

**BOROUGH OF SOUTH PLAINFIELD
BOROUGH HALL MUNICIPAL BUILDING
ENERGY ASSESSMENT**

for

**NEW JERSEY
BUREAU OF PUBLIC UTILITIES**

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1.0 INTRODUCTION AND BACKGROUND

The Borough Hall was constructed in 1960; the police department space added in 1972. The single story, 14,911 square foot structure, located at 2480 Plainfield Avenue in South Plainfield, New Jersey, also includes the town courtroom, 911 dispatch center, social services, and town administrative offices.

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 South Plainfield Borough Hall, located in South Plainfield, New Jersey. The building was constructed in 1960 and the police department space added in 1972. The one-story, 14,911 square foot structure includes the town courtroom, 911 dispatch center, and town administrative offices. The following areas were evaluated for energy conservation measures:

- Lighting replacement with occupancy sensors
- Night setback
- Boiler replacement
- Hot water temperature reset
- Window replacement
- Window AC unit replacement

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 \$10,100 for the recommended ECMs may be realized with a payback of 1.1 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-1 Night Setback

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
2,600	0	7,400	1,770	3,200	17.5	NA	0.8	NA

* There is no incentive available through the New Jersey Smart Start program for this ECM.

ECM-8 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
8,600	2.8	50,050	0	6,900	11.0	1,200	1.3	1.1

* Incentive shown is per the New Jersey Smart Start Program, 2010 Prescriptive Lighting and Lighting Controls Applications.

3.0 EXISTING CONDITIONS

3.1 Building - General

The Borough Hall administrative building is a single story, 14,911 square foot structure, located at 2480 Plainfield Avenue in South Plainfield, New Jersey. The building was constructed in 1960 with the police department area added in 1972. Other areas include the 911 dispatch center; financial, tax collector, sewer, assessor, social services, building, environmental, and court offices; and the town courtroom.

The municipal offices operate from 8:00 AM to 4:00 PM five days a week and are occupied by about 25 people. The courtroom is in session for several hours on Wednesday nights. Additionally, the courtroom is utilized about two nights a week as a meeting space. The police department operates 24 hours a day, year round. In total, South Plainfield employs over 50 police officers; about 20 occupy the station during normal business hours, and approximately six people at nighttime.

Construction of the building's exterior walls consists of face brick over a rubber membrane, concrete masonry unit (CMU) block, and furred out on the interior with a plaster finish. There are a considerable number of windows along the building exterior. The windows, original to the building, are aluminum frame with single pane un-insulated glass, and in poor condition. There are also several steel security doors along the building perimeter. Borough Hall has a flat roof constructed of a rubber membrane on hard foam insulation, and a 3" pre-cast roof deck supported by steel joists with an acoustic tile drop ceiling.

3.2 Utility Usage

Utilities include electricity, natural gas, and potable water. Electricity and natural gas are purchased from Public Service Electric & Gas Company (PSE&G). The building is also connected to the municipal sewage system.

From July 2008 through June 2009, electric usage was approximately 450,120 kWh at a cost of about \$66,800. Analyzing electricity bills during this period, the building was charged at the following rates: supply unit cost of \$0.127 per kWh; demand unit cost of \$15.33 per kW; and a blended unit cost of \$0.148 per kWh. Electricity usage was highest in the summer months when air conditioning equipment operates. During the same timeframe, the building heat and domestic hot water (DHW) produced by natural gas-fired equipment required about 13,340 therms. Based on the annual cost of about \$15,900, the blended price for natural gas was \$1.195 per therm. Natural gas consumption is highest in the winter months to heat the building. Utility data can be found in Appendix A.

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

3.3.1 Hot Water Heating System

Borough Hall's primary heating plant consists of four, Slant/Fin Caravan, cast-iron, 400 MBh gas-fired, hot water boilers located in the basement. According to building personnel, these units were installed about 10 to 12 years ago and are in good condition. Additionally, the boilers are enabled manually when the outside air temperature drops below 65°F and are selectively fired on a lead/lag schedule. Heating hot water (HHW) is produced by the boilers at 180°F and distributed to the hydronic heating system, which is divided into six zones. Each heating zone is served by an inline circulation pump ranging from 1/25 HP to 3/4 HP. Hydronic heating equipment includes baseboard fin-tube radiators, cabinet unit heaters, ceiling unit heaters, and heating and ventilating units.

3.3.2 Air Conditioning Systems

The primary air conditioning (AC) system consists of nine Carrier, packaged rooftop units (RTU) with direct expansion (DX) cooling. These units were manufactured and installed between 1997 and 2007. The police and 911 dispatch data centers are each served by dedicated, split-system AC units. The remote condenser for the unit serving the police data center has a 2 ton capacity and is located outside on grade; the condenser serving the unit in the 911 center has a 1-1/2 ton capacity and is on the roof.

The Chief of Police and Commander Operations office are each served by a dedicated packaged terminal air conditioning (PTAC) unit with hot water heat and DX cooling. In addition, there are five window AC units in various offices, approximately 10,000 Btuh in capacity, which are past their useful life.

3.3.3 Building Ventilation and Exhaust Systems

Primary ventilation is provided by nine packaged rooftop AC units. These units are cooling only and operated in the summer months; therefore, there is very little mechanical ventilation in the building during the heating season. A heating and ventilating unit provides air to the holding cells in the police area; the two PTAC units also provide outdoor air.

Six fractional horsepower exhaust fans serving the building have the capacity to exhaust a combined total of 8,000 CFM. These units serve the holding cells, janitor's closet, restrooms, and courtroom. The fan serving the courtroom is equipped with a two speed motor and exhausts the above ceiling plenum space when energized. This unit is operated on an as-needed basis.

3.4 Control Systems

HVAC controls in the building are a combination of old-style mechanical thermostats and newer programmable thermostats. The programmable thermostats were installed in conjunction with the nine rooftop AC units; building heat is still controlled by the old-style mechanical thermostats. Both types of thermostats are spread throughout the building and locally set by the occupants of the space.

Split system units serving the police and 911 dispatch data centers are controlled by dedicated, digital thermostats. These units are set to maintain the two data centers at a constant 67°F, year round. Controls on the two PTACs are integral to the unit and manually operated by the room occupants.

3.5 Lighting/Electrical Systems

The police department's lighting is controlled by individual switches in the corresponding spaces. Due to safety reasons, the common lighting in this area is required to be left on 24/7. However, there are office areas within the police section where lighting control based on occupancy would not be a safety concern. The majority of lighting in the police area is F32T8 fixtures that use 32 watts per lamp. These fixtures are either 4' tubes or 2' u-tubes. However, there remain several inefficient fixtures within this area that use F34T12, 34 watt lamps.

Lighting in the municipal office areas are also controlled by individual switches in each space. The lighting within this portion of the building is left on during normal business hours. Generally, this lighting remains on for 8 to 9 hours daily. This portion of the building utilizes a mixture of fixture types; the most common is energy efficient F32T8 lamps. There are about 20 fluorescent fixtures that have not been upgraded, and still utilize inefficient F34T12, 34 watt lamps. The exit signs within this area are inefficient, non-LED type. There are some fixtures that use incandescent screw-type bulbs that can be easily upgraded.

The majority of outdoor lighting is owned and maintained by the electrical utility company. These light fixtures are on the power poles around the parking lot and entrances, and light the building and lot at night. There is one outdoor light that is owned by the facility that is located above the rear door of the building. This fixture is a 175 watt metal halide wall-pack fixture that is turned on by a timer at night.

Backup power is provided by a 400 kW, Onan Genset diesel generator. The unit and its associated fuel tank are located in a dedicated utility shed at the southwest corner of the building. The generator supplies 1,388 amps of 120/208, 3 phase power, and is operated once a week for about 30 minutes to exercise the motor.

3.6 Plumbing Systems

Domestic hot water is generated by a 75 gallon Rheem gas-fired water heater with an input of 70,000 Btuh. This unit, located in the basement mechanical room, is in good condition.

There are two unisex, single-stall restrooms for office personnel, and two multi-stall public restrooms located in the municipal office area of the building. Four of the five holding cells in the police department are equipped with a single toilet and hand sinks. The police department also has two single-stall restrooms. All fixtures are considered low-flow type per industry standards.

Storm water is collected in a sump pit in the basement and discharged into the sewer by a vertical centrifugal pump. The existing pump and motor are scheduled to be replaced in the near future and the new unit is on hand.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 Night Setback

The HVAC system controls are a combination of old-style mechanical thermostats for heating equipment and newer programmable thermostats for cooling equipment; no provisions have been made for temperature setback during unoccupied times. By replacing the old mechanical thermostats with programmable models, all thermostats can be programmed to set back the unoccupied space temperature to save heating and cooling energy. Since the police department operates continuously, the temperature in this area cannot be set back; therefore, the thermostats in this area do not require replacement. This ECM models the expected savings of adjusting the unoccupied temperature setpoints as follows: 60°F during heating and 85°F during cooling periods in the municipal office area; and 58°F during heating and 85°F during cooling periods in the courtroom. In the calculations for this measure, occupied temperature setpoints were maintained per those in use at the time of the energy audit.

To calculate the benefits of night setback, a block load building model was created to approximate the existing energy load for the building. Since the municipal offices, courtroom, and police department operate on different occupancy schedules, a block load was created for each space. The block loads, provided in Appendix B, model the maximum overall cooling and heating load for each space, taking into account various parameters such as roof, wall, and window construction; total envelope surface area; ventilation and infiltration loads; building occupancy; internal heat generation; and other sources of heat gains and losses. By entering this calculated maximum load into a spreadsheet containing bin temperature data, the total accumulated year-round cooling and heating energy requirements were determined for each space. The heating and cooling loads for the three areas were then combined and reconciled to building utility data and HVAC equipment energy requirements to confirm the model's accuracy. Bin data for South Plainfield, NJ was not available; therefore, data from Newark, NJ was used. The bin temperature spreadsheets are included in Appendix B.

To determine the proposed energy usage in the municipal office area and courtroom during temperature setback, a second bin spreadsheet was created for the new accumulated heating and cooling loads for each space. These models were identical to the existing usage spreadsheets except the unoccupied temperatures were adjusted as noted above. The difference in heating therms and cooling kWh between the initial and proposed models is taken as the savings. Following implementation of this measure, it is expected the building's annual natural gas and electricity consumption will be reduced by approximately 1,770 therms and 7,400 kWh, respectively.

Programmable thermostats for night setback have an expected life of 15 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 26,600 therms and 111,000 kWh, totaling \$48,000.

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

ECM-1 Night Setback

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)	
	Electricity		Natural Gas					Total
\$	kW	kWh	Therms	\$	\$	Years	Years	
2,600	0	7,400	1,770	3,200	17.5	NA	0.8	NA

* There is no incentive available through the New Jersey Smart Start program for this ECM.

This measure is recommended.

4.2 ECM-2 Boiler Replacement

Heating hot water is provided by four natural gas-fired, Slant/Fin Caravan, cast-iron, hot water boilers, with a combined rating of 1,308,000 Btuh output, 1,596,000 Btuh input, and 82% efficiency. This ECM evaluates replacing the four boilers with two high efficiency, condensing boilers. Modern condensing boilers operate at much higher efficiencies, depending on the characteristics of the building's hydronic heating system. Additionally, the burners on these units are capable of greater turndown ratios, enabling the boiler to fire more accurately to match the changing building load, saving energy.

Following review of natural gas utility bills and all gas-fired equipment, it was estimated that the boiler plant consumes about 13,100 therms annually. Applying the existing boiler's 82% thermal efficiency to the natural gas usage, the annual heat load on the boilers is about 1,074,200 MBH. With an estimated average efficiency of 88%, the proposed condensing boilers will require approximately 12,210 therms to meet the heat load, resulting in a savings of about 890 therms of natural gas per year. The proposed boiler efficiency rating is based on the use of two Aerco Modulex MLX-909 boilers. These boilers were used only as an example for calculation. Exact boiler selection and sizing cannot be completed without a more detailed analysis of the building's hydronic heating system and generation of a load profile.

In addition to the two new condensing hot water boilers, other components of this measure include new immediate HW supply and return piping and valves, new exhaust flue system, condensate neutralization kit, and minor electrical modifications.

Condensing boilers have an expected life of 20 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 17,800 therms and \$22,000.

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

ECM-2 Boiler Replacement

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)	
	Electricity		Natural Gas					Total
\$	kW	kWh	Therms	\$		\$	Years	Years
71,800	0	0	890	1,100	(0.7)	3,200	>25	>25

*Incentive shown is per the New Jersey Smart Start Program, 2010 Gas Heating Application. Incentive is based on the purchase of two, 900 MBH hot water boilers.

This measure is not recommended.

4.3 ECM-3 Hot Water Temperature Reset

The boiler plant currently provides 180°F HHW to the building's hydronic heating system. This ECM evaluates installing a hot water temperature reset control system to adjust the supply temperature of the HHW with the outside air temperature. This would allow HHW to be generated at lower temperatures, decreasing heat losses from the hydronic piping system and minimizing energy losses.

Hot water temperature reset was evaluated by generating a spreadsheet that compares the hydronic piping system heat losses at the current average HHW temperature to the proposed average HHW temperature (Appendix D). Using building drawings of the HHW hydronic piping system and bin weather data, with an average HHW temperature of 170°F, the current annual heat loss by the system was determined to be about 156,900 MBH. Utilizing a hot water reset control system, the average HHW temperature can be lowered to about 163°F. This temperature is limited by the capabilities of the boilers; cast-iron boilers typically cannot accept a return water temperature lower than 150°F. The resulting annual heat loss from the HHW piping system will be reduced to approximately 142,200 MBH. After factoring in the boiler plant's efficiency, the reduction in heat loss results in an annual savings of approximately 180 therms of natural gas.

A hot water reset control system has an expected life of 15 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 2,700 therms and \$3,000.

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

ECM-3 Hot Water Temperature Reset

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas				
\$	kW	kWh	Therms	\$	\$	Years	Years
6,200	0	0	180	200	(0.5)	NA	>25

* There is no incentive available through the New Jersey Smart Start program for this ECM.

This measure is not recommended.

4.4 ECM-4 Boiler Replacement with Hot Water Temperature Reset

As previously stated, HHW is currently generated at 180°F by an 82% efficient boiler plant. While replacing the boilers with high efficiency condensing units and installing a hot water reset temperature control system (Sections 4.2 and 4.3) provide energy savings, combining these measures maximizes the savings. Since condensing boilers are capable of receiving return water at temperatures as low as 70°F, the average water temperature of the hydronic heating system can be greatly reduced. Additionally, because condensing boilers become more efficient as the return water temperature decreases, combining them with a HW control system can improve firing efficiency up to 95% or higher.

Following the same procedure utilized in section 4.3, hot water temperature reset was evaluated by generating a spreadsheet that compares the hydronic piping system heat losses at the current average HHW temperature to the proposed average HHW temperature (Appendix E). Utilizing a hot water reset control system in conjunction with condensing boilers, the average HHW temperature can be lowered to

about 108°F. Therefore, the resulting annual heat loss from the HHW piping system will can be reduced by almost 50%.

Piping heat losses calculated at the existing and proposed average HHW temperatures were then applied to the proposed boiler efficiency rates to determine the therms required to overcome these losses. Since the efficiency of the proposed condensing boilers varies based on the return water temperature, the efficiency curve for an Aerco Modulex MLX-909 boiler was used to input the different firing efficiencies with the HW reset system. Averaging the boiler firing efficiencies yielded an annual thermal efficiency of 92%. The difference between the existing and proposed therms required to overcome heat losses result in an annual energy savings of about 810 therms of natural gas.

The savings realized from replacing the boilers was calculated using the same methodology utilized in section 4.2. With the improved efficiency determined in the hot water reset calculation, the proposed condensing boilers will require approximately 11,640 therms to meet the building's heat load, resulting in a savings of about 1,460 therms of natural gas per year. As previously noted, the proposed boiler efficiency rating is based on the use of two Aerco Modulex MLX-909 boilers utilized for the calculation. Exact boiler selection and sizing were not performed.

Condensing boilers and hot water reset control system have an expected life of 20 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 45,600 therms and \$54,000.

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

ECM-4 Boiler Replacement with Hot Water Temperature Reset

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
77,700	0	0	2,280	2,700	(0.3)	3,200	>25	>25

*Incentive shown is per the New Jersey Smart Start Program, 2010 Gas Heating Application. Incentive is based on the purchase of two, 900 MBH hot water boilers.

This measure is not recommended.

4.5 ECM-5 Replace Windows

The Borough Hall windows are single pane glass with aluminum frames and are original to the building's construction. Due to age and construction type, the windows incur increased infiltration, cold drafts, and heat loss. This ECM evaluates replacement with new energy efficient windows to decrease heat energy loss.

Per the building energy audit and engineering knowledge, it was estimated that the existing windows have a U-value of 1.05 and an infiltration rate of about 0.5 CFM/LF. To calculate the savings for this measure, the baseline energy loss was found by applying these values to the total square footage and perimeter length of the existing windows in conjunction with weather bin data. The proposed energy loss was then determined using the expected U-value of 0.50, and infiltration rate of 0.2 CFM/LF, for the new energy

efficient windows. The difference in heating and cooling losses through the windows results in an annual savings of about 1,840 therms and 940 kWh.

As with most window replacement projects, long paybacks do not justify implementation for energy savings alone. Occupant comfort and building aesthetics may also be a consideration.

Windows have an expected life of 25 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 46,000 therms and 23,500 kWh, totaling \$57,500.

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

ECM-5 Replace Windows

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
41,400	0	940	1,840	2,300	0.4	NA	18.0	NA

* There is no incentive available through the New Jersey Smart Start program for this ECM.

This measure is not recommended based on energy savings alone.

4.6 ECM-6 Lighting Replacements

A comprehensive fixture survey was conducted of the entire building. Each switch and circuit was identified, and the number of fixtures, locations, and existing wattage established. The majority of the lighting in the facility utilizes T-8 lamps with electronic ballasts and compact fluorescent lamps, which are regarded as efficient by today's standards. Some of the facility is still equipped with lighting fixtures using incandescent bulbs or T-12 lamps with magnetic ballasts. In addition, the existing exit signs utilize older, incandescent technology, which can be upgraded to more efficient lighting technology.

Energy savings for this measure were calculated by applying the existing and proposed fixture wattages to the estimated time of operation. The difference resulted in an annual savings of 13,630 kWh per year. Supporting calculations, including all assumptions for lighting hours and the annual energy usage for each fixture is provided in Appendix G.

Retrofitting fixtures that utilize T-12 lamps would require replacement with electronic ballasts and T-8 lamps. Incandescent lamps would be replaced with compact fluorescent spiral light bulbs. Exit signs are to be replaced with LED type signs.

Lighting has an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 204,500 kWh, totaling \$33,000.

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

ECM-6 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	
4,400	2.3	13,630	0	2,200	6.5	400	2.0	1.9

* Incentive shown is per the New Jersey Smart Start Program, 2010 Prescriptive Lighting Application.

This measure is recommended when combined with ECM-7; see ECM-8.

4.7 ECM-7 Install Occupancy Sensors

Lighting fixtures throughout the building are all manually switched on and off. The use of these fixtures varies depending on location. In the police section of the building, common lights are in use 24/7 for safety reasons. However, in office areas within the police side of the building as well as the entire municipal office area of the building, lighting is only required when the space is occupied. In total, these interior building lights are operated approximately 63 hours per week. The operating time of many of the building's interior lighting fixtures can be considerably reduced by installing occupancy sensors.

Using a process similar to that utilized in section 4.7, the energy savings for this measure were calculated by applying the known fixture wattages in the space to the estimated existing and proposed times of operation for each fixture. The difference between the two values resulted in an annual savings of about 32,400 kWh per year.

For this energy conservation measure, the facility will be required to purchase and install occupancy sensors for each applicable area. In total, about 29 occupancy sensors and some standard electrical work is required for this measure.

Occupancy sensors have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 486,000 kWh and \$61,500.

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

ECM-7 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
3,900	0	32,400	0	4,100	17.5	700	0.9	0.8

* Incentive shown is per the New Jersey Smart Start Program, 2010 Lighting Controls Application.

This measure is recommended when combined with ECM-6; see ECM-8.

4.8 ECM-8 Lighting Replacements with Occupancy Sensors

Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative. This measure is a combination of ECM's 6 and 7 to allow for maximum energy and demand reduction.

The lighting retrofits and controls have an expected lifetime of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 750,800 kWh, totaling \$103,500.

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

ECM-8 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
8,600	2.8	50,050	0	6,900	11.0	1,200	1.3	1.1

* Incentive shown is per the New Jersey Smart Start Program, 2010 Prescriptive Lighting and Lighting Controls Applications.

This measure is recommended.

4.9 ECM-9 Replace Window Air Conditioning Units

Five window air conditioning units are utilized to cool various spaces. On average, the units provide 10,000 Btus of cooling at an energy efficiency ratio (EER) of about 7.0 and are operated throughout the cooling season. This ECM assesses replacing the window units with new, energy efficient window AC units. Modern AC units have a much higher EER value than the existing units and are capable of cycling on and off with the room temperature which enhances their energy saving benefits.

Using bin weather data for Newark, NJ and the weekly occupancy schedule for the municipal offices, the annual operating hours for the existing window AC units was established. Since new window AC units have built in thermostats and temperature controls, cycling was taken into account to determine the proposed unit's operating time. EER values were then converted to kWh and applied to the estimated hours of operation to determine the energy consumption for the existing and proposed cooling systems. Replacing the five window AC units will produce an annual savings of approximately 1,220 kWh.

Window AC units have an expected life of 15 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 18,300 kWh and \$3,000.

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

ECM-9 Replace Window Air Conditioning Units

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
3,100	0	1,220	0	200	0.0	NA	15.5	NA

* There is no incentive available through the New Jersey Smart Start program for this ECM.

This measure is not 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 South Plainfield, 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 South Plainfield Borough Hall is eligible for several incentives available under New Jersey Smart Start Programs. The total amount of all qualified incentives is about \$4,400 and includes installing a high efficiency gas-fired boiler 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. The overall energy reduction for the building is estimated to exceed the 15% minimum; therefore, the building is eligible for Incentives #2 and #3 as previously discussed. This would result in a total incentive of about \$42,700, reducing the total project payback from 8.7 years to 5.9 years. See Appendix K for calculations.

Under PSE&G’s direct install program, the municipal building is potentially eligible to receive \$133,400, and would be required to repay \$26,700. 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 gas-fired, hot water boilers and packaged rooftop AC units to meet the HVAC requirements. With exception to the hydronic heating system, most of the existing 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.

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 municipal building was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The 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 L.

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 91.2 kW and a minimum of 28.8 kW, from July 2008 through June 2009. The monthly average over the observed 12 month period was 53.1 kW. The existing load justifies the use of the maximum incentive cap of 50 kW of installed PV solar array. 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 L and summarized below:

Photovoltaic (PV) Rooftop Solar Power Generation – 50 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
500,000	0	59,150	0	8,800	8,800	50,000	28,800	>25	12.0

*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 natural gas fired water heater and, therefore, this measure would not save site electricity.

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 South Plainfield 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 M and summarized as follows:

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	150	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 South Plainfield area, the map indicates a mean annual wind speed of 10 miles per hour. For the municipal building, 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 N.

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 municipal building has 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 municipal building 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 South Plainfield municipal building had a monthly average electricity demand of 53.1 kW and a maximum demand of 91.2 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 Borough Hall is considered a high energy consumer per the Portfolio Manager with a Site Energy Usage Index (EUI) of 194 kBTU/ft²/year. Several factors contribute to the unfavorable EUI, including, wasted energy from poorly insulated windows, unnecessary heating and cooling during unoccupied hours, and inefficient lighting operation. By implementing the measures discussed in this report, it is expected that the EUI can be reduced to approximately 139 kBTU/ft²/year. The EPA Portfolio Manager did not generate an energy rating score for this building because more than 10% of the floor area is of a type (other) currently not eligible for an energy star rating.

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

The user name and password for the municipal building's EPA Portfolio Manager Account has been provided to Glen Cullen of the Borough of South Plainfield.

8.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the South Plainfield Borough Hall identified potential ECMs for lighting fixture and occupancy sensor replacements and night setback. Potential annual savings of \$10,100 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

ECM-1 Night Setback

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
2,600	0	7,400	1,770	3,200	17.5	NA	0.8	NA

* There is no incentive available through the New Jersey Smart Start program for this ECM.

ECM-8 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
8,600	2.8	50,050	0	6,900	11.0	1,200	1.3	1.1

* Incentive shown is per the New Jersey Smart Start Program, 2010 Prescriptive Lighting and Lighting Controls Applications.

APPENDIX A

Utility Usage Analysis

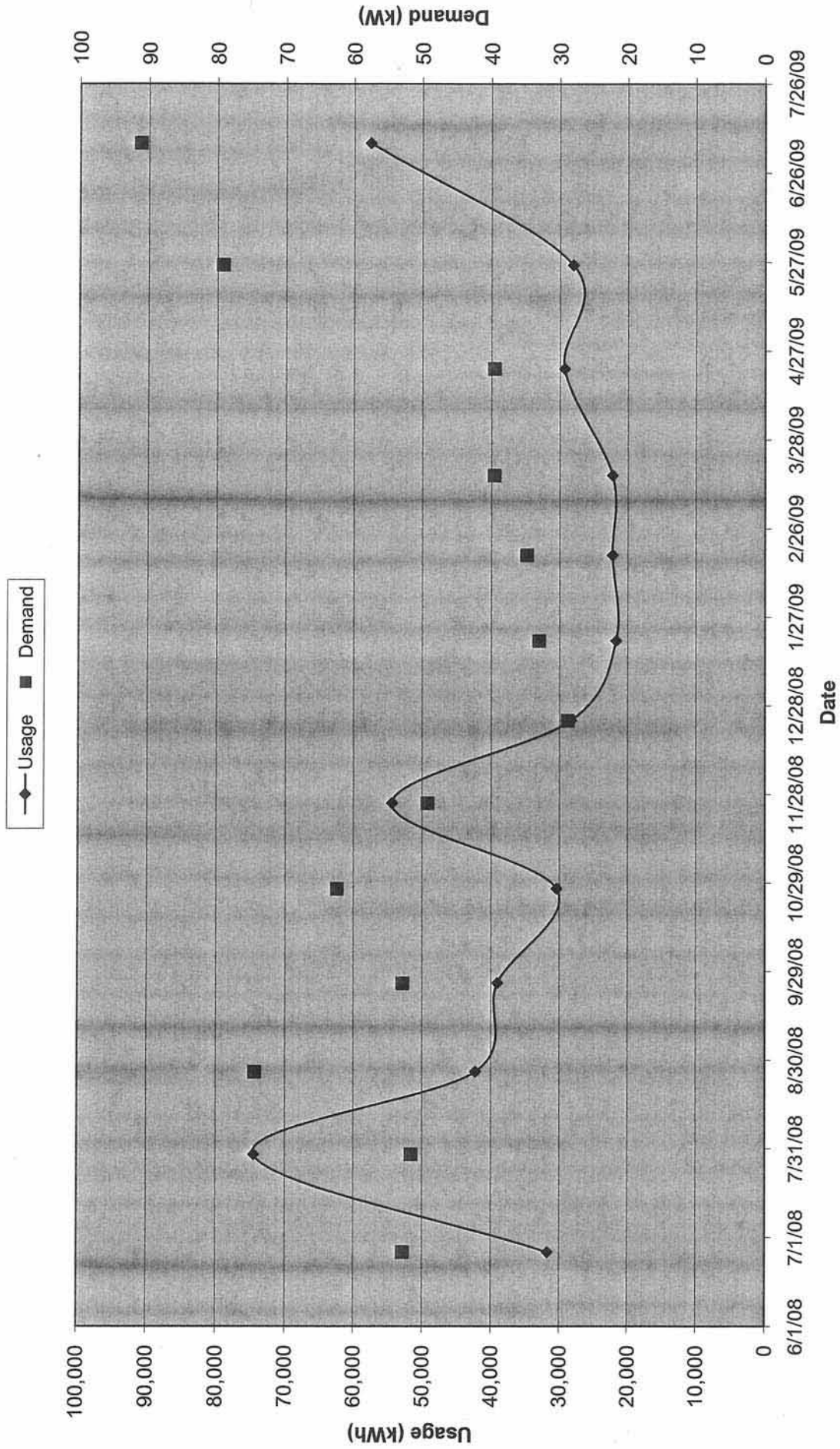
New Jersey BPU Energy Audit Program
CHA #20549
South Plainfield
Borough Hall

Account Number: 52 194 310 56
PSE&G - Electric Service

Meter #: 1087385

Date	Consumption (kWh)	Demand (kW)	Charges			Unit Costs		
			Total (\$)	Demand (\$)	Consumption (\$)	Blended Rate (\$/kWh)	Consumption (\$/kWh)	Demand (\$/kW)
6/26/2008	31,740	52.8	\$4,697.65	\$801.48	\$3,896.17	0.1480	0.1228	15.18
7/29/2008	74,520	51.6	\$11,542.76	\$1,701.86	\$9,840.90	0.1549	0.1321	32.98
8/26/2008	42,240	74.4	\$7,309.50	\$1,171.51	\$6,137.99	0.1730	0.1453	15.75
9/25/2008	39,060	52.8	\$6,711.34	\$931.30	\$5,780.04	0.1718	0.1480	17.64
10/27/2008	30,420	62.4	\$4,552.96	\$587.86	\$3,965.10	0.1497	0.1303	9.42
11/25/2008	54,360	49.2	\$7,746.56	\$1,074.68	\$6,671.88	0.1425	0.1227	21.84
12/23/2008	28,320	28.8	\$3,627.41	\$458.84	\$3,168.57	0.1281	0.1119	15.93
1/19/2009	21,720	33.0	\$2,920.24	\$473.54	\$2,446.70	0.1344	0.1126	14.35
2/17/2009	22,260	34.8	\$3,056.99	\$473.19	\$2,583.80	0.1373	0.1161	13.60
3/16/2009	22,260	39.6	\$3,225.59	\$491.89	\$2,733.70	0.1449	0.1228	12.42
4/21/2009	29,340	39.6	\$3,956.35	\$491.89	\$3,464.46	0.1348	0.1181	12.42
5/26/2009	28,080	79.2	\$3,771.84	\$492.08	\$3,279.76	0.1343	0.1168	6.21
7/6/2009	57,540	91.2	\$8,377.06	\$1,409.49	\$6,967.57	0.1456	0.1211	15.45
Total	481,860	91.2	\$71,496.25	\$10,559.61	\$60,936.64	0.1484	0.1265	15.32
Most Recent Yr	450,120	91.2	\$66,798.60	\$9,758.13	\$57,040.47	0.1484	0.1267	15.33

Electric Usage - South Plainfield/Borough Hall



**New Jersey BPU Energy Audit Program
CHA #20549
South Plainfield
Borough Hall**

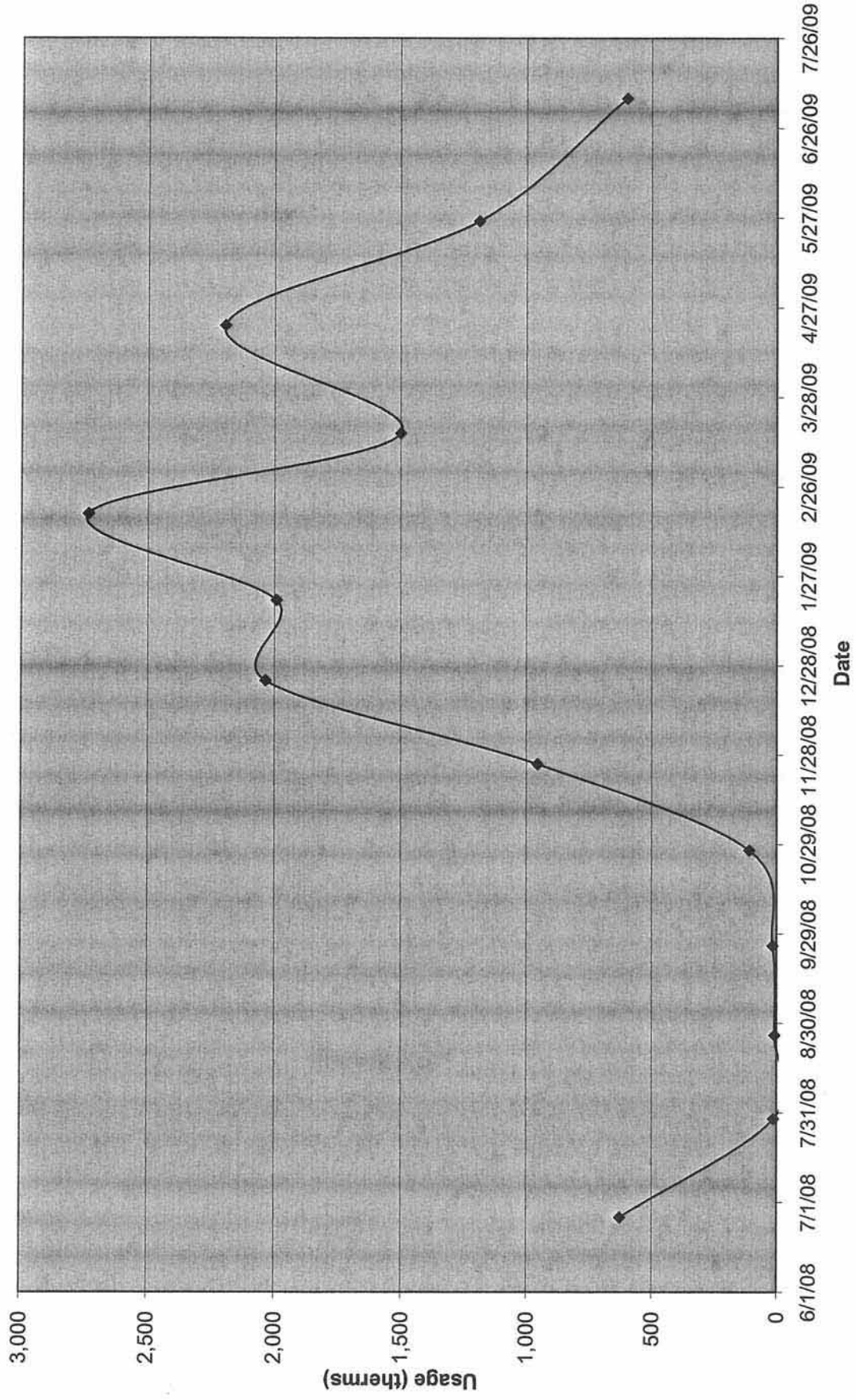
**Account Number: 52 194 310 56
PSE&G - Natural Gas Service**

Meter #: Combined

Date	Therms	Cost	(\$/Therm)
6/26/2008	628	\$1,114.02	1.775
7/29/2008	13	\$33.14	2.647
8/26/2008	7	\$23.27	3.177
9/25/2008	16	\$33.18	2.112
10/27/2008	109	\$161.16	1.481
11/25/2008	955	\$1,327.26	1.389
12/23/2008	2,035	\$2,704.49	1.329
1/19/2009	1,992	\$2,702.15	1.357
2/17/2009	2,735	\$3,504.97	1.281
3/16/2009	1,500	\$1,674.54	1.116
4/21/2009	2,195	\$2,140.90	0.975
5/26/2009	1,187	\$1,079.73	0.909
7/6/2009	599	\$556.94	0.930

Total	13,971	\$17,055.75	1.221
Most Recent Yr	13,343	\$15,941.73	1.195

Natural Gas Usage - South Plainfield/Borough Hall



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

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

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

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

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

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

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

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

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

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

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

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

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

Integrus Energy Services, Inc.
99 Wood Avenue, Suite 802
Iselin, NJ 08830
www.integrusenergy.com

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

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

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

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

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

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

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.greasterngas.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.tignaturalgas.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 GASMAR
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-1 Night Setback

Borough of South Plainfield
CHA #20549

Bldg: Borough Hall Municipal Building

ECM-1 Night Setback

Municipal Offices Only

Building Footprint	7,833 SF
Heating Efficiency	12%
Cooling Efficiency	12%
Building Balance Temp	60 °F
Internal Gains	66,224 btuh
Unoc Internal Gain factor	0.03
Ave Occ Internal Gain Factor	0.7

Ex Occupied Cing Temp	70 °F
Ex Unoccupied Cing Temp	70 °F
Prop Occupied Cing Temp	70 °F
Prop Unoccupied Cing Temp	70 °F
Occupied Cooling UA	-5,243 btuh/°F
Unoccupied Cooling UA	-1,541 btuh/°F
Cooling Occ Enthalpy Setpoint	23.3 Bulb
Cooling Unocc Enthalpy Setpoint	23.3 Bulb

Ex Occupied Htg Temp	65 °F
Ex Unoccupied Htg Temp	65 °F
Prop Occupied Htg Temp	65 °F
Prop Unoccupied Htg Temp	65 °F
Occupied Heating UA	2,435 btuh/°F
Unoccupied Heating UA	2,435 btuh/°F

Heating Energy Savings
Cooling Energy Savings
1,369 therms
5,228 kWh

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

Avg Outdoor Air Temp, Bins °F	Avg Outdoor Air Enthalpy	EXISTING LOADS				PROPOSED LOADS										Existing Heating Energy therms	Proposed Heating Energy kWh	Existing Heating Energy therms	Proposed Heating Energy therms
		Existing Equipment Bins Hours	Occupied Equipment Bins Hours	Unoccupied Equipment Bins Hours	Envelope Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied 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		
102.5	49.1	0	0	0	-202,621	-212,059	-123,259	-90,076	-2,218	-103,053	-90,076	-2,218	-163,405	-144,771	-48,266	-202,621	0	0	0
87.5	42.5	3	1	2	-163,405	-144,771	-103,053	-81,494	-2,218	-82,846	-81,494	-2,218	-135,188	-114,771	-48,266	-163,405	67	55	0
82.5	38.5	34	8	26	-135,188	-114,771	-82,846	-62,405	-2,218	-62,405	-62,405	-2,218	-102,971	-84,620	-48,266	-135,188	617	474	0
80.5	36.6	100	100	100	-102,971	-84,620	-62,405	-48,266	-2,218	-48,266	-48,266	-2,218	-68,753	-58,112	-48,266	-102,971	1,829	1,278	0
77.5	31.6	820	116	371	-68,753	-58,112	-48,266	-35,944	-2,218	-35,944	-35,944	-2,218	-35,944	-35,944	-2,218	-68,753	2,280	0	0
72.5	23.2	654	148	472	-35,944	-35,944	-35,944	-35,944	-2,218	-35,944	-35,944	-2,218	-35,944	-35,944	-2,218	-35,944	1,946	0	0
67.5	27	854	203	551	-3,322	-3,322	-3,322	-3,322	-2,218	-3,322	-3,322	-2,218	-3,322	-3,322	-2,218	-3,322	1,130	0	0
62.5	24.5	927	221	706	14,732	11,973	14,732	11,973	-2,218	14,732	11,973	-2,218	14,732	11,973	-2,218	14,732	500	664	0
57.5	21.4	600	143	457	28,124	22,857	28,124	22,857	-2,218	28,124	22,857	-2,218	28,124	22,857	-2,218	28,124	0	210	44
52.5	18.7	611	145	466	41,516	33,741	41,516	33,741	-2,218	41,516	33,741	-2,218	41,516	33,741	-2,218	41,516	0	362	103
47.5	16.2	611	145	466	54,909	44,625	54,909	44,625	-2,218	54,909	44,625	-2,218	54,909	44,625	-2,218	54,909	0	511	342
42.5	14.4	656	156	500	68,301	55,509	68,301	55,509	-2,218	68,301	55,509	-2,218	68,301	55,509	-2,218	68,301	0	708	527
37.5	12.6	1,023	244	779	81,694	66,393	81,694	66,393	-2,218	81,694	66,393	-2,218	81,694	66,393	-2,218	81,694	0	1,353	1,071
32.5	10.7	734	175	559	95,086	77,278	95,086	77,278	-2,218	95,086	77,278	-2,218	95,086	77,278	-2,218	95,086	0	1,149	947
27.5	8.6	334	80	254	108,479	88,162	108,479	88,162	-2,218	108,479	88,162	-2,218	108,479	88,162	-2,218	108,479	0	604	512
22.5	6.8	252	60	192	121,871	99,046	121,871	99,046	-2,218	121,871	99,046	-2,218	121,871	99,046	-2,218	121,871	0	517	448
17.5	5.5	125	30	95	135,263	109,830	135,263	109,830	-2,218	135,263	109,830	-2,218	135,263	109,830	-2,218	135,263	0	287	252
12.5	4.1	47	11	36	148,656	120,814	148,656	120,814	-2,218	148,656	120,814	-2,218	148,656	120,814	-2,218	148,656	0	119	108
7.5	2.6	22	5	17	162,048	131,698	162,048	131,698	-2,218	162,048	131,698	-2,218	162,048	131,698	-2,218	162,048	0	61	55
2.5	1	13	3	10	175,441	142,583	175,441	142,583	-2,218	175,441	142,583	-2,218	175,441	142,583	-2,218	175,441	0	39	36
-2.5	0	0	0	0	188,833	153,467	188,833	153,467	-2,218	188,833	153,467	-2,218	188,833	153,467	-2,218	188,833	0	0	0
-7.5	-1.5	0	0	0	202,225	164,351	202,225	164,351	-2,218	202,225	164,351	-2,218	202,225	164,351	-2,218	202,225	0	0	0
TOTALS		8,760	2,086	5,674												14,189	5,944	5,922	4,533

Existing Building Ventilation & Infiltration (occ) Heating

Existing Building Ventilation & Infiltration (occ) Cooling

Overheat Ventilation Factor

Additional Ventilation to offset overheat

Existing Building Ventilation & Infiltration (unocc)

1,832 cfm

2,082 cfm

1.10

183 cfm

862 cfm

Borough of South Plainfield

CHA #20549

Building: Borough Hall Municipal Building

ECM-1 Night Setback

Court Room Only

Building Footprint

Heating Efficiency

Cooling Efficiency

Building Balance Temp.

Internal Gains

Unoc Internal Gain factor

Ave Occ Internal Gain Factor

Ex Occupied Chg Temp.
Ex Unoccupied Chg Temp.
Prop Occupied Chg Temp.
Prop Unoccupied Chg Temp.
Unoc Cooling UA
Unoc Heating UA
Cooling Occ Enthalpy Setpoint
Cooling Unoc Enthalpy Setpoint

Ex Occupied Htg Temp.
Ex Unoccupied Htg Temp.
Prop Occupied Htg Temp.
Prop Unoccupied Htg Temp.
Unoc Heating UA
Unoc Cooling UA

Ex Occupied Htg Temp.
Ex Unoccupied Htg Temp.
Prop Occupied Htg Temp.
Prop Unoccupied Htg Temp.
Unoc Heating UA
Unoc Cooling UA

Ex Occupied Htg Temp.
Ex Unoccupied Htg Temp.
Prop Occupied Htg Temp.
Prop Unoccupied Htg Temp.
Unoc Heating UA
Unoc Cooling UA

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

Avg Outdoor Air Temp. Bins		Existing Equipment Bins		Occupied Equipment Bins		Unoccupied Equipment Bins		EXISTING LOADS				PROPOSED LOADS				Existing Cooling Energy		Proposed Cooling Energy		Existing Heating Energy		Proposed Heating Energy	
								Occupied	Unoccupied	Envelope Load	Ventilation Load	Internal Gain	Occupied	Unoccupied	Envelope Load	Ventilation Load	Internal Gain						
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	K	L	M	N	M	N	M	N
102.5	49.1	0	0	-32,717	-182,790	-16,878	-32,717	-42,390	-775	-32,717	-182,790	-16,878	-18,772	-42,390	-775	0	0	0	0	0	0	0	0
97.5	42.5	3	3	-27,354	-124,789	-16,878	-27,354	-28,939	-775	-27,354	-124,789	-16,878	-13,409	-28,939	-775	20	16	0	0	0	0	0	0
92.5	39.5	34	32	-21,990	-98,425	-16,878	-21,990	-22,825	-775	-21,990	-98,425	-16,878	-8,045	-22,825	-775	186	140	0	0	0	0	0	0
87.5	36.6	131	9	-16,627	-72,940	-16,878	-16,627	-16,915	-775	-16,627	-72,940	-16,878	-2,692	-16,915	-775	1,447	331	0	0	0	0	0	0
82.5	34	300	36	-11,263	-50,081	-16,878	-11,263	-6,725	-775	-11,263	-50,081	-16,878	0	0	-775	1,051	288	0	0	0	0	0	0
77.5	31.6	920	44	-5,900	-29,000	-16,878	-5,900	-1,834	-775	-5,900	-29,000	-16,878	0	0	-775	330	176	0	0	0	0	0	0
72.5	29.2	964	47	-536	-7,909	-16,878	-536	0	-775	-536	-7,909	-16,878	0	0	-775	173	173	0	0	0	0	0	0
67.5	26.5	827	62	0	1,712	-16,878	0	1,712	-775	0	1,712	-16,878	0	0	-775	90	160	0	0	0	0	0	0
62.5	24.1	897	65	2,186	4,157	-16,878	2,186	4,157	-775	2,186	4,157	-16,878	312	2,465	-775	38	46	0	0	0	0	0	0
57.5	21.4	893	43	8,431	8,003	-16,878	8,431	8,003	-775	8,431	8,003	-16,878	3,435	5,136	-775	8	48	0	0	0	0	0	0
52.5	18.7	810	44	11,553	9,049	-16,878	11,553	9,049	-775	11,553	9,049	-16,878	9,680	7,581	-775	0	0	139	78	0	0	0	0
47.5	16.2	811	44	14,676	11,494	-16,878	14,676	11,494	-775	14,676	11,494	-16,878	12,802	10,027	-775	0	0	372	269	0	0	0	0
42.5	14.4	656	47	17,798	13,940	-16,878	17,798	13,940	-775	17,798	13,940	-16,878	15,925	12,472	-775	0	0	317	243	0	0	0	0
37.5	12.6	1,023	73	20,921	16,385	-16,878	20,921	16,385	-775	20,921	16,385	-16,878	19,047	14,918	-775	0	0	167	133	0	0	0	0
32.5	10.7	734	52	24,043	18,831	-16,878	24,043	18,831	-775	24,043	18,831	-16,878	22,170	17,363	-775	0	0	143	118	0	0	0	0
27.5	8.6	334	24	27,166	21,276	-16,878	27,166	21,276	-775	27,166	21,276	-16,878	25,292	19,809	-775	0	0	79	67	0	0	0	0
22.5	6.8	252	18	30,289	23,722	-16,878	30,289	23,722	-775	30,289	23,722	-16,878	28,415	22,255	-775	0	0	33	28	0	0	0	0
17.5	5.3	125	9	33,411	26,167	-16,878	33,411	26,167	-775	33,411	26,167	-16,878	31,538	24,700	-775	0	0	17	15	0	0	0	0
12.5	4.1	47	3	36,534	28,613	-16,878	36,534	28,613	-775	36,534	28,613	-16,878	34,660	27,146	-775	0	0	11	10	0	0	0	0
7.5	2.6	22	2	39,656	31,059	-16,878	39,656	31,059	-775	39,656	31,059	-16,878	37,782	29,304	-775	0	0	0	0	0	0	0	0
2.5	1.0	13	1	42,779	33,504	-16,878	42,779	33,504	-775	42,779	33,504	-16,878	40,905	31,537	-775	0	0	0	0	0	0	0	0
-2.5	-1.5	0	0	45,901	35,950	-16,878	45,901	35,950	-775	45,901	35,950	-16,878	44,030	33,987	-775	0	0	0	0	0	0	0	0
TOTALS		8,760	626	8,134									3,661	1,704				1,472	1,087				

Existing Building Ventilation & Infiltration (occ) Heating
Existing Building Ventilation & Infiltration (occ) Cooling
Overheat Ventilation Factor
Additional Ventilation to offset overheat
Existing Building Ventilation & Infiltration (unocc)

453 cfm
1,953 cfm
1.00
0 cfm
453 cfm

Borough of South Plainfield
CHA #20549

Building: Borough Hall Municipal Bui Municipal Offices Only

Building Footprint 7,834 SF
Heating Efficiency 82%
Cooling Efficiency 1.26 MWh/ton
Internal Gains 65,224 bluh
Unoc Internal Gain factor 0.03
Ave Occ Internal Gain Factor 0.7
Economizer available (Y/N) No

Ex Occupied Cing Temp. 72 °F
Ex Unoccupied Cing Temp. 72 °F
Unoccupied Cooling UA (6,643) bluh/°F
Unoccupied Heating UA (4,041) bluh/°F
Cooling Occ Enthalpy Setpoint 28.3 Buils
Cooling Unocc Enthalpy Setpoint 28.3 Buils

Ex Occupied Htg Temp. 68 °F
Ex Unoccupied Htg Temp. 68 °F
Unoccupied Heating UA 2,678 bluh/°F
Unoccupied Heating UA 2,678 bluh/°F

Avg Outdoor Air Temp. Bins °F A	Avg Outdoor Air Enthalpy	Total Bin Hours				EXISTING LOADS				Unoccupied				Existing Heating Energy therm			
		B	C	D	E	Envelope Load BTUH	Ventilation Load BTUH	Internal Gain BTUH	Unoccupied Envelope Load BTUH	Unoccupied Ventilation Load BTUH	Internal Gain BTUH	Available Economizer Cooling kWh	Necessary Cooling Energy kWh	Existing Cooling Energy kWh	M	M	M
102.5	49.1	0	0	0	-202,621	-212,059	-48,266	-48,266	-103,053	-90,076	-2,218	0	0	0	0	0	0
97.5	42.5	3	1	2	-169,405	-144,771	-48,266	-48,266	-82,846	-48,503	-2,218	0	67	67	0	0	0
92.5	39.5	34	8	26	-136,188	-114,186	-48,266	-48,266	-62,640	-35,944	-2,218	0	1,829	1,829	0	0	0
87.5	36.6	131	31	100	-102,971	-84,620	-48,266	-48,266	-42,434	-24,684	-2,218	0	4,975	4,975	0	0	0
82.5	34.0	500	119	381	-69,755	-58,112	-48,266	-48,266	-22,227	-14,291	-2,218	0	3,757	3,757	0	0	0
77.5	31.6	620	148	472	-38,538	-33,644	-48,266	-48,266	-2,021	-3,898	-2,218	0	1,441	1,441	0	0	0
72.5	29.2	664	158	506	-3,322	-9,176	-48,266	-48,266	1,339	520	-2,218	0	500	500	0	0	0
67.5	27.0	854	203	651	1,339	1,088	-48,266	-48,266	28,124	10,913	-2,218	0	0	0	0	0	0
62.5	24.5	927	221	706	14,732	11,973	-48,266	-48,266	41,516	16,110	-2,218	0	0	0	0	0	0
57.5	21.4	600	143	457	28,124	22,857	-48,266	-48,266	54,909	21,306	-2,218	0	0	0	0	0	0
52.5	18.7	610	145	465	41,516	33,741	-48,266	-48,266	68,301	26,503	-2,218	0	0	0	0	0	0
47.5	16.2	611	145	466	54,909	44,625	-48,266	-48,266	81,694	31,700	-2,218	0	0	0	0	0	0
42.5	14.4	156	156	500	68,301	55,509	-48,266	-48,266	95,086	36,897	-2,218	0	0	0	0	0	0
37.5	12.6	1,023	779	779	81,694	66,393	-48,266	-48,266	121,871	47,290	-2,218	0	0	0	0	0	0
32.5	10.7	734	175	559	95,086	77,278	-48,266	-48,266	135,263	52,487	-2,218	0	0	0	0	0	0
27.5	8.6	334	80	254	108,479	88,162	-48,266	-48,266	148,656	57,683	-2,218	0	0	0	0	0	0
22.5	6.8	252	60	192	121,871	99,046	-48,266	-48,266	162,048	62,860	-2,218	0	0	0	0	0	0
17.5	5.5	125	30	95	135,263	109,930	-48,266	-48,266	175,441	66,077	-2,218	0	0	0	0	0	0
12.5	4.1	47	11	36	148,656	120,814	-48,266	-48,266	188,833	73,273	-2,218	0	0	0	0	0	0
7.5	2.6	22	5	17	162,048	131,698	-48,266	-48,266	202,225	78,470	-2,218	0	0	0	0	0	0
2.5	1.0	13	3	10	175,441	142,583	-48,266	-48,266				0	0	0	0	0	0
-2.5	0.0	0	0	0	188,833	153,467	-48,266	-48,266				0	0	0	0	0	0
-7.5	-1.5	0	0	0	202,225	164,351	-48,266	-48,266				0	0	0	0	0	0
TOTALS		3,760	2,086	6,674								14,189	14,189	14,189	5,922		

Existing Building Ventilation & Infiltration (occ) Heating
Existing Building Ventilation & Infiltration (occ) Cooling
Vertical Ventilation Factor
Additional Ventilation to offset overheat
Existing Building Ventilation & Infiltration (unocc)
Economizer Ventilation (from AHU's)

1,832 cfm
2,082 cfm
1,110 cfm
883 cfm
982 cfm
870 cfm

Building permitted sometimes open windows for fresh air

Energy Use Indices (calculated)

Heating	Base Case
Municipal	5,922
Court Rm	1,177
Police	1,111
Total	13,125
Target >	100.2%

Cooling	Base Case
Municipal	14,189
Court Rm	2,933
Police	2,907
Total	43,229
Target >	100.1%

Cooling Target
Electrical Requirements for condensing units

Unit	Cing Hrs	Apps	Volts	Phase	Power Factor	% Runtime	Annual kWh
RTU-1	1,952	52.8	208	3	0.8	25%	7,417
RTU-2	1,952	28	208	3	0.8	25%	3,933
RTU-3	1,952	16	208	3	0.8	25%	2,304
RTU-4	1,952	16	208	3	0.8	25%	2,248
RTU-5	1,952	61	208	3	0.8	25%	8,569
RTU-6	1,952	13.3	208	3	0.8	25%	2,149
RTU-7	1,952	16	208	3	0.8	25%	2,248
RTU-8	1,952	18.4	208	3	0.8	25%	2,304
Split System-1	8,760	10.1	208	1	0.8	30%	4,417
Split System-2	8,760	12.2	208	1	0.8	30%	5,339
Total							43,229

Serves Data Center
Serves Data Center

HEAT GAIN/LOSS WORKSHEET

Project Name: NJ BPU Energy Audits
 Location: South Plainfield, NJ
 Building Name: Municipal Building
 Engineer: CAA

Project No.: CHA#20549
 Site Elevation: 60 Feet
 Date: 02/09/10
 Specific Volume: 13.50 CF/#

Building/Facility Designation: Municipal Offices Only

Outdoor Winter Design DB Temperature	14 °F	Indoor Winter Design DB Temperature	68 °F
Outdoor Summer Design DB Temperature	91 °F	Indoor Summer Design DB Temperature	72 °F
Outdoor Summer Design WB Temperature	73 °F	Indoor Summer Design WB Temperature	60 °F
Outdoor Summer Humidity Ratio	0.0121 ###	Indoor Air (70°F) Humidity Ratio	0.0078 ###

ENVELOPE DESCRIPTIONS (Descriptions are from Interior to Exterior)

Walls (Select One - Type X)	R Value	Wall Type
☐ Steel Siding, 4" Insulation, Steel Siding	15.2	1
☐ Plaster or Gypsum, frame construction, 5" Insulation, 1" stucco	18.2	1
☐ 4" WH CMU, 1" Insulation, Finished Exterior	5.2	2
☐ Plaster or Gypsum, frame construction, 3" Insulation, 8" LW CMU	7.8	5
☐ 4" Face Brick, 2" Concrete, 1" Insulation, Exterior Finish	5.1	12
☐ 4" Face Brick, 4" Concrete, 1" Insulation, Exterior Finish	4.0	11
☐ Interior Finish, 2" Insulation, 8" CMU, 4" Face Brick	10.9	16
☐ Finished Surface, 8" LW CMU (filled), Air Space, 4" Face Brick	11.1	16
☐ Stucco or Gypsum, 2.5" Insul, Face Brick	14.3	10
☐ 4" Block, 1" Insulation, 8" Block	19.9	16
☒ x 3/4" Plaster, 1" Furring, 8" LW CMU, Membrane, 4" Face Brick	5.5	

Roofs (Select One)	R Value	Roof Type
☐ Tectum Deck, 3.3" Insul., BU Roof	13.0	1
☐ Steel Deck, 5" Insul., BU Roof	18.2	1
☐ Attic Roof with 6" Insul.	25.0	4
☐ 4" HW Concrete Deck, BU Roof	2.7	2
☐ Ceiling, 3" Insulation, 4" Concrete Deck, BU Roof	14.9	4
☐ Ceiling, 4" Concrete Deck, 3" Insulation, BU Roof	18.5	13
☐ Ceiling, 4" Concrete Deck, 6" Insulation, BU Roof	21.7	14
☐ Ceiling, Wood Deck, 6" Insulation, Felt & Membrane	22.7	10
☐ Wood Deck, 6" Insulation, Felt & Membrane	18.0	
☒ x Ceiling, 3" Pre-cast deck, Insulation, Felt & Membrane	14.20	

Windows (Select One)	U Value
☒ x Aluminum Frame, 1/8" SP Glazing	1.05
☐ Aluminum Frame, 1/4" DP Glazing	0.60
☐ Aluminum Frame, 3/16" DP Glazing	0.62
☐ Aluminum Frame, 1/2" DP Glazing	0.50
☐ Skylights	0.90
☐ Other	

	No Storm
Flat Glass	1.05
Flat Glass (e=.6)	1.00
Flat Glass (e=0.4)	0.90
Flat Glass (e=0.2)	0.77
Double Glaze (3/16 in air)	0.63
Double Glaze (1/4 in air)	0.60
Double Glaze (1/2 in air)	0.53
Double Glaze (e=.6)	0.50
Double Glaze (e=0.4)	0.42
Double Glaze (e=0.2)	0.35
Triple Glaze (1/4 in air)	0.42
Triple Glaze (1/2 in air)	0.35

BUILDING CHARACTERISTICS

Roof Area: 7,834 SF
 Occupied Area: 7,834 SF

Return Plenum? No

	Gross Wall Length	Average Wall Height	Ceiling Height	Window Area	Door Area	Net Wall Area
North Exposure	129 Ft	11.5 Ft	9.0 Ft	562 SF	42 SF	883 SF
East Exposure	38 Ft	11.5 Ft	9.0 Ft	484 SF	0 SF	47 SF
South Exposure	67 Ft	11.5 Ft	9.0 Ft	212 SF	42 SF	520 SF
West Exposure	123 Ft	11.5 Ft	9.0 Ft	0 SF	0 SF	1,420 SF

Forced Ventilation (Heating): 870 cfm
 Forced Ventilation (Cooling): 1,120 cfm

Requirement per 2006 International Mechanical Code based on sqft

HEAT GAIN/LOSS WORKSHEET

Project Name: NJ BPU Energy Audits
 Location: South Plainfield, NJ
 Building Name: Municipal Building
 Engineer: CAA

Project No.: CHA#20549
 Site Elevation: 80 Feet
 Date: 02/09/10

Specific Volume 13.50 CF/#

Building/Facility Designation: Municipal Offices Only

COOLING HEAT GAINS TO THE ROOM - SENSIBLE

SOLAR GAINS

WINDOWS	AREA (SF)	SHGF	Shade Coef	Cooling Load Factor	Glass Type	Solar Heat Gain
North Exposure	562	38 btu/h/sf	0.8	0.75	Glass Type C	12,802 Btu/hr
East Exposure	484	216 btu/h/sf	0.8	0.31	Glass Type C	25,927 Btu/hr
South Exposure	212	109 btu/h/sf	0.8	0.58	Glass Type C	10,709 Btu/hr
West Exposure	0	216 btu/h/sf	0.8	0.29	Glass Type C	0 Btu/hr
						49,439 Btu/h

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	560	0.18	20 °F	1.0	2,035 Btu/hr
East Exposure	-142	0.18	39 °F	1.0	-1,007 Btu/hr
South Exposure	352	0.18	27 °F	1.0	1,728 Btu/hr
West Exposure	1,109	0.18	22 °F	1.0	4,437 Btu/hr
Roof	7,834	0.07	73 °F	1.0	40,273 Btu/hr
Fenestration	1,257	1.05	19 °F		25,082 Btu/hr
Doors	84	0.14	27 °F		317 Btu/hr
Ceiling	7,834	0.14	0 °F		0 Btu/hr
Partition		0.05	0 °F		0 Btu/hr
Floor	7,834	0.04	0 °F		0 Btu/hr
					72,866 Btu/h

INTERNAL HEAT GAINS

Lights	1.50	w/sf x	7,834	Occ Area =	11.8	kW x 3.4x	1.0	RAF =	40,106	Btu/h
Plug Load	0.25	w/sf x	7,834	Occ Area =	2.0	kW x 3.4x	1.0	RAF =	6,684	Btu/h
People	25	people x	255	btu/person x	75%	time in space =			4,781	Btu/h
Computer Work Stations			25	Units x	120	W/Unit x	3414 =		10,239	Btu/h
Equipment		1.0		kW x 3.413 =					3,413	Btu/h
Misc.									0	Btu/h
									65,224	Btu/h

VENTILATION AND INFILTRATION

		Infiltration Factor	Perimeter Ratio	Coef	Temp. Diff.	Room Heat Gain
Walls	1,879 SF	0.18 CFM/SF		1.08	19 °F	7,511 Btu/h
Doors	84 SF	0.30 CFM/LF	0.62 LF/SF	1.08	19 °F	346 Btu/h
Windows	1,257 SF	0.50 CFM/LF	0.71 LF/SF	1.08	19 °F	9,927 Btu/h
Ventilation	870 cfm			1.08	19 °F	19,321 Btu/h
						37,106 Btu/h

COOLING HEAT GAINS TO THE RA PLENUM - SENSIBLE

4,950

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	323	0.18	20	1.0	1,175 Btu/hr
East Exposure	95	0.18	39	1.0	674 Btu/hr
South Exposure	168	0.18	27	1.0	826 Btu/hr
West Exposure	311	0.18	22	1.0	1,244 Btu/hr
Roof	7,834	0.07	73	0.0	0 Btu/hr
					3,919 Btu/h

INTERNAL HEAT GAINS

Lights	1.50 w/sf x	7,834 Occ Area =	11.8 kW x3413x	0.00 RAF =	0 Btu/h	
Misc.					0 Btu/h	
						0 Btu/h

SENSIBLE HEAT GAINS - TEMP. DEPENDENT

Solar	49,439
Conduction to Room	72,866
Conduction to Plenum	3,919
Ventilation and Infiltration	37,106
Sub Total	163,329

SENSIBLE HEAT GAINS - TEMP. INDEPENDENT

Internal Gains to Room	65,224
Internal Gains to Plenum	0
Sub Total	65,224

HEAT GAIN/LOSS WORKSHEET

Project Name: NJ BPU Energy Audits
 Location: South Plainfield, NJ
 Building Name: Municipal Building
 Engineer: CAA

Project No.: CHA#20549
 Site Elevation: 60 Feet
 Date: 02/09/10

Specific Volume 13.50 CF/#

Building/Facility Designation: Municipal Offices Only

LATENT COOLING LOADS

Infiltration		Infiltration Factor	Air Density	Humidity Ratio Dif.	Room Heat Gain
Walls	8,731 SF	0.18 CFM/SF	4,800	0.0043 ##	32,762 Btu/h
Doors	84 SF	0.30 CFM/LF	4,800	0.0043 ##	325 Btu/h
Windows	1,257 SF	0.50 CFM/LF	4,800	0.0043 ##	9,318 Btu/h
Ventilation	1,120 cfm		4,800	0.0043 ##	23,347 Btu/h
People	25 people	0.75 time in space		250 Btu/hr/person	4,688 Btu/h
					70,440 Btu/h

Cooling Load Summary

	Sensible	Latent	Total	SHR=	
Temperature Dependent Gains	163,329	70,440	233,769		
Temperature Indep. Gains	65,224		65,224	0.76	
Total	228,552	70,440	298,993		

Building Cooling Load 24.9 Tons at 314 SF/Ton

Building Air Flow to Condition Space based on a 12°F Temp Rise is
 17,297 CFM
 2.21 CFM/sf

HEATING CALCULATION

CONDUCTION

	NET AREA (SF)	U-VALUE	Heating Load Temp. Dif.	Room Heat Gain
North Exposure	883	0.18	54	8,668 Btu/h
East Exposure	-47	0.18	54	-461 Btu/h
South Exposure	520	0.18	54	5,107 Btu/h
West Exposure	1,420	0.18	54	13,945 Btu/h
Fenestration	1,257	1.05	54	71,286 Btu/h
Roof	7,834	0.07	54	29,791 Btu/h
Doors	84	0.14	54	634 Btu/h
Ceiling	7,834	0.14	0	0 Btu/h
Partition	0	0.05	0	0 Btu/h
Floor	7,834	0.04	50	15,668 Btu/h

Ventilation and Infiltration

	Infiltration Factor	Coef	Temp. Difference	Air Flow	Room Heat Gain
Walls	2,776 SF	0.18 CFM/SF	54	500 cfm	29,207 Btu/h
Doors	84 SF	0.30 CFM/LF	54	16 cfm	912 Btu/h
Windows	1,257 SF	0.50 CFM/LF	54	447 cfm	26,124 Btu/h
Ventilation Load	870 cfm		54	870 cfm	54,912 Btu/h
Total Ventilation & Infiltration Load				1,832 cfm	111,155 Btu/h

Building Heating Load 255,793 btu/h
 32.7 btu/sf

Borough of South Plainfield

CHA #20549

Building: Borough Hall Municipal Building

Municipal Offices Only

Doors

	Width (ft)	Height (ft)	Quantity	Area (SF)	Lineal Feet		
North	6.0	7.0	1	42.0	26.0		
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
Sub-total				42.0	26.0		
East				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
				Sub-total		0.0	0.0
South	6.0	7.0	1	42.0	26.0		
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
				0.0	0.0		
				Sub-total		42.0	26.0
West				0.0	0.0		
				0.0	0.0		
				Sub-total		0.0	0.0
				Total		84.0	52.0

LF/SF
0.62

Walls

	Width (ft)	Height (ft)	Quantity	Area (SF)	Lineal Feet
North	84.3	11.5	1	968.9	191.5
	45.0	11.5	1	517.5	113.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
	129.3			1486.4	304.5

All wall quantities must remain equal to 1

Ave. height
11.5

Average height wall automatically linked to

East	38.0	11.5	1	437.0	99.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
	38.0			437.0	99.0

Ave. height
11.5

Average height wall automatically linked to

South	32.3	11.5	1	371.5	87.6
	35.0	11.5	1	402.5	93.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
	67.3			774.0	180.6

Ave. height
11.5

Average height wall automatically linked to

West	14.0	11.5	1	161.0	51.0
	98.3	11.5	1	1132.8	219.6
	11.0	11.5	1	126.5	45.0
				0.0	0.0
				0.0	0.0
	123.3			1420.3	315.6

Ave. height
11.5

Average height auto linked to block load sheet

Windows

	Width (ft)	Height (ft)	Quantity	Area (SF)	Lineal Feet
North	5.5	5.5	14	423.5	308.0
	7.0	9.0	2	126.0	64.0
	2.0	6.0	1	12.0	16.0
				0.0	0.0
				0.0	0.0
			Sub-total	561.5	388.0

East	5.5	5.5	16	484.0	352.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
			Sub-total	484.0	352.0

South	5.5	5.5	7	211.8	154.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
			Sub-total	211.8	154.0

West				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

Total

1257.3

894.0

LF/SF
0.71

Borough of South Plainfield

CHA #20549

Building: Borough Hall Municipal Bui Court Room Only

Building Footprint
Heating Efficiency
Cooling Efficiency
Internal Gains
Unoc Internal Gain factor
Ave Occ Internal Gain Factor
Economizer available (Y/N)

1,584 SF
82%
1.28 kW/tton
22,908 Btu/h
0.03
0.7
No

Ex Occupied Cing Temp.
Ex Unoccupied Cing Temp.
Unoccupied Cooling UA
Cooling Occ Enthalpy Setpoint
Cooling Unocc Enthalpy Setpoint

72 °F
72 °F
(1,073) Btu/hr°F
(1,073) Btu/hr°F
28.3 Btu/lb
28.3 Btu/lb

Ex Occupied Htg Temp.
Ex Unoccupied Htg Temp.
Unoccupied Heating UA
Unoccupied Heating UA

66 °F
66 °F
625 Btu/hr°F
625 Btu/hr°F

Avg Outdoor Air Temp. Blns °F	Avg Outdoor Air Enthalpy	EXISTING LOADS												Existing Heating Energy therms
		Total Bin Hours	Occupied		Unoccupied				Available Economizer Cooling kWh	Necessary Cooling Energy kWh	Existing Cooling Energy kWh			
			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	
A		B	C	D	E	F	G	H	I	J	K	L	M	
102.5	49.1	0	0	0	-32,717	-182,790	-16,878	-32,717	-42,390	-775	0	0	0	
97.5	42.5	3	0	3	-27,354	-124,789	-16,878	-27,354	-28,939	-775	0	20	0	
92.5	39.5	34	2	32	-21,990	-98,425	-16,878	-21,990	-22,825	-775	0	186	0	
87.5	36.6	131	9	122	-16,527	-72,940	-16,878	-16,627	-16,915	-775	0	543	0	
82.5	34.0	500	36	464	-11,263	-50,091	-16,878	-11,263	-11,616	-775	0	1,447	0	
77.5	31.6	620	44	576	-5,900	-29,000	-16,878	-5,900	-6,725	-775	0	1,051	0	
72.5	29.2	664	47	617	-536	-7,909	-16,878	-536	-1,834	-775	0	330	0	
67.5	27.0	854	61	793	0	0	-16,878	0	0	-775	0	173	0	
62.5	24.5	927	66	861	2,186	1,712	-16,878	2,186	1,712	-775	0	90	0	
57.5	21.4	800	43	557	5,308	4,157	-16,878	5,308	4,157	-775	0	33	0	
52.5	18.7	610	44	566	8,431	6,603	-16,878	8,431	6,603	-775	0	8	0	
47.5	16.2	511	47	567	11,553	9,049	-16,878	11,553	9,049	-775	0	0	139	
42.5	14.4	656	47	609	14,676	11,494	-16,878	14,676	11,494	-775	0	0	194	
37.5	12.6	1,023	73	950	17,798	13,940	-16,878	17,798	13,940	-775	0	0	372	
32.5	10.7	734	52	682	20,921	16,385	-16,878	20,921	16,385	-775	0	0	317	
27.5	8.6	334	24	310	24,043	18,831	-16,878	24,043	18,831	-775	0	0	167	
22.5	6.8	252	18	234	27,166	21,276	-16,878	27,166	21,276	-775	0	0	143	
17.5	5.5	125	9	116	30,289	23,722	-16,878	30,289	23,722	-775	0	0	79	
12.5	4.1	47	3	44	33,411	26,167	-16,878	33,411	26,167	-775	0	0	33	
7.5	2.6	22	2	20	36,534	28,613	-16,878	36,534	28,613	-775	0	0	17	
2.5	1.0	13	1	12	39,656	31,059	-16,878	39,656	31,059	-775	0	0	11	
-2.5	0.0	0	0	0	42,779	33,504	-16,878	42,779	33,504	-775	0	0	0	
-7.5	-1.5	0	0	0	45,901	35,950	-16,878	45,901	35,950	-775	0	0	0	
TOTALS		8,760	626	8,134								3,881	1,472	

Existing Building Ventilation & Infiltration (occ) Heating

Existing Building Ventilation & Infiltration (occ) Cooling

Overheat Ventilation Factor

Additional Ventilation to offset overheat

Existing Building Ventilation & Infiltration (unocc)

Economizer Ventilation (from AHU's)

Energy Use Indices (calculated)

453 cfm

1,953 cfm

1.00

0 cfm

453 cfm

0 cfm

Heating	Base Case
Municipal	5,922
Court Rm	1,472
Police	5,731
Total	13,125
Target >=	13,100
	100.2%

Cooling	Base Case
Municipal	14,189
Court Rm	3,881
Police	25,207
Total	43,277
Target >=	43,229
	100.1%

HEAT GAIN/LOSS WORKSHEET

Project Name: NJ BPU Energy Audits
 Location: South Plainfield, NJ
 Building Name: Court Rmal Building
 Engineer: CAA

Project No.: CHA#20549
 Site Elevation: 80 Feet
 Date: 02/09/10
 Specific Volume: 13.50 CF/#

Building/Facility Designation: Court Room Only

Outdoor Winter Design DB Temperature	14 °F	Indoor Winter Design DB Temperature	66 °F
Outdoor Summer Design DB Temperature	91 °F	Indoor Summer Design DB Temperature	72 °F
Outdoor Summer Design WB Temperature	73 °F	Indoor Summer Design WB Temperature	60 °F
Outdoor Summer Humidity Ratio	0.0121 ##	Indoor Air (70°F) Humidity Ratio	0.0078 ##

ENVELOPE DESCRIPTIONS (Descriptions are from Interior to Exterior)

Walls (Select One - Type X)

	R Value	Wall Type
Steel Siding, 4" Insulation, Steel Siding	15.2	1
Plaster or Gypsum, frame construction, 5" Insulation, 1" stucco	18.2	1
4" WH CMU, 1" Insulation, Finished Exterior	5.2	2
Plaster or Gypsum, frame construction, 3" Insulation, 8" LW CMU	7.8	5
4" Face Brick, 2" Concrete, 1" Insulation, Exterior Finish	5.1	12
4" Face Brick, 4" Concrete, 1" Insulation, Exterior Finish	4.0	11
Interior Finish, 2" Insulation, 8" CMU, 4" Face Brick	10.9	16
Finished Surface, 8" LW CMU (filled), Air Space, 4" Face Brick	11.1	16
Stucco or Gypsum, 2.5" Insul, Face Brick	14.3	10
4" Block, 1" insulation, 8" Block	19.9	16
x 3/4" Plaster, 1" Furring, 8" LW CMU, Membrane, 4" Face Brick	5.5	

Roofs (Select One)

	R Value	Roof Type
Tectum Deck, 3.3" Insul., BU Roof	13.0	1
Steel Deck, 5" Insul., BU Roof	18.2	1
Attic Roof with 6" Insul.	25.0	4
4" HW Concrete Deck, BU Roof	2.7	2
x Ceiling, 3" Insulation, 4" Concrete Deck, BU Roof	14.9	4
Ceiling, 4" Concrete Deck, 3" Insulation, BU Roof	18.5	13
Ceiling, 4" Concrete Deck, 6" Insulation, BU Roof	21.7	14
Ceiling, Wood Deck, 6" Insulation, Felt & Membrane	22.7	10
Wood Deck, 6" insulation, Felt & Membrane	18.0	
Other		

Windows (Select One)

	U Value
x Aluminum Frame, 1/8" SP Glazing	1.05
Aluminum Frame, 1/4" DP Glazing	0.60
Aluminum Frame, 3/16" DP Glazing	0.62
Aluminum Frame, 1/2" DP Glazing	0.50
Skylights	0.90
Other	

	No Storm
Flat Glass	1.05
Flat Glass (e=.6)	1.00
Flat Glass (e=0.4)	0.90
Flat Glass (e=0.2)	0.77
Double Glaze (3/16 in air)	0.63
Double Glaze (1/4 in air)	0.60
Double Glaze (1/2 in air)	0.53
Double Glaze (e=.6)	0.50
Double Glaze (e=0.4)	0.42
Double Glaze (e=0.2)	0.35
Triple Glaze (1/4 in air)	0.42
Triple Glaze (1/2 in air)	0.35

BUILDING CHARACTERISTICS

Roof Area: 1,584 SF
 Occupied Area: 1,584 SF

Return Plenum? No

	Gross Wall Length	Average Wall Height	Ceiling Height	Window Area	Door Area	Net Wall Area
North Exposure	35 Ft	3.3 Ft	11.0 Ft	0 SF	0 SF	117 SF
East Exposure	50 Ft	3.3 Ft	11.0 Ft	0 SF	0 SF	167 SF
South Exposure	35 Ft	3.3 Ft	11.0 Ft	0 SF	0 SF	117 SF
West Exposure	50 Ft	3.3 Ft	11.0 Ft	0 SF	0 SF	167 SF

Forced Ventilation (Heating): 0 cfm
 Forced Ventilation (Cooling): 1,500 cfm

Requirement per 2006 International Mechanical Code based on sqft

HEAT GAIN/LOSS WORKSHEET

Project Name: NJ BPU Energy Audits
 Location: South Plainfield, NJ
 Building Name: Court Rm Building
 Engineer: CAA

Project No.: CHA#20549
 Site Elevation: 80 Feet
 Date: 02/09/10

Specific Volume 13.50 CF/#

Building/Facility Designation Court Room Only

COOLING HEAT GAINS TO THE ROOM - SENSIBLE

SOLAR GAINS

WINDOWS	AREA (SF)	SHGF	Shade Coef	Cooling Load Factor	Glass Type	Solar Heat Gain
North Exposure	0	38 btu/h/sf	0.8	0.75	Glass Type C	0 Btu/hr
East Exposure	0	216 btu/h/sf	0.8	0.31	Glass Type C	0 Btu/hr
South Exposure	0	109 btu/h/sf	0.8	0.58	Glass Type C	0 Btu/hr
West Exposure	0	216 btu/h/sf	0.8	0.29	Glass Type C	0 Btu/hr
						0 Btu/h

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	385	0.18	20 °F	1.0	1,400 Btu/hr
East Exposure	550	0.18	39 °F	1.0	3,900 Btu/hr
South Exposure	385	0.18	27 °F	1.0	1,890 Btu/hr
West Exposure	550	0.18	22 °F	1.0	2,200 Btu/hr
Roof	1,584	0.07	73 °F	1.0	7,747 Btu/hr
Fenestration	0	1.05	19 °F		0 Btu/hr
Doors	0	0.14	27 °F		0 Btu/hr
Ceiling	1,584	0.14	0 °F		0 Btu/hr
Partition		0.05	0 °F		0 Btu/hr
Floor	1,584	0.04	0 °F		0 Btu/hr
					17,137 Btu/h

INTERNAL HEAT GAINS

Lights	2.40 w/sf x	1,584 Occ Area =	3.8 kW x 3.4x	1.0 RAF =	12,975 Btu/h
Plug Load	0.05 w/sf x	1,584 Occ Area =	0.1 kW x 3.4x	1.0 RAF =	270 Btu/h
People	50 people x	255 btu/person x	75% time in space =		9,563 Btu/h
Computer Work Stations		0 Units x	120 W/Unit x	3414 =	0 Btu/h
Equipment	0.0 kW x 3.413 =				0 Btu/h
Misc.					0 Btu/h
					22,808 Btu/h

VENTILATION AND INFILTRATION

		Infiltration Factor	Perimeter Ratio	Coef	Temp. Diff.	Room Heat Gain
Walls	1,870 SF	0.18 CFM/SF		1.08	19 °F	7,475 Btu/h
Doors	0 SF	0.30 CFM/LF	0.00 LF/SF	1.08	19 °F	0 Btu/h
Windows	0 SF	0.50 CFM/LF	0.00 LF/SF	1.08	19 °F	0 Btu/h
Ventilation	0 cfm			1.08	19 °F	0 Btu/h
						7,475 Btu/h

COOLING HEAT GAINS TO THE RA PLENUM - SENSIBLE

4,950

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	133	0.18	20	1.0	484 Btu/hr
East Exposure	190	0.18	39	1.0	1,347 Btu/hr
South Exposure	133	0.18	27	1.0	653 Btu/hr
West Exposure	190	0.18	22	1.0	760 Btu/hr
Roof	1,584	0.07	73	0.0	0 Btu/hr
					3,244 Btu/h

INTERNAL HEAT GAINS

Lights	2.40 w/sf x	1,584 Occ Area =	3.8 kW x3413x	0.00 RAF =	0 Btu/h
Misc.					0 Btu/h
					0 Btu/h

SENSIBLE HEAT GAINS - TEMP. DEPENDENT

Solar	0
Conduction to Room	17,137
Conduction to Plenum	3,244
Ventilation and Infiltration	7,475
Sub Total	27,856

SENSIBLE HEAT GAINS - TEMP. INDEPENDENT

Internal Gains to Room	22,808
Internal Gains to Plenum	0
Sub Total	22,808

HEAT GAIN/LOSS WORKSHEET

Project Name: NJ BPU Energy Audits
 Location: South Plainfield, NJ
 Building Name: Court Rmal Building
 Engineer: CAA

Project No.: CHA#20549
 Site Elevation: 50 Feet
 Date: 02/09/10

Specific Volume 13.50 CF/#

Building/Facility Designation Court Room Only

LATENT COOLING LOADS

Infiltration

		Infiltration Factor	Air Density	Humidity Ratio Dif.
Walls	2,230 SF	0.18 CFM/SF	4,800	0.0043 ##
Doors	0 SF	0.30 CFM/LF	4,800	0.0043 ##
Windows	0 SF	0.50 CFM/LF	4,800	0.0043 ##
Ventilation	1,500 cfm		4,800	0.0043 ##
People	50 people	0.75 time in space		250 Btu/hr/person

Room Heat Gain

8,367 Btu/h
0 Btu/h
0 Btu/h
31,269 Btu/h
9,375 Btu/h

49,011 Btu/h

Cooling Load Summary

	Sensible	Latent	Total
Temperature Dependent Gains	27,856	49,011	76,867
Temperature Indep. Gains	22,808		22,808
Total	50,664	49,011	99,675

SHR= 0.51

Building Cooling Load 8.3 Tons at 191 SF/Ton

Building Air Flow to Condition Space based on a 12°F Temp Rise is

3,651 CFM

2.31 CFM/sf

HEATING CALCULATION

CONDUCTION

	NET AREA (SF)	U-VALUE	Heating Load Temp. Dif.
North Exposure	518	0.18	52
East Exposure	740	0.18	52
South Exposure	518	0.18	52
West Exposure	740	0.18	52
Fenestration	0	1.05	52
Roof	1,584	0.07	52
Doors	0	0.14	52
Ceiling	1,584	0.14	0
Partition	0	0.05	0
Floor	1,584	0.04	50

Room Heat Gain

4,897 Btu/h
6,996 Btu/h
4,897 Btu/h
6,996 Btu/h
0 Btu/h
5,519 Btu/h
0 Btu/h
0 Btu/h
0 Btu/h
0 Btu/h
3,168 Btu/h

Ventilation and Infiltration

		Infiltration Factor	Coef	Temp. Difference
Walls	2,516 SF	0.18 CFM/SF	1.08	52
Doors	0 SF	0.30 CFM/LF	1.08	52
Windows	0 SF	0.50 CFM/LF	1.08	52
Ventilation Load	0 cfm		1.08	52

Air Flow

453 cfm
0 cfm
0 cfm
0 cfm

Room Heat Gain

25,487 Btu/h
0 Btu/h
0 Btu/h
0 Btu/h

Total Ventilation & Infiltration Load

453 cfm

Building Heating Load 57,961

btu/h
36.6 btu/sf

Borough of South Plainfield
CHA #20549
Building: Borough Hall Municipal Building
Court Room Only

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
				0.0	0.0
			Sub-total	0.0	0.0
East				0.0	0.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
			Sub-total	0.0	0.0
South				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
West				0.0	0.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
			Sub-total	0.0	0.0
			Total	0.0	0.0

LF/SF
0.00

Walls

Note: Courtroom area enclosed within building. These walls rise up above surrounding areas.

	Width (ft)	Height (ft)	Quantity	Area (SF)	Lineal Feet	
North	35.0	3.3	1	116.6	76.7	All wall quantities must remain equal to 1
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
	35.0			116.6	76.7	

Ave. height
3.3

Average height wall automatically linked to

East	50.0	3.3	1	166.5	106.7	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
	50.0			166.5	106.7	

Ave. height
3.3

Average height wall automatically linked to

South	35.0	3.3	1	116.6	76.7	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
	35.0			116.6	76.7	

Ave. height
3.3

Average height wall automatically linked to

West	50.0	3.3	1	166.5	106.7	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
				0.0	0.0	
	50.0			166.5	106.7	

Ave. height
3.3

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
			Sub-total	0.0	0.0

East				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

South				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

West				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

Total

0.0

0.0

LF/SF
0.00

Borough of South Plainfield

CHA #20549

Building: Borough Hall Municipal Bull Police Department Only

Building Footprint: 5,010 SF
 Heating Efficiency: 92%
 Cooling Efficiency: 126 kWh/ton
 Internal Gains: 52,178 btu/h
 Ave Occ Internal Gain Factor: 0.03
 Economizer available (Y/N): 0.7

Ex Occupied Cing Temp.
 Ex Unoccupied Cing Temp.
 Occupied Cooling UA
 Unoccupied Cooling UA
 Cooling Occ Enthalpy Setpoint
 Cooling Unocc Enthalpy Setpoint

72 °F
 72 °F
 (2,975) btu/hr°F
 (2,005) btu/hr°F
 28.3 Btu/lb
 28.3 Btu/lb

Ex Occupied Htg Temp.
 Ex Unoccupied Htg Temp.
 Occupied Heating UA
 Unoccupied Heating UA

74 °F
 74 °F
 1,148 btu/hr°F
 1,148 btu/hr°F

Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Total Bin Hours	EXISTING LOADS										Existing Heating Energy therms	
			Occupied					Unoccupied						
			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
A		B	C	D	E	F	G	H	I	J	K	L	M	
102.5	49.1	0	0	0	-90,735	-351,330	-38,612	-61,155	-38,506	-1,774	0	0	0	0
97.5	42.5	3	3	0	-75,860	-239,850	-38,612	-51,130	-26,288	-1,774	0	112	0	0
92.5	39.5	34	34	0	-60,986	-189,178	-38,612	-41,104	-20,734	-1,774	0	1,031	0	0
87.5	36.6	131	131	0	-46,111	-140,194	-38,612	-31,079	-15,365	-1,774	0	3,094	0	0
82.5	34.0	500	500	0	-31,237	-96,278	-38,612	-21,053	-10,552	-1,774	0	8,722	0	0
77.5	31.6	620	620	0	-16,362	-55,740	-38,612	-11,028	-6,109	-1,774	0	7,207	0	0
72.5	29.2	664	664	0	-1,487	-15,202	-38,612	-1,003	-1,666	-1,774	0	3,856	0	0
67.5	27.0	854	854	0	7,461	17,926	-38,612	7,461	2,888	-1,774	0	1,186	0	0
62.5	24.5	927	927	0	13,201	31,715	-38,612	13,201	5,109	-1,774	0	0	0	71
57.5	21.4	600	600	0	18,941	45,504	-38,612	18,941	7,331	-1,774	0	0	0	189
52.5	18.7	610	610	0	24,680	59,293	-38,612	24,680	9,552	-1,774	0	0	0	337
47.5	16.2	611	611	0	30,420	73,082	-38,612	30,420	11,774	-1,774	0	0	0	484
42.5	14.4	656	656	0	36,159	86,871	-38,612	36,159	13,995	-1,774	0	0	0	675
37.5	12.6	1,023	1,023	0	41,899	100,660	-38,612	41,899	16,217	-1,774	0	0	0	1,297
32.5	10.7	734	734	0	47,638	114,449	-38,612	47,638	18,438	-1,774	0	0	0	1,105
27.5	8.6	334	334	0	53,378	128,238	-38,612	53,378	20,660	-1,774	0	0	0	582
22.5	6.8	252	252	0	59,118	142,027	-38,612	59,118	22,881	-1,774	0	0	0	499
17.5	5.5	125	125	0	64,857	155,816	-38,612	64,857	25,103	-1,774	0	0	0	278
12.5	4.1	47	47	0	70,597	169,605	-38,612	70,597	27,324	-1,774	0	0	0	116
7.5	2.6	22	22	0	76,336	183,394	-38,612	76,336	29,546	-1,774	0	0	0	59
2.5	1.0	13	13	0	82,076	197,183	-38,612	82,076	31,767	-1,774	0	0	0	38
-2.5	0.0	0	0	0	87,816	210,972	-38,612	87,816	33,989	-1,774	0	0	0	0
-7.5	-1.5	0	0	0	93,555	224,761	-38,612	93,555	36,210	-1,774	0	0	0	0
TOTALS		8,760	8,760	0								25,207	25,207	5,731

Existing Building Ventilation & Infiltration (occ) Heating
 Existing Building Ventilation & Infiltration (occ) Cooling
 Overheat Ventilation Factor
 Additional ventilation to offset overheat
 Existing Building Ventilation & Infiltration (unocc)
 Economizer Ventilation (from AHU's)

2,321 cfm
 3,521 cfm
 1.10
 232 cfm
 411 cfm
 1,910 cfm

Building personnel sometimes open windows for fresh air

Energy Use Indices (calculated)

Heating	Base Case
Municipal	5,922
Court Rm	1,472
Police	5,731
Total	13,125
Target >=	13,100
	100.2%

Cooling	Base Case
Municipal	14,189
Court Rm	3,881
Police	25,207
Total	43,277
Target >=	43,229
	100.1%

HEAT GAIN/LOSS WORKSHEET

Project Name: NJ BPU Energy Audits
 Location: South Plainfield, NJ
 Building Name: Policeal Building
 Engineer: CAA

Project No.: CHA#20549
 Site Elevation: 60 Feet
 Date: 02/09/10

Specific Volume 13.50 CF#

Building/Facility Designation Police Department Only

Outdoor Winter Design DB Temperature 14 °F
 Outdoor Summer Design DB Temperature 91 °F
 Outdoor Summer Design WB Temperature 73 °F
 Outdoor Summer Humidity Ratio 0.0121 ##

Indoor Winter Design DB Temperature 74 °F
 Indoor Summer Design DB Temperature 72 °F
 Indoor Summer Design WB Temperature 60 °F
 Indoor Air (70°F) Humidity Ratio 0.0078 ##

ENVELOPE DESCRIPTIONS (Descriptions are from Interior to Exterior)

Walls (Select One - Type X)

	R Value	Wall Type
Steel Siding, 4" Insulation, Steel Siding	15.2	1
Plaster or Gypsum, frame construction, 5" Insulation, 1" stucco	18.2	1
4" WH CMU, 1" Insulation, Finished Exterior	5.2	2
Plaster or Gypsum, frame construction, 3" Insulation, 8" LW CMU	7.8	5
4" Face Brick, 2" Concrete, 1" Insulation, Exterior Finish	5.1	12
4" Face Brick, 4" Concrete, 1" Insulation, Exterior Finish	4.0	11
Interior Finish, 2" Insulation, 8" CMU, 4" Face Brick	10.9	16
Finished Surface, 8" LW CMU (filled), Air Space, 4" Face Brick	11.1	16
Stucco or Gypsum, 2.5" Insul, Face Brick	14.3	10
4" Block, 1" insulation, 8" Block	19.9	16
x 3/4" Plaster, 1" Furring, 8" LW CMU, Membrane, 4" Face Brick	5.5	

Roofs (Select One)

	R Value	Roof Type
Tectum Deck, 3.3" Insul., BU Roof	13.0	1
Steel Deck, 5" Insul., BU Roof	18.2	1
Attic Roof with 6" Insul.	25.0	4
4" HW Concrete Deck, BU Roof	2.7	2
x Ceiling, 3" Insulation, 4" Concrete Deck, BU Roof	14.9	4
Ceiling, 4" Concrete Deck, 3" Insulation, BU Roof	18.5	13
Ceiling, 4" Concrete Deck, 6" Insulation, BU Roof	21.7	14
Ceiling, Wood Deck, 6" Insulation, Felt & Membrane	22.7	10
Wood Deck, 6" insulation, Felt & Membrane	18.0	
Other		

Windows (Select One)

	U Value
x Aluminum Frame, 1/8" SP Glazing	1.05
Aluminum Frame, 1/4" DP Glazing	0.60
Aluminum Frame, 3/16" DP Glazing	0.62
Aluminum Frame, 1/2" DP Glazing	0.50
Skylights	0.90
Other	

	No Storm
Flat Glass	1.05
Flat Glass (e=.6)	1.00
Flat Glass (e=0.4)	0.90
Flat Glass (e=0.2)	0.77
Double Glaze (3/16 in air)	0.63
Double Glaze (1/4 in air)	0.60
Double Glaze (1/2 in air)	0.53
Double Glaze (e=.6)	0.50
Double Glaze (e=0.4)	0.42
Double Glaze (e=0.2)	0.35
Triple Glaze (1/4 in air)	0.42
Triple Glaze (1/2 in air)	0.35

BUILDING CHARACTERISTICS

Roof Area 5,010 SF
 Occupied Area 5,010 SF

Return Plenum? No

	Gross Wall Length	Average Wall Height	Ceiling Height	Window Area	Door Area	Net Wall Area
North Exposure	6 Ft	11.5 Ft	9.0 Ft	0 SF	0 SF	69 SF
East Exposure	0 Ft	0.0 Ft	9.0 Ft	0 SF	0 SF	0 SF
South Exposure	71 Ft	11.5 Ft	9.0 Ft	212 SF	21 SF	584 SF
West Exposure	81 Ft	11.5 Ft	9.0 Ft	154 SF	42 SF	736 SF

Forced Ventilation (Heating) 1,910 cfm
 Forced Ventilation (Cooling) 3,110 cfm

Requirement per 2006 International Mechanical Code based on sqft

HEAT GAIN/LOSS WORKSHEET

Project Name: NJ BPU Energy Audits
 Location: South Plainfield, NJ
 Building Name: Policeal Building
 Engineer: CAA

Project No.: CHA#20549
 Site Elevation: 60 Feet
 Date: 02/09/10

Specific Volume 13.50 CF/#

Building/Facility Designation Police Department Only

COOLING HEAT GAINS TO THE ROOM - SENSIBLE

SOLAR GAINS

WINDOWS	AREA (SF)	SHGF	Shade Coef	Cooling Load Factor	Glass Type	Solar Heat Gain
North Exposure	0	38 btu/h/sf	0.8	0.75	Glass Type C	0 Btu/hr
East Exposure	0	216 btu/h/sf	0.8	0.31	Glass Type C	0 Btu/hr
South Exposure	212	109 btu/h/sf	0.8	0.58	Glass Type C	10,709 Btu/hr
West Exposure	154	216 btu/h/sf	0.8	0.29	Glass Type C	7,717 Btu/hr
						18,427 Btu/h

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	54	0.18	20 °F	1.0	196 Btu/hr
East Exposure	0	0.18	39 °F	1.0	0 Btu/hr
South Exposure	406	0.18	27 °F	1.0	1,994 Btu/hr
West Exposure	533	0.18	22 °F	1.0	2,132 Btu/hr
Roof	5,010	0.07	73 °F	1.0	24,504 Btu/hr
Fenestration	366	1.05	19 °F		7,297 Btu/hr
Doors	63	0.14	27 °F		238 Btu/hr
Ceiling	5,010	0.14	0 °F		0 Btu/hr
Partition		0.05	0 °F		0 Btu/hr
Floor	5,010	0.04	0 °F		0 Btu/hr
					36,361 Btu/h

INTERNAL HEAT GAINS

Lights	1.50	w/sf x	5,010	Occ Area =	7.5	kW x 3.4x	1.0	RAF =	25,649	Btu/h
Plug Load	0.25	w/sf x	5,010	Occ Area =	1.3	kW x 3.4x	1.0	RAF =	4,275	Btu/h
People	20	people x	255	btu/person x	75%	time in space =			3,825	Btu/h
Computer Work Stations			20	Units x	120	W/Unit x	3414 =		8,191	Btu/h
Equipment			3.0	kW x 3.413 =					10,239	Btu/h
Misc.									0	Btu/h
									52,179	Btu/h

VENTILATION AND INFILTRATION

		Infiltration Factor	Perimeter Ratio	Coef	Temp. Diff.	Room Heat Gain
Walls	993 SF	0.18 CFM/SF		1.08	19 °F	3,970 Btu/h
Doors	63 SF	0.30 CFM/LF	0.95 LF/SF	1.08	19 °F	400 Btu/h
Windows	366 SF	0.50 CFM/LF	0.78 LF/SF	1.08	19 °F	3,187 Btu/h
Ventilation	1,910 cfm			1.08	19 °F	42,417 Btu/h
						49,975 Btu/h

COOLING HEAT GAINS TO THE RA PLENUM - SENSIBLE

4,950

CONDUCTION

	NET AREA (SF)	U-VALUE	Cooling Load Temp. Dif.	Return Air Factor	Room Heat Gain
North Exposure	15	0.18	20	1.0	55 Btu/hr
East Exposure	0	0.18	39	1.0	0 Btu/hr
South Exposure	178	0.18	27	1.0	871 Btu/hr
West Exposure	203	0.18	22	1.0	810 Btu/hr
Roof	5,010	0.07	73	0.0	0 Btu/hr
					1,736 Btu/h

INTERNAL HEAT GAINS

Lights	1.50 w/sf x	5,010 Occ Area =	7.5 kW x3413x	0.00 RAF =	0 Btu/h	
Misc.					0 Btu/h	
						0 Btu/h

SENSIBLE HEAT GAINS - TEMP. DEPENDENT

Solar	18,427
Conduction to Room	36,361
Conduction to Plenum	1,736
Ventilation and Infiltration	49,975
Sub Total	106,498

SENSIBLE HEAT GAINS - TEMP. INDEPENDENT

Internal Gains to Room	52,179
Internal Gains to Plenum	0
Sub Total	52,179

HEAT GAIN/LOSS WORKSHEET

Project Name: NJ BPU Energy Audits
 Location: South Plainfield, NJ
 Building Name: Policeal Building
 Engineer: CAA

Project No.: CHA#20549
 Site Elevation: 60 Feet
 Date: 02/09/10

Specific Volume 13.50 CF/#

Building/Facility Designation Police Department Only

LATENT COOLING LOADS

Infiltration

		Infiltration Factor	Air Density	Humidity Ratio Dif.
Walls	5,405 SF	0.18 CFM/SF	4,800	0.0043 ##
Doors	63 SF	0.30 CFM/LF	4,800	0.0043 ##
Windows	366 SF	0.50 CFM/LF	4,800	0.0043 ##
Ventilation	3,110 cfm		4,800	0.0043 ##
People	20 people	0.75 time in space		250 Btu/hr/person

Room Heat Gain	
20,281	Btu/h
375	Btu/h
2,991	Btu/h
64,830	Btu/h
3,750	Btu/h

92,228 Btu/h

Cooling Load Summary

	Sensible	Latent	Total	SHR=	
Temperature Dependent Gains	106,498	92,228	198,726		
Temperature Indep. Gains	52,179		52,179	0.63	
Total	158,677	92,228	250,904		

Building Cooling Load 20.9 Tons at 240 SF/Ton

Building Air Flow to Condition Space based on a 12°F Temp Rise is

12,084 CFM
 2.41 CFM/sf

HEATING CALCULATION

CONDUCTION

	NET AREA (SF)	U-VALUE	Heating Load Temp. Dif.
North Exposure	69	0.18	60
East Exposure	0	0.18	60
South Exposure	584	0.18	60
West Exposure	736	0.18	60
Fenestration	366	1.05	60
Roof	5,010	0.07	60
Doors	63	0.14	60
Ceiling	5,010	0.14	0
Partition	0	0.05	0
Floor	5,010	0.04	50

Room Heat Gain

753	Btu/h
0	Btu/h
6,368	Btu/h
8,024	Btu/h
23,042	Btu/h
20,140	Btu/h
528	Btu/h
0	Btu/h
0	Btu/h
10,020	Btu/h

Ventilation and Infiltration

		Infiltration Factor	Coef	Temp. Difference	Air Flow
Walls	1,388 SF	0.18 CFM/SF	1.08	60	250 cfm
Doors	63 SF	0.30 CFM/LF	1.08	60	18 cfm
Windows	366 SF	0.50 CFM/LF	1.08	60	144 cfm
Ventilation Load	1,910 cfm				1,910 cfm
Total Ventilation & Infiltration Load					2,321 cfm

Room Heat Gain

16,227	Btu/h
1,169	Btu/h
9,318	Btu/h
133,950	Btu/h
160,664	Btu/h

Building Heating Load 229,539 btu/h
 45.8 btu/sf

Borough of South Plainfield

CHA #20549

Building: Borough Hall Municipal Building

Police Department Only

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
				0.0	0.0
				Sub-total	0.0

East		0.0	0.0
		0.0	0.0
		0.0	0.0
	Sub-total	0.0	0.0

South	3.0	7.0	1	21.0	20.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
	Sub-total			21.0	20.0

West	3.0	7.0	2	42.0	40.0
				0.0	0.0
	Sub-total			42.0	40.0

Total 63.0 60.0

LF/SF
0.95

Walls

	Width (ft)	Height (ft)	Quantity	Area (SF)	Lineal Feet
North	6.0	11.5	1	69.0	35.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
	6.0			69.0	35.0

All wall quantities must remain equal to 1

Ave. height
11.5

Average height wall automatically linked to

East				0.0	0.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
	0.0			0.0	0.0

Ave. height
0.0

Average height wall automatically linked to

South	62.0	11.5	1	713.0	147.0
	9.0	11.5	1	103.5	41.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
	71.0			816.5	188.0

Ave. height
11.5

Average height wall automatically linked to

West	35.0	11.5	1	402.5	93.0
	46.0	11.5	1	529.0	115.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
	81.0			931.5	208.0

Ave. height
11.5

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
			Sub-total	0.0	0.0

East				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

South	5.5	5.5	7	211.8	154.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
			Sub-total	211.8	154.0

West	4.0	5.5	7	154.0	133.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
				0.0	0.0
			Sub-total	154.0	133.0

Total

365.8

287.0

LF/SF
0.78

ECM-1 Night Setback

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

[illegible]

*Existing cooling thermostats are programmable and will simply need to be reprogrammed for setback. This should be done in all municipal offices and the court room with the appropriate occupancy schedules.

\$	2,161	Subtotal
\$	216	10% Contingency
\$	238	10% Contractor O&P
\$	-	10% Engineering
\$	2,615	Total

APPENDIX C

ECM-2 Boiler Replacement

Borough of South Plainfield
CHA #20549

Building: Borough Hall Municipal Building

ECM-2 Boiler Replacement

Existing Fuel	Nat.Gas	▼
Proposed Fuel	Nat.Gas	▼

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	\$ 1.20		
Proposed Fuel Cost	\$ 1.20		
Baseline Fuel Use	13,100	Therms	Based on historical utility data
Existing Boiler Plant Efficiency	82%		Estimated or Measured
Baseline Boiler Load	1,074,200	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	\$ 15,655		
Proposed Boiler Plant Efficiency	88%		New Boiler Efficiency
Proposed Fuel Use	12,207	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	\$ 14,587		
Annual Savings	893	Therms	
Annual Savings	\$ 1,067	/yr	

Borough of South Plainfield
CHA #20549
Building: Borough Hall Municipal Building
ECM-2 Boiler Replacement

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	4	EA		\$ 500		\$ -	\$ 2,420	\$ -	\$ 2,420	
900 MBH Gas-Fired Condensing HW Boiler*	2	EA	\$ 18,000	\$ 3,950		\$ 35,280	\$ 9,559	\$ -	\$ 44,839	
Condensate Neutralization Kit	1	EA	\$ 300	\$ 250		\$ 294	\$ 303	\$ -	\$ 597	
Flue Replacement	25	LF	\$ 175	\$ 40		\$ 4,288	\$ 1,210	\$ -	\$ 5,498	
Miscellaneous Electrical	1	LS	\$ 500	\$ 500		\$ -	\$ 605	\$ -	\$ 605	
Piping	50	LF	\$ 33	\$ 20		\$ 1,593	\$ 1,180	\$ -	\$ 2,772	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	

*Pricing based on Aerco Modulex MLX-909 boiler

\$ 56,730	Subtotal
\$ 5,673	10% Contingency
\$ 9,360	15% Contractor O&P
\$ -	10% Engineering
\$ 71,764	Total

New Jersey Smart Start and PSE&G Direct Install Program Incentives	QTY	UNIT	\$/ UNIT	TOTAL SAVINGS	Cost W/O INCENTIVE	Cost W/ INCENTIVE
NG Boilers ≥ 300 - < 1500 MBH	1,800	MBH	\$1.75	\$3,150	\$ 44,839	\$ 41,689
				\$3,150	\$44,839	\$41,689

Total ECM Cost w/ Incentives	\$68,614
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APPENDIX D

ECM-3 Hot Water Temperature Reset

Borough of South Plainfield
 CHA #20549
 Building: Borough Hall Municipal Building
 ECM-3 Hot Water Temperature Reset

Description
 Existing heating hot water (HHW) supply setpoint is 180°F.
Proposed:
 Vary heating hot water supply temperature as building heating load decreases in relation to outside air temperature.

A	B	C	D	E	F	G	H	I
Amb. Bin Temp °F	Avg. DB Bin Temp °F	Bin Hours	Heating Bin HOURS	Existing Heat Loss In Piping MBH	Avg. HHW Temp @ OA Temp °F	Proposed Heat Loss In Piping MBH	Existing Utility Use Therms/Yr	Proposed Utility Use Therms/Yr
100-104	102.0	0	0	0	0	0	0	0
95-99	97.0	3	0	0	0	0	0	0
90-94	92.0	34	0	0	0	0	0	0
85-89	87.0	131	0	0	0	0	0	0
80-84	82.0	500	0	0	0	0	0	0
75-79	77.0	620	0	0	0	0	0	0
70-74	72.0	664	0	0	0	0	0	0
65-69	67.0	854	0	0	0	0	0	0
60-64	62.0	927	927	24,434	160	22,132	298	270
55-59	57.0	600	600	15,815	161	14,325	193	175
50-54	52.0	610	610	16,078	162	14,564	196	178
45-49	47.0	611	611	16,105	163	14,588	196	178
40-44	42.0	656	656	17,291	163	15,662	211	191
35-39	37.0	1,023	1,023	26,964	164	24,424	329	298
30-34	32.0	734	734	19,347	165	17,524	236	214
25-29	27.0	334	334	8,804	166	7,974	107	97
20-24	22.0	252	252	6,642	167	6,017	81	73
15-19	17.0	125	125	3,295	168	2,984	40	36
10-14	12.0	47	47	1,239	168	1,122	15	14
5-9	7.0	22	22	580	169	525	7	6
0-4	2.0	13	13	343	170	310	4	4
-5 -1	-3.0	0	0	0	170	0	0	0
-10 -6	-8.0	0	0	0	170	0	0	0
Totals		8,760	5,954	156,936		142,152	1,914	1,734

Annual Energy Savings	\$	180 Therms/yr
Annual Cost Savings		215 /yr

Comments:
 A-C Newark, NJ weather bins
 D Based on building balance points and bin data.
 E Existing heat loss in piping system based on current average HHW temperature.
 F Estimated Average HHW temperature with HW reset based on OA temperature.
 G Proposed heat loss in piping system based on estimated average HW temperature. Return HHW temp min 70 deg F
 H-I Utility usage to overcome heat loss in HHW piping system based on boiler efficiency.

Existing Boiler Efficiency	82%
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Building HHW Piping System	
Heating On Temperature	65 °F
Total Length of Pipe	1910 LF
Existing HHW Setpoint High	180 °F
Existing HHW Setpoint Low	160 °F
Avg HHW Temp	170 °F
Avg Pipe Size	1 1/2 Inches
Avg Insul Thickness	1 Inches
Existing Heat Loss	13.8 Btu/Hr/LF
Percent in Uncond. Space	100%
Existing System Heat Loss	26,358 Btu/Hr
Proposed Min HHW Return*	150 °F
Avg Prop HHW Supply Temp	163 °F
Proposed Heat Loss	12.5 Btu/Hr/LF
Proposed System Heat Loss	23,875 Btu/Hr

*Refer to existing boiler capabilities

Size (in)	Length (ft)
1/2	160
3/4	210
1	500
1 1/4	490
1 1/2	260
2	170
2 1/2	65
3	55
1 1/2 Average	

Borough of South Plainfield
CHA #20549
Building: Borough Hall Municipal Building
ECM-3 Hot Water Temperature Reset

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

	QTY	UNIT COSTS			SUBTOTAL COSTS				TOTAL COST	REMARKS
		UNIT	MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Demand Control Ventilation										
Boiler Energy Management System	1	EA	\$ 2,300	\$ 1,500	\$ -	\$ 2,254	\$ 1,815	\$ -	\$ 4,069	
Miscellaneous Electrical	1	LS		\$ 500		\$ -	\$ 605	\$ -	\$ 605	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	

Subtotal	\$	4,674
10% OH, 10% Profit	\$	935
10% Contingency	\$	561
Total	\$	6,170

APPENDIX E

ECM-4 Boiler Replacement with Hot Water Temperature Reset

Borough of South Plainfield
CHA #20549

Building: Borough Hall Municipal Building

ECM-4 Boiler Replacement with Hot Water Temperature Reset

Existing Fuel	Nat.Gas	▼
Proposed Fuel	Nat.Gas	▼

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	\$ 1.20		
Proposed Fuel Cost	\$ 1.20		
Baseline Fuel Use	13,100	Therms	Based on historical utility data
Existing Boiler Plant Efficiency	82%		Estimated or Measured
Baseline Boiler Load	1,074,200	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	\$ 15,655		
Proposed Boiler Plant Efficiency	92%		New Boiler Efficiency @ 160 deg F HHW return
Proposed Fuel Use	11,638	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	\$ 13,908		
Annual Savings	1,462	Therms	
Annual Savings	\$ 1,747	/yr	

Borough of South Plainfield
CHA #20549
Building: Borough Hall Municipal Building

ECM-4 Boiler Replacement with Hot Water Temperature Reset

Description

Existing heating hot water (HHW) supply setpoint is 180°F.

Proposed:

Vary heating hot water supply temperature as building heating load decreases in relation to outside air temperature.

A	B	C	D	E	F	G	H	I	J
Amb. Bin Temp °F	Avg. DB Bin Temp °F	Bin Hours	Heating Bin HOURS	Existing Heat Loss In Piping MBH	Avg. HHW Temp @ OA Temp °F	Proposed Heat Loss In Piping MBH	Proposed Boiler Efficiency	Existing Utility Use Therms/Yr	Proposed Utility Use Therms/Yr
100-104	102.0	0	0	0	0	0	0.0%	0	0
95-99	97.0	3	0	0	0	0	0.0%	0	0
90-94	92.0	34	0	0	0	0	0.0%	0	0
85-89	87.0	131	0	0	0	0	0.0%	0	0
80-84	82.0	500	0	0	0	0	0.0%	0	0
75-79	77.0	620	0	0	0	0	0.0%	0	0
70-74	72.0	664	0	0	0	0	0.0%	0	0
65-69	67.0	854	0	0	0	0	0.0%	0	0
60-64	62.0	927	927	24,434	80	12,748	96.0%	255	133
55-59	57.0	600	600	15,815	88	8,251	95.0%	166	87
50-54	52.0	610	610	16,078	95	8,389	94.0%	171	89
45-49	47.0	611	611	16,105	103	8,402	93.4%	172	90
40-44	42.0	656	656	17,291	110	9,021	92.0%	188	98
35-39	37.0	1,023	1,023	26,964	118	14,068	90.6%	298	155
30-34	32.0	734	734	19,347	125	10,094	89.8%	215	112
25-29	27.0	334	334	8,804	133	4,593	89.0%	99	52
20-24	22.0	252	252	6,642	140	3,466	88.5%	75	39
15-19	17.0	125	125	3,295	148	1,719	88.0%	37	20
10-14	12.0	47	47	1,239	155	646	87.6%	14	7
5-9	7.0	22	22	580	163	303	87.2%	7	3
0-4	2.0	13	13	343	170	179	86.8%	4	2
-5--1	-3.0	0	0	0	170	0	86.8%	0	0
-10--6	-8.0	0	0	0	170	0	86.8%	0	0
Totals		8,760	5,954	156,936		81,879		1,702	888

Annual Energy Savings	\$	814
Annual Cost Savings	\$	973
	Therms/yr	

Comments:

- A-C Newark, NJ weather bins
- D Based on building balance points and bin data.
- E Existing heat loss in piping system based on current average HHW temperature.
- F Estimated Average HHW temperature with HW reset based on OA temperature.
- G Proposed heat loss in piping system based on estimated average HW temperature. Return HHW temp min 70 deg F
- H Proposed boiler efficiency based return water temperature and boiler efficiency curve.
- I-J Utility usage to overcome heat loss in HHW piping system based on boiler efficiency.

Existing Boiler Efficiency	82%
Avg. Proposed Boiler Efficiency	92%

Building HHW Piping System	
Heating On Temperature	65 °F
Total Length of Pipe	1910 LF
Existing HHW Setpoint High	180 °F
Existing HHW Setpoint Low	160 °F
Avg HHW Temp	170 °F
Avg Pipe Size	1 1/2 Inches
Avg Insul Thickness	1 Inches
Existing Heat Loss	13.8 Btu/Hr/LF
Percent in Uncond. Space	100%
Existing System Heat Loss	26,358 Btu/Hr
Proposed Min HHW Return*	70 °F
Avg Prop HHW Supply Temp	108 °F
Proposed Heat Loss	7.2 Btu/Hr/LF
Proposed System Heat Loss	13,752 Btu/Hr

*Refer to proposed boiler capabilities

Size (in)	Length (ft)
1/2	160
3/4	210
1	500
1 1/4	490
1 1/2	260
2	170
2 1/2	65
3	55
1 1/2	Average

Borough of South Plainfield
CHA #20549
Building: Borough Hall Municipal Building

Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

ECM-4 Boiler Replacement with Hot Water Temperature Reset

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Boiler Removal	4	EA		\$ 500		\$ -	\$ -	\$ -	\$ -	
900 MBH Gas-Fired Condensing HW Boiler**	2	EA	\$ 18,000	\$ 3,950		\$ 35,280	\$ 9,559	\$ -	\$ 44,839	Includes freight and startup
Condensate Neutralization Kit	1	EA	\$ 300	\$ 250		\$ 294	\$ 303	\$ -	\$ 597	
Flue Replacement	25	LF	\$ 175	\$ 40		\$ 4,288	\$ 1,210	\$ -	\$ 5,498	
Miscellaneous Electrical	1	LS		\$ 1,000		\$ -	\$ 1,210	\$ -	\$ 1,210	
Piping	50	LF	\$ 33	\$ 20		\$ 1,593	\$ 1,180	\$ -	\$ 2,772	
Boiler Energy Management System**	1	EA	\$ 2,300	\$ 1,500		\$ 2,254	\$ 1,815	\$ -	\$ 4,069	Controls HW temp reset
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	

*Pricing based on Aerco Modulex MLX-909 boiler

**Pricing based on Aerco Boiler Management System II

\$ 61,404	Subtotal
\$ 6,140	10% Contingency
\$ 10,132	15% Contractor O&P
\$ -	0% Engineering
\$ 77,676	Total

New Jersey Smart Start and PSE&G Direct Install Program Incentives	QTY	UNIT	\$ / UNIT	TOTAL SAVINGS	Cost W/O INCENTIVE	Cost W/ INCENTIVE
NG Boilers ≥ 300 - < 1500 MBH	1,800	MBH	\$1.75	\$3,150	\$ -	\$ -
					\$ 44,839	\$ 41,689
				\$3,150	\$44,839	\$41,689

Total ECM Cost w/ Incentives	\$74,526
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APPENDIX F

ECM-5 Replace Windows

Borough of South Plainfield
CHA #20549
Building: Borough Hall Municipal Building

*Change U-value and air infiltration
See block load spreadsheet for U-

ECM-5 Replace Windows

Municipal Offices Only

Description Windows can lead to increased energy consumption due to infiltration/exfiltration and heat gain/loss. Replacing older windows with more panes and low-emissivity coatings and insu can decrease energy usage.

Given
Occupied Cooling Hours per Week
Occupied Heating Hours per Week
Heating Energy Cost
Cooling Cost
Occupied Cooling Setpoint Temperature
Occupied Cooling Avg Space Air Enthalpy
Occupied Heating Setpoint Temperature
Unoccupied Heating Setpoint Temperature
Window Area
Window Perimeter
Proposed U factor
Proposed Air Infiltration
Cooling Conversion
Heating Btu Conversion

40 Hours
40 Hours
\$1.20 \$/therm
\$0.148 \$/kWh
72.0 Degrees F
26.3 btu/# air
68.0 Degrees F Occupied
60.0 Degrees F Unoccupied
1,119 sq.ft.
814 ft
0.50 Btu/(h*sqft*degf)
0.20 cfm/ft
12,000 Btu/ton
1,000,000 Btu/MMBtu

Assumptions
Existing U factor
Existing Air Infiltration
Heating System Efficiency
Cooling System Efficiency

1.05 Btu/(h*sqft*degf)
0.50 cfm/ft
82%
1.26 kW/ton

Formula Cooling Energy Conduction = (Existing U x Area x (OA Temp - RA Temp) x Op Hours)

Heating Energy Conduction = (Existing U x Area x (RA Temp - OA Temp) x Op Hours)
Cooling Energy Infiltration = (4.5 x Leakage x Perimeter x (OA Enthalpy - RA Enthalpy) x Op Hours)
Heating Energy Infiltration = 1.08 x Leakage x Perimeter x (RA temp - OA temp) x Op Hours
Load = (Conduction) + (Infiltration)
Cooling Energy = (Cooling Load) / (12,000 Btu/Ton) x (kw/Ton)
Heating Energy = (Heating Load) / (1,000,000 Btu/MMBtu) / (Boiler Efficiency)
Energy Cost = (Energy) x (Cost/Unit)

Existing	Operation	OA Enthalpy	OA Temp	Total Hours	Cooling Occupied Hours	Heating Occupied Hours	Heating Unoccupied Hours	Cooling Occupied Conduction	Heating Unoccupied Conduction
	Cooling	38.3	92.5	37	8.8	0.0	0.0	212,238	
	Cooling	36.6	87.5	131	31.2	0.0	0.0	568,159	
	Cooling	33.5	82.5	500	119.0	0.0	0.0	1,469,016	
	Cooling	31.6	77.5	620	147.6	0.0	0.0	954,161	
	Cooling	30.3	72.5	664	158.1	0.0	0.0	92,898	
	Heating	27.9	67.5	854	0.0	203.3	0.0	0	
	Heating	24.6	62.5	927	0.0	220.7	0.0	0	
	Heating	21.6	57.5	600	0.0	142.9	457.1	0	
	Heating	18.7	52.5	610	0.0	145.2	464.8	0	
	Heating	16.2	47.5	611	0.0	145.5	465.5	0	
	Heating	14.3	42.5	656	0.0	156.2	499.8	0	
	Heating	12.4	37.5	1,023	0.0	243.6	779.4	0	
	Heating	10.4	32.5	734	0.0	174.8	559.2	0	
	Heating	8.7	27.5	334	0.0	79.5	254.5	0	
	Heating	7	22.5	252	0.0	60.0	192.0	0	
	Heating	5.4	17.5	125	0.0	29.8	95.2	0	
	Heating	3.9	12.5	47	0.0	11.2	35.8	0	
	Heating	2.5	7.5	22	0.0	5.2	16.8	0	
	Heating	1.2	2.5	13	0.0	3.1	9.9	0	
	Heating	-0.2	-2.5	0	0.0	0.0	0.0	0	
	Heating	-1.4	-7.5	0	0.0	0.0	0.0	0	
	Subtotal =			8,760	465	1,621	3,830	3,296,471	

Cooling Load =	Conduction Infiltration	
	(3296471) + (3240578) =	6,537,049 btu
Cooling Energy =	Cooling Load	
	(6537049) / (12000) * (1.26) =	686 kWh
Cooling Energy Cost =	Cooling Energy Cooling Cost	
	(686.39) x (\$0.148) =	\$ 101.86
Heating Load =	Conduction Infiltration	
	(128143212) + (47928890) =	176,072,102 btu
Heating Energy =	Heating Load Heat Content	
	(176072102) / (82%) / (100000) =	2,147 therms
Heating Energy Cost =	Heating Energy Heating Cost	
	(2147.22) x (\$1.195) =	\$ 2,566

Operation	OA Enthalphy	OA Temp	Total Hours	Cooling Occupied Hours	Heating Occupied Hours	Heating Unoccupied Hours	Cooling Occupied Conduction
Cooling	38.3	92.5	37	8.8	0.0	0.0	101,066
Cooling	36.6	87.5	131	31.2	0.0	0.0	270,552
Cooling	33.5	82.5	500	119.0	0.0	0.0	699,531
Cooling	31.6	77.5	620	147.6	0.0	0.0	454,362
Cooling	30.3	72.5	664	158.1	0.0	0.0	44,237
Heating	27.9	67.5	854	0.0	203.3	0.0	0
Heating	24.6	62.5	927	0.0	220.7	0.0	0
Heating	21.6	57.5	600	0.0	142.9	457.1	0
Heating	18.7	52.5	610	0.0	145.2	464.8	0
Heating	16.2	47.5	611	0.0	145.5	465.5	0
Heating	14.3	42.5	656	0.0	156.2	499.8	0
Heating	12.4	37.5	1,023	0.0	243.6	779.4	0
Heating	10.4	32.5	734	0.0	174.8	559.2	0
Heating	8.7	27.5	334	0.0	79.5	254.5	0
Heating	7	22.5	252	0.0	60.0	192.0	0
Heating	5.4	17.5	125	0.0	29.8	95.2	0
Heating	3.9	12.5	47	0.0	11.2	35.8	0
Heating	2.5	7.5	22	0.0	5.2	16.8	0
Heating	1.2	2.5	13	0.0	3.1	9.9	0
Heating	-0.2	-2.5	0	0.0	0.0	0.0	0
Heating	-1.4	-7.5	0	0.0	0.0	0.0	0
Subtotal =			8,760	465	1,621	3,830	1,569,748

	Conduction	Infiltration	
Cooling Load =	(1569748) + (1296231) =		2,865,979 btu
	Cooling Load		
Cooling Energy =	(2865979) / (12000) * (1.26) =		301 kWh
	Cooling Energy	Cooling Cost	
Cooling Energy Cost =	(300.93) x (\$0.148) =		\$ 44.66
	Conduction	Infiltration	
Heating Load =	(61020577) + (19171556) =		80,192,133 btu
	Heating Load	Heat Content	
Heating Energy =	(80192133) / (82%) / (100000) =		978 therms
	Heating Energy	Heating Cost	
Heating Energy Cost =	(977.95) x (\$1.195) =		\$ 1,169

Summary

EXISTING COOLING ENERGY	686	kWh	\$	101.86	
EXISTING HEATING ENERGY	2147	therms	\$	2,565.93	
EXISTING ENERGY COST			\$	2,667.79	
PROPOSED COOLING ENERGY	301	kWh	\$	44.66	
PROPOSED HEATING ENERGY	978	therms	\$	1,168.65	
PROPOSED ENERGY COST			\$	1,213.31	
COOLING ENERGY SAVINGS	385	kWh	\$	57.20	56.2% of
HEATING ENERGY SAVINGS	1169	therms	\$	1,397.28	54.5% of
ENERGY COST SAVINGS			\$	1,454.48	54.5% of

Comments

Borough of South Plainfield
CHA #20549
Building: Borough Hall Municipal Building

*Change U-value and air infiltration rate
See block load spreadsheet for U-value

ECM-5 Replace Windows

Police Department Only

Description Windows can lead to increased energy consumption due to infiltration/exfiltration and heat gain/loss. Replacing older windows with more panes and low-emissivity coatings and insulating can decrease energy usage.

Given	Occupied Cooling Hours per Week	168	Hours
	Occupied Heating Hours per Week	168	Hours
	Heating Energy Cost	\$1.20	\$/therm
	Cooling Cost	\$0.148	\$/kWh
	Occupied Cooling Setpoint Temperature	72.0	Degrees F
	Occupied Cooling Avg Space Air Enthalpy	28.3	btu/# air
	Occupied Heating Setpoint Temperature	74.0	Degrees F
	Unoccupied Heating Setpoint Temperature	74.0	Degrees F
	Window Area	386	sq.ft.
	Window Perimeter	287	ft
	Proposed U factor	0.50	Btu/(h*sqft*degf)
	Proposed Air Infiltration	0.20	cfm/ft
	Cooling Conversion	12,000	Btu/ton
	Heating Btu Conversion	1,000,000	Btu/MMBtu
Assumptions	Existing U factor	1.05	Btu/(h*sqft*degf)
	Existing Air Infiltration	0.50	cfm/ft
	Heating System Efficiency	82%	
	Cooling System Efficiency	1.26	kW/ton

Formula Cooling Energy Conduction = (Existing U x Area x (OA Temp - RA Temp) x Op Hours)

Heating Energy Conduction = (Existing U x Area x (RA Temp - OA Temp) x Op Hours)
Cooling Energy Infiltration = (4.5 x Leakage x Perimeter x (OA Enthalpy - RA Enthalpy) x Op Hours)
Heating Energy Infiltration = 1.08 x Leakage x Perimeter x (RA temp - OA temp) x Op Hours
Load = (Conduction) + (Infiltration)
Cooling Energy = (Cooling Load) / (12,000 Btu/Ton) x (kW/Ton)
Heating Energy = (Heating Load) / (1,000,000 Btu/MMBtu) / (Boiler Efficiency)
Energy Cost = (Energy) x (Cost/Unit)

Existing	Operation	OA Enthalpy	OA Temp	Total Hours	Cooling Occupied Hours	Heating Occupied Hours	Heating Unoccupied Hours	Cooling Occupied Conduction	Heating Unoccupied Conduction
	Cooling	38.3	92.5	37	37.0	0.0	0.0	291,292	0
	Cooling	36.6	87.5	131	131.0	0.0	0.0	779,788	0
	Cooling	33.5	82.5	500	500.0	0.0	0.0	2,016,197	0
	Cooling	31.6	77.5	620	620.0	0.0	0.0	1,309,568	0
	Cooling	30.3	72.5	664	664.0	664.0	0.0	127,500	0
	Heating	27.9	67.5	854	0.0	854.0	0.0	0	0
	Heating	24.6	62.5	927	0.0	927.0	0.0	0	0
	Heating	21.6	57.5	600	0.0	600.0	0.0	0	0
	Heating	18.7	52.5	610	0.0	610.0	0.0	0	0
	Heating	16.2	47.5	611	0.0	611.0	0.0	0	0
	Heating	14.3	42.5	656	0.0	656.0	0.0	0	0
	Heating	12.4	37.5	1,023	0.0	1,023.0	0.0	0	0
	Heating	10.4	32.5	734	0.0	734.0	0.0	0	0
	Heating	8.7	27.5	334	0.0	334.0	0.0	0	0
	Heating	7	22.5	252	0.0	252.0	0.0	0	0
	Heating	5.4	17.5	125	0.0	125.0	0.0	0	0
	Heating	3.9	12.5	47	0.0	47.0	0.0	0	0
	Heating	2.5	7.5	22	0.0	22.0	0.0	0	0
	Heating	1.2	2.5	13	0.0	13.0	0.0	0	0
	Heating	-0.2	-2.5	0	0.0	0.0	0.0	0	0
	Heating	-1.4	-7.5	0	0.0	0.0	0.0	0	0
	Subtotal =			8,760	1,952	7,472	0	4,524,346	0

Cooling Load =	Conduction	Infiltration	
	(4524346) + (4798762) =		9,323,108 btu
Cooling Energy =	Cooling Load		
	(9323108) / (12000) * (1.26) =		979 kWh
Cooling Energy Cost =	Cooling Energy	Cooling Cost	
	(978.93) x (\$0.148) =		\$ 145.27
Heating Load =	Conduction	Infiltration	
	(71328437) + (28784900) =		100,113,337 btu
Heating Energy =	Heating Load	Heat Content	
	(100113337) / (82%) / (100000) =		1,221 therms
Heating Energy Cost =	Heating Energy	Heating Cost	
	(1220.89) x (\$1.195) =		\$ 1,459

Operation	OA Enthalphy	OA Temp	Total Hours	Cooling Occupied Hours	Heating Occupied Hours	Heating Unoccupied Hours	Cooling Occupied Conduction	Heating Occupied Conduction
Cooling	38.3	92.5	37	37.0	0.0	0.0	138,711	0
Cooling	36.6	87.5	131	131.0	0.0	0.0	371,328	0
Cooling	33.5	82.5	500	500.0	0.0	0.0	960,094	0
Cooling	31.6	77.5	620	620.0	0.0	0.0	623,604	0
Cooling	30.3	72.5	664	664.0	664.0	0.0	60,715	0
Heating	27.9	67.5	854	0.0	854.0	0.0	0	0
Heating	24.6	62.5	927	0.0	927.0	0.0	0	0
Heating	21.6	57.5	600	0.0	600.0	0.0	0	0
Heating	18.7	52.5	610	0.0	610.0	0.0	0	0
Heating	16.2	47.5	611	0.0	611.0	0.0	0	0
Heating	14.3	42.5	656	0.0	656.0	0.0	0	0
Heating	12.4	37.5	1,023	0.0	1023.0	0.0	0	0
Heating	10.4	32.5	734	0.0	734.0	0.0	0	0
Heating	8.7	27.5	334	0.0	334.0	0.0	0	0
Heating	7	22.5	252	0.0	252.0	0.0	0	0
Heating	5.4	17.5	125	0.0	125.0	0.0	0	0
Heating	3.9	12.5	47	0.0	47.0	0.0	0	0
Heating	2.5	7.5	22	0.0	22.0	0.0	0	0
Heating	1.2	2.5	13	0.0	13.0	0.0	0	0
Heating	-0.2	-2.5	0	0.0	0.0	0.0	0	0
Heating	-1.4	-7.5	0	0.0	0.0	0.0	0	0
Subtotal =			8,760	1,952	7,472	0	2,154,450	0

Cooling Load =	Conduction Infiltration	
	(2154450) + (1919505) =	4,073,955 btu
Cooling Energy =	Cooling Load	
	(4073955) / (12000) * (1.26) =	428 kWh
Cooling Energy Cost =	Cooling Energy Cooling Cost	
	(427.77) x (\$0.148) =	\$ 63.48
Heating Load =	Conduction Infiltration	
	(33965922) + (11513960) =	45,479,883 btu
Heating Energy =	Heating Load Heat Content	
	(45479883) / (82%) / (100000) =	555 therms
Heating Energy Cost =	Heating Energy Heating Cost	
	(554.63) x (\$1.195) =	\$ 663

Summary

EXISTING COOLING ENERGY	979	kWh	\$	145.27
EXISTING HEATING ENERGY	1221	therms	\$	1,458.97
EXISTING ENERGY COST			\$	1,604.24
PROPOSED COOLING ENERGY	428	kWh	\$	63.48
PROPOSED HEATING ENERGY	555	therms	\$	662.79
PROPOSED ENERGY COST			\$	726.27
COOLING ENERGY SAVINGS	551	kWh	\$	81.79
HEATING ENERGY SAVINGS	666	therms	\$	796.18
ENERGY COST SAVINGS			\$	877.97

56.3% of ex
54.6% of ex
54.7% of ex

Comments

Borough of South Plainfield
CHA #20549
Building: Borough Hall Municipal Building

ECM-5 Replace Windows

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.		
Window Removal and Disposal	51	Ea		\$ 50		\$ -	\$ 2,550	\$ -	\$ 2,550	
5'-6"x5'-6" Aluminum Single Hung Windows	44	Ea	\$ 400	\$ 100		\$ 17,600	\$ 4,400	\$ -	\$ 22,000	DP Insulated Glass
4'-0"x5'-6" Aluminum Single Hung Windows	7	Ea	\$ 375	\$ 100		\$ 2,625	\$ 700	\$ -	\$ 3,325	
Trim and Finish	51	EA	\$ 48	\$ 42		\$ -	\$ 2,142	\$ -	\$ 2,142	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	

\$ 30,017	Subtotal
\$ 6,003	20% Contingency
\$ 5,403	Contractor 15% O&P
\$ -	0% Engineering
\$ 41,423	Total

APPENDIX G

ECM-6 Lighting Replacements

Energy Audit of South Plainfield Facilities
CHA Project No. 20549 Borough Hall
ECM-6 Lighting Replacements

Cost of Electricity: \$0.148 \$/kWh blended
\$0.127 \$/kWh supply
\$15.330 \$/kW

Field Code	Area Description	No. of Fixtures before the retrofit	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures after the retrofit	Standard
85	Stairway	1	I 67 2 LAMP	I67/2	134	0.1	SW	8760	1,174	1	CF 26
68	Stairway	1	175 MH WALL	MH175/1	215	0.2	SW	8760	1,883	1	175 MH WALL
93	Stairway	1	I 75	I75/1	75	0.1	SW	8760	657	1	CF 26
46	File Storage	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	W 32 C F 2
71	File Storage	4	I 60	I60/1	60	0.2	SW	1000	240	4	CF 26
245	Storage Vault	4	W96CF1 (MAG)	F81EHS	83	0.3	SW	1000	332	4	W96CF1 (MAG)
71	Electrical Room	3	I 60	I60/1	60	0.2	SW	1000	180	3	CF 26
194	Officer Changing Room	1	W 34 C F 2 (MAG)	F42EE	72	0.1	SW	2080	150	1	W 28 C F 2
30	Police Locker Room	6	1 B 96 C F 2 (MAG)	F82EHS	227	1.4	SW	8760	11,931	6	T 28 R F 4
47	Police Locker Room	1	1B 34 C F 2 (MAG)	F42EE	72	0.1	SW	8760	631	1	1B 28 C F 2
18	Rear Corridor	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	8760	7,849	8	T 32 R F 4
242	Court Room	12	4B 32 C F 8 (ELE)	F48ILL	224	2.7	SW	2000	5,376	12	4B 32 C F 8
189	Court Room	3	X 7.0 W 1	ECF7/1	10	0.0	Breaker	8760	263	3	X 1.5C LEC
243	Front Corridor	4	2B 17 R F 6 (ELE)	F24ILL	102	0.4	SW	8760	3,574	4	2B 17 R F 6
6	Front Corridor	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	8760	5,046	4	T 28 R F 4
189	Front Corridor	1	X 7.0 W 1	ECF7/1	10	0.0	Breaker	8760	88	1	X 1.5C LEC
18	Municipal Clerk's Office	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	SW	2600	1,747	6	T 32 R F 4
18	Mens Room	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2080	233	1	T 32 R F 4
18	Womens Room	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2080	233	1	T 32 R F 4
71	Custodian's Closet	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26
18	Conference Room	5	T 32 R F 4 (ELE)	F44ILL	112	0.6	SW	2000	1,120	5	T 32 R F 4
46	Zoning Office	4	W 32 C F 2 (ELE)	F42LL	60	0.2	SW	2600	624	4	W 32 C F 2
18	Health Department (Front Area)	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2600	1,165	4	T 32 R F 4
18	Health Department (Back Area)	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2600	1,165	4	T 32 R F 4
18	Health Inspector's Office	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2600	582	2	T 32 R F 4
18	Building/Environmental Dept.	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2600	3,494	12	T 32 R F 4
5	Building/Environmental Dept.	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	2600	156	1	2T 32 R F 2
241	Building/Environmental File Storage	2	I 60	I60/3	180	0.4	SW	1000	360	2	CF 26
18	Construction Officials Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2600	1,165	4	T 32 R F 4
244	CFO/Mayor Secretary Area	5	T 32 R F 3 (ELE)	F43LE	110	0.6	SW	2600	1,430	5	T 32 R F 3
197	Mail Room	2	1B 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	1B 32 C F 2
244	Glen Cullen's Office	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2600	1,144	4	T 32 R F 3
244	Mayor Burdick's Office	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2600	572	2	T 32 R F 3
244	Finance/Payroll Office	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2600	1,716	6	T 32 R F 3
46	Tax Vault	2	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	2600	312	2	W 32 C F 2
244	Tax Collector's Office	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2600	572	2	T 32 R F 3
244	Tax Collector's Department	8	T 32 R F 3 (ELE)	F43LE	110	0.9	SW	2600	2,288	8	T 32 R F 3
18	Tax Assessors Office	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	SW	2600	1,747	6	T 32 R F 4
5	Social Services Office	6	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.4	SW	2600	936	6	2T 32 R F 2
4	Handicap Restroom Entrance	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	8760	631	1	2T 17 R F 2
5	Rear Handicap Restroom	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2080	374	3	2T 32 R F 2
194	Rear Custodian's Closet	1	W 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	W 28 C F 2
194	Rear Custodian's Closet	1	W 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	W 28 C F 2
6	Prosecutor's Room	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2000	576	2	T 28 R F 4
6	Computer Tech Room	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2000	1,152	4	T 28 R F 4
18	Municipal Court Violations	9	T 32 R F 4 (ELE)	F44ILL	112	1.0	SW	2600	2,621	9	T 32 R F 4
18	Municipal Court Violations	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2600	291	1	T 32 R F 4
244	Municipal Court Violations	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2600	572	2	T 32 R F 3
18	Municipal Court Violations	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2600	582	2	T 32 R F 4
18	Captain Bremb's Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
18	Lieutenant Parker's Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
18	Police Secretary	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
18	Detective Division	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	SW	8760	5,887	6	T 32 R F 4
47	Police Conference Room	2	1B 34 C F 2 (MAG)	F42EE	72	0.1	SW	8760	1,261	2	1B 28 C F 2
18	Police Copy Room	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	8760	1,962	2	T 32 R F 4
18	Evidence Room	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	8760	981	1	T 32 R F 4
46	Cell Block/Armory	4	W 32 C F 2 (ELE)	F42LL	60	0.2	SW	8760	2,102	4	W 32 C F 2
46	Booking Room	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	8760	526	1	W 32 C F 2
46	Booking Room	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	8760	526	1	W 32 C F 2
217	Report Room 2	1	W 32 C F 4 (ELE)	F44ILL/2	118	0.1	SW	8760	1,034	1	W 32 C F 4
18	Closet Next to Copy Room	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	1000	224	2	T 32 R F 4
5	Corridors	4	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	8760	2,102	4	2T 32 R F 2
18	Chief's Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
18	Police Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
18	Police Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
18	Police Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
244	Fingerprint Room	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	8760	964	1	T 32 R F 3
46	Watch Commander Room	2	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	8760	1,051	2	W 32 C F 2
244	Report Room 1	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	8760	1,927	2	T 32 R F 3
244	Communication Center	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	8760	6,745	7	T 32 R F 3
244	Server Room	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	8760	3,854	4	T 32 R F 3
18	Server Room	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
244	Server Room	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	8760	3,854	4	T 32 R F 3
5	Server Room	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	8760	526	1	2T 32 R F 2
244	Police Records Room	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	8760	6,745	7	T 32 R F 3
244	Police Women's Room	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	2080	229	1	T 32 R F 3
244	Police Men's room	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	2080	229	1	T 32 R F 3
189	Police Building Exits	2	X 7.0 W 1	ECF7/1	10	0.0	Breaker	2080	42	2	X 1.5C LEC
8	Rear Exterior Door	1	MH 175	MH175/1	215	0.2	Timer	4368	939	1	MH 175
Total		257				28.3			143,444	257	

APPENDIX H

ECM-7 Install Occupancy Sensors

Energy Audit of South Plainfield Facilities
CHA Project No. 20549 Borough Hall
ECM-7 Install Occupancy Sensors

Cost of Electricity: \$0.148 \$/kWh blended
\$0.127 \$/kWh supply
\$15.330 \$/kW

EXISTING CONDITIONS											
Field Code	Area Description	No. of Fixtures before the retrofit	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures after the retrofit	Standard
	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
85	Stairway	1	I 67 2 LAMP	I67/2	134	0.1	SW	8760	1,173.8	1	I 67 2 LAMP
68	Stairway	1	I 75 MH WALL	MH175/1	215	0.2	SW	8760	1,883.4	1	I 75 MH WALL
93	Stairway	1	I 75	I75/1	75	0.1	SW	8760	657.0	1	I 75
46	File Storage	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	W 32 C F 2
71	File Storage	4	I 60	I60/1	60	0.2	SW	1000	240.0	4	I 60
245	Storage Vault	4	W96CF1 (MAG)	F81EHS	83	0.3	SW	1000	332.0	4	W96CF1 (MAG)
71	Electrical Room	3	I 60	I60/1	60	0.2	SW	1000	180.0	3	I 60
194	Officer Changing Room	1	W 34 C F 2 (MAG)	F42EE	72	0.1	SW	2080	149.8	1	W 34 C F 2
30	Police Locker Room	6	I 8 96 C F 2 (MAG)	F82EHS	227	1.4	SW	8760	11,931.1	6	I 8 96 C F 2
47	Police Locker Room	1	I 8 34 C F 2 (MAG)	F42EE	72	0.1	SW	8760	630.7	1	I 8 34 C F 2
18	Rear Corridor	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	8760	7,849.0	8	T 32 R F 4
242	Court Room	12	4B 32 C F 8 (ELE)	F48ILL	224	2.7	SW	2000	5,376.0	12	4B 32 C F 8
189	Court Room	3	X 7.0 W 1	ECF7/1	10	0.0	Breaker	8760	262.8	3	X 7.0 W 1
243	Front Corridor	4	2B 17 R F 6 (ELE)	F24ILL	102	0.4	SW	8760	3,574.1	4	2B 17 R F 6
6	Front Corridor	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	8760	5,045.8	4	T 34 R F 4
189	Front Corridor	1	X 7.0 W 1	ECF7/1	10	0.0	Breaker	8760	87.6	1	X 7.0 W 1
18	Municipal Clerk's Office	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	SW	2600	1,747.2	6	T 32 R F 4
18	Mens Room	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2080	233.0	1	T 32 R F 4
18	Womens Room	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2080	233.0	1	T 32 R F 4
71	Custodian's Closet	1	I 60	I60/1	60	0.1	SW	1000	60.0	1	I 60
18	Conference Room	5	T 32 R F 4 (ELE)	F44ILL	112	0.6	SW	2000	1,120.0	5	T 32 R F 4
46	Zoning Office	4	W 32 C F 2 (ELE)	F42LL	60	0.2	SW	2600	624.0	4	W 32 C F 2
18	Health Department (Front Area)	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2600	1,164.8	4	T 32 R F 4
18	Health Department (Back Area)	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2600	1,164.8	4	T 32 R F 4
18	Health Inspector's Office	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2600	582.4	2	T 32 R F 4
18	Building/Environmental Dept.	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2600	3,494.4	12	T 32 R F 4
5	Building/Environmental Dept.	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	2600	156.0	1	2T 32 R F 2
241	Building/Environmental File Storage	2	I 60	I60/3	180	0.4	SW	1000	360.0	2	I 60
18	Construction Officials Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2600	1,164.8	4	T 32 R F 4
244	CFO/Mayor Secretary Area	5	T 32 R F 3 (ELE)	F43LE	110	0.6	SW	2600	1,430.0	5	T 32 R F 3
197	Mail Room	2	I 8 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	I 8 32 C F 2
244	Glen Cullen's Office	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2600	1,144.0	4	T 32 R F 3
244	Mayor Buricko's Office	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2600	572.0	2	T 32 R F 3
244	Finance/Payroll Office	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2600	1,716.0	6	T 32 R F 3
46	Tax Vault	2	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	2600	312.0	2	W 32 C F 2
244	Tax Collector's Office	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2600	572.0	2	T 32 R F 3
244	Tax Collector's Department	8	T 32 R F 3 (ELE)	F43LE	110	0.9	SW	2600	2,288.0	8	T 32 R F 3
18	Tax Assessors Office	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	SW	2600	1,747.2	6	T 32 R F 4
5	Social Services Office	6	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.4	SW	2600	936.0	6	2T 32 R F 2
4	Handicap Restroom Entrance	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	8760	630.7	1	2B 34 R F 2
5	Rear Handicap Restroom	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2080	374.4	3	2T 32 R F 2
194	Rear Custodian's Closet	1	W 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	W 34 C F 2
194	Rear Custodian's Closet	1	W 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	W 34 C F 2
6	Prosecutor's Room	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2000	576.0	2	T 34 R F 4
6	Computer Tech Room	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2000	1,152.0	4	T 34 R F 4
18	Municipal Court Violations	9	T 32 R F 4 (ELE)	F44ILL	112	1.0	SW	2600	2,620.8	9	T 32 R F 4
18	Municipal Court Violations	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2600	291.2	1	T 32 R F 4
244	Municipal Court Violations	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2600	572.0	2	T 32 R F 3
18	Municipal Court Violations	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2600	582.4	2	T 32 R F 4
18	Captain Brembt's Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924.5	4	T 32 R F 4
18	Lieutenant Parker's Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924.5	4	T 32 R F 4
18	Police Secretary	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924.5	4	T 32 R F 4
18	Detective Division	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	SW	8760	5,886.7	6	T 32 R F 4
47	Police Conference Room	2	I 8 34 C F 2 (MAG)	F42EE	72	0.1	SW	8760	1,261.4	2	I 8 34 C F 2
18	Police Copy Room	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	8760	1,962.2	2	T 32 R F 4
18	Evidence Room	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	8760	981.1	1	T 32 R F 4
46	Cell Block/Armory	4	W 32 C F 2 (ELE)	F42LL	60	0.2	SW	8760	2,102.4	4	W 32 C F 2
46	Booking Room	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	8760	525.6	1	W 32 C F 2
46	Booking Room	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	8760	525.6	1	W 32 C F 2
217	Report Room 2	1	W 32 C F 4 (ELE)	F44ILL/2	118	0.1	SW	8760	1,033.7	1	W 32 C F 4
18	Closet Next to Copy Room	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	1000	224.0	2	T 32 R F 4
5	Corridors	4	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	8760	2,102.4	4	2T 32 R F 2
18	Chief's Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924.5	4	T 32 R F 4
18	Police Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924.5	4	T 32 R F 4
18	Police Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924.5	4	T 32 R F 4
18	Police Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924.5	4	T 32 R F 4
244	Fingerprint Room	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	8760	963.6	1	T 32 R F 3
46	Watch Commander Room	2	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	8760	1,051.2	2	W 32 C F 2
244	Report Room 1	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	8760	1,927.2	2	T 32 R F 3
244	Communication Center	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	8760	6,745.2	7	T 32 R F 3
244	Server Room	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	8760	3,854.4	4	T 32 R F 3
18	Server Room	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924.5	4	T 32 R F 4
244	Server Room	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	8760	3,854.4	4	T 32 R F 3
5	Server Room	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	8760	525.6	1	2T 32 R F 2
244	Police Records Room	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	8760	6,745.2	7	T 32 R F 3
244	Police Women's Room	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	2080	228.8	1	T 32 R F 3
244	Police Men's room	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	2080	228.8	1	T 32 R F 3
189	Police Building Exits	2	X 7.0 W 1	ECF7/1	10	0.0	Breaker	2080	41.6	2	X 7.0 W 1
8	Rear Exterior Door	1	MH 175	MH175/1	215	0.2	Timer	4368	939.1	1	MH 175
Total		257				28.3			143,444	257	

APPENDIX I

ECM-8 Lighting Replacements With Occupancy Sensors

Energy Audit of South Plainfield Facilities
CHA Project No. 20549 Borough Hall
ECM-8 Lighting Replacements with Occupancy Sensors

Cost of Electricity: \$0.148 \$/kWh blended
\$0.127 \$/kWh supply
\$16.330 \$/kW

EXISTING CONDITIONS											
Field Code	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
	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.
85	Stairway	1	I 67 2 LAMP	I67/2	134	0.1	SW	8760	1,174	1	I 67 2 LAMP
68	Stairway	1	175 MH WALL	MH175/1	215	0.2	SW	8760	1,883	1	175 MH WALL
93	Stairway	1	I 75	I75/1	75	0.1	SW	8760	657	1	I 75
46	File Storage	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	W 32 C F 2
71	File Storage	4	I 60	I60/1	60	0.2	SW	1000	240	4	I 60
245	Storage Vault	4	W96CF1 (MAG)	F81EHS	83	0.3	SW	1000	332	4	W96CF1 (MAG)
71	Electrical Room	3	I 60	I60/1	60	0.2	SW	1000	180	3	I 60
194	Officer Changing Room	1	W 34 C F 2 (MAG)	F42EE	72	0.1	SW	2080	150	1	W 34 C F 2
30	Police Locker Room	6	1 B 96 C F 2 (MAG)	F82EHS	227	1.4	SW	8760	11,931	6	1 B 96 C F 2
47	Police Locker Room	1	1B 34 C F 2 (MAG)	F42EE	72	0.1	SW	8760	631	1	1B 34 C F 2
18	Rear Corridor	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	8760	7,849	8	T 32 R F 4
242	Court Room	12	4B 32 C F 8 (ELE)	F48ILL	224	2.7	SW	2000	5,376	12	4B 32 C F 8
189	Court Room	3	X 7.0 W 1	ECF7/1	10	0.0	Breaker	8760	263	3	X 7.0 W 1
243	Front Corridor	4	2B 17 R F 6 (ELE)	F24ILL	102	0.4	SW	8760	3,574	4	2B 17 R F 6
6	Front Corridor	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	8760	5,046	4	T 34 R F 4
189	Front Corridor	1	X 7.0 W 1	ECF7/1	10	0.0	Breaker	8760	88	1	X 7.0 W 1
18	Municipal Clerk's Office	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	SW	2600	1,747	6	T 32 R F 4
18	Mens Room	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2080	233	1	T 32 R F 4
18	Womens Room	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2080	233	1	T 32 R F 4
71	Custodian's Closet	1	I 60	I60/1	60	0.1	SW	1000	60	1	I 60
18	Conference Room	5	T 32 R F 4 (ELE)	F44ILL	112	0.6	SW	2000	1,120	5	T 32 R F 4
46	Zoning Office	4	W 32 C F 2 (ELE)	F42LL	60	0.2	SW	2600	624	4	W 32 C F 2
18	Health Department (Front Area)	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2600	1,165	4	T 32 R F 4
18	Health Department (Back Area)	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2600	1,165	4	T 32 R F 4
18	Health Inspector's Office	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2600	582	2	T 32 R F 4
18	Building/Environmental Dept.	12	T 32 R F 4 (ELE)	F44ILL	112	1.3	SW	2600	3,494	12	T 32 R F 4
5	Building/Environmental Dept.	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	2600	156	1	2T 32 R F 2
241	Building/Environmental File Storage	2	3i60	I80/3	180	0.4	SW	1000	360	2	3i60
18	Construction Officials Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2600	1,165	4	T 32 R F 4
244	CFO/Mayor Secretary Area	5	T 32 R F 3 (ELE)	F43LE	110	0.6	SW	2600	1,430	5	T 32 R F 3
197	Mail Room	2	1B 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	1B 32 C F 2
244	Glen Cullen's Office	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	2600	1,144	4	T 32 R F 3
244	Mayor Burdick's Office	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2600	572	2	T 32 R F 3
244	Finance/Payroll Office	6	T 32 R F 3 (ELE)	F43LE	110	0.7	SW	2600	1,716	6	T 32 R F 3
46	Tax Vault	2	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	2600	312	2	W 32 C F 2
244	Tax Collector's Office	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2600	572	2	T 32 R F 3
244	Tax Collector's Department	8	T 32 R F 3 (ELE)	F43LE	110	0.9	SW	2600	2,288	8	T 32 R F 3
18	Tax Assessors Office	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	SW	2600	1,747	6	T 32 R F 4
5	Social Services Office	6	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.4	SW	2600	936	6	2T 32 R F 2
4	Handicap Restroom Entrance	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	8760	631	1	2B 34 R F 2
5	Rear Handicap Restroom	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2080	374	3	2T 32 R F 2
194	Rear Custodian's Closet	1	W 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	W 34 C F 2
194	Rear Custodian's Closet	1	W 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	W 34 C F 2
5	Prosecutor's Room	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2000	576	2	T 34 R F 4
5	Computer Tech Room	4	T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2000	1,152	4	T 34 R F 4
18	Municipal Court Violations	9	T 32 R F 4 (ELE)	F44ILL	112	1.0	SW	2600	2,621	9	T 32 R F 4
18	Municipal Court Violations	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	2600	291	1	T 32 R F 4
244	Municipal Court Violations	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2600	572	2	T 32 R F 3
18	Municipal Court Violations	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2600	582	2	T 32 R F 4
18	Captain Bremb's Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
18	Lieutenant Parker's Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
18	Police Secretary	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
18	Detective Division	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	SW	8760	5,887	6	T 32 R F 4
47	Police Conference Room	2	1B 34 C F 2 (MAG)	F42EE	72	0.1	SW	8760	1,261	2	1B 34 C F 2
18	Police Copy Room	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	8760	1,962	2	T 32 R F 4
18	Evidence Room	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	8760	981	1	T 32 R F 4
46	Cell Block/Armory	4	W 32 C F 2 (ELE)	F42LL	60	0.2	SW	8760	2,102	4	W 32 C F 2
46	Booking Room	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	8760	526	1	W 32 C F 2
46	Booking Room	1	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	8760	526	1	W 32 C F 2
217	Report Room 2	1	W 32 C F 4 (ELE)	F44ILL/2	118	0.1	SW	8760	1,034	1	W 32 C F 4
18	Closet Next to Copy Room	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	1000	224	2	T 32 R F 4
5	Corridors	4	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	8760	2,102	4	2T 32 R F 2
18	Chief's Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
18	Police Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
18	Police Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
18	Police Office	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
244	Fingerprint Room	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	8760	964	1	T 32 R F 3
46	Watch Commander Room	2	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	8760	1,051	2	W 32 C F 2
244	Report Room 1	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	8760	1,927	2	T 32 R F 3
244	Communication Center	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	8760	6,745	7	T 32 R F 3
244	Server Room	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	8760	3,854	4	T 32 R F 3
18	Server Room	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	8760	3,924	4	T 32 R F 4
244	Server Room	4	T 32 R F 3 (ELE)	F43LE	110	0.4	SW	8760	3,854	4	T 32 R F 3
5	Server Room	1	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	8760	526	1	2T 32 R F 2
244	Police Records Room	7	T 32 R F 3 (ELE)	F43LE	110	0.8	SW	8760	6,745	7	T 32 R F 3
244	Police Women's Room	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	2080	229	1	T 32 R F 3
244	Police Men's room	1	T 32 R F 3 (ELE)	F43LE	110	0.1	SW	2080	229	1	T 32 R F 3
189	Police Building Exits	2	X 7.0 W 1	ECF7/1	10	0.0	Breaker	2080	42	2	X 7.0 W 1
8	Rear Exterior Door	1	MH 175	MH175/1	215	0.2	Timer	4368	939	1	MH 175
Total		257				28.3			143,444	257	

APPENDIX J

ECM-9 Replace Window Air Conditioning Units

Borough of South Plainfield
CHA #20549
Building: Borough Hall Municipal Building

ECM-9 Replace Window AC Units

Install ductless mini-split units with a common, remote outdoor condensing unit.

ASSUMPTIONS			Comments
Electric Cost	\$0.148	/ kWh	
Average run hours per Week	40	Hours	Unit is manually turned on (even if after hours) and sometimes left on over night
Space Temperature Setpoint	74	deg F	setpoint
Avg. BTU / Hr Rating of existing AC unit	10,000	Btu / Hr	(typical size for cooling office spaces in this type of building)
Average EER	7.0	Btu / W hr	Units 8.0 when new

Item	Value	Units	Comments
Total Number of Units	5		
Existing Annual Electric Usage	2,190	kWh	Existing Units do not cycle on and off w/ room temp
Proposed EER	9.8		New Window AC Units (per manufacturer)
Proposed Annual Electric Usage	972	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Savings	1,219	kWh
Annual Cost Savings	\$181	

OAT - DB Bin Temp F	Annual Hours	Cooling Hrs at Temp Above balance point	Assumed % of time of operation	Assumed hrs of Operation
102.5	0	0	100%	0
97.5	3	1	91%	1
92.5	34	8	82%	7
87.5	131	31	74%	23
82.5	500	119	65%	77
77.5	620	148	56%	83
72.5	664	0	0%	0
67.5	854	0	0%	0
62.5	927	0	0%	0
57.5	600	0	0%	0
52.5	610	0	0%	0
47.5	611	0	0%	0
42.5	656	0	0%	0
37.5	1,023	0	0%	0
32.5	734	0	0%	0
27.5	334	0	0%	0
22.5	252	0	0%	0
17.5	125	0	0%	0
12.5	47	0	0%	0
7.5	22	0	0%	0
2.5	13	0	0%	0
-2.5	0	0	0%	0
-7.5	0	0	0%	0
Total	8,760	307	62%	190

APPENDIX K

New Jersey Pay For Performance Incentive Program

Borough of South Plainfield
CHA #20549
Building: Borough Hall Municipal Building

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 governments or non-profit organizations. The incentive values represented below are applicable through December 31, 2010.

	Annual Utilities	
	kWh	Therms
Existing Usage (from utility)	450,120	13,340
Proposed Savings	59,610	5,890
Existing Total MMBtus	2,870	
Proposed Savings MMBtus	792	
% Reduction	27.6%	
Proposed Annual Savings	\$15,300	

	≥ %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	\$13,114	\$12,958	\$26,072
Incentive #3	\$8,345	\$8,246	\$16,591
Totals	\$21,460	\$21,204	\$42,664

Total Project Cost	\$133,400
% Incentives of Project Cost*	32.0%
Project Cost w/ Incentives*	\$90,736

Project Payback (years)	
w/o Incentives	w/ Incentives
8.7	5.9

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

APPENDIX L

Photovoltaic (PV) Rooftop Solar Power Generation



AC Energy & Cost Savings



Station Identification	
City:	Newark
State:	New Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	50.0 kW
DC to AC Derate Factor:	0.770
AC Rating:	38.5 kW
Array Type:	Fixed Tilt
Array Tilt:	40.7°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	14.8 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
1	3.36	4139	614.23
2	4.05	4469	663.20
3	4.58	5422	804.62
4	4.84	5299	786.37
5	5.30	5838	866.36
6	5.33	5506	817.09
7	5.27	5561	825.25
8	5.25	5503	816.65
9	5.06	5338	792.16
10	4.46	5027	746.01
11	3.15	3588	532.46
12	2.87	3460	513.46
Year	4.46	59150	8777.86

[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 $\pm 30\%$ for monthly values and $\pm 10\%$ 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.

**Township of South Plainfield
Borough Hall Municipal Building**

Cost of Electricity \$0.148 \$/kWh

Photovoltaic (PV) Rooftop Solar Power Generation-50kW 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						
\$500,000	0.0	59,150	0	\$8,800	\$0	\$8,800	\$50,000	\$28,800	12.0

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 M

Solar Thermal Domestic Hot Water Plant


[Home](#)
[What Can I Do?](#)
[Electric Choice](#)
[Home Energy](#)
[FAQs](#)
LEARN
[Fact Sheets](#)
[Lesson Plans](#)
PLAY
[Calculators](#)
NETWORK
[Organizations](#)
[Businesses](#)
[Events Calendar](#)
BROWSE
[Resources](#)
[Solar](#)
[Wind](#)
[Biomass](#)
[Geothermal](#)
[Water](#)
[Projects](#)
[TX Energy -
Past and Present](#)
[Financial Help](#)
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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?](#)

RENEWABLE ENERGY
THE INFINITE POWER
OF TEXAS

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	
2.0 Diameter (feet)	2.0	55 Water Inlet Temperature (Degrees F)	55
75 Capacity (gallons)	75	70 Ambient Temperature (Degrees F)	70
26.34 Surface Area (calculated - sq ft)	26.34	120 Hot Water Temperature (Degrees F)	120
NaN Effective R-value	NaN	60 Hot Water Usage (Gallons per Day)	60
Energy Use			
1334		0 Heat Delivered in Hot Water (BTU/hr)	
0		0 Heat loss through insulation (BTU/hr)	

Gas vs. Electric Water Heating		
Gas		Electric
0.8	0.98 Overall Efficiency	0.98
0.8	0.98 Conversion Efficiency	0.98
1668 BTU/hr	1361 Power Into Water Heater	1361 BTU/hr
Cost		
\$ 1.195 /Therm	\$ 0.148 Utility Rates	\$ 0.148 /kWh
\$ 174.609	\$ 516.780 Yearly Water Heating Cost	\$ 516.780
How Does Solar Compare?		
\$ 27100 Solar Water Heater Cost: \$ 27100		70 Percentage Solar: 70
221.719 years for gas	74.9143 Payback Time for Solar System	74.9143 years for electric

NJBPU Energy Audits

CHA #20549

Borough Hall Municipal Building

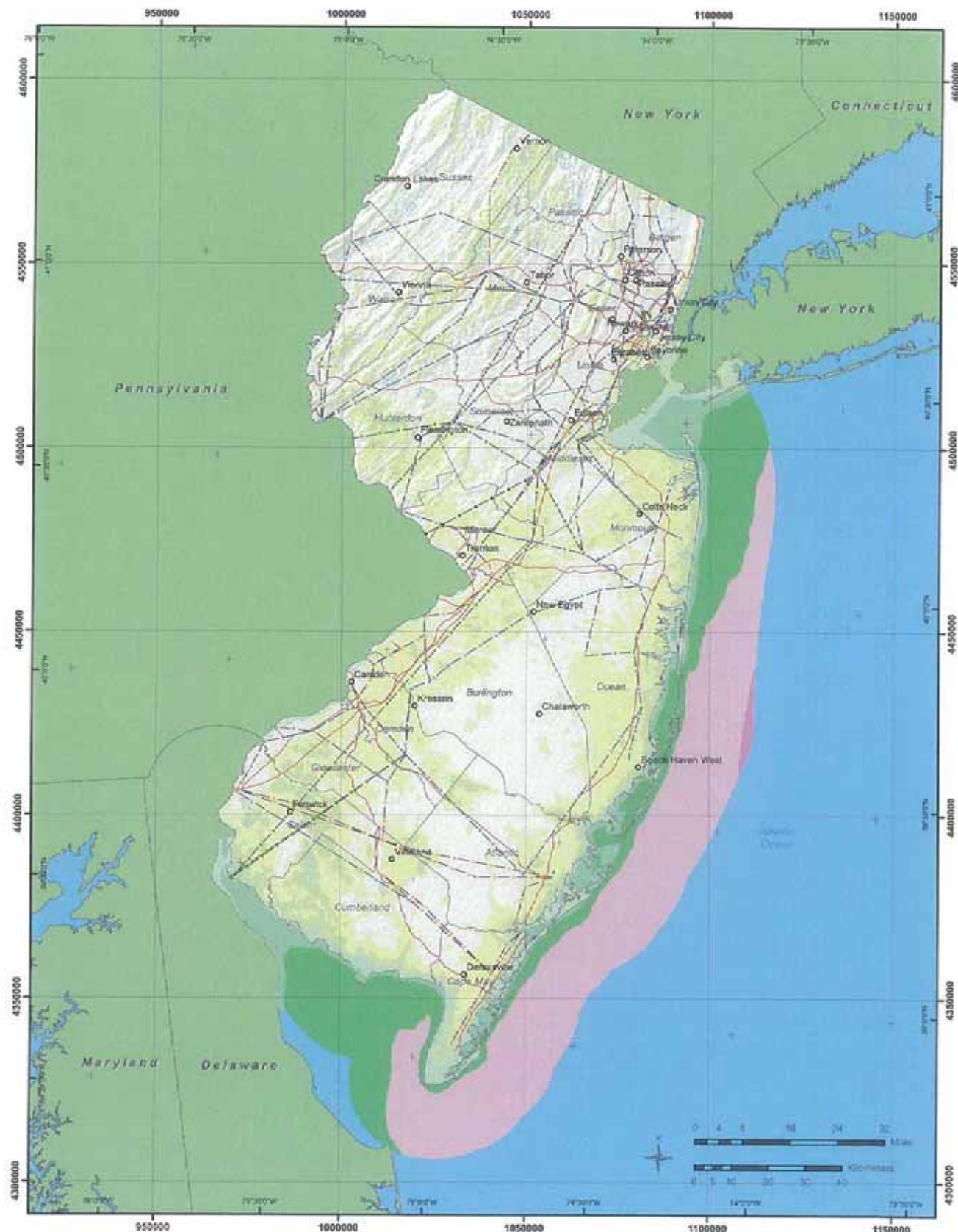
Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

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 Gallon Storage Tanks	2	ea	\$ 200	\$ 250		\$ 400	\$ 500	\$ -	\$ 900	
10 Gallon Drip Tank	2	ea	\$ 100	\$ 78		\$ 200	\$ 156	\$ -	\$ 356	
						\$ -	\$ -	\$ -	\$ -	

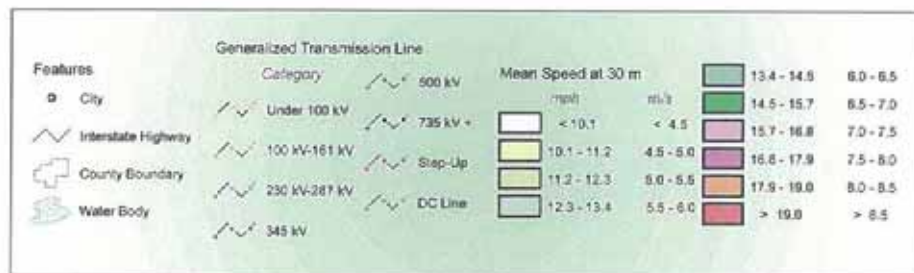
\$17,489	Subtotal
\$ 2,623	15% Contingency
\$ 2,623	15% Contractor O&P
\$ 4,372	25% Engineering
\$27,108	Total

APPENDIX N

Wind



Wind Resource of New Jersey *Mean Annual Wind Speed at 30 Meters*



AWS Truewind
 Projection: Transverse Mercator,
 UTM Zone 17 WGS84
 Spatial Resolution of Wind Resource Data: 200m
 This map was created by AWS Truewind using
 the MesosMap 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 2480 Plainfield Ave, South Plainfield, NJ
07080-3531**

YAHOO!



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 O

EPA Portfolio Manager



STATEMENT OF ENERGY PERFORMANCE

Boro Building

Building ID: 1926641

For 12-month Period Ending: June 30, 2009¹

Date SEP becomes ineligible: N/A

Date SEP Generated: February 15, 2010

Facility

Boro Building
2480 Plainfield Avenue
South Plainfield, NJ 07080

Facility Owner

Borough of South Plainfield
South Plainfield
2480 Plainfield Avenue, NJ 07080

Primary Contact for this Facility

Glen Cullen
2480 Plainfield Avenue
South Plainfield, NJ 07080

Year Built: 1960

Gross Floor Area (ft²): 14,428Energy Performance Rating² (1-100) N/A**Site Energy Use Summary³**

Electricity - Grid Purchase(kBtu)	1,469,687
Natural Gas (kBtu) ⁴	1,325,343
Total Energy (kBtu)	2,795,030

Energy Intensity⁵

Site (kBtu/ft ² /yr)	194
Source (kBtu/ft ² /yr)	436

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	422
---	-----

Electric Distribution Utility

Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	77
National Average Source EUI	182
% Difference from National Average Source EUI	140%
Building Type	Office

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.

Meets Industry Standards⁶ for Indoor Environmental Conditions:

Ventilation for Acceptable Indoor Air Quality	N/A
Acceptable Thermal Environmental Conditions	N/A
Adequate Illumination	N/A

Certifying Professional

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	Boro Building	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Office	Is this an accurate description of the space in question?		☐
Location	2480 Plainfield Avenue, South Plainfield, NJ 07080	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		☐

Courtroom (Courthouse)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☒
Gross Floor Area	1,584 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.		☐
Weekly operating hours	12 Hours	Is this the total number of hours per week that the Courthouse 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	50	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.		☐
Number of PCs	0	Is this the number of personal computers in the Courthouse?		☐
Percent Cooled	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐

Municipal Offices (Office)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☒
-----------	---------------------------------------	------------------------	-------	-------------------------------------

Gross Floor Area	7,834 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.	☐
Weekly operating hours	40 Hours	Is this the total number of hours per week that the Office 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	25	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. The normal worker density ranges between 0.3 and 10 workers per 1000 square feet (92.8 square meters)	☐
Number of PCs	25	Is this the number of personal computers in the Office?	☐
Percent Cooled	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?	☐
Percent Heated	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?	☐

Police Department (Other)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☒
Gross Floor Area	5,010 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	20(Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	168Hours(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	20(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: Electric Meter (kWh (thousand Watt-hours)) Space(s): Entire Facility Generation Method: Grid Purchase		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
04/22/2009	05/26/2009	28,080.00
03/17/2009	04/21/2009	29,340.00
02/18/2009	03/16/2009	22,260.00
01/20/2009	02/17/2009	22,260.00
12/24/2008	01/19/2009	21,720.00
11/26/2008	12/23/2008	28,320.00
10/28/2008	11/26/2008	54,360.00
09/26/2008	10/27/2008	30,420.00
08/27/2008	09/25/2008	39,060.00
07/30/2008	08/26/2008	42,240.00
Electric Meter Consumption (kWh (thousand Watt-hours))		318,060.00
Electric Meter Consumption (kBtu (thousand Btu))		1,085,220.72
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		1,085,220.72
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: Gas Meter (therms) Space(s): Entire Facility		
Start Date	End Date	Energy Use (therms)
04/22/2009	05/26/2009	1,187.00
03/17/2009	04/21/2009	2,195.00
02/18/2009	03/16/2009	1,500.00
01/20/2009	02/17/2009	2,735.00
12/24/2008	01/19/2009	1,992.00
11/26/2008	12/23/2008	2,035.00
10/28/2008	11/25/2008	955.00
09/26/2008	10/27/2008	109.00
08/26/2008	09/25/2008	16.00
07/30/2008	08/26/2008	7.00
Gas Meter Consumption (therms)		12,731.00
Gas Meter Consumption (kBtu (thousand Btu))		1,273,100.00

Total Natural Gas Consumption (kBtu (thousand Btu))	1,273,100.00
Is this the total Natural Gas consumption at this building including all Natural Gas 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

Boro Building
2480 Plainfield Avenue
South Plainfield, NJ 07080

Facility Owner

Borough of South Plainfield
South Plainfield
2480 Plainfield Avenue, NJ 07080

Primary Contact for this Facility

Glen Cullen
2480 Plainfield Avenue
South Plainfield, NJ 07080

General Information

Boro Building	
Gross Floor Area Excluding Parking: (ft ²)	14,428
Year Built	1960
For 12-month Evaluation Period Ending Date:	June 30, 2009

Facility Space Use Summary

Courtroom		Police Department	
Space Type	Courthouse	Space Type	Other - Fire Station/Police Station
Gross Floor Area(ft ²)	1,584	Gross Floor Area(ft ²)	5,010
Weekly operating hours	12	Number of PCs*	20
Workers on Main Shift	50	Weekly operating hours*	168
Number of PCs	0	Workers on Main Shift*	20
Percent Cooled	50% or more		
Percent Heated	50% or more		
Municipal Offices			
Space Type	Office		
Gross Floor Area(ft ²)	7,834		
Weekly operating hours	40		
Workers on Main Shift	25		
Number of PCs	25		
Percent Cooled	50% or more		
Percent Heated	50% or more		

Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 06/30/2009)	Baseline (Ending Date 06/30/2009)	Rating of 75	Target	National Average
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft ²)	194	194	54	N/A	77
Source (kBtu/ft ²)	436	436	122	N/A	182
Energy Cost					
\$/year	N/A	N/A	N/A	N/A	N/A
\$/ft ² /year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
MtCO ₂ e/year	422	422	118	N/A	168
kgCO ₂ e/ft ² /year	29	29	8	N/A	12

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

Notes:

o - This attribute is optional.

d - A default value has been supplied by Portfolio Manager.

APPENDIX P

Equipment Inventory

South Plainfield BPU Energy Audit Program

Borough of South Plainfield, NJ

CHA#20549

Borough Hall Municipal Building										
Item	Qty.	Manuf	Model No.	Serial No.	Capacity	Condition	Gas	MBH	Refrig.	Comments
Split System A/C Units										
1	1	Fujitsu	AOU24CL	DDN008232	2 Ton	G		24.2	R410A	Police Data Center
2	1	Mitsubishi	PUY-A18NHA		1.5 Ton	G		18	R410A	911 Dispatch Data Center
Gas-Fired HW Boiler Plant										
3	4	Slant / Fin	Carvan GG-399HEC			G	X	400		1,600 MBH total capacity
Packaged Rooftop A/C Units										
4	1	Carrier	50TM016511YA	1607U10606	16 Ton	E		178	R22	Tag 1 - Tax Office
5	1	Carrier	50TJ016-520YA	1197F60097	16 Ton	G		178	R22	Tag 2 - Front Offices
6	1	Carrier	50TM008-A-501	0107G50540	8 Ton	E		89	R22	Tag 3 - Court Room
7	1	Carrier	50TJ004-511GA	1297G21675	4 Ton	G		35	R22	Tag 4 - Health Dept.
8	1	Carrier	50TJ005-501	1397G21088	5 Ton	G		47	R22	Tag 5 - Pats Office
9	1	Carrier	50TM-006-A501	2206G30187	6 Ton	E		57	R22	Tag 6 - Dispatch Office
10	1	Carrier	50TJ-004-511GA	1397G21118	4 Ton	G		35	R22	Tag 7 - Records
11	1	Carrier	50TJ-004-511GA	1097G21668	4 Ton	G		35	R22	Tag 8 - Booking Room
12	1	Carrier	50TM006A501	4502G30439	6 Ton	G		57	R22	Tag - 9 Building Dept/Police
Domestic Hot Water Heater										
13	1	Rheem	22VR75-70N	RHLN 0505101152	75 Gallon	E	X	70		Basement, new 2005
Generator										
14	1	Ford				P				Abandoned in basement
15	1	Onan	Genset		500kva / 400kW	E				Diesel, Outside shed
Exhaust Fans										
16	1	Jenn Air			380 CFM	G				1/12 HP, Public Restroom
17	1	Jenn Air			500 CFM	G				1/12 HP, Office Restroom
18	1	Jenn Air			1,130 CFM	G				1/6 HP, Police Restroom, Jan closet
19	1	Jenn Air			770 CFM	G				1/6 HP, Holding Cells
20	1	Jenn Air			150 CFM	G				1/25 HP, Old darkroom
21	1	Jenn Air			5100/3400 CFM	G				1/2 HP, Courtroom
Heating and Ventilating Units										
22	1	Nesbitt	110.ARR.12		1,010 CFM	G				1/4 HP, Lobby
23	1	Nesbitt	110.ARR.12		1,010 CFM	G				1/4 HP, Holding Cells

E = Excellent
G = Good
P = Poor