reduction Plan. See application and program guidelines for more information.

CHANGES TO THE PROGRAM – The Program and Participation Agreements may be changed by the Market Manager at any time without notice. Approved applications, however, will be processed to completion under the agreements in effect at the time of the Market Manager's approval.

ELIGIBILITY - Program Incentives are available to existing commercial, industrial and certain multifamily buildings with peak kilowatt demand usage of more than 100 kW in any of the most recent preceding twelve months of utility bills and a customer of the New Jersey Utilities. Market Manager has the discretion to approve applications that fall below the 100 kW minimum by no more than 10%. If the Participant is a municipal electric company customer, and a customer of an investor-owned gas New Jersey Utility, only gas measures will be eligible for incentives under the Program. Similarly, if the Participant is an oil/propane customer and a customer of an investor-owned electric New Jersey Utility, only electricity measures will be eligible for incentives under the Program.

Equipment procured by participating Customer through another program offered by the New Jersey Utilities, as applicable, is not eligible for incentives through this Program. Customers who, from July 1, 2013 – June 30, 2014, have not contributed to the Societal benefits Charge of the applicable New Jersey Utility may not be eligible for incentives offered through this program.

ENDORSEMENT – The Market Manager and Administrator do not endorse, support or recommend any particular manufacturer, product or system design in promoting this Program.

ENERGY-EFFICIENT MEASURES – Any device eligible to receive a Program Incentive payment through the New Jersey's Clean Energy Commercial and Industrial Program. The total package of measures as presented in the Energy Reduction Plan must have at least a 10% internal rate of return (IRR).

ENERGY REDUCTION PLAN – A document created by the Participating Customer's selected Partner that defines several key aspects of the project including (but not limited to) existing conditions as a result of a whole-building technical analysis, benchmarking summaries, recommended measures, financing plan and implementation schedule.

ENERGY REDUCTION PLAN APPROVAL – After application approval, the Participating Customer and Partner must work together to finalize and submit an Energy Reduction Plan which incorporates a work scope that will achieve the minimum 15% reduction in source energy performance target in accordance with the Program rules and policies along with the Benchmarking Tool, modeling software file, a copy of the executed Partner and Participating Customer contract, an original copy of the executed Installation Agreement and a Request for Incentive #1 Payment form. All components of the submittal package must be filled out completely, truthfully and accurately. The Market Manager, agents thereof and/or the selected Partner must be provided reasonable access to the Participating Customer's facility, staff, tenants and/or others necessary to develop an Energy Reduction Plan that will achieve the minimum 15% performance target as well as the necessary utility billing data as dictated by the Program. The Energy Reduction Plan submittal package will be reviewed and must be approved by the Market Manager prior to payment of Incentive #1. Upon approval of the submittal package, the Customer will receive an Incentive #1 approval letter indicating the date by which all measures in the Energy Reduction Plan must be installed (no later than twelve months following the Energy Reduction Plan submittal approval date).

INCENTIVE AMOUNTS – Incentive #1 - $0.10 per square foot of the project with a maximum amount of $50,000 and minimum of $5,000, not to exceed 50% of the project's annual energy cost and contingent on installation of measures in the Energy Reduction Plan and receipt of a signed Installation Agreement. If installation does not commence within the required timeframe, Incentive #1 may be required to be returned to the program. In the event the project is cancelled and Incentive #1 is not returned, the project may reapply to the program in the future but another Incentive #1 will not be paid. Incentive #2 – 50% of the total performance-based incentive (combination of Incentives #2 and #3) calculated per Program's incentive structure; Incentive #3 – remaining amount based on the realized energy savings of the project. For customers that have successfully participated in the Local Government Energy Audit Program, Incentive #1 will be reduced by 50% to $0.05 per square foot up to $25,000. Actual Incentive #1 paid shall not be higher than 5% over the committed amount. Actual Incentive #2 paid shall not be higher than the committed amount, unless the Energy Reduction Plan has been resubmitted due to changes in the work scope. Actual Incentive #3 paid shall be higher or lower than the committed amount based on actual energy savings but shall not be greater than program Incentive Caps.

The Market Manager will provide incentives according to those described in this section or as modified upon notice to Participating Customer. All incentive payments are paid directly to the Participating Customer or the Participating Customer's designee as indicated on the application form. The Program is not bound to pay any incentive unless the submittal package associated with the incentive payment is approved by the Market Manager who reserves the sole discretion of approving or disapproving the submittal packages.

INCENTIVE CAP – Program Incentives #2 and #3 will be capped not to exceed 50% of the total actual project cost. Incentive #1 will be capped not to exceed 50% of the project's annual energy cost. The Market Manager reserves the right to limit the amount of the Program Incentives (Incentive #1, #2 and #3) to $1M per gas and electric account (limited to $2M per project) in a program year. Campus style facilities, which are mastered-metered, are subject to the annual incentive cap of $1 million per gas and electric account. The Participating Customer will also be subject to an annual Entity Cap of $4M (Definition of an Entity can be found in the Board Order Docket No. EO07030203).

INSTALLATION AGREEMENT – The Participating Customer must submit an executed Installation Agreement as part of the Request for Incentive #1 Form. By executing the Installation Agreement, the Customer agrees to install all of the measures in the Energy Reduction Plan, which are estimated to result in meeting or exceeding the minimum 15% performance target. The Customer agrees to the performance-based incentives (Incentives #2 & #3) as indicated in the document which are based on the results of the Energy Reduction Plan. Implementation of the measures must commence in the time period twelve months following the approval date of the Energy Reduction Plan. Failure to complete the installation of the measures in the Energy Reduction Plan may result in the repayment of Incentive #1. In the event the project is cancelled and Incentive #1 is not returned, the project may reapply to the program in the future but another Incentive #1 will not be paid.

LIMITATION OF LIABILITY – By virtue of participating in this Program, Participating Customers agree to waive any and all claims or damages against TRC Energy Services, the Market Manager, and the Administrator, except the receipt of the Program Incentive. Participating Customers agree that the Market Manager's and Administrator's liability, in connection with this Program, is limited to paying the Program Incentive specified. Under no circumstances shall the Market Manager, its representatives, or subcontractors, or the Administrator be liable for any lost profits, special, punitive, consequential or incidental damages or for any other damages or claims connected with or resulting from participation in this Program. Further, any liability attributed to the Market Manager under this Program shall be individual, and not joint and/or several.

The Market Manager's review and approval of the Energy Reduction Plan cannot be construed to be a determination as to performance, applicability, dollar savings, energy savings, or any other aspect of the proposed project. The Market Manager and Administrator offer no guarantee or warranty of performance of the project's equipment or system. The participant assumes full responsibility and liability for the installation of all equipment, including but not limited to design, specification, all permits, installation, maintenance, performance and financing. By participating in the program and accepting incentive dollars, you agree to hold harmless the Market Manager and Administrator and their respective staffs with respect to the Project

MARKET MANAGER – TRC Energy Services is responsible for managing the New Jersey Clean Energy Commercial & Industrial Programs.

MEASUREMENT & VERIFICATION APPROVAL – Twelve months subsequent to the Incentive #2 Payment Submittal package submission date, measurement and verification of the projected energy reduction will be conducted by the Participating Customer's Partner using the project's post-installation utility data (supplied by the Customer). The Participating Customer must work with their Partner to submit the Incentive #3 Payment Submittal, consisting of the Post-Construction Benchmarking Pay For Performance-Existing Buildings Report, Benchmarking Tool, and Request for Incentive #3 form. All components of the submittal package must be filled out

completely, truthfully and accurately. Upon review of the submittal package (by the Market Manager or agent thereof), the remaining 50% of the total performance-based incentive (Incentives #2 & #3) will be released to the Participating Customer. If the Post-Construction Benchmarking Report indicates that the project did not meet the minimum performance target, the post-installation completion period may be extended to up to twenty-four months subsequent to the Incentive Payment #2 package submission date. Upon approval of the submittal package, the Customer will receive an Incentive #3 Submittal approval letter indicating successful completion of the program.

NEW JERSEY UTILITIES – The investor-owned electric and/or gas utilities in the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.

PARTICIPATING CUSTOMERS – Those non-residential electric and/or gas service customers of the New Jersey Utilities who participate in this Program.

PARTICIPATING CUSTOMER'S CERTIFICATION – Participating Customer agrees that all information is true and that he/she has conformed to all of the Program and equipment requirements per the Program Guidelines. Participating Customer certifies that he/she purchased and installed the equipment listed in the Energy Reduction Plan at their defined New Jersey project location.

PARTNER– An approved professional who provides technical building performance services to Participating Customers, acting as their "energy efficiency expert". Participating Customers are required to hire an approved Pay for Performance Partner to develop the Energy Reduction Plan and facilitate installation of the recommended package of Energy-Efficient Measures. Participants are required to enter into a contractual agreement with a selected Partner which outlines the set of minimum services the Partner will provide to the Participating Customer throughout the life of the project. It is strongly recommended that Participating Customers perform due diligence in selecting a Pay for Performance Partner. Fees charged by the Partner are not regulated by the Program and could vary between Partners.

PERFORMANCE-BASED INCENTIVES – The combination of Incentives #2 and #3, which are based on the projected and actual energy reduction performance of the project.

PERFORMANCE TARGET – A minimum of a 15% annual source energy savings performance target must be achieved in order to participate. The performance target is based on reducing the total energy consumption for the facility. No more than 50% of the total source energy savings may be derived from lighting measures. The total energy savings may not come from a single measure. A 4% performance target may be offered to customers whose annual energy consumption is heavily weighted to manufacturing and process loads. This approach will be reviewed on a case-by-case basis and must be pre-approved by the Market Manager. In order to be considered, the project must involve: A manufacturing facility, including such industries as plastics and packaging, chemicals, petrochemicals, metals, paper and pulp, transportation, biotechnology, pharmaceutical, food and beverage, mining and mineral processing, general manufacturing, equipment manufacturers and data centers; and manufacturing and/or process-related loads, including data center consumption, consume 50% or more of total facility energy consumption. No more than 50% of the total source energy savings may be derived from non-investor owned utilities or fuels.

POST-INSTALLATION APPROVAL – After the complete installation of all measures in the Energy Reduction Plan, the Customer and their Partner must finalize and submit the Incentive #2 Payment Submittal, consisting of the Installation Report, invoices, and Request for Incentive #2 Payment form. All components of the submittal package must be filled out completely, truthfully and accurately. Upon review of the submittal package and verification of the complete installation of all measures in the Energy Reduction Plan (via inspection by the Market Manager or agent thereof), 50% of the total performancebased incentive (Incentives #2 & #3) will be released to the Participating Customer. Upon approval of the submittal package, the Customer will receive an Incentive #2 approval letter indicating the date by which the post-installation Measurement & Verification phase began and will end (twelve months in length).

The Market Manager reserves the right to verify sales transactions and to have reasonable access to Participating Customer's facility to inspect both pre-existing products or equipment (if applicable) and the Energy-Efficient Measures installed under this Program, either prior to issuing incentives or at a later time. Energy-Efficient Measures must be installed in buildings located within the service territory of one of the New Jersey Utilities (as defined by the Program) as designated on the Participating Customer's Pay for Performance application. Program Incentives are available for qualified Energy-Efficient Measures as listed and described in the Program Guidelines. The Participating Customer must ultimately own the equipment, either through an up-front purchase or at the end of a short-term lease.

PRE-INSTALLED MEASURES - An Energy Reduction Plan must be approved by the program and an approval letter sent to the customer in order for incentives to be committed. Upon receipt of an Energy Reduction Plan, all project facilities must be preinspected. Measures installed prior to pre-inspection of the facility shall not be included as part of the ERP scope of work and will not be eligible for incentives. Measure installation undertaken prior to ERP approval, but after pre-inspection, is done at the customer's own risk. In the event that an Energy Reduction Plan is rejected by the program, the customer will not receive any incentives.

PRODUCT INSTALLATION OR EQUIPMENT INSTALLATION – Installation of the Energy-Efficient Measures.

Projects with a contract threshold of $15,444 are required to pay no less than prevailing wage rate to workers employed in the performance of any construction undertaken in connection with Board of Public Utilities financial assistance, or undertaken to fulfill any condition of receiving Board of Public Utilities financial assistance, including the performance of any contract to construct, renovate or otherwise prepare a facility, the operations of which are necessary for the receipt of Board of Public Utilities financial assistance. By submitting an application, or accepting program incentives, applicant agrees to adhere to New Jersey Prevailing Wage requirements, as applicable.

PROGRAM – New Jersey's Clean Energy Pay for Performance Program offered herein by the New Jersey Board of Public Utilities pursuant to state regulatory approval under the New Jersey Electric Discount and Energy Competition Act, NJSA 48:3-49, et seq.

PROGRAM GUIDELINES – See Pay for Performance Program Guidelines available from your Partner.

PROGRAM INCENTIVES – Refers to the amount or level of incentive that the Program provides to participating customers pursuant to the Program offered herein (see the description under "Incentive Amount" heading).

PROGRAM OFFER – The Program covers products purchased and/or services rendered on or after July 1, 2014. Program Incentives are available to non-residential retail electric and/or gas service customers of the New Jersey Utilities.

PROJECT – A commercial, industrial or multifamily existing building with peak demand in excess of 100 kW in any of the most recent preceding twelve months of electric usage. Multifamily building(s) must be four (4) stories or greater or three (3) stories and under having central heating, cooling, or metering serving more than one building. The 100 kW requirement is waived for the following customer classes: hospitals, non-profits (as defined by section 501(c)(3) of the Internal Revenue Code), public colleges and universities, local government entities, including K-12 schools, and affordable multifamily customers (defined as low income, subsidized, HUD, etc.)

TAX CLEARANCE CERTIFICATION – Businesses must apply for and receive a Tax Clearance Certificate from the New Jersey Division of Taxation before they can receive any incentive, grant or other financial assistance from the Program.

TAX LIABILITY – The Market Manager will not be responsible for any tax liability that may be imposed on any Participating Customer as a result of the payment of Program Incentives. All Participating Customers must supply their federal tax identification number or social security number on the application form in addition to providing a copy of their W-9 form as part of the application package in order to receive a Program Incentive.

TERMINATION – New Jersey's Clean Energy Program reserves the right to extend, modify (this includes modification of Program Incentive levels) or terminate this Program without prior or further notice.

WARRANTIES – THE MARKET MANAGER AND ADMINISTRATOR DO NOT WARRANT THE PERFORMANCE OF INSTALLED EQUIPMENT, AND/OR SERVICES RENDERED AS PART OF THIS PROGRAM, EITHER EXPRESSLY OR IMPLICITY. NO WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER STATUTORY, EXPRESSED, OR IMPLIED, INCLUDING, WITHOUT LIMITATIONS, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE REGARDING EQUIPMENT OR SERVICES PROVIDED BY A MANUFACTURER OR VENDOR. CONTACT YOUR VENDOR/ SERVICES PROVIDER FOR DETAILS REGARDING PERFORMANCE AND WARRANTIES.

ACKNOWLEDGEMENT – I have read, understood and am in compliance with all rules and regulations concerning this incentive program. I certify that all information provided is correct to the best of my knowledge, and I give the Market Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the Pay For Performance Program, including the release of electric and natural gas utility billing information, as well as make available to the public non-sensitive information. I allow reasonable access to my property to inspect the installation and performance of the technologies and installations that are eligible for incentives under the guidelines of New Jersey's Clean Energy Program. This arrangement supersedes all other communications and representations.

CUSTOMER'S SIGNATURE
PARTNER SIGNATURE
By signing, I certify that I have read, understand and agree to the Participation Agreement listed above.

IV. ENERGY SAVINGS IMPROVEMENT PLAN (ESIP)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Home » Commercial & Industrial » Programs

Energy Savings Improvement Program

A new State law allows government agencies to make energy related improvements to t facilities and pay for the costs using the value of energy savings that result from the imp Under Chapter 4 of the Laws of 2009 (the law), the "Energy Savings Improvement Program" (ESIP), provides all government agencies in New Jersey with a flexible tool to and reduce energy usage with minimal expenditure of new financial resources.

This Local Finance Notice outlines how local governments can develop and implement a their facilities. Below are two sample RFPs:

Local Government
School Districts (K-12)

All RFPs must be submitted to the Board for approval at ESIP@bpu.state.nj.us.

The Board also adopted protocols to measure energy savings:

Measuring Energy Savings
Procedures for Implementation

The ESIP approach may not be appropriate for all energy conservation and energy effic improvements. Local units should carefully consider all alternatives to develop an appro best meets their needs. Local units considering an ESIP should carefully review the Loc Notice, the law, and consult with qualified professionals to determine how they should a task.

The NJ Board of Public Utilities sponsored Sustainable Jersey in the creation of an ESIF Guidebook that explains how to implement the program. The guidebook also includes ca of successful projects and a list of helpful resources.

FIRST STEP – ENERGY AUDIT

For local governments interested in pursuing an ESIP, the first step is to perform an ene as prescribed in P.L.2012 c.55.

ENERGY REDUCTION PLANS

If you have an ESIP plan that needs to be submitted to the Board of Public Utilities, plea to ESIP@bpu.state.nj.us. Please limit the file size to 3MB (or break it into smaller files).

Frankford Township School District
Northern Hunterdon-Voorhees Regional High School
Manalapan Township *(**180 MB** - Right Click, Save As)*

ESIP PROGRAM

Final version 42413

BPU RULES

1. Public Entity must decide if they will use an ESCO or DIY method or Hybrid thereof prior to issuing the RFP and the RFP must state the intended method. A change in the project procurement model after the RFP closing date will be cause for immediate rejection and disqualification of potential Clean Energy program incentives.

2. RFP procedures shall be adhered to as per the legislation, including the use of BPU approved forms. Any alteration of the forms, without prior approval from the BPU shall be grounds for rejection.

3. RFP must include copy of an audit (ASHRAE Level II w/Level III for lighting) and audit must be prepared by a firm classified by DPMC in the 036 discipline.

4. All firms, including professional services, whether using ESCO or DIY model, must be DPMC classified.

5. If an Architect is engaged by the public entity, the architectural fees are the responsibility of the public entity and must be paid directly to the firm. These fees may be included in the energy cost savings analysis and payback.

   ESCO's may contract directly with an architectural firm, in which case the architectural firm serves as a subcontractor to the ESCO and the project related service costs may be included within the project's economic model.

6. Public entity shall conduct pre-bid meetings and site visits per existing statutes.

   In the interest of open public bidding transparency, it is a requirement of the BPU that all proposers must attend the pre-proposal bid meeting.

7. There shall be no negative cash flow in any year of the program.
   section 7 (1)(a)
   > "the energy savings resulting from the program will be sufficient to cover the cost of the program's energy conservation measures."

8. SREC values are not permitted to be used in the energy cost savings calculations.

9. Capital cost avoidance values are not to be used in the energy savings calculations.

10. Operational and Maintenance (O&M) cost savings may be permitted in the cost savings calculations, but only with supporting documentation.

11. Blended utility rates shall not be permitted. Use the actual utility tariff or local contracted rates if there is a third party supplier.

    For the RFP proposals, the public entity shall define the utility rates in the RFP

12. Contracted third party utility rates may only be used for the term of the contract (5 yr. maximum) Subsequent years are to be projected at the utility tariff rates plus the annual BPU escalation rates.

13. Public entity shall conduct M&V (measurement and verification) at the one (1) year operational date and shall provide a copy of the M&V report to the Board of Public Utilities.

    For the RFP proposals, the ESCO shall provide the cost for the one (1) year M&V only. For comparative purposes, the one year M&V pricing shall be indicated on the proposal Form VI, under the "Annual Service Costs" column. Additional M&V costs are at the discretion of the local unit and are not to be included in the proposal.

14. The decisions made by BPU staff regarding compliance or other issues that arise in connection with the RFP procurement process shall be considered a final decision of the BPU. Any appeal will need to be through the New Jersey Superior Court, Appellate Division.

15. For the RFP proposals only, Demand Response (DR) revenues claimed by ESCO's can only be projected for a maximum period of three (3) years. DR revenue projections beyond three years will not be permitted. DR revenues must be included and presented under the "Energy Rebates/Incentives" column of FORM VI.

16. ESCO "fees" proposed during the RFP phase of the project cannot increase post-award. ESCO's are required to maintain the fee percentages through final contract negotiations and construction of the Board approved Energy Savings Plan

17. Public Bid openings shall be held on the due date of the proposal submissions. The public entity shall announce the name of the bidder and the total dollar amount. After award of a contract, all proposals received will be made available by the owner for public inspection

18. Rejection of bids by the public entity shall be conducted in accordance with the appropriate sections of the applicable legislation, as stated in Title 40A:11-13.2. Additionally all proposals must be returned to the respective ESCO's upon rejection.

19. Field changes that exceed 5% of the project cost require BPU approval.

20. Energy Savings Plans (ESP) that is dependent upon incentives from the Clean Energy Program must review the current program requirements, at the time of application, for each incentive to insure eligibility. If any program incentive is denied, resubmission of all ESIP related forms will be necessary to remain ESIP qualified.

APPENDIX E

Photovoltaic Analysis

Linden City LGEA - City Hall
CHA Project Numer: 29743

Cost of Electricity	$0.13	/kWh
Electricity Usage	1,073,800	kWh/yr
System Unit Cost	$4,000	/kW

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$260,000	**65.0**	**82,868**	**0**	**$10,524**	**0**	**$10,524**	**$0**	**$16,574**	**24.7**	**9.6**

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $200 /1000kwh

Area Output*
440 m2
4,736 ft2

Perimeter Output*
133 m
399 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
634 ft2

Approximate System Size: Is the roof flat? (Yes/No) Yes

8 watt/ft2
5,074 DC watts
65 kW Enter into PV Watts

PV Watts Inputs***

Array Tilt Angle	20	Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)
Array Azimuth	180	Enter into PV Watts (default)
Zip Code	08109	Enter into PV Watts
DC/AC Derate Factor	1.1	Enter info PV Watts

PV Watts Output
82,868 annual kWh calculated in PV Watts program

% Offset Calc

Usage	1,073,800	(from utilities)
PV Generation	82,868	(generated using PV Watts)
% offset	8%	

* http://www.freemaptools.com/area-calculator.htm
** http://www.flettexchange.com
*** http://pvwatts.nrel.gov/

PVWatts® Calculator

NREL NATIONAL RENEWABLE ENERGY LABORATORY

My Location | 301 N. WOOD AVE. LINDEN, NJ 07036 » Change Location | Release Notice (?) | HELP | ALL NREL SOLAR TOOLS

RESOURCE DATA SYSTEM INFO RESULTS

Go to system info

82,868 kWh per Year *

RESULTS

Print Results

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)	Energy Value ($)
January	2.78	4,894	361
February	3.52	5,537	409
March	4.34	7,362	543
April	4.95	7,842	579
May	5.69	9,051	668
June	5.86	8,791	649
July	5.73	8,775	648
August	5.47	8,305	613
September	4.91	7,418	547
October	3.99	6,444	476
November	2.68	4,378	323
December	2.35	4,071	300
Annual	4.36	82,868	$ 6,116

User Comments

Download Results: Monthly | Hourly

Find A Local Installer

* **Caution:** Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Similarly, the "Energy Value" column simply multiplies the utility-average electricity price by production. Complex utility rates and financing can significantly impact the energy value. See Help for additional guidance.

Location and Station Identification

Requested Location	**301 N. WOOD AVE. LINDEN, NJ 07036**
Weather Data Source	**(TMY2) NEWARK, NJ 7.0 mi**
Latitude	**40.7° N**
Longitude	**74.17° W**

PV System Specifications *(Commercial)*

DC System Size	**65 kW**
Module Type	**Standard**
Array Type	**Fixed (open rack)**
Array Tilt	**20°**
Array Azimuth	**180°**
System Losses	**14%**
Inverter Efficiency	**96%**
DC to AC Size Ratio	**1.1**

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	**0.07 $/kWh**
Initial Cost	**2.60 $/Wdc**
Cost of Electricity Generated by System	**0.13 $/kWh**

These values can be compared to get an idea of the cost-effectiveness of this system. However, system costs, system financing options (including 3rd party ownership) and complex utility rates can significantly change the relative value of the PV system.

APPENDIX F

Photos

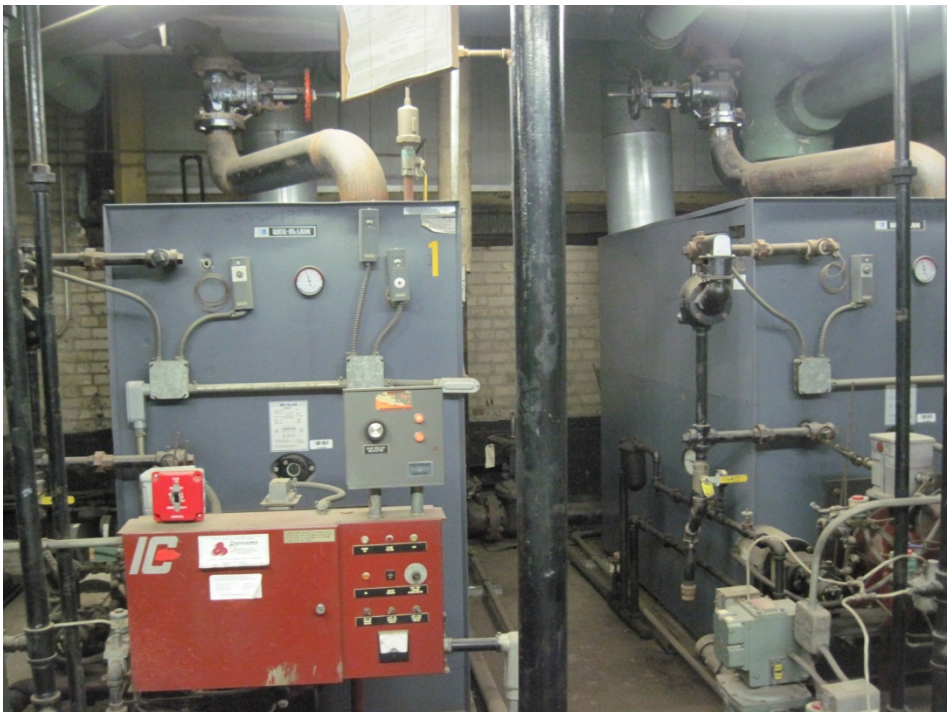
CITY HALL

LIGHT FIXTURE

VAV SENSOR

LIGHTS IN COURT ROOM

AIR COOLED CHILLERS



HOT WATER BOILERS

HOT WATER PUMPS

CHILLED WATER PUMPS

FTR THERMOSTAT

AIR COOLED CONDENSING UNITS

APPENDIX G

EPA Benchmarking Report

ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

City of Linden - City Hall

Primary Property Function: Other - Public Services
Gross Floor Area (ft²): 54,450
Built: 1979

For Year Ending: December 31, 2014
Date Generated: March 19, 2015

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
City of Linden - City Hall 301 N. Wood Ave. Linden, New Jersey 07036	_____ , (____)____-_____	____ _____ , (____)____-_____ _____

Property ID: 4344276

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
138.8 kBtu/ft²

Source EUI
286 kBtu/ft²

Annual Energy by Fuel	
Fuel Oil (No. 2) (kBtu)	524,400 (7%)
Electric - Grid (kBtu)	3,663,806 (48%)
Natural Gas (kBtu)	3,367,980 (45%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	59.7
National Median Source EUI (kBtu/ft²)	123.1
% Diff from National Median Source EUI	132%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	708

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)