TOWNSHIP OF KEARNY
SENIOR CENTER
ENERGY ASSESSMENT

for

NEW JERSEY
BUREAU OF PUBLIC UTILITIES

CHA PROJECT NO. 20711

June 2010

Prepared by:

CLOUGH HARBOUR & ASSOCIATES LLP

6 Campus Drive
Parsippany, NJ 07054

(973) 538-2120

TABLE OF CONTENTS

APPENDICES

A	Utility Usage Analysis
B	ECM-1 Replace Boiler
C	ECM-2 Install Premium Efficiency Motors
D	ECM-3 Replace Domestic Hot Water Heater
E	ECM-4 Lighting Replacements
F	ECM-5 Install Occupancy Sensors
G	ECM-6 Lighting Replacements with Occupancy Sensors
H	New Jersey Pay For Performance Incentive Program
I	Photovoltaic (PV) Rooftop Solar Power Generation
J	Solar Thermal Domestic Hot Water Plant
K	Wind
L	EPA Portfolio Manager
M	Equipment Inventory

1.0 INTRODUCTION & BACKGROUND

This report summarizes the energy audit for the Senior Center, a 3,000 square foot facility in Kearny, NJ. The one story building, has a finished basement. The first floor of the one story building consists of two reading rooms, a board room, kitchen, and restrooms. The finished basement houses a mechanical room, a large recreation room, restrooms, meeting room, and storage rooms.

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 consumptions while increasing comfort.

2.0 EXECUTIVE SUMMARY

This report details the results of the energy audit for the Senior Center, a 3,000 square foot facility in Kearny, NJ. The one story building includes two reading rooms, board room, kitchen, and restrooms. The finished basement contains a recreation area and meeting space, as well as mechanical room and storage space. The following areas were evaluated for energy conservation measures:

- Lighting replacements with occupancy sensors
- Boiler replacement
- Premium efficiency motors
- Domestic hot water heater 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 $3,300 for the recommended ECM may be realized with a payback of 2.1 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-6 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
7,500	5.8	18,200	0	3,300	5.6	700	2.3	2.1

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

3.0 EXISTING CONDITIONS

3.1 Building General

The Senior Center is a 3,000 square foot, one story building with a finished basement. The building was constructed in 1972, with minor renovations in the last few years. The first floor consists of two reading rooms, a big meeting room, kitchen, and restrooms. The basement houses a mechanical room, play room, meeting room, restrooms, and storage rooms.

The outside framing walls are insulated, constructed of veneer brick and have sheetrock or paneling interior finish. The roof is insulated; the windows are single pane with exterior storm windows.

The building is typically occupied between 8:00 AM and 2:00 PM Mondays, Tuesdays, and Thursdays by about 30-40 people, and four hours on Fridays. The schedule varies depending on the events.

3.2 Utility Usage

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

Electricity and natural gas are purchased from the Public Service Electric and Gas Company (PSE&G). For 2008, the facility consumed a total of 17,700 kWh of electricity at an annual cost of about $4,900. The annual natural gas usage for the building was about 2,900 therms at a cost of $4,400.

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

The electricity usage trend shows a higher consumption during the summer cooling months due to air conditioning. The average blended rate for electricity was $0.27 per kWh. The majority of natural gas is used for heating the building, as indicated by the higher usage trend during the colder months of November through April. The average blended rate for natural gas was $1.50 per therm.

Utility data is provided in Appendix A.

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

3.3 HVAC Systems

Building heat is provided by a single gas fired IBR hot water boiler rated at 300 MBH input and 260 MBH output. Heating hot water is delivered to perimeter fin-tubes located throughout the building. The cooling for the basement area is provided by the use of a single air handler located in the mechanical room that works with an outdoor condensing unit. There are two packaged, direct expansion (DX), cooling only air handlers located in a fenced outdoor area which serve the first floor.

3.4 Domestic Hot Water Systems

Domestic hot water is produced in a 50 gallon gas fired Rheem hot water heater rated at 60,000 Btu/hr.

3.5 Lighting/Electrical Systems

The lighting system within the building is manually controlled by individual switches in the spaces. Some of the switches within the board room, recreation room, and front sitting area have dimming capabilities. The lighting within the building remains on with occupancy, generally about 45 hours a week. Most of the lighting is a mixture of incandescent bulbs and fluorescent fixtures using F34T12 34 watt lamps. All exit signs within the building have been upgraded to LED technology.

The building's exterior lighting consists of a mixture of fluorescent fixtures that are controlled by occupancy sensors and incandescent spot fixtures controlled by timers.

3.6 Control Systems

The heating and cooling systems are each equipped with a dedicated digital thermostat which has been programmed with temperature setpoints and operating schedules. Current temperature setpoints are as follows: 74°F during occupied times and 80°F during unoccupied times for cooling; and 70°F during occupied times and 62°F during unoccupied times for heating.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 Replace Boiler

The existing boiler is an original gas fired hot water boiler rated at 260 MBH output and 300 MBH input. Based on age, type, and operations, the efficiency of the unit was estimated to be at 70%.

This ECM evaluated replacement of the existing boiler with a high efficiency condensing boiler. Installation would require modifications to the existing piping, electrical wiring, and flue ducts.

To calculate this measure, the proposed efficiency was applied to the building heat load which was determined from the existing boiler's natural gas consumption. The proposed gas consumption was then compared to the existing consumption and the difference results in energy savings.

It was calculated that the new high efficiency boiler would provide energy savings of 690 therms per year.

Boilers have an expected lifetime of 25 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 17,250 therms, and $25,000.

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

ECM-1 Replace Boiler

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
18,000	0	0	690	1,000	0.4	500	18.0	17.5

* Incentive shown is per the New Jersey Smart Start Program, 2009 Gas Heating Application.

This measure is not recommended.

4.2 ECM-2 Install Premium Efficiency Motors

The packaged air handlers serving the first floor have fans powered by electric motors that operate at lower efficiencies than the currently available premium motors. To determine the energy savings from upgrading to premium efficiency motors, the existing electrical energy consumption was compared to the projected consumption calculated on the same number of hours of operation.

Due to the low operating hours, the savings for this measure would result in savings of less than $100 with an unfavorable payback; therefore, the measure is not recommended.

Premium motors have an expected lifetime of 18 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 4,320 kWh, and $1,800.

The implementation cost and savings related to this ECM are presented in Appendix C.

4.3 ECM-3 Replace Domestic Hot Water Heater

Domestic hot water is generated by a 50 gallon gas fired hot water heater. Since the building's operating hours are low, the demand for hot water has extensive periods of time when water is not used. The existing water heater, however, must still heat the water within the storage tank to maintain the required setpoint temperature. The energy required to maintain the hot water temperature setpoint during the times are known as standby losses. This measure evaluated replacement of the existing domestic water heater with a tankless, on demand, gas-fired, condensing hot water heater.

The proposed efficiency was based on the Takagi Flash T-H1 on demand hot water heater. The implementation of this measure would require minor changes in water/gas piping, installation of new venting, and electrical connections.

Tankless water heaters have an expected lifetime of 18 years, according to ASHRAE, and total energy savings over the life of the project are estimated at 1,440 therms, and $1,800.

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

ECM-3 Replace Domestic Hot Water Heater

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
5,000	0	0	80	100	(0.6)	300	>25	>25

* Incentive shown is per the New Jersey Smart Start program, 2010 Gas Water Heating Application.

This measure is not recommended.

4.4 ECM-4 Lighting Replacements

The Senior Center contains approximately 80 fixtures with inefficient incandescent bulbs and about 50 fluorescent fixtures using inefficient T-12 lamps. These fluorescent fixtures each contain two or four-4' lamps, or two-2' u-tube lamps. Overall energy consumption can be reduced by retrofitting the existing T-12 fixtures with more efficient T-8 fluorescent lamps with electronic ballasts, and replacing incandescent bulbs with compact fluorescent bulbs.

To compute the annual savings for this ECM, the energy consumption of the lighting fixtures was established, and it was determined to be 36,780 kWh per year. To calculate the annual energy consumption utilizing replacement lamps and bulbs, the proposed fixture power requirement was used with the same annual hours of operation. The difference between the existing and proposed annual energy consumption was the energy savings. Calculations are provided in Appendix E.

Existing lamps and ballasts of each fixture would be replaced with electronic ballasts T-8 fluorescent lamps, the length and quantity varies based on application. Incandescent bulbs would also be replaced with compact fluorescent bulbs. This ECM will provide annual savings of 17,770 kWh.

The lighting retrofits have an expected life of 15 years, according to the manufacturers, and total energy savings over the life of the project are estimated at 266,550 kWh and $49,500.

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

ECM-4 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
7,000	5.8	17,770	0	3,300	6.1	600	2.1	1.9

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

This measure is not recommended in lieu of ECM-6.

4.5 ECM-5 Install Occupancy Sensors

Lighting fixtures throughout the building are manually switched on and off, and are operational with occupancy. The operating time of lights in the back office, board room and front sitting areas can be reduced by installing occupancy sensors to control their operation. Occupancy sensors were not considered for many areas because of safety concerns or low use.

Applying the same process used in the calculation of ECM-4, the existing baseline energy consumption for each fixture was determined. Typical traffic patterns for each space were then taken into account to approximate the actual occupancy hours per day. It was established that the annual energy consumption of the lighting fixtures can be reduced by 1,170 kWh.

Approximately four occupancy sensors and some standard electrical work are required to implement this measure in the areas discussed above.

Lighting controls have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 17,550 kWh, and $3,000.

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

ECM-5 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
500	0.0	1,170	0	200	5.0	100	2.5	2.0

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

This measure is not recommended in lieu of ECM-6.

4.6 ECM-6 Lighting Replacements with Occupancy Sensors

This measure is a combination of ECMs 4 and 5 to allow for maximum energy and demand reduction. Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative.

The lighting retrofits and controls have an expected lifetime of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 273,000 kWh, and $49,500.

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

ECM-6 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
7,500	5.8	18,200	0	3,300	5.6	700	2.3	2.1

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

This measure is recommended.

5.0 PROJECT INCENTIVES

5.1 Incentives Overview

5.1.1 New Jersey Pay For Performance and Smart Start Programs

The building will be eligible for incentives from the New Jersey Office of Clean Energy. The most significant incentives will be from the New Jersey Pay for Performance (P4P) Program. The P4P program is designed for qualified energy conservation projects in facilities whose demand in any of the preceding 12 months exceeds 200 kW. Facilities that meet this criterion must also achieve a minimum performance target of 15% by using the EPA Portfolio Manager benchmarking tool before and after construction. Incentives for this program are in three parts. Incentive #1 energy reduction plan pays $0.05 per square foot to a maximum of $25,000 or 50% of facility annual energy cost paid after approval of application. Incentive #2 is paid after installation of recommended measures; base incentives deliver $0.11/kWh and $1.10/therm not to exceed 30% of total project cost. Incentive #3 post-construction benchmarking is paid after acceptance of a report proving energy savings over one year utilizing the EPA Portfolio Manager benchmarking tool. Incentive #3 base incentives deliver $0.07/ kWh and $0.70/therm not to exceed 20% of total project cost. Combining incentives #2 and #3 will provide a total of $0.18/ kWh and $1.8/therm not to exceed 50% of total project cost. Additional incentives for #2 and #3 are increased by $0.005/kWh and $0.05/therm for each percentage increase above minimum performance target calculated with the EPA Portfolio Manager benchmarking tool not to exceed 50% of total project cost.

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

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

5.1.2 PSE&G Small Business Direct Install Program

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

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

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

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

Eligible energy efficiency equipment upgrades include:

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

5.2 Building Incentives

The Senior Center is eligible for several incentives available under New Jersey Smart Start Programs. The total amount of all qualified incentives is about $1,500 and includes installing a new boiler, tankless water heater, 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 as the amount received is based on building wide energy improvements. Since the overall energy reduction for the building is estimated to exceed the 15% minimum, the building is eligible for Incentives #2 and #3 as previously discussed. This would result in a total incentive of about $9,400, reducing the total project payback from 7.0 years to 5.0 years. See Appendix H for calculations.

Under PSE&G's direct install program, the Senior Center is potentially eligible to receive $31,700, and would be required to repay $6,300. Incentives cannot be accepted under multiple programs.

6.0 ALTERNATIVE ENERGY SCREENING EVALUATION

6.1 Geothermal

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

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

6.2 Solar

6.2.1 Photovoltaic Rooftop Solar Power Generation

The Senior Center was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The building's roof has sufficient room to install a large solar cell array. A structural analysis would be required to determine if the roof framing could support a cell array.

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

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

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey solar renewable energy certificates program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. An alternative compliance penalty (ACP) is paid for by the high emission producers and is set each year on a declining scale of 3% per year. One SREC credit is equivalent to

1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. The cost of the ACP penalty for 2009 is $700; this is the amount that must be paid per SERC by the high emission producers. The expected dollar amount that will be paid to the PV producer for 2009 is expected to be $600/SREC credit. Payments that will be received from the PV producer will change from year to year dependent upon supply and demand. Renewable Energy Consultants is a third party SREC broker that has been approved by the New Jersey Clean Energy Program. As stated above there is no definitive way to calculate an exact price that will be received by the PV producer per SREC over the next 15 years. Renewable Energy Consultants estimated an average of $487/ SERC per year and this number was utilized in the cash flow for this report.

The building had a maximum electricity demand of 18.2 kW and a minimum of 10.4 kW, from January 2008 through December 2008. The monthly average over the observed 12 month period was 15.5 kW. The existing load does not justify the use of the maximum incentive cap of 50 kW of installed PV solar array; therefore, a 15 kW system size was selected for the calculations. The system costs for PV installations were derived from the most recent NYSERDA (New York State Energy Research and Development Agency) estimates of total cost of system installation. It should be noted that the cost of installation is currently $10 per watt or $10,000 per kW of installed system. This has increased in the past few years due to the rise in national demand for PV power generator systems. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

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

Photovoltaic (PV) Rooftop Solar Power Generation – 15 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
150,000	0	17,750	0	4,900	4,900	15,000	8,600	>25	10.0

*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

Due to the current high cost of electricity, it is recommended that this measure be further investigated to determine the possibility for implementation and the overall benefits.

6.2.2 Solar Thermal Hot Water Plant

Active solar thermal systems use solar collectors to gather the sun's energy to heat water, another fluid, or air. An absorber in the collector converts the sun's energy into heat. The heat is then transferred by circulating water, antifreeze, or sometimes air to another location for immediate use or storage for later utilization. Applications for active solar thermal energy include providing hot water, heating swimming pools, space heating, and preheating air in residential and commercial buildings.

A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually placed

on the roof of the building, oriented south, and tilted around the site's latitude, to maximize the amount of radiation collected on a yearly basis.

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

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

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

Solar Thermal Domestic Hot Water Plant

Budgetary Cost	Annual Utility Savings				Total Savings	New Jersey Renewable Energy Incentive	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	$	$	Years	Years
27,100	0	0	130	200	200	NA	>25	NA

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

This measure is not recommended.

6.3 Wind

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

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

The New Jersey Clean Energy Program for small wind installations has designated numerous pre-approved wind turbines for installation in the State of New Jersey. Incentives for wind turbine installations are based on kilowatt hours saved in the first year. Systems sized under 16,000 kWh per year of production will receive a $3.20 per kWh incentive. Systems producing over 16,000 kWh will receive $51,200 for the first 16,000 kWh of production with an additional $0.50 per kWh up to a maximum cap of 750,000 kWh per year. Federal tax credits are also available for renewable energy projects up to 30%

of installation cost for systems less than 100 kW. However, as noted previously, municipalities do not pay federal taxes and is, therefore, not eligible for the tax credit incentive.

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

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

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

6.4 Combined Heat and Power Generation (CHP)

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

Any proposed CHP project will need to consider many factors, such as existing system load, use of thermal energy produced, system size, natural gas fuel availability, and proposed plant location. The Senior Center 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 Senior Center 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 Senior Center had a monthly average electricity demand of 15.5 kW and a maximum demand of 18.2 kW in 2008.

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 States Environmental 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 Senior Center is considered a high energy consumer per the Portfolio Manager with a Site Energy Usage Index (EUI) of 117 kBTU/ft^2/year. Several factors contribute to the unfavorable EUI, including, wasted energy from an inefficient boiler, hot water heater, motors, lighting systems, etc. By implementing the measures discussed in this report, it is expected that the EUI can be reduced to approximately 70 kBTU/ft^2/year. The EPA Portfolio Manager did not generate an energy rating score for this building because the building type (Social/Meeting) is not eligible for an energy star rating.

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

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

8.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the Senior Center, in Kearny, New Jersey identified a potential ECM for lighting upgrades with occupancy sensors. Potential annual saving of $3,300 may be realized for the recommended ECM, with a summary of the cost, saving, and payback as follows:

ECM-6 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
7,500	5.8	18,200	0	3,300	5.6	700	2.3	2.1

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

APPENDIX A

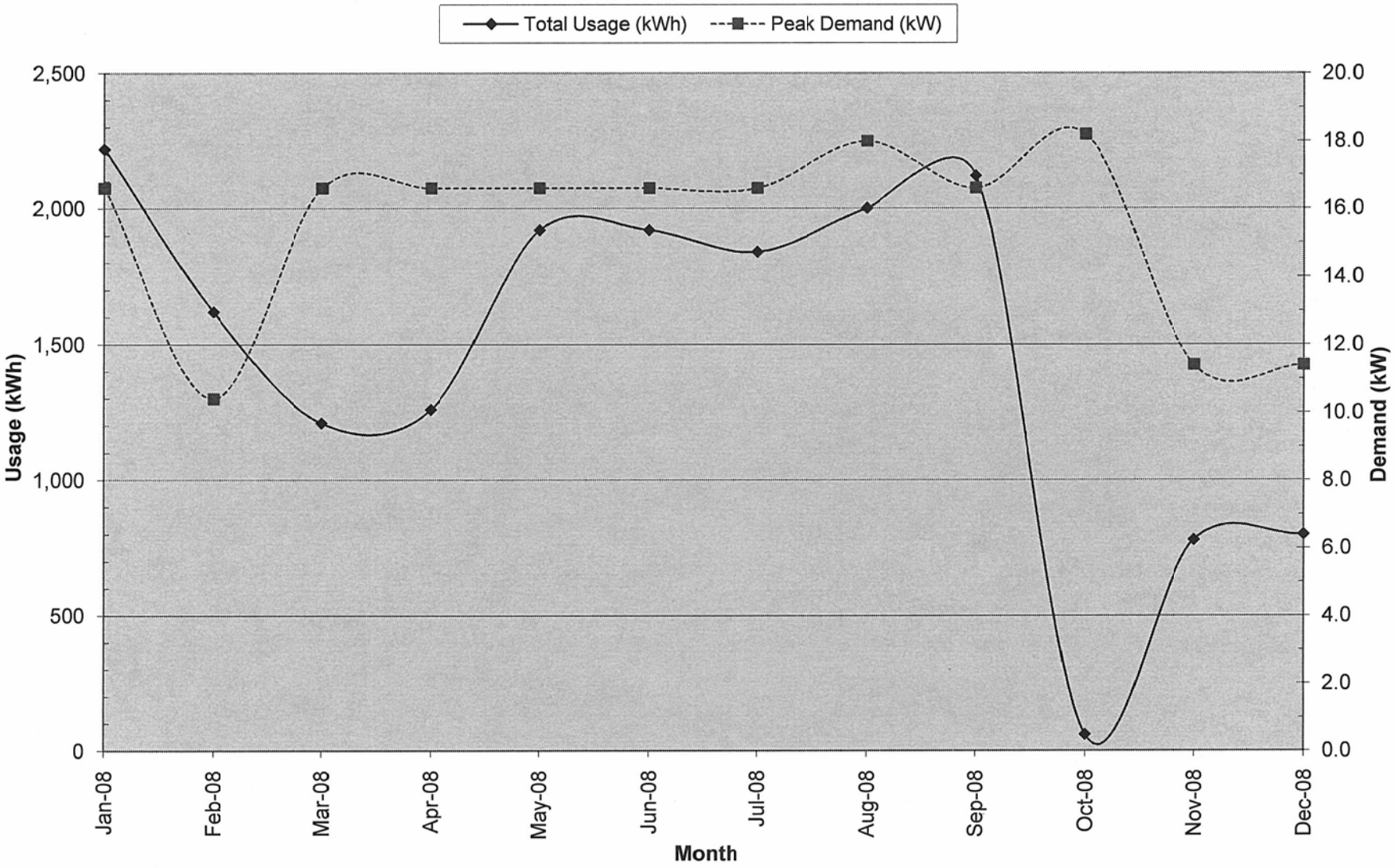
Utility Usage Analysis

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

Senior Center - 60 Columbia Ave.
Account No.: 11 929 477 03
Meter No.: 658000871

			Charges			Unit Costs		
Month	Consumption (kWh)	Demand (kW)	Total ($)	Demand ($)	Consumption ($)	Blended Rate ($/kWh)	Consumption ($/kWh)	Demand ($/kW)
January-08	2,220	16.6	$337.94	$94.03	$243.91	0.1522	0.1099	5.66
February-08	1,620	10.4	$421.40	$232.58	$188.82	0.2601	0.1166	22.36
March-08	1,210	16.6	$230.65	$94.07	$136.58	0.1906	0.1129	5.67
April-08	1,260	16.6	$232.87	$94.07	$138.80	0.1848	0.1102	5.67
May-08	1,920	16.6	$312.63	$95.79	$216.84	0.1628	0.1129	5.77
June-08	1,920	16.6	$508.09	$232.75	$275.34	0.2646	0.1434	14.02
July-08	1,840	16.6	$501.67	$232.75	$268.92	0.2726	0.1462	14.02
August-08	2,000	18.0	$552.27	$248.32	$303.95	0.2761	0.1520	13.80
September-08	2,120	16.6	$540.61	$232.75	$307.86	0.2550	0.1452	14.02
October-08	60	18.2	$900.65	$875.42	$25.23	15.0108	0.4205	48.10
November-08	780	11.4	$184.85	$92.90	$91.95	0.2370	0.1179	8.15
December-08	800	11.4	$186.10	$92.90	$93.20	0.2326	0.1165	8.15
Most Recent Yr	17,750	18.2	$4,909.73	$2,618.33	$2,291.40	0.2766	0.1291	14.11

Electric Usage - Town of Kearny Senior Center



Utility Data - Kearny Senior(rev-0).xls
Electricity Chart

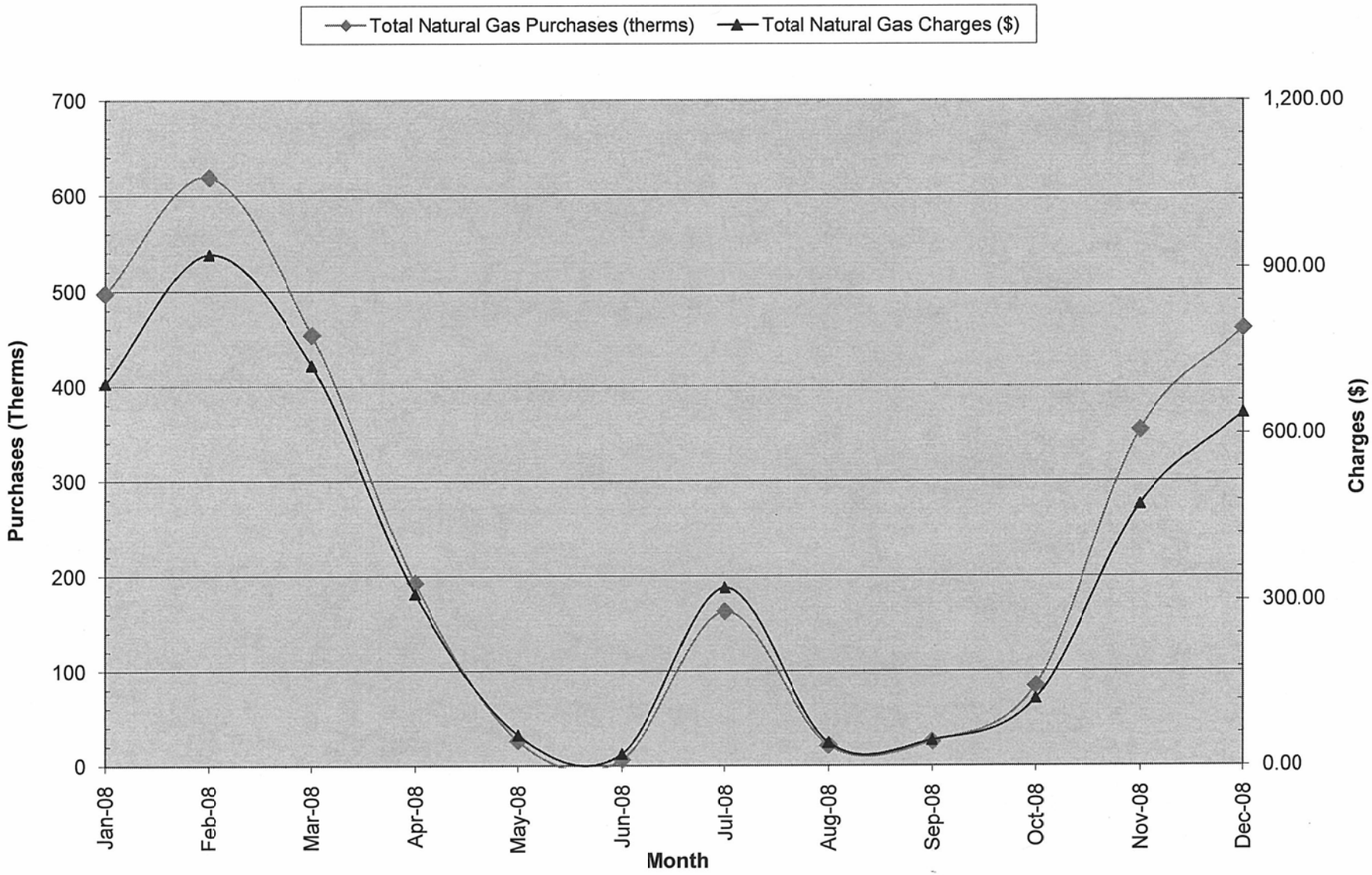
New Jersey BPU Energy Audit Program
CHA Project No.: 20711
Town of Kearny
PSE&G - Natural Gas Service

Senior Center - 60 Columbia Ave.
Account No.: 11 929 477 03
Meter No.: Combined (1816175 & 2257298)

Month	Therms	Charges ($)	($/Therm)
January-08	498	690.68	1.388
February-08	619	923.22	1.491
March-08	454	722.70	1.592
April-08	193	311.27	1.613
May-08	26	55.38	2.125
June-08	6	21.27	3.401
July-08	163	322.47	1.977
August-08	21	41.47	1.978
September-08	25	45.74	1.821
October-08	85	121.51	1.435
November-08	354	472.39	1.336
December-08	461	637.19	1.383

Most Recent Yr	2,904	4,365	1.503

Natural Gas Usage - Town of Kearny EMS



Utility Data - Kearny Senior(rev-0).xls
Natural Gas Chart

ELECTRIC MARKETERS LIST

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Jan 14, 2009

GAS MARKETERS LIST

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

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

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

RPL Holdings, Inc
601 Carlson Pkwy
Minnetonka, MN 55305

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Apr 10, 2009

APPENDIX B

ECM-1 Replace Boiler

Kearny NJ
CHA #20711
Building: Senior Center

ECM-1 Boiler Replacement

Existing Fuel	Nat.Gas
Proposed Fuel	Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 1.50		
Proposed Fuel Cost	$ 1.50		
Baseline Fuel Use	2,904	Therms	Based on historical utility data
Existing Boiler Plant Efficiency	70%		Estimated or Measured
Baseline Boiler Load	203,280	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms
Baseline Fuel Cost	$ 4,356		
Proposed Boiler Plant Efficiency	92%		New Boiler Efficiency (based on Burnham ALP399)
Proposed Fuel Use	2,210	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 3,314		
Annual Savings	694	Therms	
Annual Savings	**$ 1,042**	**/yr**	

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

Kearny NJ
CHA #20711
Building: Senior Center

ECM-1 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	1	ea		$ 360		$ -	$ 436	$ -	$ 436	
Condensing boiler 300 MBH	1	ea	$ 7,200	$ 1,670		$ 7,056	$ 2,021	$ -	$ 9,077	Burnham
Chem treatment	1	ea	$ 250	$ 220		$ 245	$ 266	$ -	$ 511	
Flue Attachment	10	lf	$ 13	$ 19		$ 130	$ 229	$ -	$ 359	
Miscellaneous Electrical	2	ea	$ 150	$ 250		$ 294	$ 605	$ -	$ 899	
Piping and specialties	1	ls	$ 320	$ 330		$ 314	$ 399	$ -	$ 713	
Controls	1	ls	$ 820	$ 360		$ 804	$ 436	$ -	$ 1,239	
Air intake piping	10	lf	$ 13	$ 19		$ 130	$ 229	$ -	$ 359	
						$ -	$ -	$ -	$ -	

New Jersey Smart Start Incentive	QTY	UNIT	$ / UNIT	TOTAL SAVINGS	Cost W/O INCENTIVE	Cost W/ INCENTIVE
					$ -	$ -
>300 MBH	300	Tons	$2	$525	$ 9,077	$ 8,552
						$ -
				$525	$9,077	$8,552

Total ECM Cost w/ Incentives	**$17,450**

$ 13,592	Subtotal
$2,038.75	15% Contingency
$2,344.56	15% Contractor O&P
$ -	Engineering
$ 17,975	**Total**

APPENDIX C

ECM-2 Install Premium Efficiency Motors

Kearny NJ
CHA #20711
Building: Senior Center

ECM-2 Install Premium Efficiency Motors

Demand Cost $/kW-month
$ 14.11

Energy Cost $/kWh
$ 0.129

Multipliers		
Material	Labor	Equipment
0.98	1.21	1.09

Savings Analysis

#	Description	Location	Existing HP	Load Factor	Existing Efficiency[a]	Existing kW	New HP[b]	New Load Factor	New Efficiency[a]	New kW	Demand Savings	Demand Savings $	Annual Hours	kWh Savings	$ kWh Savings	Total $ Savings	Estimated Cost	Payback Years
1	AHU 1 Fan	Outdoors	2	0.9	0.820	1.6	2	0.9	0.871	1.5	0.096	$ 16	1,251	120	$ 16	$ 32	$ 577	18.2
2	AHU 2 Fan	Outdoors	2	0.9	0.820	1.6	2	0.9	0.871	1.5	0.096	$ 16	1,251	120	$ 16	$ 32	$ 577	18.2
11																		
12																		
		Total	4			3.3	4			3.1	0.19	$ 33	1,251	241	$ 31	$ 64	$ 1,155	

Cost Estimates

#	Description	Unit Costs Materials	Unit Costs Labor	Unit Costs Equipment	Subtotal Costs Materials	Subtotal Costs Labor	Subtotal Costs Equipment	Total Cost	Remarks
1	AHU 1 Fan	$ 342	$ 200	$ -	$ 335	$ 242	$ -	$ 577	
2	AHU 2 Fan	$ 342	$ 200	$ -	$ 335	$ 242	$ -	$ 577	
11									
12									
								$ 1,155	

Notes

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

b Same as existing HP unless resized to better match load

New Jersey Smart Start Incentive	QTY	UNIT	$ / UNIT	TOTAL SAVINGS	Cost W/O INCENTIVE	Cost W/ INCENTIVE
						$ -
2 HP Premium Efficiency TEFC Motor	2	EA	$50	$100	$ 1,155	$ 1,055
		EA	$50	$0		$ -
				$100	$1,155	$1,055

Total ECM Cost w/ Incentives	**$1,055**

APPENDIX D

ECM-3 Replace Domestic Hot Water Heater

Kearny NJ
CHA #20711
Building: Senior Center

ECM-3 Replace DHW Heater

Summary

* Replace 60 MBH, 50 Gal Gas-Fired DHW Heater w/ Instantaneous, Condensing, Gas-Fired DHW Heater

Item	Value	Units	Formula/Comments
Avg. Monthly Utility Demand by Water Heater	23	Therms/month	Based on energy tag (conservative small use)
Total Annual Utility Demand by Water Heater	27,600	MBTU/yr	1therm = 100 MBTU
Existing DHW Heater Efficiency	80%		Per manufacturer nameplate
Total Annual Hot Water Demand (w/ standby losses)	22,080	MBTU/yr	
Existing Tank Size	50	Gallons	Per manufacturer nameplate
Hot Water Piping System Capacity	10	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	120	°F	Per building personnel
Room Temperature	70	°F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.6	MBH	
Annual Standby Hot Water Load	5,475	MBTU/yr	
New Tank Size	0	Gallons	Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Hot Water Piping System Capacity	10	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	120	°F	
Room Temperature	70	°F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.1	MBH	
Annual Standby Hot Water Load	913	MBTU/yr	
Total Annual Hot Water Demand	17,518	MBTU/yr	
Proposed Avg. Hot water heater efficiency	92%		Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Proposed Fuel Use	191	Therms	Standby Losses and inefficient DHW heater eliminated
Utility Cost	$1.50	$/Therm	
Existing Operating Cost of DHW	$414	$/yr	
Proposed Operating Cost of DHW	$287	$/yr	

Savings Summary:

Utility	Energy Savings	Cost Savings
Therms/yr	85	$127

Kearny NJ
CHA #20711
Building: Senior Center

ECM-3 Replace DHW Heater

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.		
						$ -	$ -	$ -	$ -	
Gas-Fired DHW Heater Removal	1	LS		$ 50		$ -	$ 61	$ -	$ 61	
						$ -	$ -	$ -	$ -	
Instantaneous Gas-Fired DHW Heater	1	EA	$ 2,100	$ 280		$ 2,058	$ 339	$ -	$ 2,397	
Miscellaneous Electrical	1	LS	$ 150	$ 200		$ 147	$ 242	$ -	$ 389	
Venting Kit	1	EA	$ 350	$ 300		$ 343	$ 363	$ -	$ 706	
Miscellaneous Piping and Valves	1	LS	$ 150	$ 200		$ 147	$ 242	$ -	$ 389	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 3,941	Subtotal	
$ 394	10%	Contingency
$ 650	15%	Contractor O&P
$ -	0%	Engineering
$ 4,986	**Total**	

APPENDIX E

ECM-4 Lighting Replacements

Energy Audit of Kearny, NJ
CHA Project No. 20711 - Senior Center
ECM-4 Lighting Replacements

0 $0.129 $/kWh
$14.11 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
71	DS BACK BR	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	33	0.0	$ 9.84	$ 6.25	$0	0.6	0.6
16	DS BACK LEFT OFFICE	1	T 34 C F 2 (MAG)	F42EE	72	0.1	SW	500	36	1	T 28 R F 2	F42SSILL	48	0.0	SW	500	24	12	0.0	$ 5.61	$ 106.25	$10	18.9	17.2
71	DS BACK LEFT BATH	1	I 60	I60/1	60	0.1	SW	500	30	1	CF 26	CFQ26/1-L	27	0.0	SW	500	14	17	0.0	$ 7.72	$ 6.25	$0	0.8	0.8
4	DS MAIN RM	13	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.9	SW	500	468	13	2T 17 R F 2 (ELE)	F22ILL	33	0.4	SW	500	215	254	0.5	$ 118.55	$ 1,316.25	$130	11.1	10.0
4	DS MAIN RM	13	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.9	SW	500	468	13	2T 17 R F 2 (ELE)	F22ILL	33	0.4	SW	500	215	254	0.5	$ 118.55	$ 1,316.25	$130	11.1	10.0
71	DS BACK UTILITY RM	1	I 60	I60/1	60	0.1	SW	500	30	1	CF 26	CFQ26/1-L	27	0.0	SW	500	14	17	0.0	$ 7.72	$ 6.25	$0	0.8	0.8
71	DS BOILER RM	1	I 60	I60/1	60	0.1	SW	500	30	1	CF 26	CFQ26/1-L	27	0.0	SW	500	14	17	0.0	$ 7.72	$ 6.25	$0	0.8	0.8
93	DS BOILER RM	1	I 75	I75/1	75	0.1	SW	500	38	1	CF 26	CFQ26/1-L	27	0.0	SW	500	14	24	0.0	$ 11.22	$ 5.00	$0	0.4	0.4
65	DS STORAGE RM	1	I 100	I100/1	100	0.1	SW	500	50	1	CF 26	CFQ26/1-L	27	0.0	SW	500	14	37	0.1	$ 17.07	$ 37.50	$0	2.2	2.2
71	DS BOARD RM	4	I 60	I60/1	60	0.2	DIMMER	500	120	4	CF 26	CFQ26/1-L	27	0.1	DIMMER	500	54	66	0.1	$ 30.86	$ 25.00	$0	0.8	0.8
71	DS BOARD RM STORAGE	2	I 60	I60/1	60	0.1	SW	500	60	2	CF 26	CFQ26/1-L	27	0.1	SW	500	27	33	0.1	$ 15.43	$ 12.50	$0	0.8	0.8
6	US RECREATION ROOM	14	T 34 C F 4 (MAG)	F44EE	144	2.0	SW	1040	2,097	14	T 28 R F 4	F44SSILL	96	1.3	SW	1,040	1,398	699	0.7	$ 203.94	$ 1,837.50	$280	9.0	7.6
65	US RECREATION ROOM	6	I 100	I100/1	100	0.6	DIMMER	1040	624	6	CF 26	CFQ26/1-L	27	0.2	DIMMER	1,040	168	456	0.4	$ 132.92	$ 225.00	$0	1.7	1.7
65	US RECREATION ROOM	7	I 100	I100/1	100	0.7	DIMMER	1040	728	7	CF 26	CFQ26/1-L	27	0.2	DIMMER	1,040	197	531	0.5	$ 155.08	$ 262.50	$0	1.7	1.7
X1	US RECREATION ROOM	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	1040	5	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	1,040	5	-	-	$ -	$ -	$0		
71	US RECREATION ROOM	24	I 60	I60/1	60	1.4	SW	1040	1,498	24	CF 26	CFQ26/1-L	27	0.8	SW	1,040	674	824	0.8	$ 240.36	$ 150.00	$0	0.6	0.6
65	US WOMENS BR	1	I 100	I100/1	100	0.1	SW	1000	100	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	73	0.1	$ 21.78	$ 37.50	$0	1.7	1.7
172	US WOMENS BR	1	1T 34 R F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	1T 28 R F 2	F42SSILL	48	0.0	SW	1,000	48	24	0.0	$ 7.16	$ 114.75	$0	16.0	16.0
16	US WOMENS BR	1	T 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	T 28 R F 2	F42SSILL	48	0.0	SW	1,000	48	24	0.0	$ 7.16	$ 106.25	$10	14.8	13.4
65	US MENS BR	1	I 100	I100/1	100	0.1	SW	1000	100	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	73	0.1	$ 21.78	$ 37.50	$0	1.7	1.7
172	US MENS BR	1	1T 34 R F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	1T 28 R F 2	F42SSILL	48	0.0	SW	1,000	48	24	0.0	$ 7.16	$ 114.75	$0	16.0	16.0
16	US MENS BR	1	T 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	T 28 R F 2	F42SSILL	48	0.0	SW	1,000	48	24	0.0	$ 7.16	$ 106.25	$10	14.8	13.4
206	US KITCHEN	6	S 96 C F 1 (MAG)	F81EHL	80	0.5	SW	1040	499	6	S 96 C F 1 (MAG)	F81EHL	80	0.5	SW	1,040	499	-	-	$ -	$ -	$0		
206	US KITCHEN	6	S 96 C F 1 (MAG)	F81EHL	80	0.5	SW	1040	499	6	S 96 C F 1 (MAG)	F81EHL	80	0.5	SW	1,040	499	-	-	$ -	$ -	$0		
65	US MIDDLE HALL	5	I 100	I100/1	100	0.5	SW	1040	520	5	CF 26	CFQ26/1-L	27	0.1	SW	1,040	140	380	0.4	$ 110.77	$ 187.50	$0	1.7	1.7
65	US FRONT SITTING AREA	5	I 100	I100/1	100	0.5	SW	1040	520	5	CF 26	CFQ26/1-L	27	0.1	SW	1,040	140	380	0.4	$ 110.77	$ 187.50	$0	1.7	1.7
65	US FRONT SITTING AREA	3	I 100	I100/1	100	0.3	DIMMER	1040	312	3	CF 26	CFQ26/1-L	27	0.1	DIMMER	1,040	84	228	0.2	$ 66.46	$ 112.50	$0	1.7	1.7
65	US FRONT SITTING AREA	1	I 100	I100/1	100	0.1	SW	1040	104	1	CF 26	CFQ26/1-L	27	0.0	SW	1,040	28	76	0.1	$ 22.15	$ 37.50	$0	1.7	1.7
71	US FRONT SITTING AREA	12	I 60	I60/1	60	0.7	DIMMER	1040	749	12	CF 26	CFQ26/1-L	27	0.3	DIMMER	1,040	337	412	0.4	$ 120.18	$ 75.00	$0	0.6	0.6
101	US FRONT VESTIBULE	3	I 40	I40/1	40	0.1	SW	1040	125	3	CF 13	CFQ13/1-L	15	0.0	SW	1,040	47	78	0.1	$ 22.76	$ 20.25	$0	0.9	0.9
142	EXTERIOR LIGHTS	2	MH 100	MH100/1	128	0.3	Timer	4368	1,118	2	MH 100	MH100/1	128	0.3	Timer	4,368	1,118	-	-	$ -	$ -	$0		
16	EXTERIOR LIGHTS	5	T 34 C F 2 (MAG)	F42EE	72	0.4	OCC	1000	360	5	T 28 R F 2	F42SSILL	48	0.2	OCC	1,000	240	120	0.1	$ 35.80	$ 531.25	$50	14.8	13.4
	Total	**147**				**11.8**			**11,635**	**147**			**1,241**	**6**			**6,449**	**5,185**	**5.8**	**$1,644**	**$6,987**	**$620**		
																		Demand Savings		**5.8**	**$975**			
																		kWh Savings		**5,185**	**$669**			
																		Total savings			**$1,644**		**4.3**	**3.9**

APPENDIX F

ECM-5 Install Occupancy Sensors

Energy Audit of Kearny, NJ
CHA Project No. 20711 - Senior Center 0 $0.129 $/kWh
ECM-5 Install Occupancy Sensors $14.11 $/kW

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
71	DS BACK BR	1	I 60	I60/1	60	0.1	SW	1000	60.0	1	I 60	I60/1	60	0.1	None	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		
16	DS BACK LEFT OFFICE	1	T 34 C F 2 (MAG)	F42EE	72	0.1	SW	500	36.0	1	T 34 C F 2 (MAG)	F42EE	72	0.1	OCC	520	37.4	-1.4	0.0	-$0.19	$118.75	$20.00		
71	DS BACK LEFT BATH	1	I 60	I60/1	60	0.1	SW	500	30.0	1	I 60	I60/1	60	0.1	None	500	30.0	0.0	0.0	$0.00	$0.00	$0.00		
4	DS MAIN RM	13	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.9	SW	500	468.0	13	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.9	None	500	468.0	0.0	0.0	$0.00	$0.00	$0.00		
4	DS MAIN RM	13	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.9	SW	500	468.0	13	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.9	None	500	468.0	0.0	0.0	$0.00	$0.00	$0.00		
71	DS BACK UTILITY RM	1	I 60	I60/1	60	0.1	SW	500	30.0	1	I 60	I60/1	60	0.1	None	500	30.0	0.0	0.0	$0.00	$0.00	$0.00		
71	DS BOILER RM	1	I 60	I60/1	60	0.1	SW	500	30.0	1	I 60	I60/1	60	0.1	None	500	30.0	0.0	0.0	$0.00	$0.00	$0.00		
93	DS BOILER RM	1	I 75	I75/1	75	0.1	SW	500	37.5	1	I 75	I75/1	75	0.1	None	500	37.5	0.0	0.0	$0.00	$0.00	$0.00		
65	DS STORAGE RM	1	I 100	I100/1	100	0.1	SW	500	50.0	1	I 100	I100/1	100	0.1	None	500	50.0	0.0	0.0	$0.00	$0.00	$0.00		
71	DS BOARD RM	4	I 60	I60/1	60	0.2	DIMMER	500	120.0	4	I 60	I60/1	60	0.2	OCC	520	124.8	-4.8	0.0	-$0.62	$118.75	$20.00		
71	DS BOARD RM STORAGE	2	I 60	I60/1	60	0.1	SW	500	60.0	2	I 60	I60/1	60	0.1	None	500	60.0	0.0	0.0	$0.00	$0.00	$0.00		
6	US RECREATION ROOM	14	T 34 C F 4 (MAG)	F44EE	144	2.0	SW	1040	2,096.6	14	T 34 C F 4 (MAG)	F44EE	144	2.0	None	1040	2,096.6	0.0	0.0	$0.00	$0.00	$0.00		
65	US RECREATION ROOM	6	I 100	I100/1	100	0.6	DIMMER	1040	624.0	6	I 100	I100/1	100	0.6	None	1040	624.0	0.0	0.0	$0.00	$0.00	$0.00		
65	US RECREATION ROOM	7	I 100	I100/1	100	0.7	DIMMER	1040	728.0	7	I 100	I100/1	100	0.7	None	1040	728.0	0.0	0.0	$0.00	$0.00	$0.00		
X1	US RECREATION ROOM	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	1040	4.7	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	None	1040	4.7	0.0	0.0	$0.00	$0.00	$0.00		
71	US RECREATION ROOM	24	I 60	I60/1	60	1.4	SW	1040	1,497.6	24	I 60	I60/1	60	1.4	None	1040	1,497.6	0.0	0.0	$0.00	$0.00	$0.00		
65	US WOMENS BR	1	I 100	I100/1	100	0.1	SW	1000	100.0	1	I 100	I100/1	100	0.1	None	1000	100.0	0.0	0.0	$0.00	$0.00	$0.00		
172	US WOMENS BR	1	1T 34 R F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	1T 34 R F 2 (MAG)	F42EE	72	0.1	None	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		
16	US WOMENS BR	1	T 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	T 34 C F 2 (MAG)	F42EE	72	0.1	None	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		
65	US MENS BR	1	I 100	I100/1	100	0.1	SW	1000	100.0	1	I 100	I100/1	100	0.1	None	1000	100.0	0.0	0.0	$0.00	$0.00	$0.00		
172	US MENS BR	1	1T 34 R F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	1T 34 R F 2 (MAG)	F42EE	72	0.1	None	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		
16	US MENS BR	1	T 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	T 34 C F 2 (MAG)	F42EE	72	0.1	None	1000	72.0	0.0	0.0	$0.00	$0.00	$0.00		
206	US KITCHEN	6	S 96 C F 1 (MAG)	F81EHL	80	0.5	SW	1040	499.2	6	S 96 C F 1 (MAG)	F81EHL	80	0.5	None	1040	499.2	0.0	0.0	$0.00	$0.00	$0.00		
206	US KITCHEN	6	S 96 C F 1 (MAG)	F81EHL	80	0.5	SW	1040	499.2	6	S 96 C F 1 (MAG)	F81EHL	80	0.5	None	1040	499.2	0.0	0.0	$0.00	$0.00	$0.00		
65	US MIDDLE HALL	5	I 100	I100/1	100	0.5	SW	1040	520.0	5	I 100	I100/1	100	0.5	None	1040	520.0	0.0	0.0	$0.00	$0.00	$0.00		
65	US FRONT SITTING AREA	5	I 100	I100/1	100	0.5	SW	1040	520.0	5	I 100	I100/1	100	0.5	None	1040	520.0	0.0	0.0	$0.00	$0.00	$0.00		
65	US FRONT SITTING AREA	3	I 100	I100/1	100	0.3	DIMMER	1040	312.0	3	I 100	I100/1	100	0.3	OCC	520	156.0	156.0	0.0	$20.12	$118.75	$20.00	5.9	4.9
65	US FRONT SITTING AREA	1	I 100	I100/1	100	0.1	SW	1040	104.0	1	I 100	I100/1	100	0.1	OCC	520	52.0	52.0	0.0	$6.71	$118.75	$20.00	17.7	14.7
71	US FRONT SITTING AREA	12	I 60	I60/1	60	0.7	DIMMER	1040	748.8	12	I 60	I60/1	60	0.7	None	1040	748.8	0.0	0.0	$0.00	$0.00	$0.00		
101	US FRONT VESTIBULE	3	I 40	I40/1	40	0.1	SW	1040	124.8	3	I 40	I40/1	40	0.1	None	1040	124.8	0.0	0.0	$0.00	$0.00	$0.00		
142	EXTERIOR LIGHTS	2	MH 100	MH100/1	128	0.3	Timer	4368	1,118.2	2	MH 100	MH100/1	128	0.3	None	4368	1,118.2	0.0	0.0	$0.00	$0.00	$0.00		
16	EXTERIOR LIGHTS	5	T 34 C F 2 (MAG)	F42EE	72	0.4	OCC	1000	360.0	5	T 34 C F 2 (MAG)	F42EE	72	0.4	None	1000	360.0	0.0	0.0	$0.00	$0.00	$0.00		
	Total	**147**				**11.8**			**11,635**	**147**				**12**			**11,433**	**202**	**0**	**26**	**$475**	**80**		
																		Demand Savings		**0.0**	**$0**			
																		kWh Savings		**202**	**$26**			
																		Total Savings			**$26**		**18.3**	**15.2**

APPENDIX G

ECM-6 Lighting Replacements with Occupancy Sensors

Energy Audit of Kearny, NJ
CHA Project No. 20711 - Senior Center
ECM-6 Lighting Replacements with Occupancy Sensors

0 $0.129 $/kWh
$14.11 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess, Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
71	DS BACK BR	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26/1-L	27	0.0	None	1,000	27	33	0.0	$ 9.84	$ 6.25	$ -	0.6	0.6
16	DS BACK LEFT OFFICE	1	T 34 C F 2 (MAG)	F42EE	72	0.1	SW	500	36	1	T 28 R F 2	F42SSILL	48	0.0	OCC	520	25	11	0.0	$ 5.49	$ 225.00	$ 30	41.0	35.5
71	DS BACK LEFT BATH	1	I 60	I60/1	60	0.1	SW	500	30	1	CF 26	CFQ26/1-L	27	0.0	None	500	14	17	0.0	$ 7.72	$ 6.25	$ -	0.8	0.8
4	DS MAIN RM	13	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.9	SW	500	468	13	2T 17 R F 2 (ELE)	F22ILL	33	0.4	None	500	215	254	0.5	$ 118.55	$ 1,316.25	$ 130	11.1	10.0
4	DS MAIN RM	13	2T 34 R F 2 (u) (MAG)	FU2EE	72	0.9	SW	500	468	13	2T 17 R F 2 (ELE)	F22ILL	33	0.4	None	500	215	254	0.5	$ 118.55	$ 1,316.25	$ 130	11.1	10.0
71	DS BACK UTILITY RM	1	I 60	I60/1	60	0.1	SW	500	30	1	CF 26	CFQ26/1-L	27	0.0	None	500	14	17	0.0	$ 7.72	$ 6.25	$ -	0.8	0.8
71	DS BOILER RM	1	I 60	I60/1	60	0.1	SW	500	30	1	CF 26	CFQ26/1-L	27	0.0	None	500	14	17	0.0	$ 7.72	$ 6.25	$ -	0.8	0.8
93	DS BOILER RM	1	I 75	I75/1	75	0.1	SW	500	38	1	CF 26	CFQ26/1-L	27	0.0	None	500	14	24	0.0	$ 11.22	$ 5.00	$ -	0.4	0.4
65	DS STORAGE RM	1	I 100	I100/1	100	0.1	SW	500	50	1	CF 26	CFQ26/1-L	27	0.0	None	500	14	37	0.1	$ 17.07	$ 37.50	$ -	2.2	2.2
71	DS BOARD RM	4	I 60	I60/1	60	0.2	DIMMER	500	120	4	CF 26	CFQ26/1-L	27	0.1	OCC	520	56	64	0.1	$ 30.59	$ 143.75	$ 20	4.7	4.0
71	DS BOARD RM STORAGE	2	I 60	I60/1	60	0.1	SW	500	60	2	CF 26	CFQ26/1-L	27	0.1	None	500	27	33	0.1	$ 15.43	$ 12.50	$ -	0.8	0.8
6	US RECREATION ROOM	14	T 34 C F 4 (MAG)	F44EE	144	2.0	SW	1040	2,097	14	T 28 R F 4	F44SSILL	96	1.3	None	1,040	1,398	699	0.7	$ 203.94	$ 1,837.50	$ 280	9.0	7.6
65	US RECREATION ROOM	6	I 100	I100/1	100	0.6	DIMMER	1040	624	6	CF 26	CFQ26/1-L	27	0.2	None	1,040	168	456	0.4	$ 132.92	$ 225.00	$ -	1.7	1.7
65	US RECREATION ROOM	7	I 100	I100/1	100	0.7	DIMMER	1040	728	7	CF 26	CFQ26/1-L	27	0.2	None	1,040	197	531	0.5	$ 155.08	$ 262.50	$ -	1.7	1.7
X1	US RECREATION ROOM	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	Breaker	1040	5	3	X 1.5 W LED	ELED1.5/1	1.5	0.0	None	1,040	5	-	-	$ -	$ -	$ -	-	-
71	US RECREATION ROOM	24	I 60	I60/1	60	1.4	SW	1040	1,498	24	CF 26	CFQ26/1-L	27	0.6	None	1,040	674	824	0.8	$ 240.36	$ 150.00	$ -	0.6	0.6
65	US WOMENS BR	1	I 100	I100/1	100	0.1	SW	1000	100	1	CF 26	CFQ26/1-L	27	0.0	None	1,000	27	73	0.1	$ 21.78	$ 37.50	$ -	1.7	1.7
172	US WOMENS BR	1	1T 34 R F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	1T 28 R F 2	F42SSILL	48	0.0	None	1,000	48	24	0.0	$ 7.16	$ 114.75	$ -	16.0	16.0
16	US WOMENS BR	1	T 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	T 28 R F 2	F42SSILL	48	0.0	None	1,000	48	24	0.0	$ 7.16	$ 106.25	$ 10	14.8	13.4
65	US MENS BR	1	I 100	I100/1	100	0.1	SW	1000	100	1	CF 26	CFQ26/1-L	27	0.0	None	1,000	27	73	0.1	$ 21.78	$ 37.50	$ -	1.7	1.7
172	US MENS BR	1	1T 34 R F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	1T 28 R F 2	F42SSILL	48	0.0	None	1,000	48	24	0.0	$ 7.16	$ 114.75	$ -	16.0	16.0
16	US MENS BR	1	T 34 C F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	T 28 R F 2	F42SSILL	48	0.0	None	1,000	48	24	0.0	$ 7.16	$ 106.25	$ 10	14.8	13.4
206	US KITCHEN	6	S 96 C F 1 (MAG)	F81FHL	80	0.5	SW	1040	499	6	S 96 C F 1 (MAG)	F81EHL	80	0.5	None	1,040	499	-	-	$ -	$ -	$ -	-	-
206	US KITCHEN	6	S 96 C F 1 (MAG)	F81EHL	80	0.5	SW	1040	499	6	S 96 C F 1 (MAG)	F81EHL	80	0.5	None	1,040	499	-	-	$ -	$ -	$ -	-	-
65	US MIDDLE HALL	5	I 100	I100/1	100	0.5	SW	1040	520	5	CF 26	CFQ26/1-L	27	0.1	None	1,040	140	380	0.4	$ 110.77	$ 187.50	$ -	1.7	1.7
65	US FRONT SITTING AREA	5	I 100	I100/1	100	0.5	SW	1040	520	5	CF 26	CFQ26/1-L	27	0.1	None	1,040	140	380	0.4	$ 110.77	$ 187.50	$ -	1.7	1.7
65	US FRONT SITTING AREA	3	I 100	I100/1	100	0.3	DIMMER	1040	312	3	CF 26	CFQ26/1-L	27	0.1	OCC	520	42	270	0.2	$ 71.90	$ 231.25	$ 20	3.2	2.9
65	US FRONT SITTING AREA	1	I 100	I100/1	100	0.1	SW	1040	104	1	CF 26	CFQ26/1-L	27	0.0	OCC	520	14	90	0.1	$ 23.97	$ 156.25	$ 20	6.5	5.7
71	US FRONT SITTING AREA	12	I 60	I60/1	60	0.7	DIMMER	1040	749	12	CF 26	CFQ26/1-L	27	0.3	None	1,040	337	412	0.4	$ 120.18	$ 75.00	$ -	0.6	0.6
101	US FRONT VESTIBULE	3	I 40	I40/1	40	0.1	SW	1040	125	3	CF 13	CFQ13/1-L	15	0.0	None	1,040	47	78	0.1	$ 22.76	$ 20.25	$ -	0.9	0.9
142	EXTERIOR LIGHTS	2	MH 100	MH100/1	128	0.3	Timer	4368	1,118	2	MH 100	MH100/1	128	0.3	None	4,368	1,118	-	-	$ -	$ -	$ -	-	-
16	EXTERIOR LIGHTS	5	T 34 C F 2 (MAG)	F42EE	72	0.4	OCC	1000	360	5	T 28 R F 2	F42SSILL	48	0.2	None	1,000	240	120	0.1	$ 35.80	$ 531.25	$ 50	14.8	13.4
	Total	**147**				**11.8**			**11,635**	**147**				**6.0**			**6,396**		**5.8**	**1,651**	**7,462**	**700**		
																	Demand Savings			**5.8**	**$975**			
																	kWh Savings			**5,238**	**$676**			
																	Total Savings				**$1,651**		**4.5**	**4.1**

APPENDIX H

New Jersey Pay For Performance Incentive Program

Kearny NJ
CHA #20711
Building: Senior Center

New Jersey Pay For Performance Incentive Program

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

	Annual Utilities	
	kWh	Therms
Existing Usage (from utility)	17,750	2,900
Proposed Savings	5,480	770
Existing Total MMBtus	351	
Proposed Savings MMBtus	95.703	
% Reduction	27.3%	
Proposed Annual Savings	$2,900	

	≥ %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	$1,206	$1,694	$2,900
Incentive #3	$767	$1,078	$1,845
Totals	**$1,973**	**$2,772**	**$4,745**

Total Project Cost	$31,700
% Incentives of Project Cost*	15.0%
Project Cost w/ Incentives*	$26,955

Project Payback (years)	
w/o Incentives	w/ Incentives
10.9	9.3

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

APPENDIX I

Photovoltaic (PV) Rooftop Solar Power Generation

PVWatts *** AC Energy & Cost Savings

Cautions for Interpreting the Results

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	15.0 kW
DC to AC Derate Factor:	0.770
AC Rating:	11.5 kW
Array Type:	Fixed Tilt
Array Tilt:	40.7°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	27.7 ¢/kWh

Results			
Month	Solar Radiation ($kWh/m^2/day$)	AC Energy (kWh)	Energy Value ($)
1	3.36	1242	343.54
2	4.05	1341	370.92
3	4.58	1627	450.03
4	4.84	1590	439.79
5	5.30	1751	484.33
6	5.33	1652	456.94
7	5.27	1668	461.37
8	5.25	1651	456.67
9	5.06	1601	442.84
10	4.46	1508	417.11
11	3.15	1076	297.62
12	2.87	1038	287.11
Year	4.46	17745	4908.27

Output Hourly Performance Data * Output Results as Text

About the Hourly Performance Data Saving Text from a Browser

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

Please send questions and comments regarding PVWATTS to Webmaster

Disclaimer and copyright notice

Cautions for Interpreting the Results

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

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

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

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

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

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

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

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

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

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

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

Township of Kearny
Senior Center

Cost of Electricity $0.277 $/kWh

Photovoltaic (PV) Rooftop Solar Power Generation-15kW System

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	New Jersey Renewable * Energy Incentive	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$150,000	**0.0**	**17,750**	**0**	**$4,900**	**0**	**$4,900**	**$15,000**	**$8,600**	**30.6**	**10.0**

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

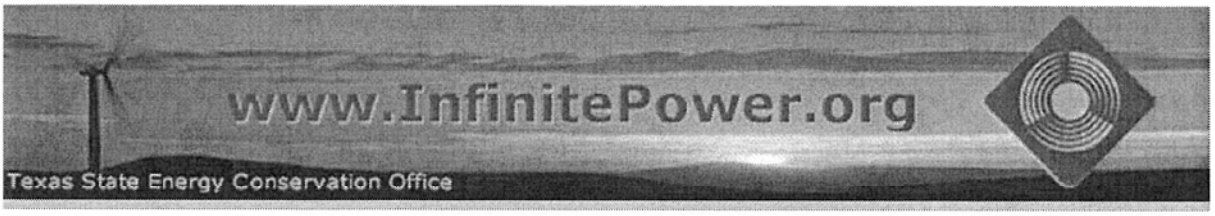
** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $487/1000kwh

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 J

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

About Us

About SECO

RARE

RENEWABLE ENERGY
THE INFINITE POWER OF TEXAS

Interactive Energy Calculators

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

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

Solar Water Heating Calculator

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

Water Heater Characteristics			
Physical		**Thermal**	
? Diameter (feet)	1.5	? Water Inlet Temperature (Degrees F)	50
? Capacity (gallons)	50	? Ambient Temperature (Degrees F)	70
? Surface Area (calculated - sq ft)	21.36	? Hot Water Temperature (Degrees F)	120
? Effective R-value	NaN	? Hot Water Usage (Gallons per Day)	50
Energy Use			
1197		? Heat Delivered in Hot Water (BTU/hr)	
0		? Heat loss through insulation (BTU/hr)	

Gas vs. Electric Water Heating		
Gas		**Electric**
0.8	? Overall Efficiency	0.98
0.8	? Conversion Efficiency	0.98
1496 BTU/hr	? Power Into Water Heater	1221 BTU/hr
Cost		
$ 1.503 /Therm	? Utility Rates	$ 0.2766 /kWh
$ 196.967!	? Yearly Water Heating Cost	$ 866.471
How Does Solar Compare?		
? Solar Water Heater Cost: $ 27100		? Percentage Solar: 70
196.551! years for gas	? Payback Time for Solar System	44.6803! years for electric

NJBPU Energy Audits
CHA # 20711
Township of Kearny
Senior Center

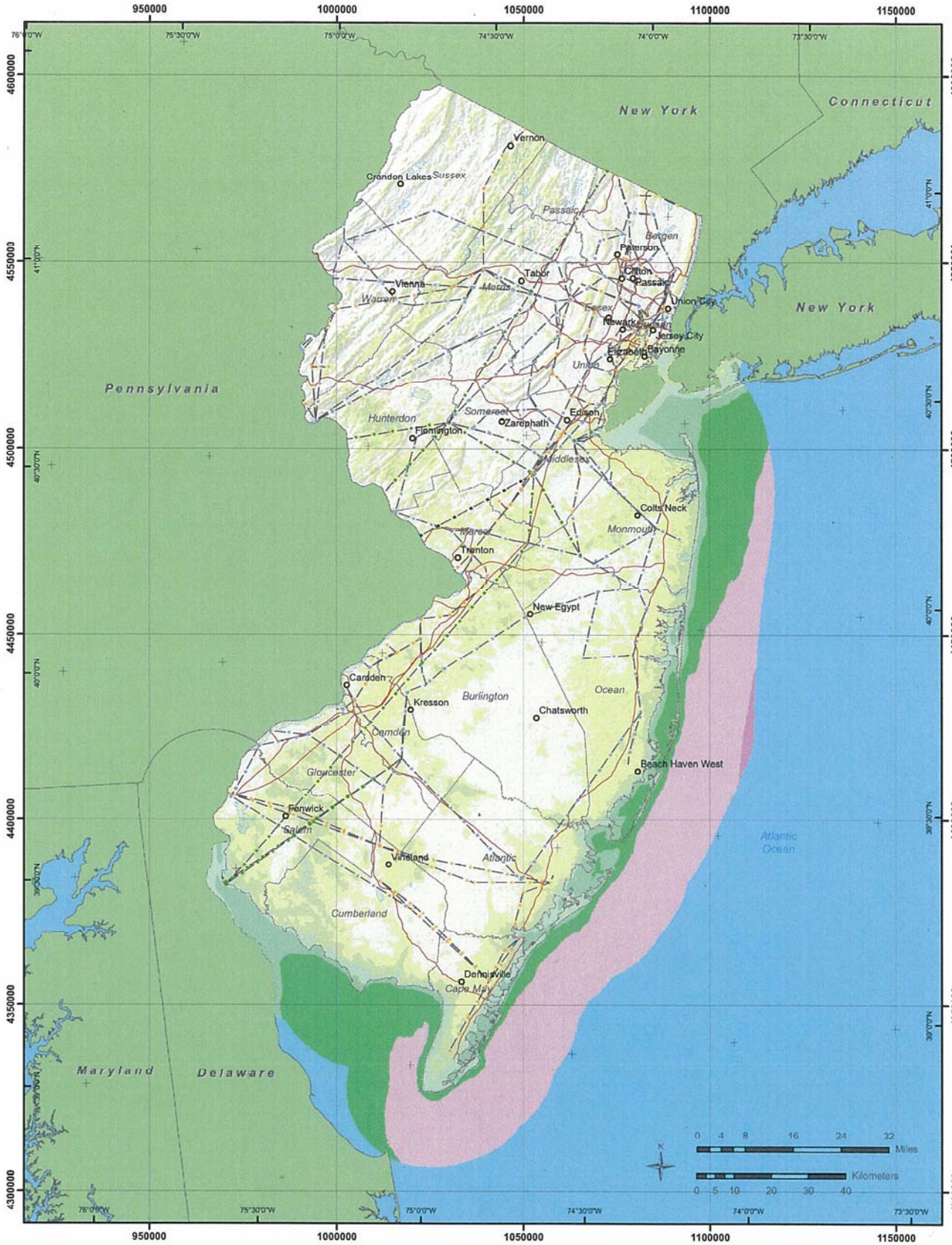
Multipliers	
Material:	0.98
Labor:	1.21
Equipment:	1.09

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

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

APPENDIX K

Wind



Wind Resource of New Jersey

Mean Annual Wind Speed at 30 Meters

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

Generalized Transmission Line

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

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

AWS Truewind

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

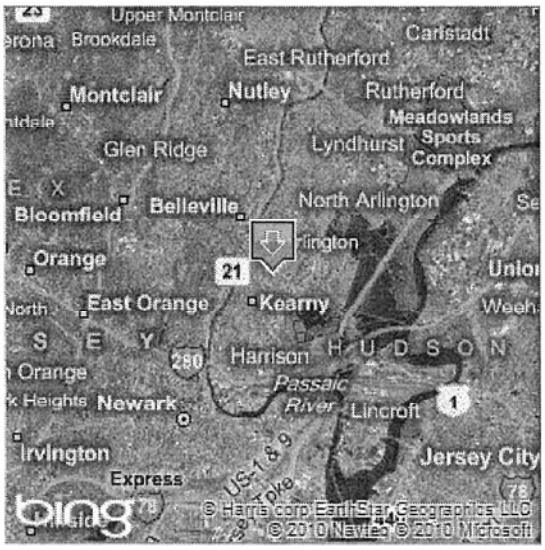
The transmission line information was obtained by AWS Truewind from the Global Energy Decisions Velocity Suite. AWS does not warrant the accuracy of the transmission line information.

AWS Truewind, LCC

Bing Maps

60 Columbia Ave, Kearny, NJ 07032-2945

My Notes



APPENDIX L

EPA Portfolio Manager

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Senior Center

Building ID: 2241166
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: March 22, 2010

Facility
Senior Center
60 Columbia Avenue
Kearny, NJ 07032

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

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

Year Built: 1972
Gross Floor Area (ft²): 3,000

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

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	60,563
Natural Gas (kBtu)[4]	290,500
Total Energy (kBtu)	351,063

Energy Intensity[5]	
Site (kBtu/ft²/yr)	117
Source (kBtu/ft²/yr)	169

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	25

Electric Distribution Utility
Public Service Elec & Gas Co

National Average Comparison	
National Average Site EUI	52
National Average Source EUI	102
% Difference from National Average Source EUI	66%
Building Type	Social/Meeting

Stamp of Certifying Professional

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

Certifying Professional
N/A

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

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

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Senior Center	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Social/Meeting	Is this an accurate description of the space in question?		☐
Location	60 Columbia Avenue, Kearny, NJ 07032	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Senior Center (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	3,000 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	2(Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	24Hours(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	30(Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

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

Fuel Type: Electricity

Meter: PSE&G Electricity (kWh (thousand Watt-hours))
Space(s): Entire Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
12/01/2008	12/31/2008	800.00
11/01/2008	11/30/2008	780.00
10/01/2008	10/31/2008	60.00
09/01/2008	09/30/2008	2,120.00
08/01/2008	08/31/2008	2,000.00
07/01/2008	07/31/2008	1,840.00
06/01/2008	06/30/2008	1,920.00
05/01/2008	05/31/2008	1,920.00
04/01/2008	04/30/2008	1,260.00
03/01/2008	03/31/2008	1,210.00
02/01/2008	02/29/2008	1,620.00
01/01/2008	01/31/2008	2,220.00
PSE&G Electricity Consumption (kWh (thousand Watt-hours))		**17,750.00**
PSE&G Electricity Consumption (kBtu (thousand Btu))		**60,563.00**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**60,563.00**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: PSE&G Natural Gas (therms)
Space(s): Entire Facility

Start Date	End Date	Energy Use (therms)
12/01/2008	12/31/2008	461.00
11/01/2008	11/30/2008	354.00
10/01/2008	10/31/2008	85.00
09/01/2008	09/30/2008	25.00
08/01/2008	08/31/2008	21.00
07/01/2008	07/31/2008	163.00
06/01/2008	06/30/2008	6.00
05/01/2008	05/31/2008	26.00
04/01/2008	04/30/2008	193.00
03/01/2008	03/31/2008	454.00

02/01/2008	02/29/2008	619.00
01/01/2008	01/31/2008	498.00
PSE&G Natural Gas Consumption (therms)		**2,905.00**
PSE&G Natural Gas Consumption (kBtu (thousand Btu))		**290,500.00**
Total Natural Gas Consumption (kBtu (thousand Btu))		**290,500.00**
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
Senior Center
60 Columbia Avenue
Kearny, NJ 07032

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

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

General Information

Senior Center	
Gross Floor Area Excluding Parking: (ft^2)	3,000
Year Built	1972
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

Senior Center	
Space Type	Other - Social/Meeting
Gross Floor Area(ft^2)	3,000
Number of PCs[o]	2
Weekly operating hours[o]	24
Workers on Main Shift[o]	30

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 12/31/2008)	**Baseline** (Ending Date 12/31/2008)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft^2)	117	117	0	N/A	52
Source (kBtu/ft^2)	169	169	0	N/A	102
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					
$MtCO_2e$/year	25	25	0	N/A	11
$kgCO_2e/ft^2$/year	8	8	0	N/A	4

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

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

APPENDIX M

Equipment Inventory

New Jersey BPU Energy Audit Program
CHA #20711
Kearny
Senior Center

Description	Manufacturer Name	Model No.	Equipment Type	Capacity/Size	Location	Areas Served	Date Installed	Useable Life Expectancy (years)
Boiler	IBR	Series B406, Serial 4BSE-J3	Gas fired hot water boiler	300 MBH output, 375 MBH input	Basement	Entire building	1972	-7
DMHWH	Rheem	RHGR050-60, Serial RHNG0400D02244	Gas fired hot water heater	50 gallon, 60,000Bth/hr input	Basement	Entire building	1998	9
Air handler	York	DSCE090A25C, Serial NGCM064166	Outdoor air handler	7.5 ton, 208 V,3ph, 60Hz	Outside	1st floor	1995	6
Air handler	York	DSCE090A25C, Serial NGCM064194	Electric condensing unit	7.5 ton, 208 V,3ph, 60Hz	Outside	1st floor	1995	6
Split system	York	Not accessible	Electric condensing unit	Estimated at 5 ton, 208V, 3ph, 60Hz	Outside	Basement playroom	1995	6