TOWNSHIP OF KEARNY
TOWN HALL
ENERGY ASSESSMENT

for

NEW JERSEY
BUREAU OF PUBLIC UTILITIES

CHA PROJECT NO. 20711

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Prepared by:

CLOUGH HARBOUR & ASSOCIATES LLP

6 Campus Drive
Parsippany, NJ 07054

(973) 538-2120

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1.0 INTRODUCTION & BACKGROUND

This report summarizes the energy audit for the Town Hall. The 11,000 square foot facility is three stories with a finished basement and unoccupied attic. The building houses offices, storage spaces, a court room, and restrooms.

New Jersey's Clean Energy Program, funded by the New Jersey Board of Public Utilities, supports energy efficiency and sustainability for Municipal and Local Government Energy Audits. Through the support of a utility trust fund, New Jersey is able to assist state and local authorities in reducing energy consumption while increasing comfort.

2.0 EXECUTIVE SUMMARY

This report details the results of the energy audit for the Town Hall in Kearny, NJ. The three story, 11,000 square foot facility houses offices, storage spaces, a court room, and restrooms. The following areas were evaluated for energy conservation measures:

- Boiler replacement
- Motor upgrade
- Lighting upgrades with occupancy sensors
- Door seals

Various potential Energy Conservation Measures (ECMs) were identified for the above categories. Measures which are recommended for implementation have a payback of 10 years or less. This threshold is considered a viable return on investment. Potential annual savings of $6,700 for the recommended ECMs may be realized with a payback of 2.8 years.

The ECMs identified in this report will allow for the building to reduce its energy usage and if pursued has the opportunity to qualify for the New Jersey SmartStart Buildings Program. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

ECM-1A Replace Boiler 1 (hot water)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
14,400	0	0	940	1,400	1.3	600	10.3	9.9

* Incentive shown is per the New Jersey Smart Start Program, 2010 Gas Heating Application. Incentive is based on the purchase of 320 MBH boiler.

ECM-2 Eliminate Vestibule HVAC

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,100	4.5	26,510	0	4,000	-	NA	0.3	NA

* The ECM is not eligible for New Jersey's Smart Start Incentive of the 2010 Application.

ECM-4 Install Premium Efficiency Motors

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,000	0.2	560	0	100	0.8	100	10.0	9.0

* Incentive shown is per the New Jersey's Smart Start Premium Motors Application.

ECM-7 Lighting Replacements with 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
3,300	2.5	6,850	0	1,200	4.5	500	2.8	2.3

* Incentives based on New Jersey Smart Start Prescriptive Lighting Measures.

3.0 EXISTING CONDITIONS

3.1 Building General

3.1.1 Structure

The Town Hall is a three story building constructed more than 100 years ago. The facility has been renovated over the years; most recently in the summer of 2009, which included architectural, envelope, electrical, lighting, and HVAC upgrades. The building houses offices, court room, storage closets, and restrooms. The first floor is partially below ground level and has windows closer to the ceiling. The unoccupied attic is used as storage area for archives.

The building's walls in the occupied spaces are insulated with stone or brick on the outside and gypsum on the inside. The roof is insulated, mostly flat, covered with asphalt roll roofing material or shingles on sloped areas. The windows are operable double pane and in wooden or metal frames.

3.1.2 Occupancy and Operating Hours

The building is occupied by about 24 staff members and operates from 8:00 AM to 5:00 PM five days per week.

3.2 Utility Usage

The building uses electricity, #2 fuel oil, natural gas, municipal water, and is connected to the municipal sewage system.

Electricity and natural gas are purchased from the Public Service Electric and Gas Company (PSE&G). For 2008, the facility consumed 203,800 kWh of electricity at an annual cost of about $32,900. The annual natural gas usage was about 4,800 therms at a cost of $7,000; fuel oil usage was about 3,700 gallons at a cost of $8,300.

Water usage was not available; however, the building is not charged for water use.

Electricity has an average blended rate of $0.16 per kWh, and has a higher consumption rate in the summer due to air conditioning needs. The majority of natural gas and fuel oil is used for building heat, with a higher usage trend from November through April. The average blended rate for natural gas was $1.46 per therm, and the blended rate for fuel oil was $2.25 per gallon.

Utility data is provided in Appendix A.

As noted, electricity and natural gas commodity supply and delivery is presently purchased from PSE&G. The delivery component will always be the responsibility of the utility that connects the facility to the power grid or gas line; however, the supply can be purchased from a third party. The electricity or natural gas commodity supply entity will require submission of one to three years of past energy bills. Contract terms can vary among suppliers. A list of approved electrical and natural gas energy commodity suppliers can be found in Appendix A.

3.3 HVAC Systems

The building is heated by two boilers. Installed in 1984, a Weil McLain gas fired, 300MBH, hot water boiler serves the first floor. The second boiler is an HB Smith oil fired, 880MBH, steam boiler that serves the second and third floors, and was installed in 1960. Heating steam is distributed to radiators and convectors throughout the building. The heating system was recently upgraded. Air vents on the radiators and convectors were replaced, and steam angle valves upgraded to packaged thermostatic valves with remote capillary thermostat/setpoint adjustment controllers.

The first floor is cooled by an air handler in the mechanical room that is connected to a Trane remote condensing unit which is located outside the mechanical room. A new cooling system was recently installed to serve the second and the third floors. Chilled water is produced by a Carrier air cooled chiller model 30RAN018-511CX and distributed to fan coils and ceiling cassette air conditioning units. A gas fired heating and electric cooling packaged HVAC unit manufactured by AAON is located on the ground level and serves the conference room on the third floor.

3.4 Control Systems

The boilers are controlled by an automatic heating controller that regulates the indoor temperatures according to outdoor temperature. The heating system is shut down when the outdoor temperature rises above an adjustable setpoint. In addition, a built-in program clock allows the controller to hold lower temperatures during the night or when the building is not occupied. An adjustable morning warm-up is also included. The heating in individual rooms is controlled by the newly installed thermostatic valves located on most of the radiators.

The chiller's controls are interfaced with the Honeywell building management system that is capable of responding to outside temperatures, working in occupied/unoccupied time schedules. The fan coil units are set to operate in occupied and unoccupied modes through the Building Manager's timeclock and have the ability of manual night setback overrides. The ceiling cassette AC units are controlled by the associated cooling only thermostats that modulate 3-way cooling control valves. The packaged AAON HVAC unit is controlled by the Honeywell Building Manger set to work in occupied/unoccupied modes with night setback overrides and scheduling options.

3.5 Lighting/Electrical Systems

The lighting system is manually controlled by individual switches in the spaces. Most spaces within the building are offices that operate between 5 and 8 hours a day, totaling between 35 and 40 hours a week. The lighting within these offices is turned on and off with occupancy. The lights in the public restrooms are on constantly during building operation. Most of the lighting is fluorescent using F32T8 32 watt, or F17T8 17 watt lamps. In some locations, older and more inefficient F34T12 34 watt fluorescent lamps are still in use. Many incandescent lamps still exist in chandelier fixtures in the lobby or corridor areas of the first and second floor. All exit signs within the building have been upgraded to new LED technology. The building's exterior lighting consists of metal halide fixtures controlled by timers.

3.6 Domestic Hot Water System

Hot water is produced by a Rheem gas fired 40 gallon hot water heater installed in 1991.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1A &1B Replace Boilers

As previously noted, building heating is provided by a Weil McLain gas fired hot water boiler and HB Smith oil fired steam boiler, with a combined output rating of 1,180 MBH. Both boilers are at the end of their useful life.

The ECM evaluated replacement of the Weil McLain with a high efficiency condensing boiler and the HB Smith with a high efficiency steam boiler in the same location. Gas conversion feasibility was investigated and it was determined that it would be economically feasible to replace the existing oil fired boiler with a gas fired boiler. Modifications to the existing piping, electrical wiring and flue stacks would also be required.

The high efficiency hot water boiler would provide energy savings of 940 therms at a cost of $1,400. The steam boiler would save 3,670 gallons of fuel oil that would be replaced by 4,370 therms of natural gas resulting in savings of $1,900 per year. Further investigation shall be required to ensure the existing gas service has the extra capacity available for the additional gas-fired boiler.

The hot water boiler has an expected life of 24 years and the steam boiler has an expected life 30 years, according to ASHRAE. Total energy savings over the life of the project are estimated at 22,560 therms and $33,600, for the hot water boiler; and 110,100 gallons fuel oil, (131,100) therms and $57,000, for the steam boiler.

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

ECM-1A Replace Boiler 1 (hot water)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
14,400	0	0	940	1,400	1.3	600	10.3	9.9

* Incentive shown is per the New Jersey Smart Start Program, 2010 Gas Heating Application. Incentive is based on the purchase of 320 MBH boiler.

This measure is recommended.

ECM-1B Replace Boiler 2 (steam)

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Fuel Oil	Natural Gas	Total				
$	kW	kWh	Gallons	Therms	$		$	Years	Years
28,700	0	0	3,670	(4,370)	1,900	1.0	1,600	15.1	14.3

* Incentive shown is per the New Jersey Smart Start Program, 2010 Gas Heating Application. Incentive is based on the purchase of 892 MBH boiler.

This measure is not recommended.

4.2 ECM-2 Eliminate Vestibule HVAC

The vestibule addition to the main building that houses the elevator is heated and cooled. The heating consist of two electric baseboard heaters on each floor totaling six units. The cooling to this space is provided by a split system AC unit. Although temperatures can be set to provide minimum cooling and heating, the space is unoccupied and does not require tempering. The vestibules experience frequent traffic, particularly when employees enter and leave the building. However, energy could be saved by removing or disabling the existing heating and cooling units.

This measure determined the energy required by the electric heaters and cooling split system unit on an annual basis. All of this energy can be considered savings assuming that these units will be eliminated and tempering of the space will cease.

This measure does not require any additional equipment and therefore, will payback indefinitely as long as the space exists.

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

ECM-2 Eliminate Vestibule HVAC

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,100	4.5	26,510	0	4,000	-	NA	0.3	NA

* The ECM is not eligible for New Jersey's Smart Start Incentive of the 2010 Application.

This measure is recommended.

4.3 ECM-3 Install Door Seals

The doors leading to the elevator's vestibule have visible gaps around the perimeter. The gaps are a source of air infiltration, and installing door seals will reduce infiltration and save energy. Perimeter length and gap spacing of the doors were determined. Infiltration reductions and associated energy savings were then calculated by using hourly bin weather data.

This measure was evaluated and the savings were less than $100; therefore, it is not recommended as part of the study. However, it is a low cost measure with an attractive payback, and implementation may be desired for occupant comfort. See Appendix C for calculations.

Door seals have an expected life of 10 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 300 kWh and 200 therms, totaling $400.

4.4 ECM-4 Install Premium Efficiency Motors

The air handler serving the first floor has supply and return fans operated by two low efficiency motors compared to current motors. The inefficient motors are wasting electrical energy, and should be upgraded

to premium efficiency. This ECM considers energy savings due to the differences in efficiency ratings resulting from replacement of the motors.
Premium efficiency motors have an expected life of 18 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 10,080 kWh, totaling $1,800.

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

ECM-4 Install Premium Efficiency Motors

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,000	0.2	560	0	100	0.8	100	10.0	9.0

* Incentive shown is per the New Jersey's Smart Start Premium Motors Application.

This measure is recommended.

4.5 ECM-5 Lighting Replacements

The Town Hall contains approximately seven fluorescent fixtures with inefficient T-12 lamps. Each fixture is equipped with either two - 4' bulbs, or two – 2' u-tube bulbs. There are also about seven inefficient incandescent bulbs installed in the front vestibule that are not used, as well as about 14 three bulb incandescent fixtures located throughout the hallways of the building. Overall energy consumption can be reduced by retrofitting the existing 2' and 4' T-12 fixtures with more efficient T-8 fluorescent lamps and replacing incandescent bulbs with compact fluorescent bulbs.

To compute the annual savings for this ECM, the energy consumption of the lighting fixtures was established, and it was determined to be 41,580 kWh per year. To calculate the annual energy consumption utilizing T-8 lamps and compact fluorescent bulbs, the proposed fixture requirement was used with the same annual hours of operation. The difference between the existing and proposed annual energy consumption was the energy savings. Calculations are provided in Appendix I.

Existing lamps and ballasts of each fixture would be replaced with electronic ballasts T-8 fluorescent lamps, the length and quantity varies based on application. Existing incandescent bulbs would also be replaced with compact fluorescent bulbs. This ECM will provide annual savings of 5,140 kWh.

The lighting retrofits have an expected life of 15 years, according to the manufacturers, and total energy savings over the life of the project are estimated at 77,100 kWh and $15,000.

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

ECM-5 Lighting Replacements

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,100	2.5	5,140	0	1,000	12.6	100	1.1	1.0

* Incentives based on New Jersey Smart Start Prescriptive Lighting Measures.

This measure is not recommended in lieu of ECM-7.

4.6 ECM-6 Install Occupancy Sensors

Lighting fixtures throughout the building are manually switched on and off, and are operational with occupancy. The operating time of many of the building's interior lighting fixtures can be reduced by installing occupancy sensors. Occupancy sensors were not considered for many areas because of safety concerns or low use.

Applying the same process used in the calculation of ECM-5, the existing baseline energy consumption for each fixture was determined. Typical traffic patterns for each space were then taken into account to approximate the actual occupancy hours per day. It was established that the annual energy consumption of the lighting fixtures can be reduced by 2,330 kWh.

Approximately nine occupancy sensors and some standard electrical work are required for this measure.

Lighting controls have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 34,950 kWh, and $6,000.

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

ECM-6 Install 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
1,500	0.0	2,330	0	400	3.0	300	3.8	3.0

* Incentives based on New Jersey Smart Start Prescriptive Lighting Measures.

This measure is not recommended in lieu of ECM-7.

4.7 ECM-7 Lighting Replacements with Occupancy Sensors

This measure is a combination of ECMs 5 and 6 to allow for maximum energy and demand reduction. Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative.

The lighting retrofits and controls have an expected lifetime of 15 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 102,750 kWh, and $18,000.

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

ECM-7 Lighting Replacements with Occupancy Sensors

Budgetary Cost	Annual Utility Savings					Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total	ROI			
$	kW	kWh	Therms	$		$	Years	Years
3,300	2.5	6,850	0	1,200	4.5	500	2.8	2.3

* Incentives based on New Jersey Smart Start Prescriptive Lighting Measures.

This measure is recommended.

5.0 PROJECT INCENTIVES

5.1 Incentives Overview

5.1.1 New Jersey Pay For Performance and Smart Start Programs

The building will be eligible for incentives from the New Jersey Office of Clean Energy. The most significant incentives will be from the New Jersey Pay for Performance (P4P) Program. The P4P program is designed for qualified energy conservation projects in facilities whose demand in any of the preceding 12 months exceeds 200 kW. Facilities that meet this criterion must also achieve a minimum performance target of 15% by using the EPA Portfolio Manager benchmarking tool before and after construction. Incentives for this program are in three parts. Incentive #1 energy reduction plan pays $0.05 per square foot to a maximum of $25,000 or 50% of facility annual energy cost paid after approval of application. Incentive #2 is paid after installation of recommended measures; base incentives deliver $0.11/kWh and $1.10/therm not to exceed 30% of total project cost. Incentive #3 post-construction benchmarking is paid after acceptance of a report proving energy savings over one year utilizing the EPA Portfolio Manager benchmarking tool. Incentive #3 base incentives deliver $0.07/ kWh and $0.70/therm not to exceed 20% of total project cost. 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 minimum performance target calculated with the EPA Portfolio Manager benchmarking tool not to exceed 50% of total project cost.

A new incentive structure is in place for projects exceeding 20% in energy savings, which doubles incentives #2 and #3 for a total of $0.36/kWh and $3.60/therm. For Incentive #1, the maximum incentive has been raised to 80% of project costs, or $2 million per gas account and $2 million per electric account. The 200 kW/month average minimum has been waived for buildings owned by local governments or municipalities and non-profit organizations. This new incentive structure has been extended to December 31, 2010.

Specific incentives for energy conservation measures were calculated on an individual basis utilizing the 2009 New Jersey Smart Start incentive program. This program provides incentives dependent upon mechanical and electrical equipment. If applicable, incentives from this program are reflected in the ECM summaries and attached appendices. If the building qualifies and enters into the New Jersey Pay for Performance Program, all energy savings will be included in the total building energy usage and savings to be applied towards the Pay for Performance incentive. A project is not applicable for incentives in both programs.

5.1.2 PSE&G Small Business Direct Install Program

PSE&G has a new Small Business Direct Install Program, and the following information was obtained from the current PSE&G customer service website. Small business and not-for-profit customers residing in the municipalities noted in the following listing, which includes Kearny, may be eligible to participate in the PSE&G Direct Install Program.

Bayonne	Gloucester City	**Kearny**	Orange	Plainfield
Camden	Guttenberg	Mt. Holly	Passaic	Roselle
Carteret	Hillside	New Brunswick	Paterson	Trenton
East Orange	Irvington	Newark	Pemberton	Union City
Elizabeth	Jersey City	North Bergen	Perth Amboy	West New York

PSE&G is offering this program to customers designated by the State of New Jersey as having "Urban Enterprise Zones". Program guidelines require that customers be a PSE&G customer of record with a separately metered PSE&G electric or gas account; must have a qualifying energy usage profile - an average electric demand of 200 kW or less, or 40,300 kWh or less per month (the kW limit is waived for municipalities); and have a satisfactory payment history with PSE&G. Customers who lease their business are eligible for program participation; however, landlord permission is required.

As part of the PSE&G Direct Install Program, participants can obtain a free on-site energy audit of electrical equipment, proposal based on the audit with recommended energy efficiency measures; and installation of energy-saving equipment. PSE&G pays 100% of the cost to install the recommended energy efficiency measures. The customer is required to repay 20% of the total cost interest free, over two years as part of their PSE&G bill. The measures eligible for participation in this program are subject to approval by PSE&G.

Eligible energy efficiency equipment upgrades include:

- Lighting retrofits including sensors and controls
- Refrigeration, motors, and HVAC
- Site-specific custom projects

5.2 Building Incentives

The Town Hall is eligible for several incentives available under New Jersey Smart Start Programs. The total amount of all qualified incentives is about $2,800 towards new boilers, premium efficiency motors and upgrades to the lighting system.

When calculating the total incentive for the New Jersey Pay For Performance program, all energy conservation measures are applicable since the amount received is based on building-wide energy improvements. While the building's overall energy reduction is decreased, the load on major utilities is increased by the installation of a gas-fired boiler in place of the original oil-fired boiler. Therefore, the overall energy reduction for the building, as it pertains to the incentive program, does not reach the 15% minimum, and is not eligible for Incentives #2 and #3 as previously discussed. See Appendix H for calculations.

Under PSE&G's direct install program, the Town Hall is potentially eligible to receive $48,700, and would be required to repay $9,700. Incentives cannot be accepted under multiple programs.

6.0 ALTERNATIVE ENERGY SCREENING EVALUATION

6.1 Geothermal

Geothermal heat pumps (GHP) transfer heat between the constant temperature of the earth and the building to maintain the building's interior space conditions. Below the surface of the earth throughout New Jersey the temperature remains in the low 50°F range throughout the year. This stable temperature provides a source for heat in the winter and a means to reject excess heat in the summer. With GHP systems, water is circulated between the building and the piping buried in the ground. The ground heat exchanger in a GHP system is made up of a closed or open loop pipe system. Most common is the closed loop in which high density polyethylene pipe is buried horizontally at 4-6 feet deep or vertically at 100 to 400 feet deep. These pipes are filled with an environmentally friendly antifreeze/water solution that acts as a heat exchanger. In the summer, the water picks up heat from the building and moves it to the ground. In the winter the system reverses and fluid picks up heat from the ground and moves it to the building. Heat pumps make collection and transfer of this heat to and from the building possible.

The building uses a wide variety of heating and cooling equipment to meet the HVAC requirements. With exception to the hydronic heating and chilled water systems, the remaining equipment is not compatible with a geothermal energy source. Therefore, to take advantage of a GHP system, the existing mechanical equipment would have to be removed or overhauled; and either a low temperature closed loop water source heat pump system or a water to water heat pump system would have to be installed to realize the benefit of the consistent temperature of the ground. Therefore, this measure is not recommended due to the extent of HVAC system renovation needed for implementation.

6.2 Solar

6.2.1 Photovoltaic Rooftop Solar Power Generation

The Town Hall 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 building's roof has sufficient room to install a large solar cell array. A structural analysis would be required to determine if the roof framing could support a cell array.

The PVWATTS solar power generation model was utilized to calculate PV power generation. The New Jersey Clean Power Estimator provided by the New Jersey Clean Energy Program is presently being updated; therefore, the site recommended use of the PVWATT solar grid analyzer version 1. The closest city available in the model is Newark, New Jersey and a fixed tilt array type was utilized to calculate energy production. The PVWATT solar power generation model is provided in Appendix I.

The State of New Jersey incentives for non-residential PV applications is $1.00/watt up to 50 kW of installed PV array. Federal tax credits are also available for renewable energy projects up to 30% of installation cost. Municipalities do not pay federal taxes; therefore, would not be able to utilize the federal tax credit incentive.

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. The cost of the ACP penalty for 2009 is $700; this is the amount that must be paid per SERC by the high emission producers. The expected dollar amount that will be paid to the PV producer for 2009 is expected to be $600/SREC credit. Payments that will be received from the PV producer will change from year to year dependent upon supply and demand. Renewable Energy Consultants is a third party SREC broker that has been approved by the New Jersey Clean Energy Program. As stated above there is no definitive way to calculate an exact price that will be received by the PV producer per SREC over the next 15 years. Renewable Energy Consultants estimated an average of $487/ SERC per year and this number was utilized in the cash flow for this report.

The building had a maximum electricity demand of 74.4 kW and a minimum of 31.2 kW, from January 2008 through December 2008. The monthly average over the observed 12 month period was 48.1 kW. The existing load does not justify the use of the maximum incentive cap of 50 kW of installed PV solar array; therefore, a 45 kW system size was selected for the calculations. The system costs for PV installations were derived from the most recent NYSERDA (New York State Energy Research and Development Agency) estimates of total cost of system installation. It should be noted that the cost of installation is currently $10 per watt or $10,000 per kW of installed system. This has increased in the past few years due to the rise in national demand for PV power generator systems. Other cost considerations will also need to be considered. 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 need to be replaced multiple times during the useful life of the PV system.

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

Photovoltaic (PV) Rooftop Solar Power Generation – 45 kW System

Budgetary Cost	Annual Utility Savings				Total Savings	New Jersey Renewable Energy Incentive*	New Jersey Renewable SREC**	Payback (without incentive)	Payback (with incentives)
	Electricity		Natural Gas	Total					
$	kW	kWh	Therms	$	$	$	$	Years	Years
450,000	0	53,240	0	8,600	8,600	45,000	25,900	>25	11.7

*Incentive based on New Jersey Renewable Energy Program for non-residential applications of $1.00 per Watt of installed capacity
** Estimated Solar Renewable Energy Certificate Program (SREC) for 15 years at $487/1000 kWh

While this measure is currently not recommended, future increases in the cost of electricity may make the payback period more attractive.

6.2.2 Solar Thermal Hot Water Plant

Active solar thermal systems use solar collectors to gather the sun's energy to heat water, another fluid, or air. An absorber in the collector converts the sun's energy into heat. The heat is then transferred by circulating water, antifreeze, or sometimes air to another location for immediate use or storage for later utilization. Applications for active solar thermal energy include providing hot water, heating swimming pools, space heating, and 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 around the site's latitude, to maximize the amount of radiation collected on a yearly basis.

Several options exist for using active solar thermal systems for space heating. The most common method involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system). The most practical system would transfer the heat from the panels to thermal storage tanks and transfer solar produced thermal energy to use for domestic hot water production. DHW is presently produced by a gas-fired water heater and, therefore, this measure would offer savings in natural gas usage.

Currently, an incentive is not available for installation of thermal solar systems. A Federal tax credit of 30% of installation cost for the thermal applications is available; however, the Township of Kearny does not pay Federal taxes and, therefore, would not benefit from this program.

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

Solar Thermal Domestic Hot Water Plant

Budgetary Cost	Annual Utility Savings				Total Savings	New Jersey Renewable Energy Incentive	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	$	$	Years	Years
27,100	0	0	120	200	200	NA	>25	NA

* No incentive is available in New Jersey at this time.

This measure is not recommended.

6.3 Wind

Small wind turbines use a horizontal axis propeller, or rotor, to capture the kinetic energy of the wind and convert it into rotary motion to drive a generator which usually is designed specifically for the wind turbine. The rotor consists of two or three blades, usually made from wood or fiberglass. These materials give the turbine the needed strength and flexibility, and have the added advantage of not interfering with television signals. The structural backbone of the wind turbine is the mainframe, and includes the slip-rings that connect the wind turbine, which rotates as it points into changing wind directions, and the fixed tower wiring. The tail aligns the rotor into the wind.

To avoid turbulence and capture greater wind energy, turbines are mounted on towers. Turbines should be mounted at least 30 feet above any structure or natural feature within 300 feet of the installation. Smaller turbines can utilize shorter towers. For example, a 250-watt turbine may be mounted on a 30-50 foot tower, while a 10 kW turbine will usually need a tower of 80-120 feet. Tower designs include tubular or latticed, guyed or self-supporting. Wind turbine manufacturers also provide towers.

The New Jersey Clean Energy Program for small wind installations has designated numerous pre-approved wind turbines for installation in the State of New Jersey. Incentives for wind turbine

installations are based on kilowatt hours saved in the first year. Systems sized under 16,000 kWh per year of production will receive a $3.20 per kWh incentive. Systems producing over 16,000 kWh will receive $51,200 for the first 16,000 kWh of production with an additional $0.50 per kWh up to a maximum cap of 750,000 kWh per year. Federal tax credits are also available for renewable energy projects up to 30% of installation cost for systems less than 100 kW. However, as noted previously, municipalities do not pay federal taxes and is, therefore, not eligible for the tax credit incentive.

The most important part of any small wind generation project is the mean annual wind speed at the height of which the turbine will be installed. In the Kearny area, the map indicates a mean annual wind speed of 10 miles per hour. For the Town Hall, there are site restrictions. Parking lots, trees and surrounding structures would greatly affect a tower location.

A wind speed map and aerial site photo are included in Appendix K.

This measure is not recommended due to the low mean annual wind speed and site restrictions.

6.4 Combined Heat and Power Generation (CHP)

Combined heat and power, 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 Town Hall ha s sufficient need for electrical generation and the ability to use most of the thermal byproduct during the winter, thermal usage during the summer months is low. 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. The most viable selection for a CHP plant at this location would be a reciprocating engine natural gas-fired unit. Purchasing this system and performing modifications to the existing HVAC and electrical systems would greatly outweigh the savings over the life of the equipment.

This measure is not recommended.

6.5 Biomass Power Generation

Biomass power generation is a process in which waste organic materials are used to produce electricity or thermal energy. These materials would otherwise be sent to the landfill or expelled to the atmosphere. To participate in NJCEP's Customer On-Site Renewable Energy program, participants must install an on-site sustainable biomass or fuel cell energy generation system. Incentives for bio-power installations are available to support up to 1MW-dc of rated capacity.

*Class I organic residues are eligible for funding through the NJCEP CORE program. Class I wastes include the following renewable supply of organic material:

- Wood wastes not adulterated with chemicals, glues or adhesives
- Agricultural residues (corn stover, rice hulls or nut shells, manures, poultry litter, horse manure, etc) and/or methane gases from landfills
- Food wastes
- Municipal tree trimming and grass clipping wastes
- Paper and cardboard wastes
- Non adulterated construction wood wastes, pallets

The NJDEP evaluates biomass resources not identified in the RPS.

Examples of eligible facilities for a CORE incentive include:

- Digestion of sewage sludge
- Landfill gas facilities
- Combustion of wood wastes to steam turbine
- Gasification of wood wastes to reciprocating engine
- Gasification or pyrolysis of bio-solid wastes to generation equipment

* from NJOCE Website

This measure is not recommended because of noise issues, potential zoning issues, and because the Town Hall does not have a steady waste stream to fuel the power generation system. Additionally, purchasing this system and performing modifications to the existing HVAC and electrical systems would greatly outweigh the savings over the life of the equipment.

6.6 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 PSE&G 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 PSE&G 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 PSE&G pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program. The Town Hall had a monthly average electricity demand of 29.1 kW and a maximum demand of 41.7 kW from July 2008 through June 2009.

This measure is not recommended because the facility does not have adequate load to meet the required minimum load reduction.

7.0 EPA PORTFOLIO MANAGER

The United State Energy Protection Agency (EPA) is a federal agency in charge of regulating environment waste and policy in the United States. The EPA has released the EPA Portfolio Manager for public use. The program is designed to allow property owners and managers to share, compare and improve upon their facility's energy consumption. Inputting such parameters as electricity, heating fuel, building characteristics and location into the website based program generates a naturalized energy rating score out of 100. Once an account is registered, monthly utility data can be entered to track the savings progress and retrieve an updated energy rating score on a monthly basis.

The Town Hall is considered a high energy consumer per the Portfolio Manager with a Site Energy Usage Index (EUI) of 152 kBTU/ft^2/year. Several factors contribute to the unfavorable EUI, including, wasted energy from inefficient boilers, motors, lighting systems, etc. By implementing the measures discussed in this report, it is expected that the EUI can be reduced to approximately 88 kBTU/ft^2/year. The EPA Portfolio Manager did not generate an energy rating score for this building because the building type (Public Assembly) is not eligible for an energy star rating.

A full EPA Energy Star Portfolio Manager Report is located in Appendix L.

The user name and password for the Town Hall's EPA Portfolio Manager Account has been provided to Gerry Kerr of the Township of Kearny.

7.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the Town Hall in Kearny, New Jersey identified potential ECMs for electric heating replacement, night setback, door seals, lighting upgrades, and occupancy sensors. Potential annual savings of $6,700 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

ECM-1A Replace Boiler 1 (hot water)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
14,400	0	0	940	1,400	1.3	600	10.3	9.9

* Incentive shown is per the New Jersey Smart Start Program, 2010 Gas Heating Application. Incentive is based on the purchase of 320 MBH boiler.

ECM-2 Eliminate Vestibule HVAC

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,100	4.5	26,510	0	4,000	-	NA	0.3	NA

* The ECM is not eligible for New Jersey's Smart Start Incentive of the 2010 Application.

ECM-4 Install Premium Efficiency Motors

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,000	0.2	560	0	100	0.8	100	10.0	9.0

* Incentive shown is per the New Jersey's Smart Start Premium Motors Application.

ECM-7 Lighting Replacements with 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
3,300	2.5	6,850	0	1,200	4.5	500	2.8	2.3

* Incentives based on New Jersey Smart Start Prescriptive Lighting Measures.

APPENDIX A

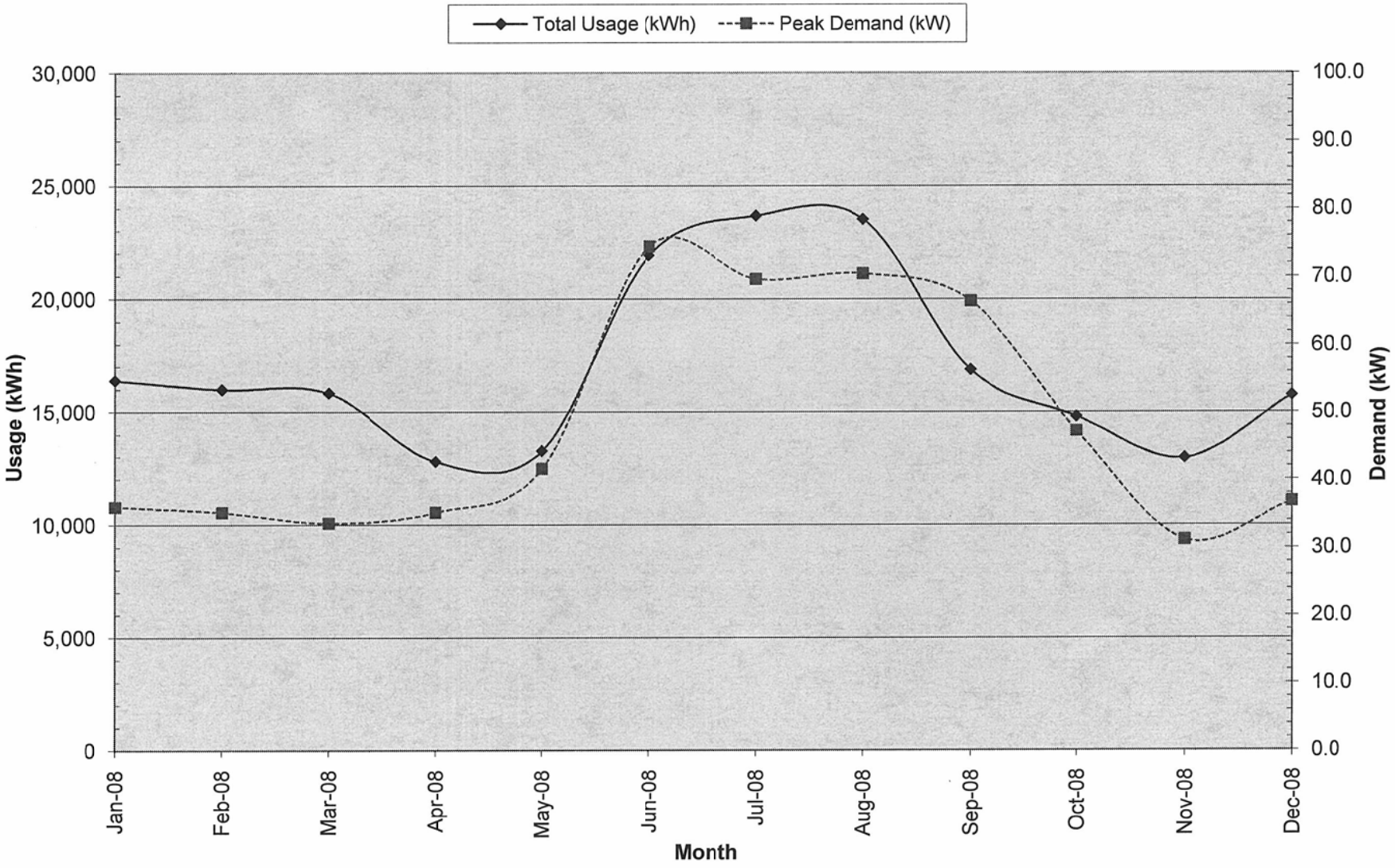
Utility Usage Analysis

New Jersey BPU Energy Audit Program
CHA Project No.: 20711
Town of Kearny
PSE&G - Electric Service

Town Hall - 400 Kearny Ave.
Account No.: 11 878 145 04
Meter No.: 728001095

			Charges			Unit Costs		
Month	Consumption (kWh)	Demand (kW)	Total ($)	Demand ($)	Consumption ($)	Blended Rate ($/kWh)	Consumption ($/kWh)	Demand ($/kW)
January-08	16,400	36.0	$2,053.88	$279.09	$1,774.79	0.1252	0.1082	7.75
February-08	16,000	35.2	$2,063.79	$276.25	$1,787.54	0.1290	0.1117	7.85
March-08	15,840	33.6	$1,994.61	$270.03	$1,724.58	0.1259	0.1089	8.04
April-08	12,800	35.2	$1,646.74	$276.26	$1,370.48	0.1287	0.1071	7.85
May-08	13,280	41.6	$1,743.40	$301.18	$1,442.22	0.1313	0.1086	7.24
June-08	21,920	**74.4**	$4,256.22	$1,177.78	$3,078.44	0.1942	0.1404	15.83
July-08	23,680	69.6	$4,532.34	$1,131.44	$3,400.90	0.1914	0.1436	16.26
August-08	23,520	70.4	$4,655.07	$1,140.33	$3,514.74	0.1979	0.1494	16.20
September-08	16,880	66.4	$3,510.23	$1,095.85	$2,414.38	0.2080	0.1430	16.50
October-08	14,800	47.2	$2,258.58	$543.81	$1,714.77	0.1526	0.1159	11.52
November-08	12,960	31.2	$1,946.94	$481.60	$1,465.34	0.1502	0.1131	15.44
December-08	15,760	36.8	$2,261.74	$503.40	$1,758.34	0.1435	0.1116	13.68
Most Recent Yr	203,840	74.4	$32,923.54	$7,477.02	$25,446.52	0.1615	0.1248	12.94

Electric Usage - Town of Kearny Town Hall Building



Utility Data - Kearny TownHall(rev-2).xls
Electricity Chart

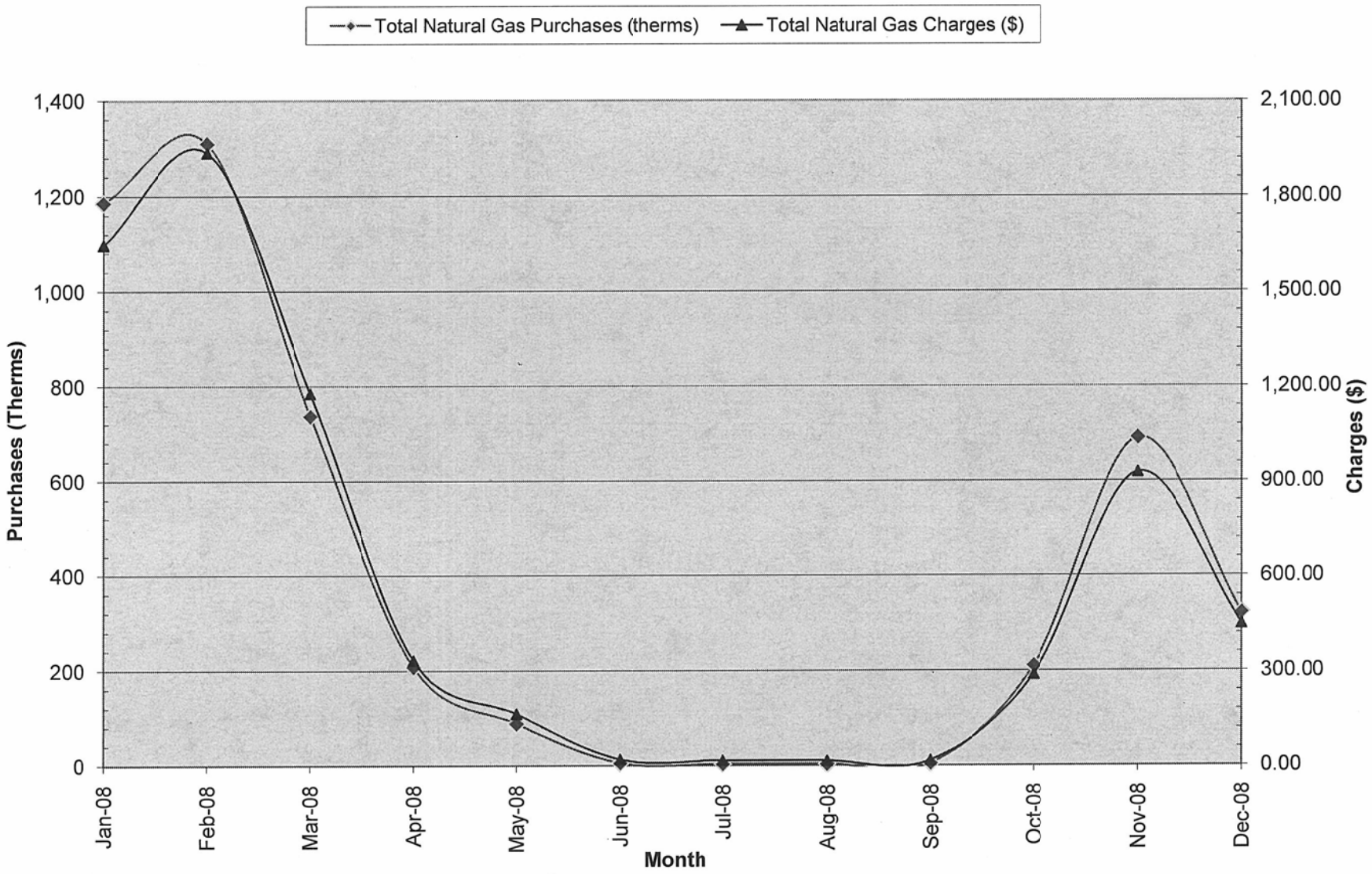
New Jersey BPU Energy Audit Program
CHA Project No.: 20711
Town of Kearny
PSE&G - Natural Gas Service

Town Hall - 400 Kearny Ave.
Account No.: 11 878 145 04
Meter No.: 3227826

Month	Therms	Charges ($)	($/Therm)
January-08	1,186	1,646.71	1.388
February-08	1,310	1,936.93	1.478
March-08	738	1,177.00	1.595
April-08	208	333.53	1.602
May-08	89	164.72	1.848
June-08	6	19.88	3.614
July-08	3	16.35	4.940
August-08	3	14.94	4.501
September-08	4	16.21	3.670
October-08	211	288.35	1.368
November-08	691	928.39	1.343
December-08	322	448.76	1.394

Most Recent Yr	4,772	6,992	1.465

Natural Gas Usage - Town of Kearny Town Hall Building



Utility Data - Kearny TownHall(rev-2).xls
Natural Gas Chart

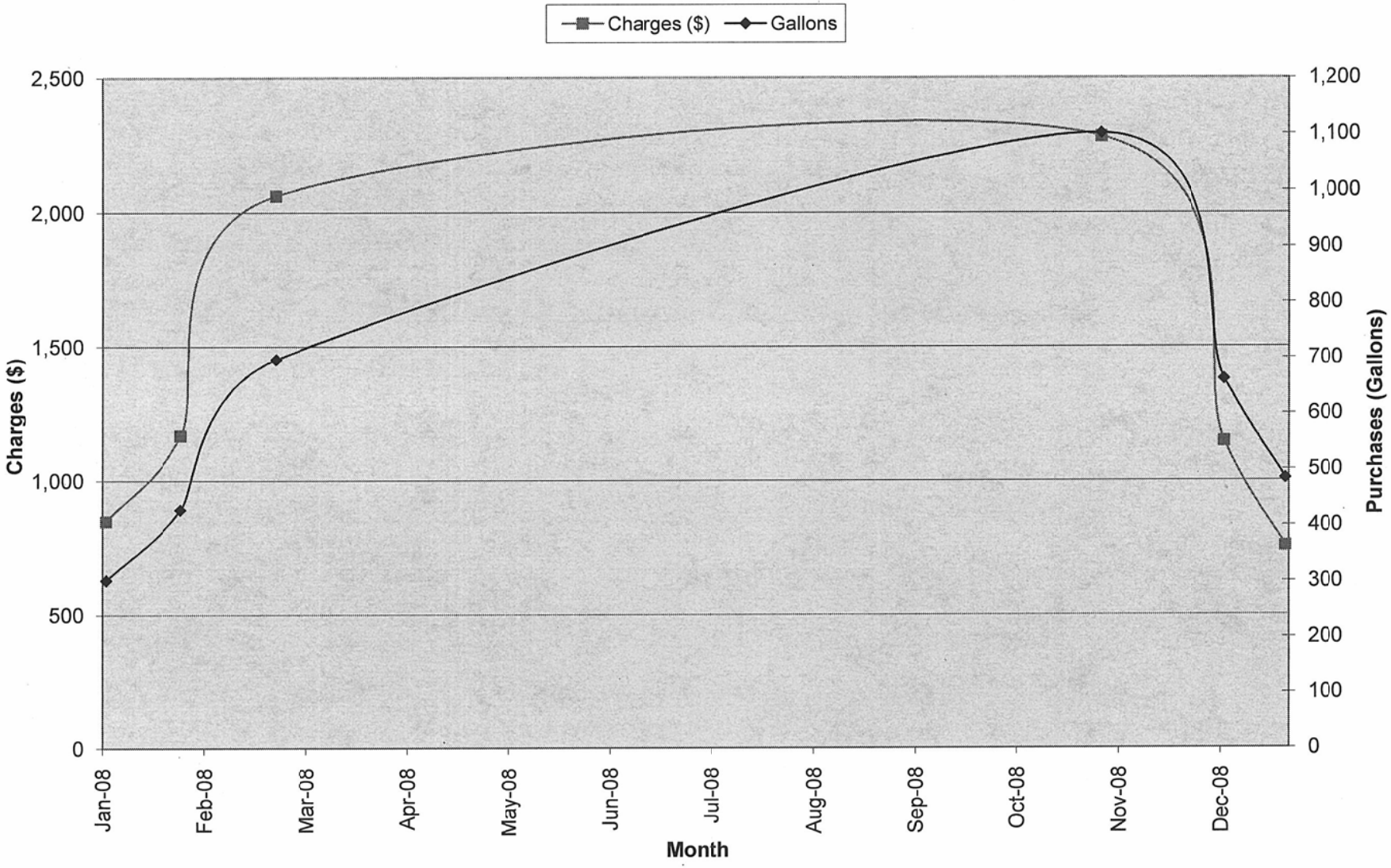
New Jersey BPU Energy Audit Program
CHA Project No.: 20711
Town of Kearny
National Term Inc. - #2 Fuel Oil

Town Hall - 400 Kearny Ave.
Account No.: **n/a**
Meter No.: **n/a**

Month	Gallons	Charges ($)	($/Gallon)
1/9/08	302	848	2.81
1/31/08	428	1,169	2.73
2/28/08	697	2,063	2.96
10/29/08	1,101	2,281	2.07
12/4/08	662	1,147	1.73
12/22/08	484	756	1.56

Most Recent Yr	3,674	8,263	2.25

#2 Fuel Oil Usage - Town of Kearny Town Hall Building



ELECTRIC MARKETERS LIST

The following is a listing of marketers/suppliers/brokers that have been licensed by the NJ Board of Public Utilities to sell electricity to residential, small commercial and industrial customers served by the Public Service Electric and Gas Company distribution system. **This listing is provided for informational purposes only and PSE&G makes no representations or warranties as to the competencies of the entities listed herein or to the completeness of this listing.**

American Powernet Management
867 Berkshire Blvd, Suite 101
Wyomissing, PA 19610
www.americanpowernet.com

BOC Energy Services
575 Mountain Avenue
Murray Hill, NJ 07974
www.boc-gases.com

Commerce Energy Inc.
535 Route 38, Suite 138
Cherry Hill, NJ 08002
(888) 817-8572 or
(858) 910-8099
www.commerceenergy.com

ConEdison Solutions
701 Westchester Avenue
Suite 201 West
White Plains, NY 10604
(800) 316-8011
www.ConEdSolutions.com

Constellation NewEnergy, Inc.
1199 Route 22 East
Mountainside, NJ 07092
908 228-5100
www.newenergy.com

Credit Suisse (USA), Inc.
700 College Road East
Princeton, NJ 08450
www.creditsuisse.com

Direct Energy Services, LLC
One Gateway Center, Suite 2600
Newark, NJ 07102
(973) 799-8568
www.directenergy.com

FirstEnergy Solutions
395 Ghent Road Suite 407
Akron, OH 44333
(800) 977-0500
www.fes.com

Gerdau Ameristeel Energy Co.
North Crossman Road
Sayreville, NJ 08872

Gexa Energy LLC New Jersey
20 Greenway Plaza, Suite 600
Houston, TX 77046
(866) 304-GEXA
Beth.miller@gexaenergy.com

Glacial Energy of New Jersey
2602 McKinney Avenue, Suite 220
Dallas, TX 75204
www.glacialenergy.com

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095
www.hess.com

Integrys Energy Services, Inc
99 Wood Avenue, Suite 802
Iselin, NJ 08830
www.integrysenergy.com

Liberty Power Delaware, LLC
1901 W Cypress Road, Suite 600
Fort Lauderdale, FL 33309
(866) Power-99
(866) 769-3799
www.libertypowercorp.com

Liberty Power Holdings, LLC
1901 W Cypress Creek Road, Suite 600
Fort Lauderdale, FL 33309
(866) Power-99
(866) 769-3799
www.libertypowercorp.com

Pepco Energy Services, Inc.
d/b/a Power Choice
23 S. Kinderkamack Rd Ste D
Montvale, NJ 07645
(800) 363-7499
www.pepco-services.com

PPL EnergyPlus, LLC
Energy Marketing Center
Two North Ninth Street
Allentown, PA 18101
1-866-505-8825
http://www.pplenergyplus.com/

Sempra Energy Solutions
The Mac-Cali Building
581 Main Street, 8th Floor
Woodbridge, NJ 07095
(877) 273-6772
www.SempraSolutions.com

South Jersey Energy Company
1 South Jersey Plaza, Route 54
Folsom, NJ 08037
(800) 756-3749
www.sjindustries.com

Strategic Energy, LLC
6 East Main Street, Suite 6E
Ramsey, NJ 07446
(888) 925-9115
www.sel.com

Suez Energy Resources NA
333 Thornall Street FL6
Edison, NJ 08818
866.999.8374(toll free)
www.suezenergyresources.com

UGI Energy Services, Inc.
d/b/a POWERMARK
1 Meridian Blvd. Suite 2C01
Wyomissing, PA 19610
(800) 427-8545
www.ugienergyservices.com

Jan 14, 2009

GAS MARKETERS LIST

The following is a listing of marketers/suppliers/brokers that have been licensed by the NJ Board of Public Utilities to sell natural gas to residential, small commercial and industrial customers served by the Public Service Electric and Gas Company distribution system. **This listing is provided for informational purposes only and PSE&G makes no representations or warranties as to the competencies of the entities listed herein or to the completeness of this listing.**

Gateway Energy Services
44 Whispering Pines Lane
Lakewood, NJ 08701
(800) 805-8586
www.gesc.com

Metro Energy Group, LLC
14 Washington Place
Hackensack, NJ 07601
www.metroenergy.com

RPL Holdings, Inc
601 Carlson Pkwy
Minnetonka, MN 55305

Great Eastern Energy
3044 Coney Island Ave. PH
Brooklyn, NY 11235
888-651-4121
www.greateasterngas.com

Metromedia Energy, Inc.
6 Industrial Way
Eatontown, NJ 07724
(800) 828-9427
www.metromediaenergy.com

South Jersey Energy Company
One South Jersey Plaza, Rte 54
Folsom, NJ 08037
(800) 756-3749
www.sjindustries.com/sje.htm

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095
(800) 437-7872
www.hess.com

Mitchell- Supreme Fuel
(NATGASCO)
532 Freeman Street
Orange, NJ 07050
(800) 840-4GAS
www.mitchellsupreme.com

Sprague Energy Corp.
Two International Drive, Ste 200
Portsmouth, NH 03801
800-225-1560
www.spragueenergy.com

Hudson Energy Services, LLC
545 Route 17 South
Ridgewood, NJ 07450
(201) 251-2400
www.hudsonenergyservices.com

MxEnergy Inc.
P.O. Box 177
Annapolis Junction, MD 20701
800-375-1277
www.mxenergy.com

Stuyvesant Energy LLC
642 Southern Boulevard
Bronx, NY 10455
(718) 665-5700
www.stuyfuel.com

Intelligent Energy
7001 SW 24th Avenue
Gainesville, FL 32607
Sales: 1 877 I've Got Gas
(1 877 483-4684)
Customer Service:
1 800 927-9794
www.intelligentenergy.org

Pepco Energy Services, Inc.
23 S Kinderkamack Rd, Suite D
Montvale, NJ 07645
(800) 363-7499
www.pepco-services.com

Tiger Natural Gas, Inc.
1422 E. 71st Street, Suite J.
Tulsa, OK 74136
1-888-875-6122
www.tigernaturalgas.com

Systrum Energy
877-SYSTRUM
(877-797-8786)
www.systrumenergy.com

Plymouth Rock Energy, LLC
165 Remsen Street
Brooklyn, NJ 11201
866-539-6450
www.plymouthrockenergy.com

UGI Energy Services, Inc.
d/b/a GASMARK
704 E. Main Street, Suite I
Moorestown, NJ 08057
856-273-9995
www.ugienergyservices.com

Macquarie Cook Energy, LLC
10100 Santa Monica Blvd, 18th Fl
Los Angeles, CA 90067

PPL EnergyPlus, LLC
Energy Marketing Center
Two North Ninth Street
Allentown, PA 18101
1-866-505-8825
www.pplenergyplus.com/natural+gas/

Woodruff Energy
73 Water Street
P.O. Box 777
Bridgeton, NJ 08302
(856) 455-1111
www.woodruffenergy.com

APPENDIX B

ECM-1A & 1B Replace Boilers

Kearny NJ
CHA #20711
Building: Town Hall

ECM-1A Boiler Replacement (1st Floor)

Existing Fuel	Nat.Gas
Proposed Fuel	Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 1.46		
Proposed Fuel Cost	$ 1.46		
Baseline Fuel Use	4,505	Therms	Based on historical utility data (less hot water usage)
Existing Boiler Plant Efficiency	74%		Estimated or Measured
Baseline Boiler Load	331,118	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	$ 6,577		
Proposed Boiler Plant Efficiency	93%		New Boiler Efficiency (300MBH)
Proposed Fuel Use	3,560	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 5,198		
Annual Savings	945	Therms	
Annual Savings	**$ 1,379**	**/yr**	

*Note to engineer: Link savings back to summary sheet in appropriate column.

Kearny NJ
CHA #20711
Building: Town Hall

ECM-1A Boiler Replacement (1st Floor)

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Boiler Removal	1	ea		$ 675		$ -	$ 817	$ -	$ 817	
Gas Fired Hot Water Boiler (320MBH)	1	ea	$ 4,200	$ 2,150		$ 4,116	$ 2,602	$ -	$ 6,718	
Piping connections	1	ea	$ 450	$ 880		$ 441	$ 1,065	$ -	$ 1,506	
Flue Attachment	1	ls	$ 300	$ 120		$ 294	$ 145	$ -	$ 439	
Miscellaneous Electrical	1	ea	$ 200	$ 300		$ 196	$ 363	$ -	$ 559	
Misc controls	1	ls	$ 250	$ 500		$ 245	$ 605	$ -	$ 850	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

New Jersey Smart Start Incentive	QTY	UNIT	$ / UNIT	TOTAL SAVINGS	Cost W/O INCENTIVE	Cost W/ INCENTIVE
					$ -	$ -
>300 MBH	320	Tons	$1.75	$560	$ 6,718	$ 6,158
						$ -
				$560	$6,718	$6,158

$ 10,888	Subtotal	
$ 2,178	20%	Contingency
$ 1,307	10%	Contractor O&P
$ -		Engineering
$ 14,372	**Total**	

Total ECM Cost w/ Incentives	**$13,812**

Kearny NJ
CHA #20711
Building: Town Hall

ECM-1B Boiler Replacement (2nd &3rd Floors)

Existing Fuel	#2 Oil
Proposed Fuel	Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 2.25		
Proposed Fuel Cost	$ 1.46		
Baseline Fuel Use	3,674	Gals #2	Base on fuel oil bill
Existing Boiler Plant Efficiency	72%		Estimated or Measured
Baseline Boiler Load	366,900	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 138.7 Mbtu/Gals #2
Baseline Fuel Cost	$ 8,267		
Proposed Boiler Plant Efficiency	84%		New Boiler Efficiency
Proposed Fuel Use	4,368	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 6,377		
Annual Savings	3,674	Gals #2	
	(4,368)	Therms	
Annual Savings	**$ 1,889**	**/yr**	

*Note to engineer: Link savings back to summary sheet in appropriate column.

Kearny NJ
CHA #20711
Building: Town Hall

ECM-1B Boiler Replacement (2nd &3rd Floors)

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Boiler Removal	1	ea		$ 1,100		$ -	$ 1,331	$ -	$ 1,331	
Abondon oil tank system	1	ls		$ 500		$ -	$ 605	$ -	$ 605	
Gas Fired Steam Boiler (892MBH)	1	ea	$ 11,400	$ 3,950		$ 11,172	$ 4,780	$ -	$ 15,952	
Flue Attachment	1	ls	$ 300	$ 120		$ 294	$ 145	$ -	$ 439	
Miscellaneous Electrical	1	ea	$ 300	$ 500		$ 294	$ 605	$ -	$ 899	
Gas Piping	1	ls	$ 650	$ 880		$ 637	$ 1,065	$ -	$ 1,702	
Misc controls	1	ls	$ 250	$ 500		$ 245	$ 605	$ -	$ 850	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

New Jersey Smart Start Incentive	QTY	UNIT	$ / UNIT	TOTAL SAVINGS	Cost W/O INCENTIVE	Cost W/ INCENTIVE
					$ -	$ -
>300 MBH	892	Tons	$1.75	$1,561	$ 15,952	$ 14,391
						$ -
				$1,561	$15,952	$14,391

$	21,778	Subtotal	
$	4,356	20%	Contingency
$	2,613	10%	Contractor O&P
$	-		Engineering
$	**28,746**	**Total**	

Total ECM Cost w/ Incentives	**$27,185**

APPENDIX C

ECM-2 Eliminate Vestibule HVAC

Kearny NJ
CHA #20711
Building: Town Hall

ECM-2 Eliminate Vestibule HVAC

Building Footprint	1,134 SF	Ex Occupied Clng Temp.	78 °F	Ex Occupied Htg Temp	60 °F		
Heating Efficiency	73%	Ex Unoccupied Clng Temp.	78 °F	Ex Unoccupied Htg Temp.	60 °F		
Cooling Efficiency	1.20 kW/ton	Occupied Cooling UA	(1,148) btu/hr/°F	Occupied Heating UA	312 btu/hr/°F		
Internal Gains	26 btu/h	Unoccupied Cooling UA	(570) btu/hr/°F	Unoccupied Heating UA	312 btu/hr/°F		
Unoc Internal Gain factor	0.03	Cooling Occ Enthalpy Setpoint	27.5 Btu/lb				
Ave Occ Internal Gain Factor	0.7	Cooling Unocc Enthalpy Setpoint	27.5 Btu/lb				
Economizer available (Y/N)	No						

Savings when electric heating and cooling of vestibule is not used

Existing unit heater size	0.75 kW
Number of heaters	6

					EXISTING LOADS									
					Occupied			Unoccupied						
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Total Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Available Economizer Cooling kWh	Necessary Cooling Energy kWh	Existing Cooling Energy kWh	Existing Heating Energy therms
A		B	C	D	E	F	G	H	I	J	K	L	M	M
102.5	49.1	0	0	0	-28,117	-30,234	-18	-13,972	-30,234	-1	0	0	0	0
97.5	42.5	3	1	2	-22,378	-20,996	-18	-11,120	-20,996	-1	0	11	11	0
92.5	39.5	34	12	22	-16,640	-16,797	-18	-8,269	-16,797	-1	0	95	95	0
87.5	36.6	131	47	84	-10,902	-12,737	-18	-5,418	-12,737	-1	0	264	264	0
82.5	34.0	500	179	321	-5,154	-9,098	-18	-2,566	-9,098	-1	0	630	630	0
77.5	31.6	620	221	399	0	0	-18	0	0	-1	0	0	0	0
72.5	29.2	664	237	427	0	0	-18	0	0	-1	0	0	0	0
67.5	27.0	854	305	549	0	0	-18	0	0	-1	0	1	1	0
62.5	24.5	927	331	596	0	0	-18	0	0	-1	0	1	1	0
57.5	21.4	600	214	386	780	840	-18	780	840	-1	0	0	0	13
52.5	18.7	610	218	392	2,339	2,520	-18	2,339	2,520	-1	0	0	0	41
47.5	16.2	611	218	393	3,899	4,199	-18	3,899	4,199	-1	0	0	0	68
42.5	14.4	656	234	422	5,458	5,879	-18	5,458	5,879	-1	0	0	0	102
37.5	12.6	1,023	365	658	7,018	7,559	-18	7,018	7,559	-1	0	0	0	204
32.5	10.7	734	262	472	8,577	9,238	-18	8,577	9,238	-1	0	0	0	179
27.5	8.6	334	119	215	10,137	10,918	-18	10,137	10,918	-1	0	0	0	96
22.5	6.8	252	90	162	11,697	12,598	-18	11,697	12,598	-1	0	0	0	84
17.5	5.5	125	45	80	13,256	14,277	-18	13,256	14,277	-1	0	0	0	47
12.5	4.1	47	17	30	14,816	15,957	-18	14,816	15,957	-1	0	0	0	20
7.5	2.6	22	8	14	16,375	17,637	-18	16,375	17,637	-1	0	0	0	10
2.5	1.0	13	5	8	17,935	19,316	-18	17,935	19,316	-1	0	0	0	7
-2.5	0.0	0	0	0	19,494	20,996	-18	19,494	20,996	-1	0	0	0	0
-7.5	-1.5	0	0	0	21,054	22,676	-18	21,054	22,676	-1	0	0	0	0
TOTALS		8,760	3,129	5,631								1,002	1,002	871

Existing Building Ventilation & Infiltration (occ)	**311**	**cfm**
Overheat Ventilation Factor	**1.00**	
Additional ventilation to offset overheat	**0**	**cfm**
Existing Building Ventilation & Infiltration (unocc)	**311**	**cfm**
Economizer Ventilation (from AHU's)	**0**	**cfm**

Energy Use Indices (calculated)

	Base Case	
Heating	871	therms
	25,513	kWh
	4.5	kWh

	Base Case
Cooling	1,002

Total Energy Savings	**26,515 kWh**
Total Savings	**$4,981**

Kearny NJ
CHA #20711
Building: Town Hall

Reconcile Thermal Model

(Elevator shaft bldg)							
Building Footprint	1,134 SF	Ex Occupied Clng Temp.	78 °F	Ex Occupied Htg Temp.	60 °F		
Heating Efficiency	73%	Ex Unoccupied Clng Temp.	78 °F	Ex Unoccupied Htg Temp.	60 °F		
Cooling Efficiency	1.20 kW/ton	Occupied Cooling UA	(1,148) btu/hr/°F	Occupied Heating UA	312 btu/hr/°F		
Internal Gains	26 btu/h	Unoccupied Cooling UA	(570) btu/hr/°F	Unoccupied Heating UA	312 btu/hr/°F		
Unoc Internal Gain factor	0.03	Cooling Occ Enthalpy Setpoint	27.5 Btu/lb				
Ave Occ Internal Gain Factor	0.7	Cooling Unocc Enthalpy Setpoint	27.5 Btu/lb				
Economizer available (Y/N)	No						

Heating and cooling energy are unrelated in this model. If the building being analyzed is not cooled, disregard cooling energy calculations

					EXISTING LOADS									
					Occupied			Unoccupied						
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Total Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Available Economizer Cooling kWh	Necessary Cooling Energy kWh	Existing Cooling Energy kWh	Existing Heating Energy therms
A		B	C	D	E	F	G	H	I	J	K	L	M	M
102.5	49.1	0	0	0	-28,117	-30,234	-18	-13,972	-30,234	-1	0	0	0	0
97.5	42.5	3	1	2	-22,378	-20,996	-18	-11,120	-20,996	-1	0	11	11	0
92.5	39.5	34	12	22	-16,640	-16,797	-18	-8,269	-16,797	-1	0	95	95	0
87.5	36.6	131	47	84	-10,902	-12,737	-18	-5,418	-12,737	-1	0	264	264	0
82.5	34.0	500	179	321	-5,164	-9,098	-18	-2,566	-9,098	-1	0	630	630	0
77.5	31.6	620	221	399	0	0	-18	0	0	-1	0	0	0	0
72.5	29.2	664	237	427	0	0	-18	0	0	-1	0	0	0	0
67.5	27.0	854	305	549	0	0	-18	0	0	-1	0	1	1	0
62.5	24.5	927	331	596	0	0	-18	0	0	-1	0	1	1	0
57.5	21.4	600	214	386	780	840	-18	780	840	-1	0	0	0	13
52.5	18.7	610	218	392	2,339	2,520	-18	2,339	2,520	-1	0	0	0	41
47.5	16.2	611	218	393	3,899	4,199	-18	3,899	4,199	-1	0	0	0	68
42.5	14.4	656	234	422	5,458	5,879	-18	5,458	5,879	-1	0	0	0	102
37.5	12.6	1,023	365	658	7,018	7,559	-18	7,018	7,559	-1	0	0	0	204
32.5	10.7	734	262	472	8,577	9,238	-18	8,577	9,238	-1	0	0	0	179
27.5	8.6	334	119	215	10,137	10,918	-18	10,137	10,918	-1	0	0	0	96
22.5	6.8	252	90	162	11,697	12,598	-18	11,697	12,598	-1	0	0	0	84
17.5	5.5	125	45	80	13,256	14,277	-18	13,256	14,277	-1	0	0	0	47
12.5	4.1	47	17	30	14,816	15,957	-18	14,816	15,957	-1	0	0	0	20
7.5	2.6	22	8	14	16,375	17,637	-18	16,375	17,637	-1	0	0	0	10
2.5	1.0	13	5	8	17,935	19,316	-18	17,935	19,316	-1	0	0	0	7
-2.5	0.0	0	0	0	19,494	20,996	-18	19,494	20,996	-1	0	0	0	0
-7.5	-1.5	0	0	0	21,054	22,676	-18	21,054	22,676	-1	0	0	0	0
TOTALS		**8,760**	**3,129**	**5,631**								**1,002**	**1,002**	**871**

Existing Building Ventilation & Infiltration (occ)	**311 cfm**
Overheat Ventilation Factor	**1.00**
Additional ventilation to offset overheat	**0 cfm**
Existing Building Ventilation & Infiltration (unocc)	**311 cfm**
Economizer Ventilation (from AHU's)	**0 cfm**

Energy Use Indices (calculated)

	Base Case
Heating	871

	Base Case
Cooling	1,002

Kearny NJ
CHA #20711
Building: Town Hall

Elevator shaft addition

Doors

	Width (ft)	Height (ft)	Quantity	Area (SF)	Lineal Feet	
North				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
			Sub-total	0.0	0.0	
East	3.5	7.0	1	24.5	21.0	
				0.0	0.0	
				0.0	0.0	
			Sub-total	24.5	21.0	
South				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
			Sub-total	0.0	0.0	
West	5.0	7.0	1	35.0	24.0	
				0.0	0.0	
			Sub-total	35.0	24.0	
			Total	**59.5**	**45.0**	LF/SF 0.76

Walls

	Width (ft)	Height (ft)	Quantity	Area (SF)	Lineal Feet		
North	20.0	36.0	1	720.0	112.0		All wall quantities must remain equal to 1
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
	20.0			720.0	112.0	Ave. height 36.0	Average height wall automatically linked to
East	14.0	36.0	1	504.0	100.0		
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
	14.0			504.0	100.0	Ave. height 36.0	Average height wall automatically linked to
South	30.0	36.0	1	1080.0	132.0		
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
	30.0			1080.0	132.0	Ave. height 36.0	Average height wall automatically linked to
West	14.0	36.0	1	504.0	100.0		
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
	14.0			504.0	100.0	Ave. height 36.0	Average height auto linked to block load sheet

Windows

	Width (ft)	Height (ft)	Quantity	Area (SF)	Lineal Feet	
North				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
			Sub-total	0.0	0.0	
East	2.0	24.0	1	48.0	52.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
			Sub-total	48.0	52.0	
South	1.0	4.0	2	8.0	20.0	
	3.0	7.0	2	42.0	40.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
			Sub-total	50.0	60.0	
West	2.0	24.0	1	48.0	52.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
			Sub-total	48.0	52.0	
			Total	**146.0**	**164.0**	LF/SF 1.12

Kearny NJ
CHA #20711
Building: Town Hall

ECM-2 Eliminate Vestibule HVAC

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Demo existing heaters	6	ea		$ 55		$ -	$ 399	$ -	$ 399	
Patch and paint	6	ls	$ 10	$ 35		$ 59	$ 254	$ -	$ 313	
Demo existing Split System	1	ea		$ 120		$ -	$ 145	$ -	$ 145	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$	857	Subtotal
$	86	10% Contingency
$	141	15% Contractor O&P
$	-	Engineering
$	**1,085**	**Total**

APPENDIX D

ECM-3 Install Door Seals

Kearny NJ
KHA #20711
Building: Town Hall

ECM-3 Install Door Seals

Existing: Doors or Door Seals result in excessive heat loss and infiltration
Proposed: Install new doors and/or weatherstripping to eliminate door infiltration

Building Footprint	1,134	SF	Ex Occupied Clng Temp.	78	*F	Ex Occupied Htg Temp.	60	*F
Heating System Efficiency	73%		Ex Unoccupied Clng Temp.	78	*F	Ex Unoccupied Htg Temp.	60	*F
Cooling System Efficiency	1.20	kW/ton	Prop Occupied Clng Temp.	78	*F	Prop Occupied Htg Temp.	60	*F
Internal Gains	26	btu/h	Prop Unoccupied Clng Temp.	78	*F	Prop Unoccupied Htg Temp.	60	*F
Unoc Internal Gain factor	0.03		Occupied Cooling UA	-1,148	btu/hr/°F	Occupied Heating UA	312	btu/hr/°F
Ave Occ Internal Gain Factor	0.7		Unoccupied Cooling UA	-570	btu/hr/°F	Unoccupied Heating UA	312	btu/hr/°F
			Cooling Occ Enthalpy Setpoint	27.5	Btu/lb			
			Cooling Unocc Enthalpy Setpoint	27.5	Btu/lb			

					EXISTING LOADS						PROPOSED LOADS								
					Occupied			Unoccupied			Occupied			Unoccupied					
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy lbs	Proposed Heating Energy lbs
A		B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	K	L	M	N
102.5	49.1	0	0	0	-28,117	-30,234	-18	-13,972	-30,234	-1	-28,117	-28,834	-18	-13,972	-28,834	-1	0	0	0	0
97.5	42.5	3	1	2	-22,378	-20,996	-18	-11,120	-20,996	-1	-22,378	-20,024	-18	-11,120	-20,024	-1	11	11	0	0
92.5	39.5	34	12	22	-16,640	-16,797	-18	-8,269	-16,797	-1	-16,640	-16,019	-18	-8,269	-16,019	-1	95	93	0	0
87.5	36.6	131	47	84	-10,902	-12,737	-18	-5,418	-12,737	-1	-10,902	-12,148	-18	-5,418	-12,148	-1	264	256	0	0
82.5	34.0	500	179	321	-5,164	-9,098	-18	-2,566	-9,098	-1	-5,164	-8,677	-18	-2,566	-8,677	-1	630	609	0	0
77.5	31.6	620	221	399	0	0	-18	0	0	-1	0	0	-18	0	0	-1	0	0	0	0
72.5	29.2	664	237	427	0	0	-18	0	0	-1	0	0	-18	0	0	-1	0	0	0	0
67.5	27.0	854	305	549	0	0	-18	0	0	-1	0	0	-18	0	0	-1	1	1	0	0
62.5	24.5	927	331	596	0	0	-18	0	0	-1	0	0	-18	0	0	-1	1	1	0	0
57.5	21.4	600	214	386	780	840	-18	780	840	-1	780	801	-18	780	801	-1	0	0	13	13
52.5	18.7	610	218	392	2,339	2,520	-18	2,339	2,520	-1	2,339	2,403	-18	2,339	2,403	-1	0	0	41	40
47.5	16.2	611	218	393	3,899	4,199	-18	3,899	4,199	-1	3,899	4,005	-18	3,899	4,005	-1	0	0	68	66
42.5	14.4	656	234	422	5,458	5,879	-18	5,458	5,879	-1	5,458	5,607	-18	5,458	5,607	-1	0	0	102	99
37.5	12.6	1,023	365	658	7,018	7,559	-18	7,018	7,559	-1	7,018	7,209	-18	7,018	7,209	-1	0	0	204	199
32.5	10.7	734	262	472	8,577	9,238	-18	8,577	9,238	-1	8,577	8,811	-18	8,577	8,811	-1	0	0	179	175
27.5	8.6	334	119	215	10,137	10,918	-18	10,137	10,918	-1	10,137	10,412	-18	10,137	10,412	-1	0	0	96	94
22.5	6.8	252	90	162	11,697	12,598	-18	11,697	12,598	-1	11,697	12,014	-18	11,697	12,014	-1	0	0	84	82
17.5	5.5	125	45	80	13,256	14,277	-18	13,256	14,277	-1	13,256	13,616	-18	13,256	13,616	-1	0	0	47	46
12.5	4.1	47	17	30	14,816	15,957	-18	14,816	15,957	-1	14,816	15,218	-18	14,816	15,218	-1	0	0	20	19
7.5	2.6	22	8	14	16,375	17,637	-18	16,375	17,637	-1	16,375	16,820	-18	16,375	16,820	-1	0	0	10	10
2.5	1.0	13	5	8	17,935	19,316	-18	17,935	19,316	-1	17,935	18,422	-18	17,935	18,422	-1	0	0	7	6
-2.5	0.0	0	0	0	19,494	20,996	-18	19,494	20,996	-1	19,494	20,024	-18	19,494	20,024	-1	0	0	0	0
-7.5	-1.5	0	0	0	21,054	22,676	-18	21,054	22,676	-1	21,054	21,626	-18	21,054	21,626	-1	0	0	0	0
TOTALS		8,760	3,129	5,631													1,002	970	871	850

Existing Building Ventilation & Infiltration	311	cfm
Existing Unocc. Building Ventilation & Infiltration	311	cfm
Door infiltration	18	cfm
Proposed reduction (80%)	14	cfm
Proposed Building Ventilation & Infiltration	297	cfm
Proposed Unocc. Building Ventilation & Infiltration	297	cfm

Savings		
	21	therms
	32	kWh

Kearny NJ
CHA #20711
Building: Town Hall

ECM-3 Install Door Seals

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
Door Seals (double door - 5' x 7')	1	ea	$ 65	$ 100	$ -	$ 64	$ 121	$ -	$ 185	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 185	Subtotal	
$ 37	20%	Contingency
$ 22	10%	Contractor O&P
$ -	0%	Engineering
$ 244	**Total**	

APPENDIX E

ECM-4 Install Premium Efficiency Motors

earny NJ
HA #20711
uilding: Town Hall

CM-4 Install Premium Efficiency Motors

Demand Cost $/kW-month
$ 12.94

Energy Cost $/kWh
$ 0.12

Multipliers		
Material	Labor	Equipment
0.98	1.21	1.09

avings Analysis

Cost Estimates

#	Description	Location	Existing HP	Load Factor	Existing Efficiency[a]	Existing kW	New HP[b]	New Load Factor	New Efficiency[a]	New kW	Demand Savings	Demand Savings $	Annual Hours	kWh Savings	$ kWh Savings	Total $ Savings	Estimated Cost	Payback Years	Unit Costs Materials	Unit Costs Labor	Unit Costs Equipment	Subtotal Costs Materials	Subtotal Costs Labor	Subtotal Costs Equipment	Total Cost	Remarks
1	AHU 1 Fan	Basement north	1	0.9	0.786	0.9	1	0.9	0.852	0.8	0.066	$ 10	2,374	157	$ 20	$ 30	$ 460	15.4	$ 284	$ 150	$ -	$ 278	$ 182	$ -	$ 460	
2	AHU 1 Fan	Basement north	2	0.9	0.785	1.7	2	0.9	0.871	1.5	0.169	$ 26	2,374	402	$ 50	$ 76	$ 577	7.6	$ 342	$ 200	$ -	$ 335	$ 242	$ -	$ 577	
11																										
12																										
		Total	**3**			**2.6**	**3**			**2.3**	**0.24**	**$ 37**		**559**	**$ 70**	**$ 106**	**$ 1,037**									

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Existing and new efficiencies should be entered if known. If not known, use provided curve fit based on "DOE Survey Installed Average" and NEMA Premium values, respectively.

Same as existing HP unless resized to better match load

New Jersey Smart Start Incentive	QTY	UNIT	$ / UNIT	TOTAL SAVINGS	Cost W/O INCENTIVE	Cost W/ INCENTIVE
1 HP TEFC Premium Motor	1	EA	$50	$50	$ 460	$ 410
2 HP TEFC Premium Motor	1	EA	$60	$60	$ 577	$ 517
				$110	$1,037	$927

Total ECM Cost w/ Incentives	**$927**

APPENDIX F

ECM-5 Lighting Replacements

Energy Audit of Kearny, NJ
CHA Project No. 20711 - Town Hall
ECM-5 Lighting Replacements

0 $0.125 $/kWh
$12.94 $/kW

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA 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 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
69	TOWN HALL SIGN LIGHT	1	175 MH GROUND	MH175/1	215	0.2	SW	4368	939	1	175 MH GROUND	MH175/1	215	0.2	SW	4,368	939	-	-	$ -	$ -	$0		
146	TOWN HALL SIGN LIGHT	2	MH 400 POLE	MH400/1	458	0.9	SW	4368	4,001	2	MH 400 POLE	MH400/1	458	0.9	SW	4,368	4,001	-	-	$ -	$ -	$0		
146	REAR PARKING LOT RIGHT SIDE	1	MH 400 POLE	MH400/1	458	0.5	SW	4368	2,001	1	MH 400 POLE	MH400/1	458	0.5	SW	4,368	2,001	-	-	$ -	$ -	$0		
146	REAR PARKING LOT LEFT SIDE	1	MH 400 POLE	MH400/1	458	0.5	SW	4368	2,001	1	MH 400 POLE	MH400/1	458	0.5	SW	4,368	2,001	-	-	$ -	$ -	$0		
70	BOILER ROOM	3	W 32 C F 1	F41LL	32	0.1	SW	1000	96	3	W 32 C F 1	F41LL	32	0.1	SW	1,000	96	-	-	$ -	$ -	$0		
46	BOILER ROOM	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1,000	60	-	-	$ -	$ -	$0		
175	BOILER ROOM	1	S 25 C F 1 (MAG) SINK LIGHT	F31EE	38	0.0	SW	1000	38	1	S 25 C F 1 (MAG) SINK LIGHT	F31EE	38	0.0	SW	1,000	38	-	-	$ -	$ -	$0		
199	VENTILATION ROOM	5	W 32 W F 1 (ELE)	F41LL	32	0.2	SW	1000	160	5	W 32 W F 1 (ELE)	F41LL	32	0.2	SW	1,000	160	-	-	$ -	$ -	$0		
108	BASEMENT HALLWAY	2	I 65	I65/1	65	0.1	SW	1820	237	2	CF 26	CFQ26/1-L	27	0.1	SW	1,820	98	138	0.1	$ 29.06	$ 37.50	$0	1.3	1.3
55	BASEMENT HALLWAY	3	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1820	257	3	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1,820	257	-	-	$ -	$ -	$0		
X1	CENTRAL CORR.	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	1820	5	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	1,820	5	-	-	$ -	$ -	$0		
55	CENTRAL CORR.	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1820	171	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1,820	171	-	-	$ -	$ -	$0		
4	CENTRAL CORR.	1	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1820	131	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	SW	1,820	60	71	0.0	$ 14.91	$ 101.25	$10	6.8	6.1
55	CENTRAL CORR.	7	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	1820	599	7	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	1,820	599	-	-	$ -	$ -	$0		
55	CENTRAL CORR.	3	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1820	257	3	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1,820	257	-	-	$ -	$ -	$0		
4	CENTRAL CORR.	1	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1820	131	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	SW	1,820	60	71	0.0	$ 14.91	$ 101.25	$10	6.8	6.1
4	BATHROOM CORR.	2	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1820	262	2	2T 17 R F 2 (ELE)	F22ILL	33	0.1	SW	1,820	120	142	0.1	$ 29.83	$ 202.50	$20	6.8	6.1
55	BATHROOM CORR.	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	1820	86	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	1,820	86	-	-	$ -	$ -	$0		
55	KITCHEN	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	1820	513	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	1,820	513	-	-	$ -	$ -	$0		
55	TAX OFFICE	12	2T 17 R F 3 (ELE)	F23ILL	47	0.6	SW	1820	1,026	12	2T 17 R F 3 (ELE)	F23ILL	47	0.6	SW	1,820	1,026	-	-	$ -	$ -	$0		
55	TAX OFFICE	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	1820	342	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	1,820	342	-	-	$ -	$ -	$0		
108	ELEVATOR ROOM	1	I 65	I65/1	65	0.1	SW	1820	118	1	CF 26	CFQ26/1-L	27	0.0	SW	1,820	49	69	0.0	$ 14.53	$ 18.75	$0	1.3	1.3
38	TAX ASSESSORS	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1950	234	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1,950	234	-	-	$ -	$ -	$0		
219	HANDICAP VEST.	10	S 17 C F 1(ELE)	F21ILL	20	0.2	SW	2080	416	10	S 17 C F 1(ELE)	F21ILL	20	0.2	SW	2,080	416	-	-	$ -	$ -	$0		
63	HANDICAP VEST. ELEV.	8	S 32 R F 1	F41LL	32	0.3	SW	2080	532	8	S 32 R F 1	F41LL	32	0.3	SW	2,080	532	-	-	$ -	$ -	$0		
55	DEPT. OF FINANCE & PATROLL	8	2T 17 R F 3 (ELE)	F23ILL	47	0.4	SW	1820	684	8	2T 17 R F 3 (ELE)	F23ILL	47	0.4	SW	1,820	684	-	-	$ -	$ -	$0		
55	FINANCE/ TAX VAULT CORR.	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1820	171	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1,820	171	-	-	$ -	$ -	$0		
46	FINANCE/ TAX VAULT CORR.	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1820	109	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1,820	109	-	-	$ -	$ -	$0		
46	FINANCE/ TAX VAULT CORR.	2	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1820	218	2	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1,820	218	-	-	$ -	$ -	$0		
55	TAX COLLECTOR OFFICE	11	2T 17 R F 3 (ELE)	F23ILL	47	0.5	SW	1820	941	11	2T 17 R F 3 (ELE)	F23ILL	47	0.5	SW	1,820	941	-	-	$ -	$ -	$0		
46	TAX COLLECTOR OFFICE	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1820	109	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1,820	109	-	-	$ -	$ -	$0		
38	TAX OFFICE #1	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1820	218	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1,820	218	-	-	$ -	$ -	$0		
55	TAX STORAGE	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	1820	342	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	1,820	342	-	-	$ -	$ -	$0		
55	MENS BR	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	2080	98	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	2,080	98	-	-	$ -	$ -	$0		
199	MENS BR	1	W 32 W F 1 (ELE)	F41LL	32	0.0	SW	2080	67	1	W 32 W F 1 (ELE)	F41LL	32	0.0	SW	2,080	67	-	-	$ -	$ -	$0		
55	WOMENS BR	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	2080	98	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	2,080	98	-	-	$ -	$ -	$0		
199	WOMENS BR	1	W 32 W F 1 (ELE)	F41LL	32	0.0	SW	2080	67	1	W 32 W F 1 (ELE)	F41LL	32	0.0	SW	2,080	67	-	-	$ -	$ -	$0		
55	Utility Room	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	1000	47	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	1,000	47	-	-	$ -	$ -	$0		
199	COMM ROOM	1	W 32 W F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	W 32 W F 1 (ELE)	F41LL	32	0.0	SW	1,000	32	-	-	$ -	$ -	$0		
35	RECREATION OFFICE	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1820	983	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1,820	983	-	-	$ -	$ -	$0		
35	CFO'S OFFICE	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	1820	655	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	1,820	655	-	-	$ -	$ -	$0		
X1	FRONT ENTRANCE	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2080	3	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2,080	3	-	-	$ -	$ -	$0		
127	FIRST FLOOR CENTRAL	4	DC 75 C I 3	I75/3	225	0.9	SW	2080	1,872	4	3CF26	CF26/3-L	82	0.3	SW	2,080	682	1,190	0.6	$ 237.30	$ 81.00	$0	0.3	0.3
55	MENS BR	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	2080	391	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	2,080	391	-	-	$ -	$ -	$0		
127	STAIRWELL	1	DC 75 C I 3	I75/3	225	0.2	SW	2080	468	1	3CF26	CF26/3-L	82	0.1	SW	2,080	171	297	0.1	$ 59.33	$ 20.25	$0	0.3	0.3
55	TOWN CLERK'S OFFICE	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	2080	196	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	2,080	196	-	-	$ -	$ -	$0		
35	TOWN CLERK'S OFFICE	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2080	562	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2,080	562	-	-	$ -	$ -	$0		
38	VAULT	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2080	125	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2,080	125	-	-	$ -	$ -	$0		
35	HALL	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2080	187	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2,080	187	-	-	$ -	$ -	$0		
55	REAR OFFICE	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	2080	391	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	2,080	391	-	-	$ -	$ -	$0		
4	REAR OFFICE	2	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2080	300	2	2T 17 R F 2 (ELE)	F22ILL	33	0.1	SW	2,080	137	162	0.1	$ 32.36	$ 202.50	$20	6.3	5.6
35	ACCOUNTING OFFICE	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2080	749	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2,080	749	-	-	$ -	$ -	$0		
35	ACCOUNTING OFFICE	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2080	374	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2,080	374	-	-	$ -	$ -	$0		
38	ACCOUNTING OFFICE 2	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2080	125	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2,080	125	-	-	$ -	$ -	$0		
55	ELEVATOR ROOM	10	2T 17 R F 3 (ELE)	F23ILL	47	0.5	SW	2080	978	10	2T 17 R F 3 (ELE)	F23ILL	47	0.5	SW	2,080	978	-	-	$ -	$ -	$0		
206	ELEVATOR ROOM	1	S 96 C F 1 (MAG)	F81EHL	80	0.1	SW	2080	166	1	S 96 C F 1 (MAG)	F81EHL	80	0.1	SW	2,080	166	-	-	$ -	$ -	$0		
38	ELEVATOR ROOM	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2080	250	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2,080	250	-	-	$ -	$ -	$0		
35	CENTRAL OFFICE	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2080	374	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2,080	374	-	-	$ -	$ -	$0		
35	CENTRAL OFFICE	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2080	374	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2,080	374	-	-	$ -	$ -	$0		
127	MAYORS OFFICE	2	DC 75 C I 3	I75/3	225	0.5	SW	2080	936	2	3CF26	CF26/3-L	82	0.2	SW	2,080	341	595	0.3	$ 118.65	$ 40.50	$0	0.3	0.3
127	MAYORS OFFICE	2	DC 75 C I 3	I75/3	225	0.5	SW	2080	936	2	3CF26	CF26/3-L	82	0.2	SW	2,080	341	595	0.3	$ 118.65	$ 40.50	$0	0.3	0.3
81	ELEVATOR ROOM	1	S 34 C F 2	F42EE	72	0.1	SW	2080	150	1	S 28 C F 2	F42SSILL	48	0.0	SW	2,080	100	50	0.0	$ 9.96	$ 106.25	$10	10.7	9.7
15	2ND FLOOR FLAG POLE RM	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2080	624	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2,080	624	-	-	$ -	$ -	$0		
38	2ND FL VESTIBULE	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2080	250	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2,080	250	-	-	$ -	$ -	$0		
35	VIOLATIONS DEPT	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2080	1,123	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2,080	1,123	-	-	$ -	$ -	$0		
35	VIOLATIONS DEPT 2	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2080	749	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2,080	749	-	-	$ -	$ -	$0		
35	JUDGES CHAMBERS	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2080	749	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2,080	749	-	-	$ -	$ -	$0		
223	COURT ROOM	3	4B 33 R F 6	F46ILL	175	0.5	SW	2080	1,092	3	4B 33 R F 6	F46ILL	175	0.5	SW	2,080	1,092	-	-	$ -	$ -	$0		
127	LOBBY	1	DC 75 C I 3	I75/3	225	0.2	Breaker	2080	468	1	3CF26	CF26/3-L	82	0.1	Breaker	2,080	171	297	0.1	$ 59.33	$ 20.25	$0	0.3	0.3
X1	LOBBY	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	2080	3	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	2,080	3	-	-	$ -	$ -	$0		
55	WOMENS BR	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	2080	587	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	2,080	587	-	-	$ -	$ -	$0		
127	2ND FLOOR LAWYERS CHAMBERS	4	DC 75 C I 3	I75/3	225	0.9	SW	2080	1,872	4	3CF26	CF26/3-L	82	0.3	SW	2,080	682	1,190	0.6	$ 237.30	$ 81.00	$0	0.3	0.3
71	LAWYERS CHAMBERS CLOSET	1	I 60	I60/1	60	0.1	SW	2080	125	1	CF 26	CFQ26/1-L	27	0.0	SW	2,080	56	69	0.0	$ 13.69	$ 6.25	$0	0.5	0.5
204	RECORD STORAGE/ATTIC	4	S 96 C F 2 (MAG) 8'	F82EHE	207	0.8	SW	2080	1,722	4	S 96 C F 2 (MAG) 8'	F82EHE	207	0.8	SW	2,080	1,722	-	-	$ -	$ -	$0		
X1	RECORD STORAGE/ATTIC	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	2080	3	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	2,080	3	-	-	$ -	$ -	$0		
71	ATTIC SIDE STORAGE	3	I 60	I60/1	60	0.2	SW	2080	374	3	CF 26	CFQ26/1-L	27	0.1	SW	2,080	168	206	0.1	$ 41.07	$ 18.75	$0	0.5	0.5
204	ATTIC FRONT STORAGE	2	S 96 C F 2 (MAG) 8'	F82EHE	207	0.4	SW	2080	861	2	S 96 C F 2 (MAG) 8'	F82EHE	207	0.4	SW	2,080	861	-	-	$ -	$ -	$0		
204	ATTIC COMP STORAGE	1	S 96 C F 2 (MAG) 8'	F82EHE	207	0.2	SW	2080	431	1	S 96 C F 2 (MAG) 8'	F82EHE	207	0.2	SW	2,080	431	-	-	$ -	$ -	$0		
X1	ATTIC COMP STORAGE	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	2080	3	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	2,080	3	-	-	$ -	$ -	$0		
204	ATTIC RIGHT SIDE STORAGE	2	S 96 C F 2 (MAG) 8'	F82EHE	207	0.4	SW	2080	861	2	S 96 C F 2 (MAG) 8'	F82EHE	207	0.4	SW	2,080	861	-	-	$ -	$ -	$0		
217	ATTIC BACK RIGHT VOILATIONS	1	W 32 C F 4 (ELE)	F44ILL/2	118	0.1	SW	2080	245	1	W 32 C F 4 (ELE)	F44ILL/2	118	0.1	SW	2,080	245	-	-	$ -	$ -	$0		
29	ATTIC BACK RIGHT VOILATIONS	1	CR 32 C F 1	FC32/1	40	0.0	SW	2080	83	1	CR 32 C F 1	FC32/1	40	0.0	SW	2,080	83	-	-	$ -	$ -	$0		
	Total	**234**				**18.6**			**41,583**	**234**			**6,458**	**16**				**36,441**	**5,142**	**2.5**	**$1,031**	**$1,079**	**$70**		
																		Demand Savings			**2.5**	**$389**			
																		kWh Savings			**5,142**	**3642**			
																		Total savings				**$1,031**		**1.0**	**1.0**

APPENDIX G

ECM-6 Install Occupancy Sensors

Energy Audit of Kearny, NJ
CHA Project No. 20711 - Town Hall
ECM-6 Install Occupancy Sensors

0 $0.125 $/kWh
$12.94 $/kW

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA 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 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 annual 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)	(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
69	TOWN HALL SIGN LIGHT	1	175 MH GROUND	MH175/1	215	0.2	SW	4368	939.1	1	175 MH GROUND	MH175/1	215	0.2	None	4368	939.1	0.0	0.0	$0.00	$0.00	$0.00		
146	TOWN HALL SIGN LIGHT	2	MH 400 POLE	MH400/1	458	0.9	SW	4368	4,001.1	2	MH 400 POLE	MH400/1	458	0.9	None	4368	4,001.1	0.0	0.0	$0.00	$0.00	$0.00		
146	REAR PARKING LOT RIGHT SIDE	1	MH 400 POLE	MH400/1	458	0.5	SW	4368	2,000.5	1	MH 400 POLE	MH400/1	458	0.5	None	4368	2,000.5	0.0	0.0	$0.00	$0.00	$0.00		
146	REAR PARKING LOT LEFT SIDE	1	MH 400 POLE	MH400/1	458	0.5	SW	4368	2,000.5	1	MH 400 POLE	MH400/1	458	0.5	None	4368	2,000.5	0.0	0.0	$0.00	$0.00	$0.00		
70	BOILER ROOM	3	W 32 C F 1	F41LL	32	0.1	SW	1000	96.0	3	W 32 C F 1	F41LL	32	0.1	None	1000	96.0	0.0	0.0	$0.00	$0.00	$0.00		
46	BOILER ROOM	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	W 32 C F 2 (ELE)	F42LL	60	0.1	None	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		
175	BOILER ROOM	1	S 25 C F 1 (MAG) SINK LIGHT	F31EE	38	0.0	SW	1000	38.0	1	S 25 C F 1 (MAG) SINK LIGHT	F31EE	38	0.0	None	1000	38.0	0.0	0.0	$0.00	$0.00	$0.00		
199	VENTILATION ROOM	5	W 32 W F 1 (ELE)	F41LL	32	0.2	SW	1000	160.0	5	W 32 W F 1 (ELE)	F41LL	32	0.2	None	1000	160.0	0.0	0.0	$0.00	$0.00	$0.00		
108	BASEMENT HALLWAY	2	I 65	I65/1	65	0.1	SW	1820	236.6	2	I 65	I65/1	65	0.1	None	1820	236.6	0.0	0.0	$0.00	$0.00	$0.00		
55	BASEMENT HALLWAY	3	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1820	256.6	3	2T 17 R F 3 (ELE)	F23ILL	47	0.1	None	1820	256.6	0.0	0.0	$0.00	$0.00	$0.00		
X1	CENTRAL CORR.	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	1820	5.5	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	None	1820	5.5	0.0	0.0	$0.00	$0.00	$0.00		
55	CENTRAL CORR.	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1820	171.1	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	None	1820	171.1	0.0	0.0	$0.00	$0.00	$0.00		
4	CENTRAL CORR.	1	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1820	131.0	1	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	None	1820	131.0	0.0	0.0	$0.00	$0.00	$0.00		
55	CENTRAL CORR.	7	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	1820	598.8	7	2T 17 R F 3 (ELE)	F23ILL	47	0.3	None	1820	598.8	0.0	0.0	$0.00	$0.00	$0.00		
55	CENTRAL CORR.	3	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1820	256.6	3	2T 17 R F 3 (ELE)	F23ILL	47	0.1	None	1820	256.6	0.0	0.0	$0.00	$0.00	$0.00		
4	CENTRAL CORR.	1	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1820	131.0	1	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	None	1820	131.0	0.0	0.0	$0.00	$0.00	$0.00		
4	BATHROOM CORR.	2	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1820	262.1	2	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	None	1820	262.1	0.0	0.0	$0.00	$0.00	$0.00		
55	BATHROOM CORR.	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	1820	85.5	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	None	1820	85.5	0.0	0.0	$0.00	$0.00	$0.00		
55	KITCHEN	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	1820	513.2	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	None	1820	513.2	0.0	0.0	$0.00	$0.00	$0.00		
55	TAX OFFICE	12	2T 17 R F 3 (ELE)	F23ILL	47	0.6	SW	1820	1,026.5	12	2T 17 R F 3 (ELE)	F23ILL	47	0.6	None	1820	1,026.5	0.0	0.0	$0.00	$0.00	$0.00		
55	TAX OFFICE	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	1820	342.2	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	None	1820	342.2	0.0	0.0	$0.00	$0.00	$0.00		
108	ELEVATOR ROOM	1	I 65	I65/1	65	0.1	SW	1820	118.3	1	I 65	I65/1	65	0.1	None	1820	118.3	0.0	0.0	$0.00	$0.00	$0.00		
38	TAX ASSESSORS	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1950	234.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	900	108.0	126.0	0.0	$15.72	$118.75	$40.00	7.6	5.0
219	HANDICAP VEST.	10	S 17 C F 1(ELE)	F21ILL	20	0.2	SW	2080	416.0	10	S 17 C F 1(ELE)	F21ILL	20	0.2	None	2080	416.0	0.0	0.0	$0.00	$0.00	$0.00		
63	HANDICAP VEST. ELEV.	8	S 32 R F 1	F41LL	32	0.3	SW	2080	532.5	8	S 32 R F 1	F41LL	32	0.3	None	2080	532.5	0.0	0.0	$0.00	$0.00	$0.00		
55	DEPT. OF FINANCE & PATROLL	8	2T 17 R F 3 (ELE)	F23ILL	47	0.4	SW	1820	684.3	8	2T 17 R F 3 (ELE)	F23ILL	47	0.4	None	1820	684.3	0.0	0.0	$0.00	$0.00	$0.00		
55	FINANCE/ TAX VAULT CORR.	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1820	171.1	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	None	1820	171.1	0.0	0.0	$0.00	$0.00	$0.00		
46	FINANCE/ TAX VAULT CORR.	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1820	109.2	1	W 32 C F 2 (ELE)	F42LL	60	0.1	None	1820	109.2	0.0	0.0	$0.00	$0.00	$0.00		
46	FINANCE/ TAX VAULT CORR.	2	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1820	218.4	2	W 32 C F 2 (ELE)	F42LL	60	0.1	None	1820	218.4	0.0	0.0	$0.00	$0.00	$0.00		
55	TAX COLLECTOR OFFICE	11	2T 17 R F 3 (ELE)	F23ILL	47	0.5	SW	1820	940.9	11	2T 17 R F 3 (ELE)	F23ILL	47	0.5	None	1820	940.9	0.0	0.0	$0.00	$0.00	$0.00		
46	TAX COLLECTOR OFFICE	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1820	109.2	1	W 32 C F 2 (ELE)	F42LL	60	0.1	None	1820	109.2	0.0	0.0	$0.00	$0.00	$0.00		
38	TAX OFFICE #1	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1820	218.4	2	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	800	96.0	122.4	0.0	$15.28	$118.75	$20.00	7.8	6.5
55	TAX STORAGE	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	1820	342.2	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	C-OCC	800	150.4	191.8	0.0	$23.93	$187.50	$35.00	7.8	6.4
55	MENS BR	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	2080	97.8	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	C-OCC	1000	47.0	50.8	0.0	$6.33	$187.50	$35.00	29.6	24.1
199	MENS BR	1	W 32 W F 1 (ELE)	F41LL	32	0.0	SW	2080	66.6	1	W 32 W F 1 (ELE)	F41LL	32	0.0	None	2080	66.6	0.0	0.0	$0.00	$0.00	$0.00		
55	WOMENS BR	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	2080	97.8	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	C-OCC	1000	47.0	50.8	0.0	$6.33	$187.50	$35.00	29.6	24.1
199	WOMENS BR	1	W 32 W F 1 (ELE)	F41LL	32	0.0	SW	2080	66.6	1	W 32 W F 1 (ELE)	F41LL	32	0.0	None	2080	66.6	0.0	0.0	$0.00	$0.00	$0.00		
55	Utility Room	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	1000	47.0	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	OCC	250	11.8	35.3	0.0	$4.40	$118.75	$20.00	27.0	22.4
199	COMM ROOM	1	W 32 W F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	W 32 W F 1 (ELE)	F41LL	32	0.0	None	1000	32.0	0.0	0.0	$0.00	$0.00	$0.00		
35	RECREATION OFFICE	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1820	982.8	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	None	1820	982.8	0.0	0.0	$0.00	$0.00	$0.00		
35	CFO'S OFFICE	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	1820	655.2	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	None	1820	655.2	0.0	0.0	$0.00	$0.00	$0.00		
X1	FRONT ENTRANCE	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2080	3.1	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	None	2080	3.1	0.0	0.0	$0.00	$0.00	$0.00		
127	FIRST FLOOR CENTRAL	4	DC 75 C I 3	I75/3	225	0.9	SW	2080	1,872.0	4	DC 75 C I 3	I75/3	225	0.9	None	2080	1,872.0	0.0	0.0	$0.00	$0.00	$0.00		
55	MENS BR	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	2080	391.0	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	None	2080	391.0	0.0	0.0	$0.00	$0.00	$0.00		
127	STAIRWELL	1	DC 75 C I 3	I75/3	225	0.2	SW	2080	468.0	1	DC 75 C I 3	I75/3	225	0.2	None	2080	468.0	0.0	0.0	$0.00	$0.00	$0.00		
55	TOWN CLERK'S OFFICE	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	2080	195.5	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	None	2080	195.5	0.0	0.0	$0.00	$0.00	$0.00		
35	TOWN CLERK'S OFFICE	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2080	561.6	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	None	2080	561.6	0.0	0.0	$0.00	$0.00	$0.00		
38	VAULT	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2080	124.8	1	T 32 R F 2 (ELE)	F42LL	60	0.1	None	2080	124.8	0.0	0.0	$0.00	$0.00	$0.00		
35	HALL	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2080	187.2	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	None	2080	187.2	0.0	0.0	$0.00	$0.00	$0.00		
55	REAR OFFICE	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	2080	391.0	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	None	2080	391.0	0.0	0.0	$0.00	$0.00	$0.00		
4	REAR OFFICE	2	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2080	299.5	2	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	None	2080	299.5	0.0	0.0	$0.00	$0.00	$0.00		
35	ACCOUNTING OFFICE	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2080	748.8	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	None	2080	748.8	0.0	0.0	$0.00	$0.00	$0.00		
35	ACCOUNTING OFFICE	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2080	374.4	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	2080	374.4	0.0	0.0	$0.00	$0.00	$0.00		
38	ACCOUNTING OFFICE 2	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2080	124.8	1	T 32 R F 2 (ELE)	F42LL	60	0.1	None	2080	124.8	0.0	0.0	$0.00	$0.00	$0.00		
55	ELEVATOR ROOM	10	2T 17 R F 3 (ELE)	F23ILL	47	0.5	SW	2080	977.6	10	2T 17 R F 3 (ELE)	F23ILL	47	0.5	None	2080	977.6	0.0	0.0	$0.00	$0.00	$0.00		
206	ELEVATOR ROOM	1	S 96 C F 1 (MAG)	F81EHL	80	0.1	SW	2080	166.4	1	S 96 C F 1 (MAG)	F81EHL	80	0.1	None	2080	166.4	0.0	0.0	$0.00	$0.00	$0.00		
38	ELEVATOR ROOM	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2080	249.6	2	T 32 R F 2 (ELE)	F42LL	60	0.1	None	2080	249.6	0.0	0.0	$0.00	$0.00	$0.00		
35	CENTRAL OFFICE	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2080	374.4	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	2080	374.4	0.0	0.0	$0.00	$0.00	$0.00		
35	CENTRAL OFFICE	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2080	374.4	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	2080	374.4	0.0	0.0	$0.00	$0.00	$0.00		
127	MAYORS OFFICE	2	DC 75 C I 3	I75/3	225	0.5	SW	2080	936.0	2	DC 75 C I 3	I75/3	225	0.5	None	2080	936.0	0.0	0.0	$0.00	$0.00	$0.00		
127	MAYORS OFFICE	2	DC 75 C I 3	I75/3	225	0.5	SW	2080	936.0	2	DC 75 C I 3	I75/3	225	0.5	None	2080	936.0	0.0	0.0	$0.00	$0.00	$0.00		
81	ELEVATOR ROOM	1	S 34 C F 2	F42EE	72	0.1	SW	2080	149.8	1	S 34 C F 2	F42EE	72	0.1	None	2080	149.8	0.0	0.0	$0.00	$0.00	$0.00		
15	2ND FLOOR FLAG POLE RM	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2080	624.0	5	S 32 C F 2 (ELE)	F42LL	60	0.3	None	2080	624.0	0.0	0.0	$0.00	$0.00	$0.00		
38	2ND FL VESTIBULE	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2080	249.6	2	T 32 R F 2 (ELE)	F42LL	60	0.1	None	2080	249.6	0.0	0.0	$0.00	$0.00	$0.00		
35	VIOLATIONS DEPT	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2080	1,123.2	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	None	2080	1,123.2	0.0	0.0	$0.00	$0.00	$0.00		
35	VIOLATIONS DEPT 2	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2080	748.8	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	C-OCC	1000	360.0	388.8	0.0	$48.52	$187.50	$35.00	3.9	3.1
35	JUDGES CHAMBERS	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2080	748.8	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	C-OCC	1000	360.0	388.8	0.0	$48.52	$187.50	$35.00	3.9	3.1
223	COURT ROOM	3	4B 33 R F 6	F46ILL	175	0.5	SW	2080	1,092.0	3	4B 33 R F 6	F46ILL	175	0.5	None	2080	1,092.0	0.0	0.0	$0.00	$0.00	$0.00		
127	LOBBY	1	DC 75 C I 3	I75/3	225	0.2	Breaker	2080	468.0	1	DC 75 C I 3	I75/3	225	0.2	None	2080	468.0	0.0	0.0	$0.00	$0.00	$0.00		
X1	LOBBY	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	2080	3.1	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	None	2080	3.1	0.0	0.0	$0.00	$0.00	$0.00		
55	WOMENS BR	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	2080	586.6	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	None	2080	586.6	0.0	0.0	$0.00	$0.00	$0.00		
127	2ND FLOOR LAWYERS CHAMBERS	4	DC 75 C I 3	I75/3	225	0.9	SW	2080	1,872.0	4	DC 75 C I 3	I75/3	225	0.9	C-OCC	1000	900.0	972.0	0.0	$121.31	$187.50	$35.00	1.5	1.3
71	LAWYERS CHAMBERS CLOSET	1	I 60	I60/1	60	0.1	SW	2080	124.8	1	I 60	I60/1	60	0.1	None	2080	124.8	0.0	0.0	$0.00	$0.00	$0.00		
204	RECORD STORAGE/ATTIC	4	S 96 C F 2 (MAG) 8'	F82EHE	207	0.8	SW	2080	1,722.2	4	S 96 C F 2 (MAG) 8'	F82EHE	207	0.8	None	2080	1,722.2	0.0	0.0	$0.00	$0.00	$0.00		
X1	RECORD STORAGE/ATTIC	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	2080	3.1	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	None	2080	3.1	0.0	0.0	$0.00	$0.00	$0.00		
71	ATTIC SIDE STORAGE	3	I 60	I60/1	60	0.2	SW	2080	374.4	3	I 60	I60/1	60	0.2	None	2080	374.4	0.0	0.0	$0.00	$0.00	$0.00		
204	ATTIC FRONT STORAGE	2	S 96 C F 2 (MAG) 8'	F82EHE	207	0.4	SW	2080	861.1	2	S 96 C F 2 (MAG) 8'	F82EHE	207	0.4	None	2080	861.1	0.0	0.0	$0.00	$0.00	$0.00		
204	ATTIC COMP STORAGE	1	S 96 C F 2 (MAG) 8'	F82EHE	207	0.2	SW	2080	430.6	1	S 96 C F 2 (MAG) 8'	F82EHE	207	0.2	None	2080	430.6	0.0	0.0	$0.00	$0.00	$0.00		
X1	ATTIC COMP STORAGE	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	2080	3.1	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	None	2080	3.1	0.0	0.0	$0.00	$0.00	$0.00		
204	ATTIC RIGHT SIDE STORAGE	2	S 96 C F 2 (MAG) 8'	F82EHE	207	0.4	SW	2080	861.1	2	S 96 C F 2 (MAG) 8'	F82EHE	207	0.4	None	2080	861.1	0.0	0.0	$0.00	$0.00	$0.00		
217	ATTIC BACK RIGHT VOILATIONS	1	W 32 C F 4 (ELE)	F44ILL/2	118	0.1	SW	2080	245.4	1	W 32 C F 4 (ELE)	F44ILL/2	118	0.1	None	2080	245.4	0.0	0.0	$0.00	$0.00	$0.00		
29	ATTIC BACK RIGHT VOILATIONS	1	CR 32 C F 1	FC32/1	40	0.0	SW	2080	83.2	1	CR 32 C F 1	FC32/1	40	0.0	None	2080	83.2	0.0	0.0	$0.00	$0.00	$0.00		
	Total	**234**				**16.6**			**41,583**	**234**				**19**				**39,257**	**2,327**	**0**	**290**	**$1,461**	**290**		
																		Demand Savings		**0.0**	**$0**			
																		kWh Savings		**2,327**	**$290**			
																		Total Savings			**$290**		**5.1**	**4.1**

APPENDIX H

ECM-7 Lighting Replacements with Occupancy Sensors

Energy Audit of Kearny, NJ

CHA Project No. 20711 - Town Hall 0 $0.125 $/kWh

ECM-7 Lighting Replacements with Occupancy Sensors $12.94 $/kW

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA 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 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
69	TOWN HALL SIGN LIGHT	1	175 MH GROUND	MH175/1	215	0.2	SW	4368	939	1	175 MH GROUND	MH175/1	215	0.2	None	4,368	939	-	-	$ -	$ -	$ -		
146	TOWN HALL SIGN LIGHT	2	MH 400 POLE	MH400/1	458	0.9	SW	4368	4,001	2	MH 400 POLE	MH400/1	458	0.9	None	4,368	4,001	-	-	$ -	$ -	$ -		
146	REAR PARKING LOT RIGHT SIDE	1	MH 400 POLE	MH400/1	458	0.5	SW	4368	2,001	1	MH 400 POLE	MH400/1	458	0.5	None	4,368	2,001	-	-	$ -	$ -	$ -		
146	REAR PARKING LOT LEFT SIDE	1	MH 400 POLE	MH400/1	458	0.5	SW	4368	2,001	1	MH 400 POLE	MH400/1	458	0.5	None	4,368	2,001	-	-	$ -	$ -	$ -		
70	BOILER ROOM	3	W 32 C F 1	F41LL	32	0.1	SW	1000	96	3	W 32 C F 1	F41LL	32	0.1	None	1,000	96	-	-	$ -	$ -	$ -		
46	BOILER ROOM	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	W 32 C F 2 (ELE)	F42LL	60	0.1	None	1,000	60	-	-	$ -	$ -	$ -		
175	BOILER ROOM	1	S 25 C F 1 (MAG) SINK LIGHT	F31EE	38	0.0	SW	1000	38	1	S 25 C F 1 (MAG) SINK LIGHT	F31EE	38	0.0	None	1,000	38	-	-	$ -	$ -	$ -		
199	VENTILATION ROOM	5	W 32 W F 1 (ELE)	F41LL	32	0.2	SW	1000	160	5	W 32 W F 1 (ELE)	F41LL	32	0.2	None	1,000	160	-	-	$ -	$ -	$ -		
108	BASEMENT HALLWAY	2	I 65	I65/1	65	0.1	SW	1820	237	2	CF 26	CFQ26/1-L	38	0.1	None	1,820	98	138	0.1	$ 29.06	$ -	$ -	0.0	0.0
55	BASEMENT HALLWAY	3	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1820	257	3	2T 17 R F 3 (ELE)	F23ILL	32	0.1	None	1,820	257	-	-	$ -	$ -	$ -		
X1	CENTRAL CORR.	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	1820	5	2	X 1.5 W LED	ELED1.5/1	1.5	0.0	None	1,820	5	-	-	$ -	$ -	$ -		
55	CENTRAL CORR.	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1820	171	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	None	1,820	171	-	-	$ -	$ -	$ -		
4	CENTRAL CORR.	1	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1820	131	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	None	1,820	60	71	0.0	$ 14.91	$ 101.25	$ 10	6.8	6.1
55	CENTRAL CORR.	7	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	1820	599	7	2T 17 R F 3 (ELE)	F23ILL	47	0.3	None	1,820	599	-	-	$ -	$ -	$ -		
55	CENTRAL CORR.	3	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1820	257	3	2T 17 R F 3 (ELE)	F23ILL	47	0.1	None	1,820	257	-	-	$ -	$ -	$ -		
4	CENTRAL CORR.	1	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1820	131	1	2T 17 R F 2 (ELE)	F22ILL	33	0.0	None	1,820	60	71	0.0	$ 14.91	$ 101.25	$ 10	6.8	6.1
4	BATHROOM CORR.	2	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1820	262	2	2T 17 R F 2 (ELE)	F22ILL	33	0.1	None	1,820	120	142	0.1	$ 29.83	$ 202.50	$ 20	6.8	6.1
55	BATHROOM CORR.	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	1820	86	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	None	1,820	86	-	-	$ -	$ -	$ -		
55	KITCHEN	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	1820	513	6	2T 17 R F 3 (ELE)	F23ILL	60	0.3	None	1,820	513	-	-	$ -	$ -	$ -		
55	TAX OFFICE	12	2T 17 R F 3 (ELE)	F23ILL	47	0.6	SW	1820	1,026	12	2T 17 R F 3 (ELE)	F23ILL	60	0.6	None	1,820	1,026	-	-	$ -	$ 118.75	$ 20		
55	TAX OFFICE	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	1820	342	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	None	1,820	342	-	-	$ -	$ 187.50	$ 35		
108	ELEVATOR ROOM	1	I 65	I65/1	65	0.1	SW	1820	118	1	CF 26	CFQ26/1-L	47	0.0	None	1,820	49	69	0.0	$ 14.53	$ 187.50	$ 35	12.9	10.5
38	TAX ASSESSORS	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1950	234	2	T 32 R F 2 (ELE)	F42LL	32	0.1	OCC	900	108	126	-	$ 15.72	$ -	$ -	0.0	0.0
219	HANDICAP VEST.	10	S 17 C F 1(ELE)	F21ILL	20	0.2	SW	2080	416	10	S 17 C F 1(ELE)	F21ILL	47	0.2	None	2,080	416	-	-	$ -	$ 187.50	$ 35		
63	HANDICAP VEST. ELEV.	8	S 32 R F 1	F41LL	32	0.3	SW	2080	532	8	S 32 R F 1	F41LL	32	0.3	None	2,080	532	-	-	$ -	$ -	$ -		
55	DEPT. OF FINANCE & PATROLL	8	2T 17 R F 3 (ELE)	F23ILL	47	0.4	SW	1820	684	8	2T 17 R F 3 (ELE)	F23ILL	47	0.4	None	1,820	684	-	-	$ -	$ 118.75	$ 20		
55	FINANCE/ TAX VAULT CORR.	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	1820	171	2	2T 17 R F 3 (ELE)	F23ILL	32	0.1	None	1,820	171	-	-	$ -	$ -	$ -		
46	FINANCE/ TAX VAULT CORR.	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1820	109	1	W 32 C F 2 (ELE)	F42LL	48	0.1	None	1,820	109	-	-	$ -	$ 106.25	$ 10		
46	FINANCE/ TAX VAULT CORR.	2	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1820	218	2	W 32 C F 2 (ELE)	F42LL	60	0.1	None	1,820	218	-	-	$ -	$ -	$ -		
55	TAX COLLECTOR OFFICE	11	2T 17 R F 3 (ELE)	F23ILL	47	0.5	SW	1820	941	11	2T 17 R F 3 (ELE)	F23ILL	60	0.5	None	1,820	941	-	-	$ -	$ -	$ -		
46	TAX COLLECTOR OFFICE	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1820	109	1	W 32 C F 2 (ELE)	F42LL	60	0.1	None	1,820	109	-	-	$ -	$ -	$ -		
38	TAX OFFICE #1	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1820	218	2	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	800	96	122	-	$ 15.28	$ 118.75	$ 20	7.8	6.5
55	TAX STORAGE	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	1820	342	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	C-OCC	800	150	192	-	$ 23.93	$ 187.50	$ 35	7.8	6.4
55	MENS BR	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	2080	98	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	C-OCC	1,000	47	51	-	$ 6.33	$ 187.50	$ 35	29.6	24.1
199	MENS BR	1	W 32 W F 1 (ELE)	F41LL	32	0.0	SW	2080	67	1	W 32 W F 1 (ELE)	F41LL	32	0.0	None	2,080	67	-	-	$ -	$ -	$ -		
55	WOMENS BR	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	2080	98	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	C-OCC	1,000	47	51	-	$ 6.33	$ 187.50	$ 35	29.6	24.1
199	WOMENS BR	1	W 32 W F 1 (ELE)	F41LL	32	0.0	SW	2080	67	1	W 32 W F 1 (ELE)	F41LL	32	0.0	None	2,080	67	-	-	$ -	$ -	$ -		
55	Utility Room	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	SW	1000	47	1	2T 17 R F 3 (ELE)	F23ILL	47	0.0	OCC	250	12	35	-	$ 4.40	$ 118.75	$ 20	27.0	22.4
199	COMM ROOM	1	W 32 W F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	W 32 W F 1 (ELE)	F41LL	32	0.0	None	1,000	32	-	-	$ -	$ -	$ -		
35	RECREATION OFFICE	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	1820	983	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	None	1,820	983	-	-	$ -	$ -	$ -		
35	CFO'S OFFICE	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	1820	655	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	None	1,820	655	-	-	$ -	$ -	$ -		
X1	FRONT ENTRANCE	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	SW	2080	3	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	None	2,080	3	-	-	$ -	$ -	$ -		
127	FIRST FLOOR CENTRAL	4	DC 75 C I 3	I75/3	225	0.9	SW	2080	1,872	4	3CF26	CF26/3 L	82	0.3	None	2,080	682	1,190	0.6	$ 237.30	$ 81.00	$ -	0.3	0.3
55	MENS BR	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	2080	391	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	None	2,080	391	-	-	$ -	$ -	$ -		
127	STAIRWELL	1	DC 75 C I 3	I75/3	225	0.2	SW	2080	468	1	3CF26	CF26/3-L	82	0.1	None	2,080	171	297	0.1	$ 59.33	$ 20.25	$ -	0.3	0.3
55	TOWN CLERK'S OFFICE	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	SW	2080	196	2	2T 17 R F 3 (ELE)	F23ILL	47	0.1	None	2,080	196	-	-	$ -	$ -	$ -		
35	TOWN CLERK'S OFFICE	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2080	562	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	None	2,080	562	-	-	$ -	$ -	$ -		
38	VAULT	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2080	125	1	T 32 R F 2 (ELE)	F42LL	60	0.1	None	2,080	125	-	-	$ -	$ -	$ -		
35	HALL	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	2080	187	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	None	2,080	187	-	-	$ -	$ -	$ -		
55	REAR OFFICE	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	SW	2080	391	4	2T 17 R F 3 (ELE)	F23ILL	47	0.2	None	2,080	391	-	-	$ -	$ -	$ -		
4	REAR OFFICE	2	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2080	300	2	2T 17 R F 2 (ELE)	F22ILL	33	0.1	None	2,080	137	162	0.1	$ 32.36	$ 202.50	$ 20	6.3	5.6
35	ACCOUNTING OFFICE	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2080	749	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	None	2,080	749	-	-	$ -	$ -	$ -		
35	ACCOUNTING OFFICE	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2080	374	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	2,080	374	-	-	$ -	$ -	$ -		
38	ACCOUNTING OFFICE 2	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2080	125	1	T 32 R F 2 (ELE)	F42LL	60	0.1	None	2,080	125	-	-	$ -	$ -	$ -		
55	ELEVATOR ROOM	10	2T 17 R F 3 (ELE)	F23ILL	47	0.5	SW	2080	978	10	2T 17 R F 3 (ELE)	F23ILL	47	0.5	None	2,080	978	-	-	$ -	$ -	$ -		
206	ELEVATOR ROOM	1	S 96 C F 1 (MAG)	F81EHL	80	0.1	SW	2080	166	1	S 96 C F 1 (MAG)	F81EHL	80	0.1	None	2,080	166	-	-	$ -	$ -	$ -		
38	ELEVATOR ROOM	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2080	250	2	T 32 R F 2 (ELE)	F42LL	60	0.1	None	2,080	250	-	-	$ -	$ -	$ -		
35	CENTRAL OFFICE	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2080	374	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	2,080	374	-	-	$ -	$ -	$ -		
35	CENTRAL OFFICE	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2080	374	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	2,080	374	-	-	$ -	$ -	$ -		
127	MAYORS OFFICE	2	DC 75 C I 3	I75/3	225	0.5	SW	2080	936	2	3CF26	CF26/3-L	82	0.2	None	2,080	341	595	0.3	$ 118.65	$ 40.50	$ -	0.3	0.3
127	MAYORS OFFICE	2	DC 75 C I 3	I75/3	225	0.5	SW	2080	936	2	3CF26	CF26/3-L	82	0.2	None	2,080	341	595	0.3	$ 118.65	$ 40.50	$ -	0.3	0.3
81	ELEVATOR ROOM	1	S 34 C F 2	F42EE	72	0.1	SW	2080	150	1	S 28 C F 2	F42SSILL	48	0.0	None	2,080	100	50	0.0	$ 9.96	$ 106.25	$ 10	10.7	9.7
16	2ND FLOOR FLAG POLE RM	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	2080	624	5	S 32 C F 2 (ELE)	F42LL	60	0.3	None	2,080	624	-	-	$ -	$ -	$ -		
38	2ND FL VESTIBULE	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2080	250	2	T 32 R F 2 (ELE)	F42LL	60	0.1	None	2,080	250	-	-	$ -	$ -	$ -		
35	VIOLATIONS DEPT	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2080	1,123	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	None	2,080	1,123	-	-	$ -	$ -	$ -		
35	VIOLATIONS DEPT 2	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2080	749	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	C-OCC	1,000	360	389	-	$ 48.52	$ 187.50	$ 35	3.9	3.1
35	JUDGES CHAMBERS	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2080	749	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	C-OCC	1,000	360	389	-	$ 48.52	$ 187.50	$ 35	3.9	3.1
223	COURT ROOM	3	4B 33 R F 6	F46ILL	175	0.5	SW	2080	1,092	3	4B 33 R F 6	F46ILL	175	0.5	None	2,080	1,092	-	-	$ -	$ -	$ -		
127	LOBBY	1	DC 75 C I 3	I75/3	225	0.2	Breaker	2080	468	1	3CF26	CF26/3-L	82	0.1	None	2,080	171	297	0.1	$ 59.33	$ 20.25	$ -	0.3	0.3
X1	LOBBY	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	2080	3	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	None	2,080	3	-	-	$ -	$ -	$ -		
55	WOMENS BR	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	SW	2080	587	6	2T 17 R F 3 (ELE)	F23ILL	47	0.3	None	2,080	587	-	-	$ -	$ -	$ -		
127	2ND FLOOR LAWYERS CHAMBERS	4	DC 75 C I 3	I75/3	225	0.9	SW	2080	1,872	4	3CF26	CF26/3-L	82	0.3	C-OCC	1,000	328	1,544	0.6	$ 281.51	$ 268.50	$ 35	1.0	0.8
71	LAWYERS CHAMBERS CLOSET	1	I 60	I60/1	60	0.1	SW	2080	125	1	CF 26	CFQ26/1-L	27	0.0	None	2,080	56	69	0.0	$ 13.69	$ 6.25	$ -	0.5	0.5
204	RECORD STORAGE/ATTIC	4	S 96 C F 2 (MAG) 8'	F82EHE	207	0.8	SW	2080	1,722	4	S 96 C F 2 (MAG) 8'	F82EHE	207	0.8	None	2,080	1,722	-	-	$ -	$ -	$ -		
X1	RECORD STORAGE/ATTIC	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	2080	3	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	None	2,080	3	-	-	$ -	$ -	$ -		
71	ATTIC SIDE STORAGE	3	I 60	I60/1	60	0.2	SW	2080	374	3	CF 26	CFQ26/1-L	27	0.1	None	2,080	168	206	0.1	$ 41.07	$ 18.75	$ -	0.5	0.5
204	ATTIC FRONT STORAGE	2	S 96 C F 2 (MAG) 8'	F82EHE	207	0.4	SW	2080	861	2	S 96 C F 2 (MAG) 8'	F82EHE	207	0.4	None	2,080	861	-	-	$ -	$ -	$ -		
204	ATTIC COMP STORAGE	1	S 96 C F 2 (MAG) 8'	F82EHE	207	0.2	SW	2080	431	1	S 96 C F 2 (MAG) 8'	F82EHE	207	0.2	None	2,080	431	-	-	$ -	$ -	$ -		
X1	ATTIC COMP STORAGE	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	2080	3	1	X 1.5 W LED	ELED1.5/1	1.5	0.0	None	2,080	3	-	-	$ -	$ -	$ -		
204	ATTIC RIGHT SIDE STORAGE	2	S 96 C F 2 (MAG) 8'	F82EHE	207	0.4	SW	2080	861	2	S 96 C F 2 (MAG) 8'	F82EHE	207	0.4	None	2,080	861	-	-	$ -	$ -	$ -		
217	ATTIC BACK RIGHT VOILATIONS	1	W 32 C F 4 (ELE)	F44ILL/2	118	0.1	SW	2080	245	1	W 32 C F 4 (ELE)	F44ILL/2	118	0.1	None	2,080	245	-	-	$ -	$ -	$ -		
29	ATTIC BACK RIGHT VOILATIONS	1	CR 32 C F 1	FC32/1	40	0.0	SW	2080	83	1	CR 32 C F 1	FC32/1	40	0.0	None	2,080	83	-	-	$ -	$ -	$ -		
	Total	234				16.6			41,563	234				16.1			34,732		2.5	1,244	3,291	475		
																	Demand Savings			2.5	$389			
																	kWh Savings			6,851	$855			
																	Total Savings				$1,244		2.6	2.3

APPENDIX I

New Jersey Pay For Performance Incentive Program

Kearny NJ
CHA #20711
Building: Town Hall

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per January, 2010. Building must have a minimum average electric demand of 200 kW. This minimum is waived for buildings owned by local governements or non-profit organizations.
The incentive values represented below are applicable through December 31, 2010.

	Annual Utilities	
	kWh	Therms
Existing Usage (from utility)	203,840	4,770
Proposed Savings	33,950	-3,410
Existing Total MMBtus	1,173	
Proposed Savings MMBtus	-225	
% Reduction	-19.2%	
Proposed Annual Savings	$8,640	

	≥ %15 - < 20%	
	$/kWh	$/therm
Incentive #2	$0.11	$1.10
Incentive #3	$0.07	$0.70

	≥ 20%	
	$/kWh	$/therm
Incentive #2	$0.22	$2.20
Incentive #3	$0.14	$1.40

	Incentives $		
	Elec	Gas	Total
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Totals	**$0**	**$0**	**$0**

Total Project Cost	$48,700
% Incentives of Project Cost*	0.0%
Project Cost w/ Incentives*	$48,700

Project Payback (years)	
w/o Incentives	w/ Incentives
5.6	5.6

* Maximum allowable incentive is 80% of total project cost, or
$2 million per gas account and $2 million per electric account

APPENDIX J

Photovoltaic (PV) Rooftop Solar Power Generation

PVWatts * * * AC Energy & Cost Savings

Cautions for Interpreting the Results

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	45.0 kW
DC to AC Derate Factor:	0.770
AC Rating:	34.6 kW
Array Type:	Fixed Tilt
Array Tilt:	40.7°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	16.1 ¢/kWh

Results

Month	Solar Radiation (kWh/m²/day)	AC Energy (kWh)	Energy Value ($)
1	3.36	3725	601.59
2	4.05	4022	649.55
3	4.58	4880	788.12
4	4.84	4769	770.19
5	5.30	5254	848.52
6	5.33	4956	800.39
7	5.27	5005	808.31
8	5.25	4952	799.75
9	5.06	4804	775.85
10	4.46	4525	730.79
11	3.15	3229	521.48
12	2.87	3114	502.91
Year	4.46	53235	8597.45

Output Hourly Performance Data * Output Results as Text

About the Hourly Performance Data Saving Text from a Browser

Run PVWATTS v.1 for another US location or an International location
Run PVWATTS v.2 (US only)

Please send questions and comments regarding PVWATTS to Webmaster

Disclaimer and copyright notice

Cautions for Interpreting the Results

The monthly and yearly energy production are modeled using the PV system parameters you selected and weather data that are typical or representative of long-term averages. For reference, or comparison with local information, the solar radiation values modeled for the PV array are included in the performance results.

Because weather patterns vary from year-to-year, the values in the tables are better indicators of long-term performance than performance for a particular month or year. PV performance is largely proportional to the amount of solar radiation received, which may vary from the long-term average by ± 30% for monthly values and ± 10% for yearly values. How the solar radiation might vary for your location may be evaluated by examining the tables in the *Solar Radiation Data Manual for Flat-Plate and Concentrating Collectors* (*http://rredc.nrel.gov/solar/old_data/nsrdb/redbook/*).

For these variations and the uncertainties associated with the weather data and the model used to model the PV performance, future months and years may be encountered where the actual PV performance is less than or greater than the values shown in the table. The variations may be as much as 40% for individual months and up to 20% for individual years. Compared to long-term performance over many years, the values in the table are accurate to within 10% to 12%.

If the default overall DC to AC derate factor is used, the energy values in the table will overestimate the actual energy production if nearby buildings, objects, or other PV modules and array structure shade the PV modules; if tracking mechanisms for one- and two-axis tracking systems do not keep the PV arrays at the optimum orientation with respect to the sun's position; if soiling or snow cover related losses exceed 5%; or if the system performance has degraded from new. (PV performance typically degrades 1% per year.) If any of these situations exist, an overall DC to AC derate factor should be used with PVWATTS that was calculated using system specific component derate factors for *shading*, *sun-tracking*, *soiling*, and *age*.

The PV system size is the nameplate DC power rating. The energy production values in the table are valid only for crystalline silicon PV systems.

The cost savings are determined as the product of the number of kilowatt hours (kWh) and the cost of electricity per kWh. These cost savings occur if the owner uses all the electricity produced by the PV system, or if the owner has a net-metering agreement with the utility. With net-metering, the utility bills the owner for the net electricity consumed. When electricity flows from the utility to the owner, the meter spins forward. When electricity flows from the PV system to the utility, the meter spins backwards.

If net-metering isn't available and the PV system sends surplus electricity to the utility grid, the utility generally buys the electricity from the owner at a lower price than the owner pays the utility for electricity. In this case, the cost savings shown in the table should be reduced.

Besides the cost savings shown in the table, other benefits of PV systems include greater energy independence and a reduction in fossil fuel usage and air pollution. For commercial customers, additional cost savings may come from reducing demand charges. Homeowners can often include the cost of the PV system in their home mortgage as a way of accommodating the PV system's initial cost.

To accelerate the use of PV systems, many state and local governments offer financial incentives and programs. Go to http://www.nrel.gov/stateandlocal for more information.

Please send questions and comments to Webmaster Disclaimer and copyright notice.

Return to RREDC Home Page (*http://rredc.nrel.gov/*)

Township of Kearny
Town Hall

Cost of Electricity $0.162 $/kWh

Photovoltaic (PV) Rooftop Solar Power Generation-45kW System

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	New Jersey Renewable * Energy Incentive	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$450,000	**0.0**	**53,240**	**0**	**$8,600**	**0**	**$8,600**	**$45,000**	**$25,900**	**52.3**	**11.7**

Note: Budgetary cost is based on $10,000/kW.

*Incentive based on New Jersey renewable energy program for non-residential applications(PV)= $1.00/W of installed PV system

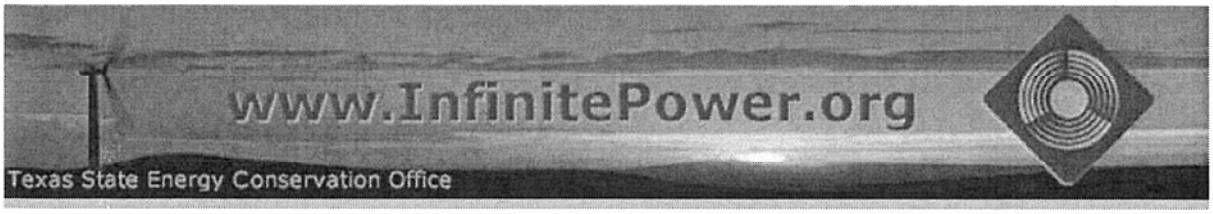
** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $487/1000kwh

Estimated Solar Renewable Energy Certificate Program (SREC) payments for 15 Years from RR Renewable Energy Consultants

Year	SREC
1	600
2	600
3	600
4	500
5	500
6	500
7	500
8	500
9	500
10	500
11	400
12	400
13	400
14	400
15	400
AVG	**487**

APPENDIX K

Solar Thermal Domestic Hot Water Plant



RENEWABLE ENERGY
THE INFINITE POWER OF TEXAS

Interactive Energy Calculators

Our calculators help you understand energy production and consumption in a whole new way. Use them to develop a personal profile of your own energy use.

Carbon Pollution Calculator
Electric Power Pollution Calculator
PV System Economics
Solar Water Heating
What's a Watt?

Solar Water Heating Calculator

Water heating is a major energy consumer. Although the energy consumed daily is often less than for air conditioning or heating, it is required year round, making it a good application of solar energy. Use this calculator to explore the energy usage of your water heater, and to estimate whether a solar water heater could save you money.

Water Heater Characteristics			
Physical		**Thermal**	
? Diameter (feet)	1.5	? Water Inlet Temperature (Degrees F)	55
? Capacity (gallons)	40	? Ambient Temperature (Degrees F)	70
? Surface Area (calculated - sq ft)	17.79	? Hot Water Temperature (Degrees F)	120
? Effective R-value	NaN	? Hot Water Usage (Gallons per Day)	50
Energy Use			
1112		? Heat Delivered in Hot Water (BTU/hr)	
0		? Heat loss through insulation (BTU/hr)	

Gas vs. Electric Water Heating		
Gas		**Electric**
0.8	? Overall Efficiency	0.98
0.8	? Conversion Efficiency	0.98
1390 BTU/hr	? Power Into Water Heater	1135 BTU/hr
Cost		
$ 1.465 /Therm	? Utility Rates	$ 0.1248 /kWh
$ 178.384	? Yearly Water Heating Cost	$ 363.409
How Does Solar Compare?		
? Solar Water Heater Cost: $ 27100		? Percentage Solar: 70
217.027 years for gas	? Payback Time for Solar System	106.530 years for electric

NJBPU Energy Audits
CHA # 20711
Township of Kearny
Town Hall

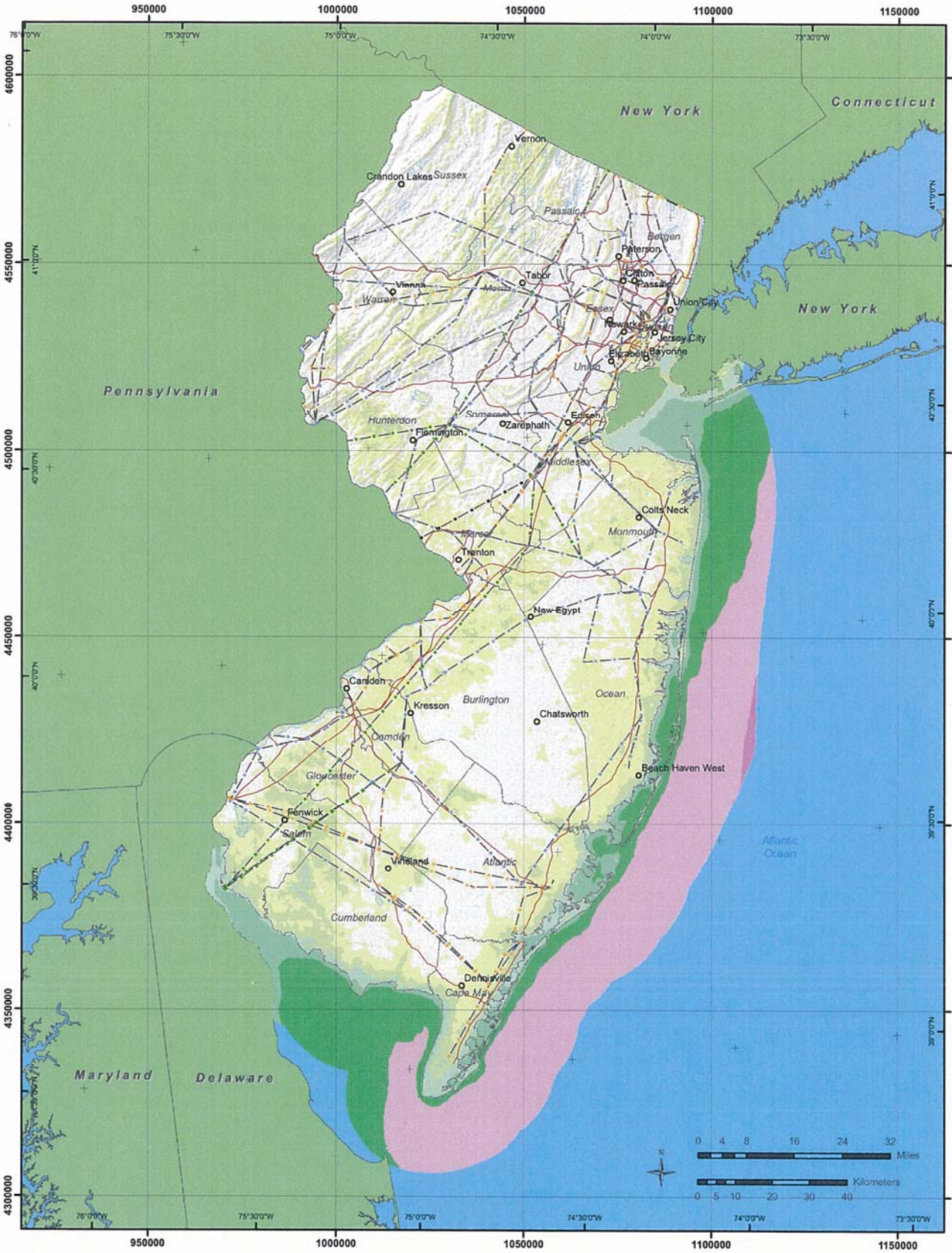
Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Synergy Solar Thermal System	2	ea			$ 3,600	$ -	$ -	$ 7,848	$ 7,848	
Piping modifications	1	ls	$ 2,000	$ 3,500		$ 1,960	$ 4,235	$ -	$ 6,195	
Electrical modifications	1	ls	$ 1,000	$ 1,000		$ 980	$ 1,210	$ -	$ 2,190	
65 GallonStorage Tanks	2	ea	$ 200	$ 250		$ 400	$ 500	$ -	$ 900	
10 Gallon Drip Tank	2	ea	$ 100	$ 78		$ 200	$ 156	$ -	$ 356	
						$ -	$ -	$ -	$ -	

$17,489	Subtotal
$ 2,623	15% Contingency
$ 2,623	15% Contractor O&P
$ 4,372	25% Engineering
$27,108	**Total**

APPENDIX L

Wind



Wind Resource of New Jersey

Mean Annual Wind Speed at 30 Meters

Features
- City
- Interstate Highway
- County Boundary
- Water Body

Generalized Transmission Line

Category	
Under 100 kV	500 kV
100 kV-161 kV	735 kV +
230 kV-287 kV	Step-Up
345 kV	DC Line

Mean Speed at 30 m		
mph	m/s	
< 10.1	< 4.5	13.4 - 14.5 / 6.0 - 6.5
10.1 - 11.2	4.5 - 5.0	14.5 - 15.7 / 6.5 - 7.0
11.2 - 12.3	5.0 - 5.5	15.7 - 16.8 / 7.0 - 7.5
12.3 - 13.4	5.5 - 6.0	16.8 - 17.9 / 7.5 - 8.0
		17.9 - 19.0 / 8.0 - 8.5
		> 19.0 / > 8.5

AWS Truewind

Projection: Tranverse Mercator,
UTM Zone 17 WGS84
Spatial Resolution of Wind Resource Data: 200m
This map was created by AWS Truewind using the MesoMap system and historical weather data. Although it is believed to represent an accurate overall picture of the wind energy resource, estimates at any location should be confirmed by measurement.

The transmission line information was obtained by AWS Truewind from the Global Energy Decisions Velocity Suite. AWS does not warrant the accuracy of the transmission line information.

Map of 400 Kearny Ave, Kearny, NJ 07032-2604

When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning.

APPENDIX M

EPA Portfolio Manager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Town Hall

Building ID: 2235548
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: March 11, 2010

Facility	**Facility Owner**	**Primary Contact for this Facility**
Town Hall 400 Kearny Avenue Kearny, NJ 07032	Township of Kearny 357 Bergen Ave Kearny, NJ 07032	Gerry Kerr 357 Bergen Ave Kearny, NJ 07032

Year Built: 1900
Gross Floor Area (ft²): 11,000

Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	695,502
Fuel Oil (No. 2) (kBtu)	501,851
Natural Gas (kBtu)[4]	477,100
Total Energy (kBtu)	1,674,453

Energy Intensity[5]	
Site (kBtu/ft²/yr)	152
Source (kBtu/ft²/yr)	303

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	168

Electric Distribution Utility
Public Service Elec & Gas Co

National Average Comparison	
National Average Site EUI	66
National Average Source EUI	143
% Difference from National Average Source EUI	112%
Building Type	Public Assembly

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

Certifying Professional
N/A

Meets Industry Standards[6] **for Indoor Environmental Conditions:**	
Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.
NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Town Hall	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Public Assembly	Is this an accurate description of the space in question?		☐
Location	400 Kearny Avenue, Kearny, NJ 07032	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐

Town Hall (Other)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	11,000 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	42(Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	45Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	48(Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Public Service Elec & Gas Co

Fuel Type: Electricity		
Meter: PSE&G Electric (kWh (thousand Watt-hours)) **Space(s):** Entire Facility **Generation Method:** Grid Purchase		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
12/01/2008	12/31/2008	15,760.00
11/01/2008	11/30/2008	12,960.00
10/01/2008	10/31/2008	14,800.00
09/01/2008	09/30/2008	16,880.00
08/01/2008	08/31/2008	23,520.00
07/01/2008	07/31/2008	23,680.00
06/01/2008	06/30/2008	21,920.00
05/01/2008	05/31/2008	13,280.00
04/01/2008	04/30/2008	12,800.00
03/01/2008	03/31/2008	15,840.00
02/01/2008	02/29/2008	16,000.00
01/01/2008	01/31/2008	16,400.00
PSE&G Electric Consumption (kWh (thousand Watt-hours))		**203,840.00**
PSE&G Electric Consumption (kBtu (thousand Btu))		**695,502.08**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**695,502.08**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas		
Meter: PSE&G Natural Gas (therms) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (therms)**
12/01/2008	12/31/2008	322.00
11/01/2008	11/30/2008	691.00
10/01/2008	10/31/2008	211.00
09/01/2008	09/30/2008	4.00
08/01/2008	08/31/2008	3.00
07/01/2008	07/31/2008	3.00
06/01/2008	06/30/2008	6.00
05/01/2008	05/31/2008	89.00
04/01/2008	04/30/2008	208.00
03/01/2008	03/31/2008	738.00

02/01/2008	02/29/2008	1,310.00
01/01/2008	01/31/2008	1,186.00
PSE&G Natural Gas Consumption (therms)		**4,771.00**
PSE&G Natural Gas Consumption (kBtu (thousand Btu))		**477,100.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**477,100.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

Fuel Type: Fuel Oil (No. 2)

Meter: Fuel Oil #2 (Gallons)
Space(s): Entire Facility

Start Date	End Date	Energy Use (Gallons)
11/09/2008	12/08/2008	662.00
10/09/2008	11/08/2008	1,101.00
09/09/2008	10/08/2008	0.00
08/09/2008	09/08/2008	0.00
07/09/2008	08/08/2008	0.00
06/09/2008	07/08/2008	0.00
05/09/2008	06/08/2008	0.00
04/09/2008	05/08/2008	0.00
03/09/2008	04/08/2008	697.00
02/09/2008	03/08/2008	428.00
01/09/2008	02/08/2008	302.00
Fuel Oil #2 Consumption (Gallons)		**3,190.00**
Fuel Oil #2 Consumption (kBtu (thousand Btu))		**442,422.69**
Total Fuel Oil (No. 2) Consumption (kBtu (thousand Btu))		**442,422.69**
Is this the total Fuel Oil (No. 2) consumption at this building including all Fuel Oil (No. 2) meters?		☐

Additional Fuels	
Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	☐

On-Site Solar and Wind Energy	
Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported.	☐

Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same as the PE that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

Facility
Town Hall
400 Kearny Avenue
Kearny, NJ 07032

Facility Owner
Township of Kearny
357 Bergen Ave
Kearny, NJ 07032

Primary Contact for this Facility
Gerry Kerr
357 Bergen Ave
Kearny, NJ 07032

General Information

Town Hall	
Gross Floor Area Excluding Parking: (ft²)	11,000
Year Built	1900
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

Town Hall	
Space Type	Other - Public Assembly
Gross Floor Area(ft²)	11,000
Number of PCs[o]	42
Weekly operating hours[o]	45
Workers on Main Shift[o]	48

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 12/31/2008)	**Baseline** (Ending Date 12/31/2008)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft²)	152	152	0	N/A	66
Source (kBtu/ft²)	303	303	0	N/A	143
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/ft²/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	168	168	0	N/A	73
$kgCO_2e$/ft²/year	15	15	0	N/A	7

More than 50% of your building is defined as Public Assembly. This building is currently ineligible for a rating. Please note the National Average column represents the CBECS national average data for Public Assembly. This building uses X% less energy per square foot than the CBECS national average for Public Assembly.

Notes:
o - This attribute is optional.
d - A default value has been supplied by Portfolio Manager.

APPENDIX N

Equipment Inventory

New Jersey BPU Energy Audit Program
CHA #20711
Kearny
Town Hall

Description	Manufacturer Name	Model No.	Equipment Type	Capacity/Size	Location	Areas Served	Date Installed	Useable Life Expectancy (years)
Boiler	Weil McLain	Serial 4625	Gas fired, hot water	Esitmated 300MBH	Basement	1st floor	1984	5
Boiler	HB Smith	#25-250	#2 fuel oil, steam	Esimated 880 MBH	Basement	2nd and 3rd floors	1960	-19
Chiller	Carrrier	30RAN018-511CX, Serial 3704Q00316	Electric air cooled chiller	18 ton, 230V, 3ph, 60Hz	Outside	2nd and 3rd floors	2009	23
Air handler/condensing unit	Trane	CGAA0103CD53CC5C48311CK, L84F19996	Electric condensing unit	10 ton, 230 V, 3ph, 60Hz	Outside	1 st floor	Unknown	Unknown
DHWH	Rheem	21X40-7, Serial 0493A15245	Gas fired hot water heater	40 gallon, 34,000 but/hr	Basement	Entire building	1991	2
Packaged HVAC	AAON	57104, Serial 200409 AMGK19	Packaged HVAC, gas heating, electric cooling	Input 270 MBH, output 219 MBH, 13 ton	Outside	3 rd floor conference room	2009	20
Split System	Mitsubishi	MUY-A24NA, Serial 6002631	Electric condensing unit	2 tons, 208/230V, 1ph, 60Hz	Roof	Elevator shaft entry	2009	15
Split System	Libert	PFH037A-YL3	Electric condensing unit	2 tons, 208/230V, 1ph, 60Hz	Roof	Elevator shaft entry	2009	15
Exhaust	Greenheck	G141-B, Serial 04126307	Upright exhauster	1/6 HP, 1140 rpm, 208/230V, 1ph, 60Hz	Roof	Elevator shaft entry	2009	20
Exhaust	Greenheck	G035-D, Serial 94126723	Upright exhauster	1/60 HP, 1040rpm, 208/230V, 1ph, 60Hz	Roof	Elevator shaft entry	2009	20
Exhaust	Greenheck	G160B, Serial 04125312	Upright exhauster	1/3 HP, 1140 rpm, 208/230V, 1ph, 60Hz	Roof	Elevator shaft entry	2009	20