

BOROUGH OF GLEN ROCK

Fire Department
1 Harding Plaza Glen Rock NJ, 07452

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

October 2015
Revised November 12, 2015

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CHA PROJECT NO. 30655

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REPORT DISCLAIMER

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

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

List of Common Energy Audit Abbreviations

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

1.0 EXECUTIVE SUMMARY

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

Building Name	Address	Square Feet	Construction Date
Fire Department	1 Harding Plaza, Glen Rock, NJ 07452	9,604	Early 1900s

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

Building Name	Electric Savings (kWh)	NG Savings (therms)	Total Savings (\$)	Payback (years)
Fire Department	18,235	546	\$3,619	8.2

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

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

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

Summary of Energy Conservation Measures

ECM #	Energy Conservation Measure	Est. Costs (\$)	Est. Savings (\$/year)	Payback w/o Incentive	Potential Incentive (\$)*	Payback w/ Incentive	Recommended
1	Install roof/ceiling insulation	44,695	433	103.2	0	103.2	N
2	Replace DHW heater with condensing DHW heater	8,511	310	27.5	50	27.3	Y
3	Install pipe insulation	717	279	2.6	0	2.6	Y
L1	Lighting Replacements / Upgrades	22,089	3,029	7.3	1,478	6.8	Y
Total**		76,012	4,052	19	1,528	18	
Total(Recommended)		31,317	3,619	9	1,528	8.2	

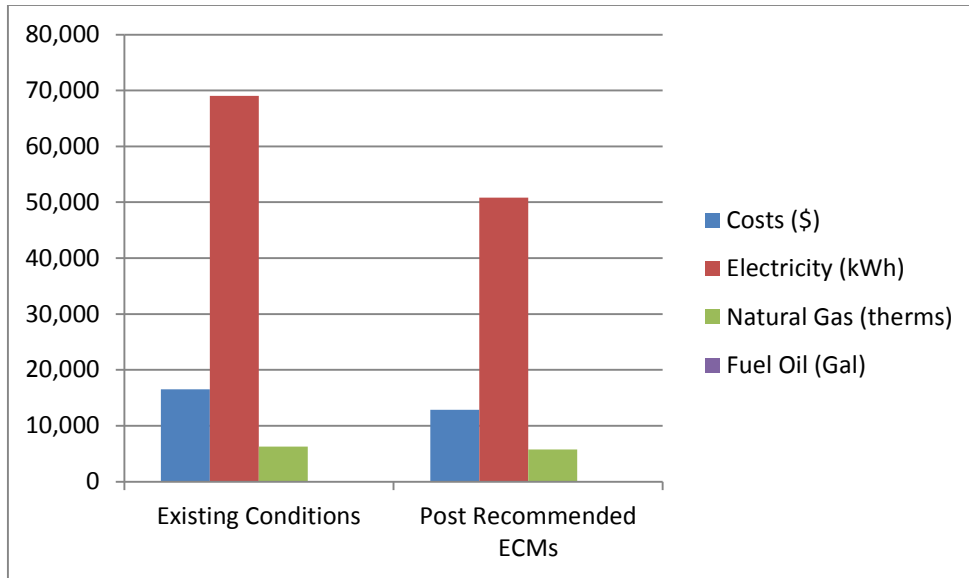
* Incentive shown, if available, is per the New Jersey SmartStart Program.

** These ECMs are not included in the Total, as they are alternate measures not recommended.

Due to the fact that there is limited available roof space on this building and the roof is significantly shaded by trees, it was not recommended to install a solar PV system.

If the Borough of Glen Rock implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs (\$)	18,647	14,461	22%
Electricity (kWh)	69,040	50,805	26%
Natural Gas (therms)	6,295	5,749	9%
Greenhouse Gas Reduction (MT CO2)	63	52	17%
Site EUI (kbtu/SF/Yr)	90.1	77.9	



2.0 BUILDING INFORMATION AND EXISTING CONDITIONS

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

Building Name: Fire Department
Address: 1 Harding Plaza, Glen Rock, NJ 07452
Gross Floor Area: 9,604 sq. ft.
Number of Floors: Two floors
Year Built: 1930s



General

Description of Spaces: The building is used as an emergency services building for the Glen Rock Fire Department. It has offices, storage rooms, restrooms and four garage bays.

Description of Occupancy: The facility has an estimated 20 part-time employees.

Number of Computers: The building has approximately 5 desktop and laptop computers.

Building Usage: The Fire Department is volunteer, so the building has the potential to be occupied 24/7 year round, but is typically only occupied during emergency events.

Construction: The original three garage bay building located at the right side of the current structure is constructed of multiple layers of brick with some partial ceramic tile interior finish in the garages. Some of the spaces have had concrete masonry block reinforcement. The remaining building is constructed of concrete masonry blocks with brick exterior fascia. Some of the rooms in the building have had stud framed walls installed with sheetrock interior finish. It is assumed that these walls have some insulation while the others have none. The walls are in good condition.

Roof: This facility has a flat roof constructed of concrete decking, rigid tapered insulation and a black EPDM rubber membrane. The roofing system is in fair condition, however it was noted that there is a large parapet wall surrounding the roof structure which would allow for installation of additional tapered rigid insulation. A measure has been included to evaluate installing additional roof insulation.

Windows: The building has double pane windows with wooden framing and exterior storm windows. These windows appear to have been installed as part of a renovation project and are in good condition.

Exterior Doors: The garage has four insulated composite roll up doors. The main entrance door is an insulated steel door with small double pane windows. The doors and their seals and sweeps all appear to be in good condition.

Heating Ventilation & Air Conditioning (HVAC) Systems

Heating & Cooling: One of the garage bays, named the 834 fire rescue bay, is heated by natural gas fired infrared heaters. One of the two infrared heaters that heats this bay is broken and has not been operational for at least a year. Although this unit should be replaced to ensure proper heating of the space, there is unfortunately no energy savings associated with its replacement therefore an ECM was not recommended in this study. The second infrared heater appeared to be in good condition, but it should be considered to replace both heaters at the same time when the failed unit gets replaced.

The remaining garage bays and several of the first floor common areas and side rooms are heated by cabinet unit heaters, wall hung unit heaters and perimeter fin tube radiation. These terminal devices are provided with heating hot water by a brand new natural gas fired Aerco AM Series condensing boiler. Heating hot water from this boiler is circulated to the terminal devices by (1) fractional HP boiler primary pump and (4) fractional horsepower zone pumps. This boiler and hot water pumping system is brand new and in good condition, however, none of the hot water piping was insulated during the system installation. An ECM has been included to evaluate the installation of piping insulation.

The second floor areas are heated and cooled by (2) Trane packaged rooftop air handling units (RTUs) having direct expansion (DX) cooling and natural gas heat. The larger of these units serves the second floor meeting room and was installed this year and manufactured in April of 2015. The smaller unit was manufactured in 2003 and serves the offices on the opposite side of the second floor.

The front office of the building is heated by a through the wall heat pump unit that appears to be in good condition.

Ventilation: Ventilation is provided by the RTUs described above. There is no ECM associated with the ventilation system.

Exhaust: This building has (3) roof mounted exhaust fans. One of these fans serves the kitchen hood and the other two serve the bathrooms. None of the nameplates on these fans had information relating to total fan horsepower, but it is assumed based on the size of the units that they are all (1) HP or smaller fan motors. No ECM has been evaluated for the exhaust fans.

Controls Systems

Space temperature control is achieved using several space mounted programmable thermostats. These thermostats are 7-day programmable. All of the thermostats observed were set at unoccupied temperatures and are scheduled at 65°F heating and 78°F cooling at all times until the building is occupied. When occupants arrive they adjust the temperature to their desired temperatures. These thermostats are in good condition and are programmed well. No ECM has been evaluated with relation to modifying the HVAC control system.

Domestic Hot Water Systems

Domestic hot water to the entire building is provided by a Bradford White natural gas fired water heater installed next to the heating hot water boiler in the ground floor boiler room. This water heater operates at an efficiency of 80% per the manufacturers specifications. The water heater is new and in good condition, however there was no piping insulation installed on the hot water piping and it is not efficient by today's standards. An ECM has been evaluated to replace this water heater with a condensing tank type water heater, as well as a measure to install piping insulation.

Kitchen Equipment

The kitchen equipment in this building includes one large combination range/stove which is natural gas fired and is in good condition. In addition, the kitchen is not used very heavily. No ECM was considered for replacing this equipment.

Plug Load

This building has computers, copiers, residential appliances and general appliances used in the apparatus bays that contribute to the plug load in the building. We have calculated the plug load to have minimal impact compared to other electric consuming devices. A recommendation has been included in the O&M section to purchase Energy Star rated equipment when the old ones need replacement.

Plumbing Systems

There are two restrooms in this facility that have sinks, urinals and toilets are all high water consuming fixtures. The sinks use 2.5 gallons per minute, and the urinals and toilets use 3.5 gallons per flush. Due to the fact that this fire station has only part time occupants, the use of these plumbing fixtures is minimal. Because of the low use, no ECM has been evaluated for replacing plumbing fixtures.

Lighting Systems

The majority of the lighting in this building consists of 4' linear fluorescent fixtures utilizing 32 watt lamps. There are also several incandescent and compact fluorescent fixtures using various wattage and style bulbs. All of the lighting in the building is manually controlled by wall mounted switches. The exterior lighting consists of various wattage metal halide wall pack fixtures. LED lights are recommended in this study. We have provided three alternatives for the observed lighting that include adding occupancy sensors to the existing lights, replacing the lights with LED lights and a third ECM that evaluates adding occupancy sensors to the proposed LED lights.

3.0 UTILITIES

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

	Electric	Natural Gas
Deliverer	PSE&G	PSE&G
Supplier	Direct Energy	PSE&G

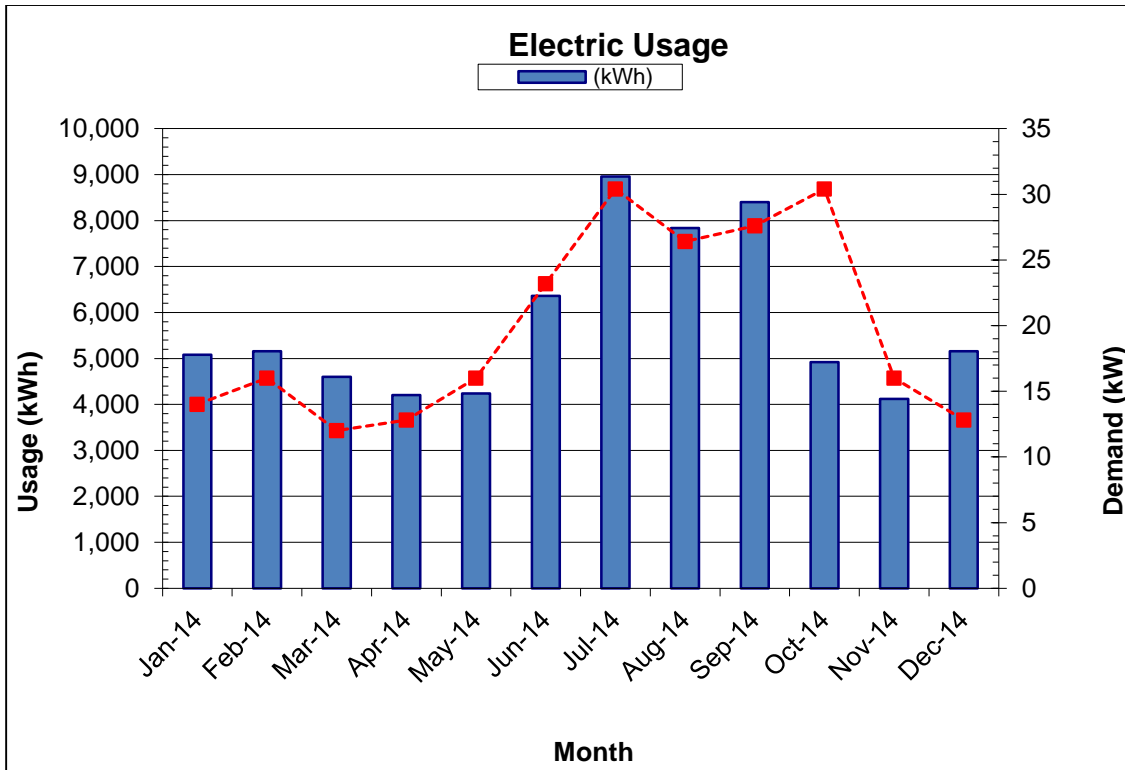
For the 12-month period ending in June 2014, the utilities usages and costs for the building were as follows:

Electric		
Annual Usage	69,040	kWh/yr
Annual Cost	11,850	\$
Blended Rate	0.172	\$/kWh
Consumption Rate	0.144	\$/kWh
Demand Rate	7.93	\$/kW
Peak Demand	30.4	kW
Min. Demand	12.0	kW
Avg. Demand	19.8	kW
Natural Gas		
Annual Usage	6,295	Therms/yr
Annual Cost	6,791	\$
Blended Rate	1.079	\$/therm

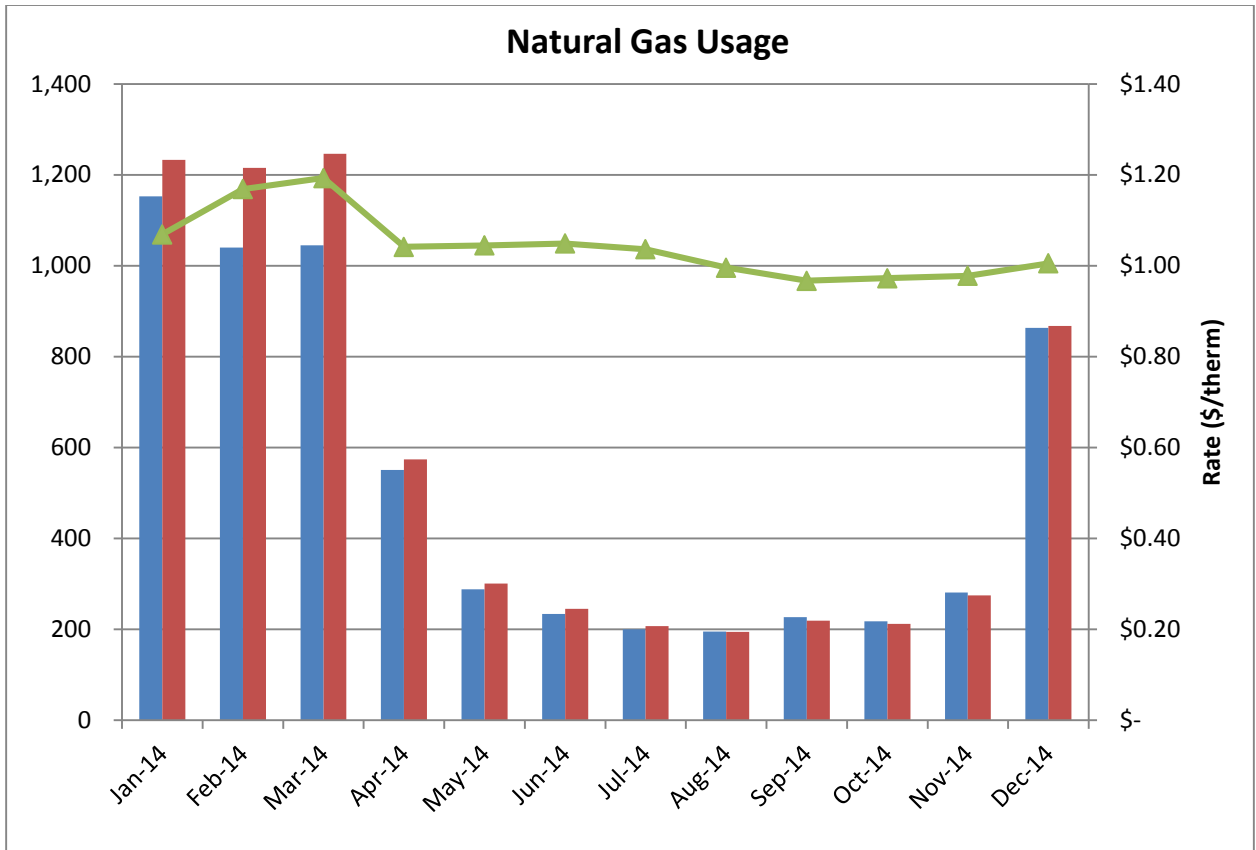
Blended Rate: Average rate charged determined by the annual cost / annual usage

Supply Rate: Estimated

Demand Rate: Rate charged for actual electrical demand in kW (based on most recent electric bill)



The electric usage fluctuates with the building usage. The major electricity consuming loads in the building are lighting and air conditioners. The consumption increases in the summer when the cooling equipment is operational and flattens out for the rest of the year when the loads are mostly lighting.



Natural gas in this building is used by the hot water boiler and domestic hot water heater (DHW). The gas usage in non-heating season is small and only for DHW heating. The gas usage during the heating season varies with winter weather conditions.

See Appendix A for utility analysis.

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

Comparison of Utility Rates to NJ State Average Rates*				Recommended to Shop for Third Party Supplier?
Utility	Units	Average Rate	NJ Average Rate	
Electricity	\$/kWh	\$0.172	\$0.13	Y
Natural Gas	\$/Therm	\$1.079	\$0.96	Y

* Per U.S. Energy Information Administration (2015 data – Electricity and Natural Gas, 2015 data – Fuel Oil)

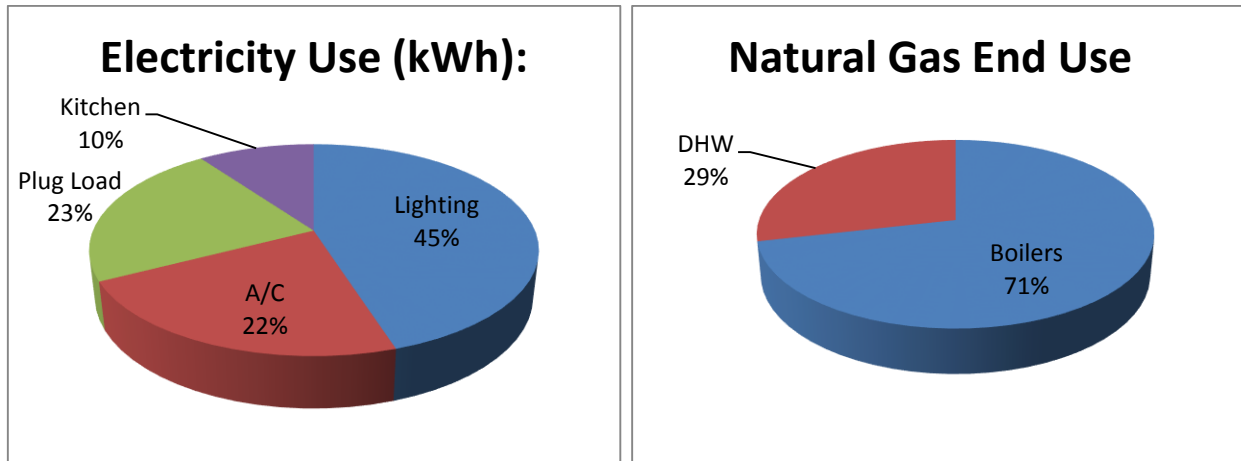
Additional information on selecting a third party energy supplier is available here:

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

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

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

Site End-Use Utility Profile



4.0 BENCHMARKING

The EPA Portfolio Manager benchmarking tool provides a site and source Energy Use Intensity (EUI), as well as an Energy Star performance rating for qualifying building types. The EUIs are provided in kBtu/ft²/year, and the performance rating represents how energy efficient a building is on a scale of 1 to 100, with 100 being the most efficient. In order for a building to receive an Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed measures, the Energy Star rating will increase. However, the EPA does not have score for all types of buildings. The buildings that do not have energy rating now are compared with national median EUI.

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

Site EUI kBtu/ft ² /yr	Source EUI (kBtu/ft ² /yr)	Energy Star Rating (1-100)
90.1	145.8	NA

The building's Energy Star score is not available as this building is labeled in portfolio managers "other" category and does not closely match a category with enough available supporting benchmarking data. . The score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide. A score of 50 represents median energy performance and a score of 75 or higher indicates that the building is a top performer. The site EUI of the building is 90.1 and source EUI is 145.8. The building has lower EUIs than the national median EUIs (national median site EUI is 95.3 kBtu/ft² and national median source EUI is 154.4 kBtu/ft²). The EUI of this building is (-)6% lower than national median. The EUI could be further reduced after implementing some of the proposed energy conservation measures.

5.0 ENERGY CONSERVATION MEASURES

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

- Energy conservation measures (ECMs) are energy savings recommendations that typically require a financial investment. For these areas of opportunity, CHA prepared detailed calculations, as summarized in this section and in Appendix C. In general, additional savings may exist from reductions in maintenance activities associated with new equipment or better controls; however for conservatism, maintenance savings are not accounted for in this report; instead the only savings which are reported are those derived directly from reductions in energy which can be tracked by the utility bills.
- Operational and Maintenance measures (O&M) consist of low- or no-cost operational opportunities, which if implemented would have positive impacts on overall building operation, comfort levels, and/or energy usage. There are no estimated savings, costs or paybacks associated with the O&M measures included as part of this study.

Energy savings were quantified in the form of:

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

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

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

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

5.1 ECM-1: Install Roof Insulation (Incremental Cost)

The existing building has a flat roof with tapered rigid insulation and an EPDM rubber membrane surface. The roof appears to have been replaced when the additional garage bay was constructed. The roof is in fair condition, but appears to be reaching the end of its useful life and is estimated to have an approximate thermal resistance value of R-10. This measure proposes installing additional rigid tapered insulation to the roof when the existing roof gets replaced. The total proposed thermal resistance evaluated in the calculations is R-26. Energy savings in the form of electricity and natural gas will result from a reduction in heating and cooling loads. The implementation costs associated for this measure do not account for the roofing material itself, as it is assumed that the roof will need to be replaced soon as a capital expenditure.

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

ECM-1 Install roof insulation (incremental cost)

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)	
	Electricity		Natural Gas					Total
\$	kW	kWh	Therms	\$	\$	Years	Years	
44.695	0	120	385	433	(0.9)	0	103.2	103.2

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

This measure is not recommended due to the long payback period. It is recommended, however, to install additional roof when the borough pursues replacing this roof as there is significant space available for more insulation.

5.2 ECM-2: Replace DHW heater with Condensing DHW heater

The existing domestic hot water heater is a standard efficiency water heater. Although this unit is fairly new, it only operates at a rated efficiency of 80% per the manufacturer. It is recommended to replace this water heater with a condensing type water heater of the same capacity that will operate at an efficiency of 96% or higher. Natural gas savings will result from improved water heating system efficiency.

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

ECM-2 Replace DHW heater with Condensing DHW heater

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)	
	Electricity		Natural Gas					Total
\$	kW	kWh	Therms	\$	\$	Years	Years	
8,511	0	0	287	310	(0.9)	50	27.5	27.3

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

This measure is recommended.

5.3 ECM-3: Install pipe insulation

The boiler room contains both a new DHW heater as well as a new boiler. It was noted during the site visit that when these systems were installed, none of the hot water piping in the boiler room was insulated. It is recommended to install piping insulation on all of the hot water piping in this room as well as any other piping found to be un-insulated. Natural gas savings will result from reduced heat transfer and reduced heating loads of the water heater and boiler systems.

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

ECM-3 Install pipe insulation

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)	
	Electricity		Natural Gas					Total
\$	kW	kWh	Therms	\$	\$	Years	Years	
717	0	0	259	279	4.8	0	2.6	2.6

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

This measure is recommended.

5.4.1 ECM-L1 Lighting Replacement / Upgrades

The building has a mixture of T-8 fluorescent, incandescent and CFL lighting fixtures. Exterior lights are various wattage metal halide fixtures. The majority of these lights are controlled by occupancy sensors, therefore there are minimal potential savings for improving lighting control.

Overall energy consumption can be reduced by replacing inefficient bulbs and linear fluorescent bulbs with more efficient LED technology. To compute the annual savings for this ECM, the energy consumption of the current lighting fixtures was established and compared to the proposed fixture power requirement with the same annual hours of operation. The difference between the existing and proposed annual energy consumption was the energy savings. These calculations are based on 1 to 1 replacements of the fixtures, and do not take into account lumen output requirements for a given space. A more comprehensive engineering study should be performed to determine correct lighting levels.

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

ECM-L1 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)	
	Electricity		Natural Gas					Total
\$	kW	kWh	Therms	\$	\$	Years	Years	
22,089	4.9	18,235	0	3,029	1.1	1,478	7.3	6.8

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

This measure is recommended.

5.5 Additional O&M Opportunities

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

- Replace door seals and sweeps.
- Purchase Energy Star labeled appliances when replacement is needed.
- Install an insulation blanket on the domestic hot water heater

6.0 PROJECT INCENTIVES

6.1 Incentives Overview

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

6.1.1 New Jersey Smart Start Program

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

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

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

Forest Glen Elementary School qualifies for the direct install program since the peak electric demand in the evaluated 12 month period was below 200 KW.

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

6.1.2 Direct Install Program

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

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

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

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

6.1.3 New Jersey Pay For Performance Program (P4P)

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

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

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

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

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

Electric

- Base incentive based on 15% savings: \$0.09/ per projected kWh saved.

- For each % over 15% add: \$0.005 per projected kWh saved.
- Maximum incentive: \$0.11/ kWh per projected kWh saved.

Gas

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

Incentive cap: 25% of total project cost

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

Electric

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

Gas

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

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

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

6.1.4 Energy Savings Improvement Plan

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

ESIP allows local units to use “energy savings obligations” (ESO) to pay for the capital costs of energy improvements to their facilities. ESIP loans have a maximum loan term of 15 year. ESOs are not considered “new general obligation debt” of a local unit and do not count against debt limits or require voter approval. They may be issued as refunding bonds or leases. Savings generated from the installation of energy conservation measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

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

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs.

6.1.5 Renewable Energy Incentive Program

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

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

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

7.0 ALTERNATIVE ENERGY SCREENING EVALUATION

7.1 Solar

7.1.1 Photovoltaic Rooftop Solar Power Generation

The building was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The amount of available roof area determines how large of a solar array can be installed on any given roof. Due to the fact that there is not a significant amount of free space on this roof and because there are several trees that shade it for a good portion of the day, installation of a solar PV system was not considered for this building.

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

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

7.1.2 Solar Thermal Hot Water Generation

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

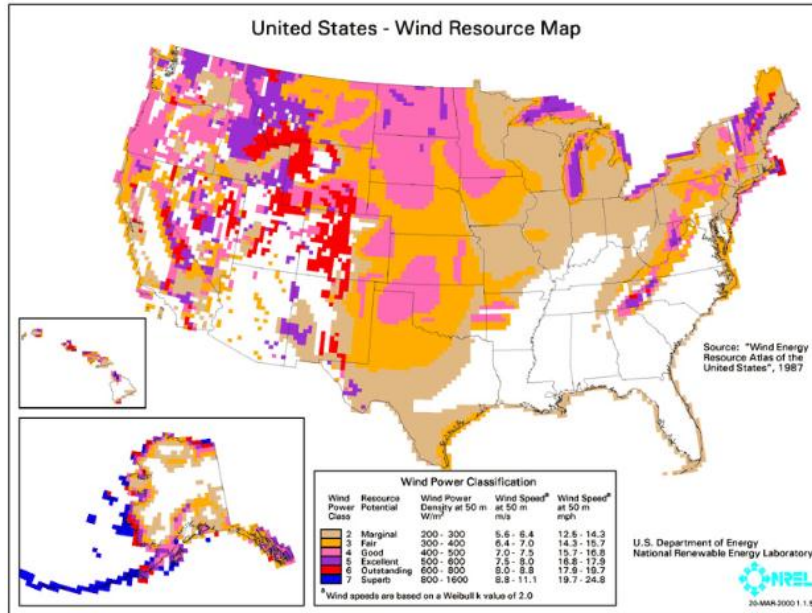
A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually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

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

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

7.2 Wind Powered Turbines

Wind power is the conversion of kinetic energy from wind into mechanical power that is used to drive a generator which creates electricity by means of a wind turbine. A wind turbine consists of rotor and blades connected to a gearbox and generator that are mounted onto a tower. Newer wind turbines also use advanced technology to generate electricity at a variety of frequencies depending on the wind speed, convert it to DC and then back to AC before sending it to the grid. Wind turbines range from 50 – 750 kW for utility scale turbines down to below 50 kW for residential use. On a scale of 1 (the lowest) to 7 (the highest), Class 3 and above (wind speeds of 13 mph or greater) are generally considered “good wind resource” according to the Wind Energy Development Programmatic EIS Information Center hosted by the Bureau of Land Management. According to the map below, published by NREL, Glen Rock, NJ is classified as Class 1 at 50m, meaning the city would not be a good candidate for wind power.



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

7.3 Combined Heat and Power Plant

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

Any proposed CHP project will need to consider many factors, such as existing system load, use of thermal energy produced, system size, natural gas fuel availability, and proposed plant location. The building has sufficient need for electrical generation and the ability to use most of the thermal byproduct during the winter; however thermal usage during the summer months does not exist. Thermal energy produced by the CHP plant in the warmer months will be wasted. An absorption chiller could be installed to utilize the heat to produce chilled water; however, there is no chilled water distribution system in the building. CHP is not recommended due to the building's limited summer thermal demand.

This measure is not recommended due to the absence of large enough year-round thermal loads which are needed for efficiency CHP operation.

7.4 Demand Response Curtailment

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

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

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

Building Electric Load Profile

Peak Demand kW	Min Demand kW	Avg Demand kW	Onsite Generation Y/N	Eligible? Y/N
30.4	12.0	19.8	N	N

*the demand is estimated from one month bill

This measure is not recommended due to the low demand usage.

8.0 CONCLUSIONS & RECOMMENDATIONS

The following section summarizes the LGEA energy audit conducted by CHA for the Borough of Glen Rock fire Department.

The following projects should be considered for implementation:

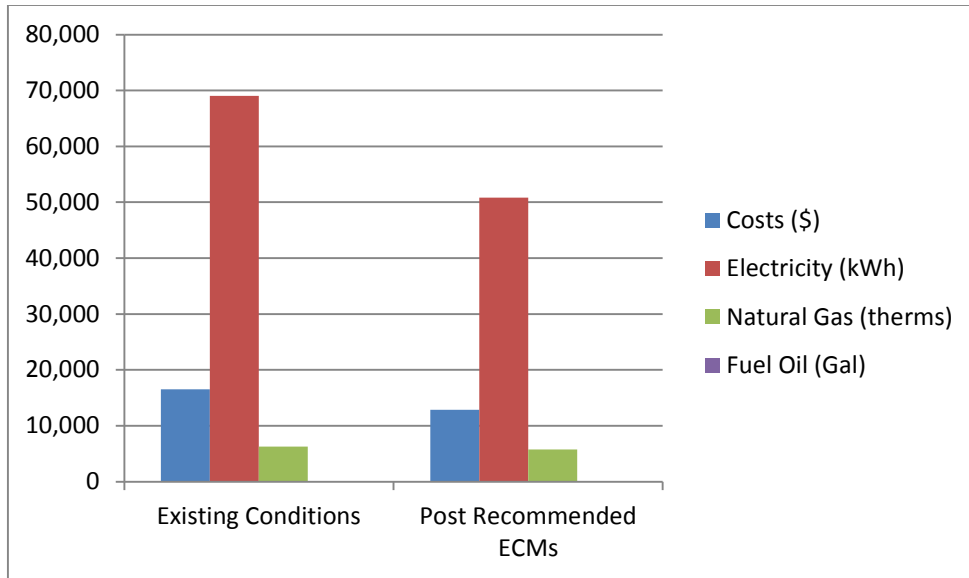
- Replace DHW heater with Condensing DHW heater
- Install pipe insulation
- Lighting Replacements

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

Electric Savings (kWh)	Natural Gas Savings (therms)	Total Savings (\$)	Payback (years)
18,235	546	3,619	8.2

If the Borough of Glen Rock implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs (\$)	18,647	14,461	22%
Electricity (kWh)	69,040	50,805	26%
Natural Gas (therms)	6,295	5,749	9%
Greenhouse Gas Reduction (MT CO ₂)	63	52	17%
Site EUI (kbtu/SF/Yr)	90.1	77.9	



Next Steps: This energy audit has identified several areas of potential energy savings. Borough of Glen Rock can use this information to pursue incentives offered by the NJBPU's NJ Clean Energy Program. A close out meeting will be scheduled with Borough of Glenrock staff members to review the ECMs and possible incentive options.

APPENDIX A

Utility Usage Analysis and Alternate Utility Suppliers



Local Government Energy Audit
 Borough of Glen Rock
 Fire Department - 1 Harding Plaze, Glen Rock, NJ

Electric Service

For Service at: Fire Department - 1 Harding Plaze, Glen Rock, NJ
 Account No.: 65 464 420 00
 Meter No.: 778014360

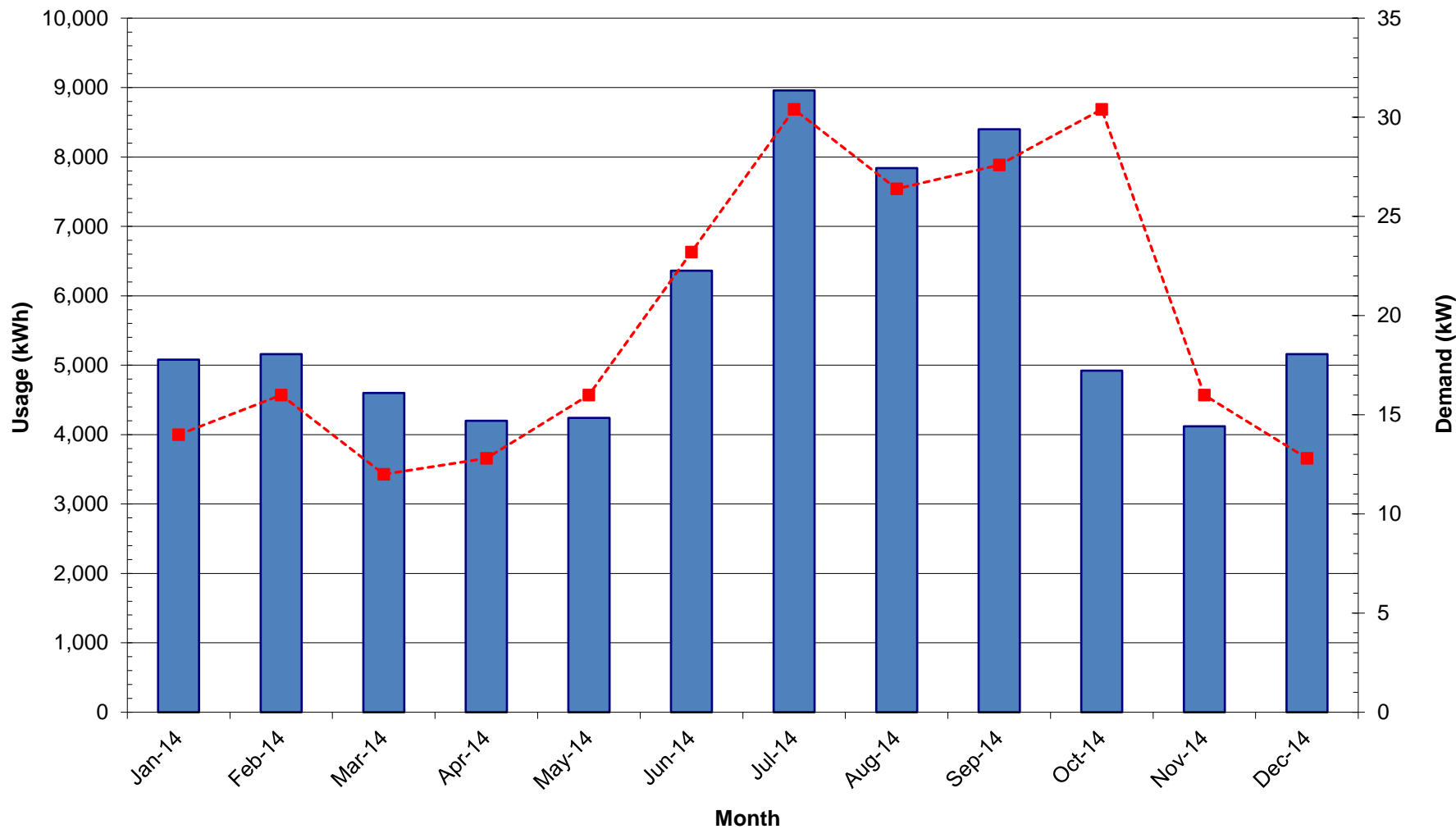
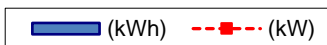
Delivery: PSE&G
 Supply: South Jersey Energy Company

Month	Consumption		Demand		Provider Charges			Unit Costs				
	(kWh)	(\$)	(kW)	(\$)	Delivery (\$)	Supplier (\$)	Total (\$)	Demand (\$/kW)	Consumption (\$/kWh)	Delivery (\$/kWh)	Supplier (\$/kWh)	Blended Rate (\$/kWh)
January-14	5,080	\$769.63	14.0	59.9	233.7	595.9	829.56	4.281	0.152	0.046	0.117	0.163
February-14	5,160	\$1,147.13	16.0	68.5	441.6	774.0	1,215.62	4.281	0.222	0.086	0.150	0.236
March-14	4,600	\$416.36	12.0	51.4	204.5	263.2	467.72	4.280	0.091	0.044	0.057	0.102
April-14	4,200	\$856.64	12.8	54.8	195.0	716.5	911.43	4.280	0.204	0.046	0.171	0.217
May-14	4,240	\$650.34	16.0	68.49	209.96	508.87	718.83	4.281	0.153	0.050	0.120	0.170
June-14	6,360	\$876.21	23.2	282.70	528.73	630.18	1,158.91	12.185	0.138	0.083	0.099	0.182
July-14	8,960	\$1,117.12	30.4	373.08	711.25	778.95	1,490.20	12.272	0.125	0.079	0.087	0.166
August-14	7,840	\$1,011.99	26.4	326.89	624.02	714.86	1,338.88	12.382	0.129	0.080	0.091	0.171
September-14	8,400	\$1,064.96	27.6	341.8	659.8	746.9	1,406.72	12.383	0.127	0.079	0.089	0.167
October-14	4,920	\$702.26	30.4	131.8	286.3	547.8	834.06	4.336	0.143	0.058	0.111	0.170
November-14	4,120	\$631.16	16.0	69.4	198.5	502.0	700.53	4.336	0.153	0.048	0.122	0.170
December-14	5,160	\$722.21	12.8	55.5	216.2	561.5	777.71	4.336	0.140	0.042	0.109	0.151
Total (12 months)	69,040	\$9,966.01	30.4	1,884.16	\$4,509.50	\$7,340.67	\$11,850.17	\$7.930	\$0.144	\$0.065	\$0.106	\$0.172
Notes	1A	1B	2A	2B	3	4	5	6	7	8	9	9

- 1A.) Number of kWh of electric energy used per month
- 1B.) Consumption charges (\$)
- 2A.) Number of kW of power measured
- 2B.) Demand charges (\$)
- 3.) Electric charges from Delivery provider
- 4.) Electric charges from Supply provider - note, includes 8.875% tax
- 5.) Total charges (Delivery + Supplier)
- 6.) Demand charges (\$) / Demand (kW)
- 7.) Consumption charges (\$) / Consumption (kWh)
- 8.) Delivery Charges (\$) / Consumption (kWh)
- 9.) Supplier Charges (\$) / Consumption (kWh)
- 10.) Total Charges (\$) / Consumption (kWh)

#REF! of blended rate (fixed portion of the bill that can't be negotiated)
 #REF! of blended rate (portion of the bill that can be negotiated)

Electric Usage



**Local Government Energy Audit
Borough of Glen Rock
Fire Department - 1 Harding Plaze, Glen Rock, NJ**

Natural Gas Service

For Service at: Fire Department - 1 Harding Plaze, Glen Rock, NJ

Account No.: 67 438 407 18

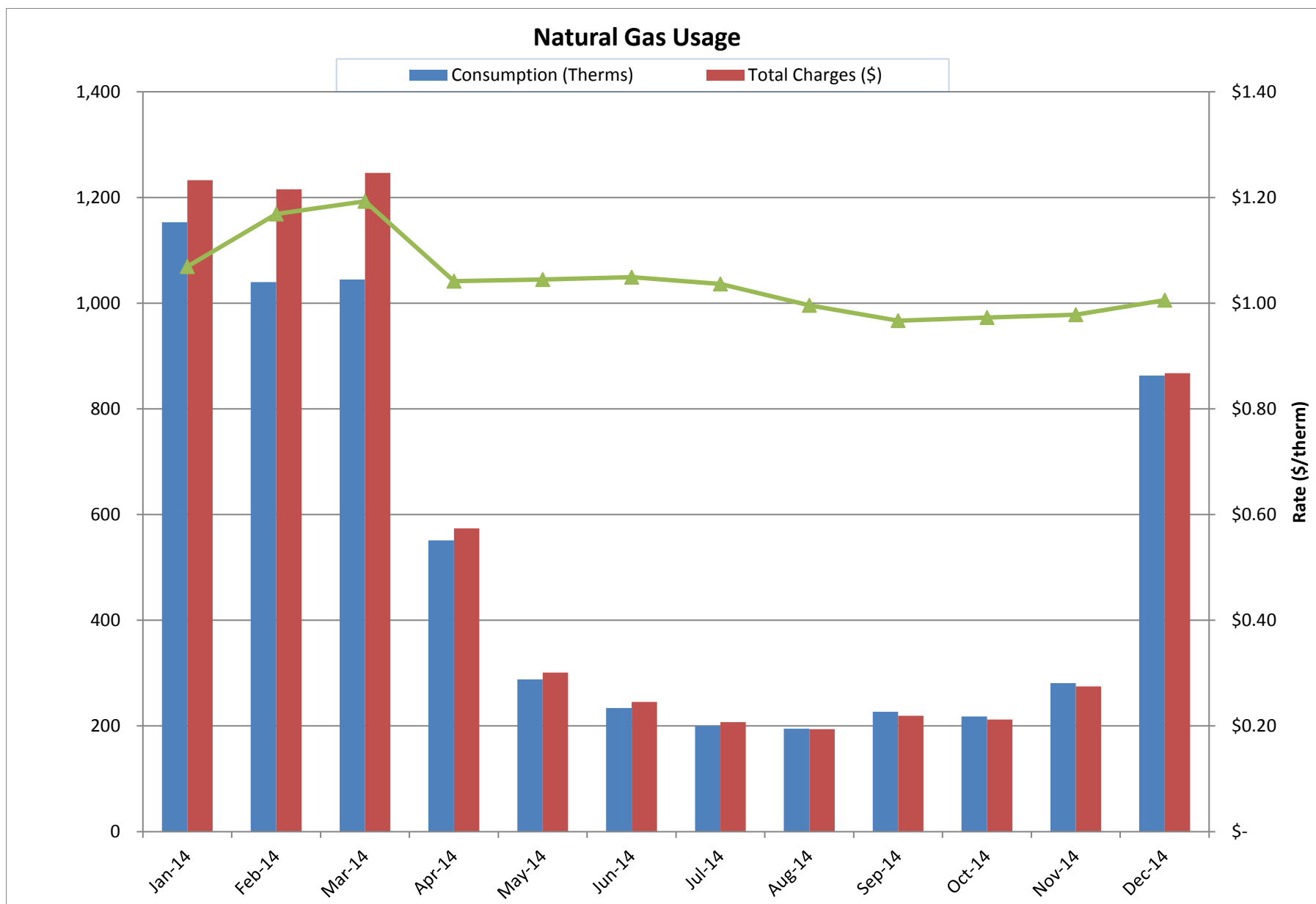
Meter No: 3740063

Delivery: PSE&G

Supply: PSE&G

Month	Consumption (Therms)	Delivery Charge (\$)	Supply Charge (\$)	Total Charges (\$)	Delivery Rate (\$/Therm)	Supply Rate (\$/Therm)	Total Rate (\$/Therm)
January-14	1,153	497.92	734.66	\$1,232.58	0.432	0.637	1.069
February-14	1,040	441.61	774.01	\$1,215.62	0.425	0.744	1.169
March-14	1,045	436.06	810.48	\$1,246.54	0.417	0.776	1.193
April-14	551	182.86	391.02	\$573.88	0.332	0.710	1.042
May-14	288	100.88	200.03	\$300.91	0.350	0.695	1.045
June-14	234	82.98	162.52	\$245.50	0.355	0.695	1.049
July-14	200	72.33	134.97	\$207.30	0.362	0.675	1.037
August-14	195	70.97	123.23	\$194.20	0.364	0.632	0.996
September-14	227	81.09	138.39	\$219.48	0.357	0.610	0.967
October-14	218	77.71	134.35	\$212.06	0.356	0.616	0.973
November-14	281	101.70	173.12	\$274.82	0.362	0.616	0.978
December-14	863	313.39	554.35	\$867.74	0.363	0.642	1.005
Total (last 12-months)	6,295.0	\$ 2,459.50	\$ 4,331.13	\$ 6,790.63	0.391	0.688	1.079

36.2% 63.8% 100.0%



PSE&G ELECTRIC SERVICE TERRITORY
Last Updated: 7/21/15

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Abest Power & Gas of NJ, LLC 202 Smith Street Perth Amboy, NJ 08861	(888)987-6937 www.AbestPower.com	R/C/I ACTIVE
AEP Energy, Inc. f/k/a BlueStar Energy Services 309 Fellowship Road, Fl. 2 Mount Laurel, NJ 08054	(866) 258-3782 www.aepenergy.com	R/C/I ACTIVE
Agera Energy, LLC 115 route 46, Building F Parsippany, NJ 07054	(844) 692-4372 www.ageraenergy.com	R/C/I
Alpha Gas and Electric, LLC 641 5 th Street Lakewood, NJ 08701	(855) 553-6374 www.alphagasandelectric.com	R/C ACTIVE
Ambit Northeast, LLC d/b/a Ambit Energy 103 Carnegie Center Suite 300 Princeton, NJ 08540	877-282-6284 www.ambitenergy.com	R/C ACTIVE
American Power & Gas of NJ, LLC - 10000 Lincoln Drive East – Suite 201 Marlton, NJ 08053	(800) 205-7491 www.GoAPG.com	R/C/I
American Powernet Management, LP 437 North Grove St. Berlin, NJ 08009	(877) 977-2636 www.americanpowernet.com	C/I ACTIVE
Amerigreen Energy, Inc. 333 Sylvan Avenue, Suite 305 Englewood Cliffs, NJ 07632	888-559-4567 www.amerigreen.com	C/I ACTIVE
AP Gas & Electric, (NJ) LLC 10 North Park Place, Suite 420 Morristown, NJ 07960	(855) 544-4895 www.apgellc.com	R/C/I ACTIVE
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	(888)850-1872 www.AstralEnergyLLC.com	R/C/I ACTIVE

Barclays Capital Services, Inc. 70 Hudson Street Jersey City, NJ 07302-4585	(800) 526-7000 www.barclays.com	C ACTIVE
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	(888) 651-4121 www.greateasternenergy.com	C ACTIVE
Berkshire Energy Partners, LLC 9 Berkshire Road Landenberg, PA 19350 Attn: Dana A. LeSage, P.E.	(610) 255-5070 www.berkshireenergypartners.com	C/I ACTIVE
Blue Pilot Energy, LLC 197 State Rte. 18 South Ste. 3000 East Brunswick, NJ 08816	(800) 451-6356 www.bluepilotenergy.com	R/C ACTIVE
Brick Standard, LLC 235 Hudson Street Suite 1 Hoboken, NJ 07030	(201)706-8101 www.standardalternative.com	C/I ACTIVE
CCES LLC dba Clean Currents Energy Services 566 Terhune Street Teaneck, NJ 07666	(877) 933-2453 www.cleancurrents.com	R/C ACTIVE
Champion Energy Services, LLC 1200 Route 22 Bridgewater, NJ 08807	(888) 653-0093 www.championenergyservices.com	R/C/I ACTIVE
Choice Energy, LLC 4257 US Highway 9, Suite 6C Freehold, NJ 07728	(888) 565-4490 www.4choiceenergy.com	R/C ACTIVE
Clearview Electric, Inc. 1744 Lexington Avenue Pennsauken, NJ 08110	(888) CLR-VIEW (800) 746- 4702 www.clearviewenergy.com	R/C/I ACTIVE
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07446	1-866-587-8674 www.commerceenergy.com	R/C ACTIVE
Community Energy Inc. 51 Sandbrook Headquarters Road Stockton, NJ 08559	(866)946-3123 www.communityenergyinc.com	R/C/I ACTIVE

ConEdison Solutions Cherry Tree Corporate Center 535 State Highway Suite 180 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com	C/I ACTIVE
ConocoPhillips Company 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(800) 646-4427 www.conocophillips.com	C/I ACTIVE
Constellation New Energy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(888) 635-0827 www.constellation.com	R/C/I ACTIVE
Constellation Energy 900A Lake Street, Suite 2 Ramsey, NJ 07446	(877) 997-9995 www.constellation.com	R ACTIVE
Constellation Energy Services, Inc. 116 Village Boulevard Suite 200 Princeton, NJ 08540	1 (800) 536-0151 www.integrysenergy.com	R/C/I
Corporate Services Support Corp. 665 Howard Avenue Somerset, NJ 08873	1(800) 761-4000 www.morganstanley.com	C
Credit Suisse, (USA) Inc. 700 College Road East Princeton, NJ 08450	(800) 325-2000 www.creditsuisse.com	C ACTIVE
Direct Energy Business, LLC 1 Hess Plaza Woodbridge	(888) 925-9115 http://www.business.directenergy.com/	C/I ACTIVE
Direct Energy Business Marketing, LLC (fka Hess Energy Marketing) 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 http://www.business.directenergy.com/	C/I ACTIVE
Direct Energy Small Business, LLC (fka Hess Small Business Services, LLC) One Hess Plaza Woodbridge, NJ 07095	(888) 925-9115 http://www.business.directenergy.com/small-business	C/I ACTIVE

Direct Energy Services, LLC 1 Hess Plaza Woodbridge, NJ 07095	1 (866) 348-4193 www.directenergy.com	C/I INACTIVE
Discount Energy Group, LLC 811 Church Road, Suite 149 Cherry Hill, New Jersey 08002	(800) 282-3331 www.discountenergygroup.com	R/C ACTIVE
DTE Energy Supply, Inc. One Gateway Center, Suite 2600 Newark, NJ 07102	(877) 332-2450 www.dtesupply.com	C/I ACTIVE
EDF Energy Services, LLC 1 Meadowlands Plaza Suite 200, Office No. 246 East Rutherford, NJ 07073	1 (877) 432-4530 www.edfenergyservices.com	C/I
Energy.me Midwest LLC 90 Washington Blvd Bedminster, NJ 07921	(855) 243-7270 www.energy.me	R/C/I ACTIVE
Energy Plus Holdings LLC 309 Fellowship Road East Gate Center, Suite 200 Mt. Laurel, NJ 08054	(877) 866-9193 www.energypluscompany.com	R/C ACTIVE
EnerPenn d/b/a YEP Energy 89 Headquarters Plaza North #1463 Morristown, NJ 07960	(855) 363-7736 www.yepenergyNJ.com	R/C/I ACTIVE
Ethical Electric Benefit Co. d/b/a Ethical Electric/d/b/a Clean Energy Option 100 Overlook Center, 2 nd Fl. Princeton, NJ 08540	(888) 444-9452 www.ethicalelectric.com	R/C ACTIVE
Energy Service Providers, Inc., d/b/a New Jersey Gas & Electric 1 Bridge Plaza fl. 2 Fort Lee, NJ 07024	(866) 568-0290 www.njgande.com	R/C ACTIVE
Everyday Energy, LLC One International Blvd., Suite 400 Mahwah, NJ 07495-0400	844-684-5506 www.energyrewards.comcast.com	R/I

FirstEnergy Solutions 150 West State Street Trenton, NJ 08608	(888) 254-63590- www.fes.com	C/I ACTIVE
First Point Power, LLC 90 Washington Valley Road Bedminister, NJ 07921	(888) 875-1711 www.firstpointpower.com	R/C/I
Frontier Utilities Northeast, LLC 199 New Road, Suite 61-187 Linwood, NJ 08221	(877) 437-6930 www.frontierutilities.com	R/C/I
Gateway Energy Services Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 805-8586 www.gesc.com	R/C ACTIVE
GDF SUEZ Energy Resources NA, Inc. 333 Thornall Street Sixth Floor Edison, NJ 08837	(866) 999-8374 www.gdfsuezenergyresources.com	C/I ACTIVE
GDF Suez Retail Energy Solutions LLC d/b/a THINK ENERGY 333 Thornall St. Sixth Floor Edison, NJ 08819	1-866-252-0078 www.mythinkenergy.com	R/C/I ACTIVE
Glacial Energy of New Jersey, Inc. 21 Pine Street, Suite 237 Rockaway, NJ 07866	(888) 452-2425 www.glacialenergy.com	C/I ACTIVE
Global Energy Marketing LLC 129 Wentz Avenue Springfield, NJ 07081	(800) 542-0778 www.globalp.com	R/C/I ACTIVE
Greenlight Energy, Inc. 2608 25th Road Astoria, NY 11102	(888) 453-4427 www.greenlightenergy.us	R
Green Mountain Energy Company 211 Carnegie Center Drive Princeton, NJ 08540	(866) 767-5818 www.greenmountain.com/commercial-home	C/I ACTIVE

Harborside Energy LLC 101 Hudson Street Suite 2100 Jersey City, NJ 07302	(877) 940-3835 www.harborsideenergynj.com	R/C ACTIVE
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com	C/I ACTIVE
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	(888) 264-4908 www.hikoenergy.com	R/C/I ACTIVE
Holcim (US) Inc. 595 Morgan Boulevard Camden, NJ 08104	(800) 831-9507 ext. 4354 www.holcim.us	I
Hudson Energy Services, LLC 7 Cedar Street Ramsey, New Jersey 07466	(877) Hudson 9 www.hudsonenergyservices.com	C ACTIVE
IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	(877) 887-6866 www.idtenergy.com	R/C ACTIVE
Independence Energy Group, LLC 211 Carnegie Center Princeton, NJ 08540	(877) 235-6708 www.chooseindependence.com	R/C ACTIVE
Inspire Energy Holdings LLC 923 Haddonfield Road 3rd Fl. Building B2 Cherry Hill, NJ 08002	(866) 403-2620 www.inspireenergy.com	R/C/I
IntegrYS Energy Services, Inc. 33 Wood Ave, South, Suite 610 Iselin, NJ 08830	(800) 536-0151 www.integrYSenergy.com	C/I ACTIVE
Jsynergy, LLC 445 Central Ave. Suite 204 Cedarhurst, NY 11516	(516) 331-2020 Jsynergyllc.com	R/C/I ACTIVE
Kuehne Chemical Company, Inc. 86 North Hackensack Avenue South Kearney, NJ 07032	(973) 589-0700 kuehnechemical@comcast.net	I

Liberty Power Delaware, LLC 1973 Highway 34, Suite 211 Wall, NJ 07719	(866) 769-3799 www.libertypowercorp.com	C/I ACTIVE
Liberty Power Holdings, LLC 1973 Highway 34, Suite 211 Wall, NJ 07719	(866) 769-3799 www.libertypowercorp.com	R/C/I ACTIVE
Linde Energy Services 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.linde.com	C/I ACTIVE
Marathon Power LLC 302 Main Street Paterson, NJ 07505	(888) 779-7255 www.mecny.com	R/C/I ACTIVE
MP2 Energy NJ, LLC 111 River Street, Suite 1204 Hoboken, NJ 07030	(877) 238-5343 www.mp2energy.com	R/C/I ACTIVE
Natures Current, LLC 95 Fairmount Avenue Philadelphia, Pennsylvania 19123	(215) 464-6000 www.naturescurrent.com	R/C/I ACTIVE
MPOWER Energy NJ LLC One University Plaza, Suite 507 Hackensack, NJ 07601	(877) 286-7693 www.mpowerenergy.com	R/C/I ACTIVE
NATGASCO, Inc. (Supreme Energy, Inc.) 532 Freeman St. Orange, NJ 07050	(800) 840-4427 www.supremeenergyinc.com	R/C/I ACTIVE
New Jersey Gas & Electric 10 North Park Place Suite 420 Morristown, NJ 07960	(866) 568-0290 www.njgande.com	R/C/ ACTIVE
NextEra Energy Services New Jersey, LLC 651 Jernee Mill Road Sayreville, NJ 08872	(877) 528-2890 Commercial (800) 882-1276 Residential www.nexteraenergyservices.com	R/C/I ACTIVE
Noble Americas Energy Solutions The Mac-Cali Building 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.noblesolutions.com	C/I ACTIVE

Nordic Energy Services, LLC 50 Tice Boulevard, Suite 340 Woodcliff Lake, NJ 07677	(877) 808-1027 www.nordiceenergy.us.com	R/C/I ACTIVE
North American Power and Gas, LLC 222 Ridgedale Avenue Cedar Knolls, NJ 07927	(888) 313-9086 www.napower.com	R/C/I ACTIVE
North Eastern States, Inc. d/b/a Entrust Energy 90 Washington Valley Road Bedminster, NJ 07921	(888) 521-5861 www.entrustenergy.com	R/C/I ACTIVE
Oasis Power, LLC d/b/a Oasis Energy 11152 Westheimer, Suite 901 Houston, TX 77042	(800)324-3046 www.oasisenergy.com	R/C ACTIVE
Palmco Power NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	(877) 726-5862 www.PalmcoEnergy.com	R/C/I ACTIVE
Park Power, LLC 1200 South Church St. Suite 23 Mount Laurel, NJ 08054	(856) 778-0079 www.parkpower.com	R/C/I ACTIVE
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	(855) 32-POWER (76937) www.plymouthenergy.com	R/C/I ACTIVE
Power Management Co., LLC b/b/a PMC Lightsavers Limited Liability Company 1600 Moseley Road Victor, NY 14564	(585) 249-1360 www.powermanagementco.com	C/I ACTIVE
PPL Energy Plus, LLC Shrewsbury Executive Offices 788 Shrewsbury Ave., Suite 2178 Tinton Falls, NJ 07724	(800) 281-2000 www.pplenergyplus.com	C I ACTIVE
Progressive Energy Consulting, LLC PO Box 4582 Wayne, New Jersey 07474	(917) 837-7400 Progressivenrg@optionline.net	R/C/I ACTIVE

Prospect Resources, Inc. 208 W. State Street Trenton, NJ 08608-1002	(847) 673-1959 www.prospectresources.com	C ACTIVE
Public Power & Utility of New Jersey, LLC One International Blvd, Suite 400 Mahwah, NJ 07495	(888) 354-4415 www.ppandu.com	R/C/I ACTIVE
Reliant Energy 211 Carnegie Center Princeton, NJ 08540	(877) 297-3795 (877) 297-3780 www.reliant.com	R/C/I ACTIVE
ResCom Energy LLC 18C Wave Crest Ave. Winfield Park, NJ 07036	(888) 238-4041 http://rescom-energy.com	R/C/I ACTIVE
Residents Energy, LLC 550 Broad Street Newark, NJ 07102	(888) 828-7374 www.residentsenergy.com	R/C
Respond Power LLC 1001 East Lawn Drive Teaneck, NJ 07666	(888) 625-6760 www.majorenergy.com	R/C/I ACTIVE
Save on Energy, LLC 1101 Red Ventures Drive Fort Mill, SC 29707	1 (877)-658-3183 www.saveonenergy.com	R/C
SFE Energy One Gateway Center Suite 2600 Newark, NJ 07012	1 (877) 316-6344 www.sfeenergy.com	R/C/I ACTIVE
S.J. Energy Partners, Inc. 208 White Horse Pike, Suite 4 Barrington, NJ 08007	(800) 695-0666 www.sjnaturalgas.com	C ACTIVE
SmartEnergy Holdings, LLC 100 Overlook Center 2nd Floor Princeton, NJ NJ 08540 United States of America	(800) 443-4440 www.smartenergy.com	R/C/I ACTIVE
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 266-6020 www.southjerseyenergy.com	R/C/I ACTIVE
Spark Energy Gas, LP/ Spark Energy	(713)600-2600	R/C/I

2105 City West Blvd. Suite 100 Houston, TX 77042	www.sparkenergy.com	ACTIVE
Sperian Energy Corp. 1200 Route 22 East, Suite 2000 Bridgewater, NJ 08807	(888) 682-8082 www.sperianenergy.com	R/CI ACTIVE
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	855-466-2842 www.spragueenergy.com	CI ACTIVE
Starion Energy PA Inc. 101 Warburton Avenue Hawthorne, NJ 07506	(800) 600-3040 www.starionenergy.com	R/CI ACTIVE
Stream Energy New Jersey, LLC 309 Fellowship Rd., Suite 200 Mt. Laurel, NJ 08054	(877) 369-8150 www.streamenergy.net	R/C ACTIVE
Summit Energy Services, Inc. 10350 Ormsby Park Place Suite 400 Louisville, KY 40223	1 (800) 90-SUMMIT www.summitenergy.com	CI ACTIVE
Talen Energy Marketing, LLC 788 Shrewsbury Avenue, Suite 2178 Tinton Falls, NJ 07724	(888) 289-7693 www.pplenergyplus.com/ *	R/C
Texas Retail Energy LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663 Attn: Chris Hendrix	(866) 532-0761 Texasretailenergy.com	CI ACTIVE
TransCanada Power Marketing Ltd. 190 Middlesex Essex Turnpike, Suite 200 Iselin, NJ 08830	(877) MEGAWAT www.transcanada.com/powermarketing	CI ACTIVE
TriEagle Energy, LP 90 Washington Valley Rd Bedminster, NJ 07921	(877) 933-2453 www.trieagleenergy.com	R/CI ACTIVE

UGI Energy Services, Inc. dba UGI Energy Link 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(800) 427-8545 www.ugienergylink.com	C/I ACTIVE
Verde Energy USA, Inc. 2001 Route 46 Waterview Plaza Suite 301 Parsippany, NJ 07054	(800) 388-3862 www.lowcostpower.com	R/C ACTIVE
Viridian Energy 2001 Route 46, Waterview Plaza Suite 310 Parsippany, NJ 07054	(866) 663-2508 www.viridian.com	R/C/I ACTIVE
XOOM Energy New Jersey, LLC 744 Broad Street. 16 th Floor Newark, NJ 07102	(888) 997-8979 www.xoomenergy.com	R/C/I ACTIVE
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	(855) 732-2493 www.thisisyourenergy.com	R/C/I ACTIVE

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PSE&G GAS SERVICE TERRITORY
Last Updated 7/21/15

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

Supplier	Telephone & Web Site	*Customer Class
Agera Energy, LLC 115 route 46, Building F Parsippany, NJ 07054	(844) 692-4372 www.ageraenergy.com	R/C/I
Ambit Northeast, LLC d/b/a Ambit Energy 103 Carnegie Center Suite 300 Princeton, NJ 08540	877-282-6284 www.ambitenergy.com	R/C ACTIVE
American Power & Gas of NJ, LLC 10000 Lincoln Drive East – Suite 201 Marlton, NJ 08053	(800) 2057491 www.GoAPG.com	R/C/I
Amerigreen Energy, Inc. 333 Sylvan Avenue Suite 305 Englewood Cliffs, NJ 07632	(888)559-4567 www.amerigreen.com	C/I ACTIVE
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	888-850-1872 www.AstralEnergyLLC.com	R/C/I ACTIVE
BBPC, LLC Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	888-651-4121 www.greateasternenergy.com	C ACTIVE
Choice Energy, LLC 4257 US Highway 9, Suite 6C Freehold, NJ 07728	(888) 565-4490 www.4choiceenergy.com	R/C/I
Clearview Electric Inc. d/b/a Clearview Gas 1744 Lexington Ave. Pennsauken, NJ 08110	800-746-4720 www.clearviewenergy.com	R/C ACTIVE

Colonial Energy, Inc. 83 Harding Road Wyckoff, NJ 07481	845-429-3229 www.colonialgroupinc.com	C/I ACTIVE
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07746	888 817-8572 www.commerceenergy.com	R ACTIVE
Compass Energy Services, Inc. 33 Wood Avenue South, 610 Iselin, NJ 08830	866-867-8328 www.compassenergy.net	C/I ACTIVE
Compass Energy Gas Services, LLC 33 Wood Avenue South Suite 610 Iselin, NJ 08830	866-867-8328 www.compassenergy.net	C/I ACTIVE
ConocoPhillips Company 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	800-646-4427 www.conocophillips.com	C/I ACTIVE
Consolidated Edison Energy, Inc. d/b/a Con Edison Solutions 535 State Highway 38, Suite 140 Cherry Hill, NJ 08002	888-686-1383 x2130 www.conedenergy.com	
Consolidated Edison Solutions, Inc. Cherry Tree Corporate Center 535 State Highway 38, Suite 140 Cherry Hill, NJ 08002	888-665-0955 www.conedsolutions.com	C/I ACTIVE
Constellation NewEnergy-Gas Division, LLC 116 Village Boulevard, Suite 200 Princeton, NJ 08540	800-785-4373 www.constellation.com	C/I ACTIVE
Constellation Energy Gas Choice, Inc. 116 Village Blvd., Suite 200 Princeton, NJ 08540	800-785-4373 www.constellation.com	R/C/I ACTIVE
Constellation Energy Services Natural Gas, LLC 116 Village Boulevard	1 (800) 536-0151	C/I

Suite 200 Princeton, NJ 08540	www.integrysenergy.com	
Direct Energy Business, LLC 1 Hess Plaza Woodbridge, NJ 07095	888-925-9115 http://www.business.directenergy.com/	C/I ACTIVE
Direct Energy Business Marketing, LLC (fka Hess Energy Marketing) One Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 http://www.business.directenergy.com/	C/I ACTIVE
Direct Energy Small Business, LLC (fka Hess Small Business Services, LLC) One Hess Plaza Woodbridge, NJ 07095	(888) 925-9115 http://www.business.directenergy.com/small-business	C/I ACTIVE
Direct Energy Services, LLC 1 Hess Plaza Woodbridge, NJ 07095	1 (866) 348-4193 www.directenergy.com	C/I INACTIVE
Dominion Retail, Inc. d/b/a Dominion Energy Solutions 395 Route #70 West, Suite 125 Lakewood, NJ 08701	(866)237-4765 www.dominionenergy.com	R/C
Everyday Energy, LLC One International Blvd., Suite 400 Mahwah, NJ 07495-0400	844-684-5506 www.energyrewards.comcast.com	R/I
Frontier Utilities Northeast, LLC 199 New Road, Suite 61-187 Linwood, NJ 08221	(877) 437-6930 www.frontierutilities.com	R/C/I
Glacial Energy of New Jersey, Inc. 21 Pine Street, Suite 237 Rockaway, NJ 07866	888-452-2425 www.glacialenergy.com	C/I ACTIVE
Gateway Energy Services Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 805-8586 www.gesc.com	R/C ACTIVE

Global Energy Marketing, LLC 129 Wentz Avenue Springfield, NJ 07081	800-542-0778 www.globalp.com	C/I ACTIVE
Great Eastern Energy 116 Village Blvd., Suite 200 Princeton, NJ 08540	888-651-4121 www.greateastern.com	C/I ACTIVE
Greenlight Energy 2608 25 th Road Astoria, NY 11102	(888) 453-4427 www.greenlightenergy.us	R ACTIVE
Harborside Energy LLC 101 Hudson Street, Suite 2100 Jersey City, NJ 07302	877-940-3835 www.harborsideenergynj.com	R/C ACTIVE
Hess Energy, Inc. One Hess Plaza Woodbridge, NJ 07095	800-437-7872 www.hess.com	C/I ACTIVE
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	888 264-4908 www.hikoenergy.com	R/C/I ACTIVE
Hudson Energy Services, LLC 7 Cedar Street Ramsey, NJ 07466	877- Hudson 9 www.hudsonenergyservices.com	C ACTIVE
IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	877-887-6866 www.idtenergy.com	R/C ACTIVE
Infinite Energy dba Intelligent Energy 1200 Route 22 East Suite 2000 Bridgewater, NJ 08807-2943	(800) 927-9794 www.InfiniteEnergy.com	R/C/I ACTIVE
Integrlys Energy Services-Natural Gas, LLC 101 Eisenhower Parkway Suite 300 Roseland, NJ 07068	(800) 536-0151 www.integrlysenergy.com	C/I ACTIVE
Jsynergy LLC 445 Cental Ave. Suite 204 Cedarhurst, NY 11516	(516) 331-2020 www.Jsnergylc.com	R/C/I ACTIVE
Major Energy Services, LLC 1001 East Lawn Drive Teaneck NJ 07666	888-625-6760 www.majorenergy.com	R/C/I ACTIVE

Marathon Power LLC 302 Main Street Paterson, NJ 07505	888-779-7255 www.mecny.com	R/C/I ACTIVE
Metromedia Energy, Inc. 6 Industrial Way Eatontown, NJ 07724	1-877-750-7046 www.metromediaenergy.com	C/I ACTIVE
Metro Energy Group, LLC 14 Washington Place Hackensack, NJ 07601	888-53-Metro www.metroenergy.com	R/C ACTIVE
MPower Energy NJ LLC One University Plaza, Suite 507 Hackensack, NJ 07601	877-286-7693 www.mpowerenergy.com	R/C/I ACTIVE
NATGASCO (Supreme Energy, Inc.) 532 Freeman Street Orange, NJ 07050	800-840-4427 www.supremeenergyinc.com	R/C/I ACTIVE
New Energy Services LLC 101 Neptune Avenue Deal, New Jersey 07723	800-660-3643 www.newenergyservicesllc.com	R/C/I ACTIVE
New Jersey Gas & Electric 10 North Park Place Suite 420 Morristown, NJ 07960	866-568-0290 www.njgande.com	R/C ACTIVE
Noble Americas Energy Solutions The Mac-Cali Building 581 Main Street, 8th fl. Woodbridge, NJ 07095	877-273-6772 www.noblesolutions.com	C/I ACTIVE
North American Power & Gas, LLC d/b/a North American Power 197 Route 18 South Ste. 300 New Brunswick, NJ 08816	888- 313-8086 www.napower.com	R/C/I ACTIVE
North Eastern States, Inc. d/b/a Entrust Energy 90 Washington Valley Road Bedminster, NJ 07921	(888) 521-5861 www.entrustenergy.com	R/C/I ACTIVE
Oasis Power, LLC d/b/a Oasis Energy 11152 Westheimer, Suite 901 Houston, TX 77042	(800)324-3046 www.oasisenergy.com	R/C ACTIVE

Palmco Energy NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	877-726-5862 www.PalmcoEnergy.com	R/C/I ACTIVE
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	855-32-POWER (76937) www.plymouthenergy.com	R/C/I ACTIVE
PPL EnergyPlus, LLC Shrewsbury Executive Offices 788 Shrewsbury Avenue Suite 2200 Tinton Falls, NJ 07724	(732) 741-0505 www.pplenergyplus.com	C/I ACTIVE
Public Power & Utility of New Jersey, LLC One International Blvd, Suite 400 Mahwah, NJ 07495	(888) 354-4415 www.ppandu.com	R/C/I ACTIVE
Residents Energy, LLC 550 Broad Street Newark, NJ 07102	(888) 828-7374 www.residentsenergy.com	R/C ACTIVE
Respond Power LLC 1001 East Lawn Drive Teaneck, NJ 07666	(877) 973-7763 www.respondpower.com	R/C/I ACTIVE
Save on Energy, LLC 1101 Red Ventures Drive Fort Mill, SC 29707	1 (877) 658-3183 www.saveonenergy.com	R/C ACTIVE
SFE Energy One Gateway Center Suite 2600 Newark, NJ 07012	1 (877) 316-6344 www.sfeenergy.com	R/C/I ACTIVE
S.J. Energy Partners, Inc. 208 White Horse Pike, Suite 4 Barrington, NJ 08007	(800) 695-0666 www.sjnaturalgas.com	C ACTIVE
Star Energy Partners, LLC CEO Corporate Center 1812 Front Street Scotch Plains, NJ 07076	(855) 427-7827 www.starenergypartners.com	R/C/I ACTIVE
South Jersey Energy Company 1 South Jersey Plaza, Route 54	800-266-6020 www.southjerseyenergy.com	R/C/I ACTIVE

Folsom, NJ 08037		
SouthStar Energy d/b/a New Jersey Energy 1085 Morris Avenue, Suite 155 Union, NJ 07083	(866) 477-8823 www.newjerseyenergy.com	R/C ACTIVE
Spark Energy Gas, LP/ Spark Energy 2105 City West Blvd. Suite 100 Houston, TX 77042	(713)600-2600 www.sparkenergy.com	R/C/I ACTIVE
Sperian Energy Corp. Bridgewater Center 1200 Route 22 East Bridgewater, NJ 08807	888-682-8082 www.sperianenergy.com	R/C/I ACTIVE
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	855-466-2842 www.spragueenergy.com	C/I ACTIVE
Stuyvesant Energy LLC 10 West Ivy Lane, Suite 4 Englewood, NJ 07631	800-640-6457 www.stuyfuel.com	C ACTIVE
Stream Energy New Jersey, LLC 309 Fellowship Road Suite 200 Mt. Laurel, NJ 08054	(877) 369-8150 www.streamenergy.net	R/C ACTIVE
Summit Energy Services, Inc. 10350 Ormsby Park Place Suite 400 Louisville, KY 40223	1 (800) 90-SUMMIT www.summitenergy.com	C/I ACTIVE
Systrum Energy 1 Bergen Blvd. Fairview, NJ 07022	877-797-8786 www.systrumenergy.com	R/C/I ACTIVE
Talen Energy Marketing, LLC 788 Shrewsbury Avenue, Suite 2178 Tinton Falls, NJ 07724	(888) 289-7693 www.pplenergyplus.com/ *	R/C
Tiger Natural Gas, Inc. dba Tiger, Inc. 234 20th Avenue Brick, NJ 008724	888-875-6122 www.tignaturalgas.com	R/C/I ACTIVE

UGI Energy Services, Inc. dba UGI Energy Link 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	800-427-8545 www.ugienergylink.com	C/I ACTIVE
UGI Energy Services, Inc. d/b/a GASMAR 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	856-273-9995 www.ugienergylink.com	C/I ACTIVE
Verde Energy USA, Inc. 2001 Route 46 Waterview Plaza, Suite 301 Parsippany, NJ 07054	800-388-3862 www.lowcostpower.com	R/C ACTIVE
Viridian Energy PA LLC 2001 Route 46, Waterview Plaza Suite 230 Parsippany, NJ 07054	866-663-2508 www.viridian.com	R/C ACTIVE
Vista Energy Marketing, L.P. 197 State Route 18 South, Suite 3000 South Wing East Brunswick, NJ 08816	888-508-4782 www.vistaenergymarketing.com	R/C/I ACTIVE
Woodruff Energy 73 Water Street PO Box 777 Bridgeton, NJ 08302	800-557-1121 www.woodruffenergy.com	R/C/I ACTIVE
Woodruff Energy US LLC 73 Water Street P.O. Box 777 Bridgeton, NJ 08302	800-457-1121 www.woodruffenergy.com	C/I ACTIVE
XOOM Energy New Jersey, LLC 744 Broad Street. 16th Floor Newark, NJ 07102	888-997-8979 www.xoomenergy.com	R/C/I ACTIVE
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	855-732-2493 www.thisisyourenergy.com	R/C/I ACTIVE

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APPENDIX B

Equipment Inventory

CHA Project # 30655
 Glen Rock - Borough Hall
 Inventory of Major Equipment

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size /Efficiency	Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.	Current year	Years Old	ASHRAE life expectancy
Boiler	1	Aerco	AM 500 B	14260251	Gas fired condensing boiler	500 MBH	95%	Boiler Room	Entire building perimeter	2015	30		2015	0	30
Boiler Pump	1	B&G/Emerson	PL-130	1BL108	Boiler Primary Pump	525 W	85.00%	Boiler Room	Entire building perimeter	2015	15		2015	0	15
Zone Pumps	3	Armstrong	S-25 BF	Various	Heating Hot Water Zone Pump	Various Fractional HP	85%	Boiler Room	Entire building perimeter	2015	15		2015	0	15
DHW Heater	1	Bradford White	M140T6FBN	HD14855213	Domestic Hot Water Heater	40 gallon	80%	Boiler Room	Entire Building	2009	14		2015	6	20
RTU	1	Trane	YSD150F3RHA001S	151710688D	Packaged DX RTU with Natraul Gas Heat	250MBH/ 12.5 Ton	11.5 EER/80%	Roof	Second Floor Meeting Room	2015	15		2015	0	15
RTU	1	Trane	YSC060A3	381102252L	Packaged DX RTU with Natraul Gas Heat	130 MBH/5 Tons	10 EER/80%	Roof	Second Floor Offices	2008	8		2015	7	15
EF-1	1	Jenn-Air	148CR00	unknown	Exhaust Fan	3/4 HP	85%	Roof	Bathrooms	1995	0		2015	20	20
EF-2	1	Penn Ventilator	FMX-13B	unknown	Exhaust Fan	1 HP	87%	Roof	Kitchen Hood	1995	0		2015	20	20

APPENDIX C

ECM summary of Savings and costs

Glen Rock
CHA Project Number: 30655

Rate of Discount (used for NPV) 3.0%

Utility Costs		Yearly Usage	Existing MT CO ₂	Metric Ton Carbon Dioxide Equivalent	Building Area	Annual Utility Cost		
\$	0.172	\$/kWh blended		0.000420205	9,604	Electric	Natural Gas	Fuel Oil
\$	0.172	\$/kWh supply	69,040	29.01		\$ 11,850	\$ 6,797	
\$	7.93	\$/kW	30.4					
\$	1.080	\$/Therm	6,295	33.58				
		\$/kgals						
		\$/Gal						

Fire Department

Recommend? Y or N	Item	Savings					Cost	Simple Payback	Life Expectancy	Equivalent CO ₂ (Metric tons)	NJ Smart Start Incentives	Direct Install Eligible (Y/N)	Payback w/ Incentives	Simple Projected Lifetime Savings					ROI	NPV	IRR		
		kW	kWh	therms	No. 2 Oil gal	Water kgal								\$	kW	kWh	therms	kgal/yr				\$	
N	ECM-1	Install roof insulation (Incremental Cost)	0.0	120	385	0	0	437	\$ 44,695	102.3	15	2.1	\$ -	N	102.3	0.0	1,800	5,782	0	\$ 6,552	(0.9)	(\$39,480)	-17.9%
Y	ECM-2	Replace DHW heater with condensing DHW heater	0.0	0	287	0	0	310	\$ 8,511	27.5	15	1.5	\$ 50	N	27.3	0.0	0	4,306	0	\$ 4,649	(0.5)	(\$4,761)	-6.7%
Y	ECM-3	Install pipe insulation	0.0	0	259	0	0	279	\$ 717	2.6	15	1.4	\$ -	N	2.6	0.0	0	3,881	0	\$ 4,190	4.8	\$2,618	38.7%
Y	ECM-L1	Lighting Replacements / Upgrades	4.9	18,235	0	0	0	3,596	\$ 22,089	6.1	15.0	7.7	\$ 1,478	N	5.7	73.5	273,525	0	\$ 53,942	1.4	\$22,319	15.4%	
		Total (Not Including [B] Option ECMs or L1, L2)	4.9	18,355	931	0	0	\$ 4,622	\$ 76,012	16.4	15.0	13	\$ 1,528		16.1	74	275,325	13,970	-	\$ 69,334	(0.1)	(\$19,304)	-0.9%
		Recommended Measures (highlighted green above)	4.9	18,235	546	0	0	\$ 4,185	\$ 31,317	7.5	15.0	11	\$ 1,528	0	7.1	74	273,525	8,187	-	\$ 62,782	1.0	\$20,176	11.2%
		% of Existing	16%	26%	9%	0%	0%																

		City: Newark, NJ				
		Occupied Hours/Week				
		70	70	70	70	50
		Building Operating	Auditorium Occupied	Gymnasium Occupied	Library Occupied	Classrooms Occupied
Temp	Enthalpy h (Btu/lb)	Bin Hours	Hours	Hours	Hours	Hours
102.5						
97.5	35.4	6	3	3	3	2
92.5	37.4	31	13	13	13	9
87.5	35.0	131	55	55	55	39
82.5	33.0	500	208	208	208	149
77.5	31.5	620	258	258	258	185
72.5	29.9	664	277	277	277	198
67.5	27.2	854	356	356	356	254
62.5	24.0	927	386	386	386	276
57.5	20.3	600	250	250	250	179
52.5	18.2	730	304	304	304	217
47.5	16.0	491	205	205	205	146
42.5	14.5	656	273	273	273	195
37.5	12.5	1,023	426	426	426	304
32.5	10.5	734	306	306	306	218
27.5	8.7	334	139	139	139	99
22.5	7.0	252	105	105	105	75
17.5	5.4	125	52	52	52	37
12.5	3.7	47	20	20	20	14
7.5	2.1	34	14	14	14	10
2.5	1.3	1	0	0	0	0
-2.5						
-7.5						

Multipliers	
Material:	1.027
Labor:	1.246
Equipment:	1.124

Heating System Efficiency	94%
Cooling Eff (kW/ton)	1.2

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

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

ECM-1: Install Roof Insulation

Description: This ECM evaluates the energy savings associated with installing additional tapered insulation to the roof of the building when the existing roof gets replaced.

Existing Roof Area 4,802 sf
 Existing U-value 0.10 Btu/hr/(sf°F)
 Existing R-value 10.0
 Proposed R-value 26
 Proposed U-value 0.04 Btu/hr/(sf°F)
 Heating System Efficiency 94%
 Cooling System Efficiency 1.2 kW/Ton
 Heating "On" Temp 60 F

Existing Cooling Load 75 F
 Existing Max. Roof Cooling Load 36,015 Btu/hr

Proposed Cooling Load 13,852 Btu/hr

Occupied Cooling Setpoint 78 F
 Unoccupied Cooling Setpoint 78 F

Existing Heating Load 60 F
 Existing Max. Roof Heating Load 28,812 Btu/hr

Proposed Heating Load 11,082 Btu/hr

Occupied Heating Setpoint 65 F
 Unoccupied Heating Setpoint 65 F

Existing Heating Total 58,883,325 Btu/yr
 Proposed Heating Total 22,647,433 Btu/yr
 Savings 36,235,892 Btu/yr
 Input 385.49 Therms

Existing Cooling Total 195 kWh/yr
 Proposed Cooling Total 75 kWh/yr
 Savings 120 kWh/yr

Avg Outdoor Air Temp. Bins °F	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Occupied				Unoccupied				Existing Cooling Load (Kwh)	Existing Heating Load (Btu/yr)	Proposed Cooling Load (Kwh)	Proposed Heating Load (Btu/yr)
				Existing Heat Gain	Proposed Heat Gain	Existing Heat Loss	Proposed Heat Loss	Existing Heat Gain	Proposed Heat Gain	Existing Heat Loss	Proposed Heat Loss				
				(Btu/hr)	(Btu/hr)	(Btu/hr)	(Btu/hr)	(Btu/hr)	(Btu/hr)	(Btu/hr)	(Btu/hr)				
102.5	0	0	0	11,765	4,525	-	-	11,765	4,525	-	-	0.00	-	-	-
97.5	6	3	4	9,364	3,602	-	-	9,364	3,602	-	-	5.62	-	2.16	-
92.5	31	13	18	6,963	2,678	-	-	6,963	2,678	-	-	21.58	-	8.30	-
87.5	131	55	76	4,562	1,755	-	-	4,562	1,755	-	-	59.76	-	22.98	-
82.5	500	208	292	2,161	831	-	-	2,161	831	-	-	108.05	-	41.56	-
77.5	620	258	362	-	-	-	-	-	-	-	-	0.00	-	0.00	-
72.5	664	277	387	-	-	-	-	-	-	-	-	0.00	-	0.00	-
67.5	854	356	498	-	-	-	-	-	-	-	-	0.00	-	0.00	-
62.5	927	386	541	-	-	-	-	-	-	-	-	-	-	-	-
57.5	600	250	350	-	-	3,602	1,385	-	-	3,602	1,385	-	2,160,900	-	831,115
52.5	730	304	426	-	-	6,003	2,309	-	-	6,003	2,309	-	4,381,825	-	1,685,317
47.5	491	205	286	-	-	8,404	3,232	-	-	8,404	3,232	-	4,126,119	-	1,586,969
42.5	656	273	383	-	-	10,805	4,156	-	-	10,805	4,156	-	7,087,752	-	2,726,058
37.5	1,023	426	597	-	-	13,206	5,079	-	-	13,206	5,079	-	13,509,227	-	5,195,856
32.5	734	306	428	-	-	15,607	6,003	-	-	15,607	6,003	-	11,455,171	-	4,405,835
27.5	334	139	195	-	-	18,008	6,926	-	-	18,008	6,926	-	6,014,505	-	2,313,271
22.5	252	105	147	-	-	20,409	7,849	-	-	20,409	7,849	-	5,142,942	-	1,978,055
17.5	125	52	73	-	-	22,810	8,773	-	-	22,810	8,773	-	2,851,188	-	1,096,611
12.5	47	20	27	-	-	25,211	9,696	-	-	25,211	9,696	-	1,184,894	-	455,728
7.5	34	14	20	-	-	27,612	10,620	-	-	27,612	10,620	-	938,791	-	361,073
2.5	1	0	1	-	-	30,013	11,543	-	-	30,013	11,543	-	30,013	-	11,543
TOTALS	8,760	3,650	5,110									195.0	58,883,325	75	22,647,433

Glen Rock
 CHA Project Number: 30655
 Fire Department

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-1: Install Roof Insulation - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						\$ -	\$ -	\$ -	\$ -	
Rigid Tapered Roof Insulation	4,802	SF	\$5.50	\$ 1.00		\$ 27,124	\$ 5,983	\$ -	\$ 33,107	RS Means
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	

Note: cost for this measure includes incremental cost of installing additional insulation only, this does not include costs for a new roof
 Note: Cost Estimates are for energy calculations only, do not use for procurement

\$ 33,107	Subtotal
\$ 11,588	35% Contingency
\$ 44,695	Total

Glen Rock
 CHA Project Number: 30655
 Fire Department

ECM-2: Replace Gas-Fired DHW Heater w/ Tank Condensing Gas-Fired DHW Heater

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

Item	Value	Units	Formula/Comments
Avg. Monthly Utility Demand by Water Heater	150	Therms/month	Calculated from utility bill
Total Annual Utility Demand by Water Heater	180,000	MBTU/yr	1therm = 100 MBTU
Existing DHW Heater Efficiency	80%		Per manufacturer nameplate
Total Annual Hot Water Demand (w/ standby losses)	144,000	MBTU/yr	
Existing Tank Size	40	Gallons	Per manufacturer nameplate
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	140	°F	Per building personnel
Room Temperature	72	°F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.6	MBH	
Annual Standby Hot Water Load	5,585	MBTU/yr	
New Tank Size	50	Gallons	Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	140	°F	
Room Temperature	72	°F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.8	MBH	
Annual Standby Hot Water Load	6,826	MBTU/yr	
Total Annual Hot Water Demand	145,241	MBTU/yr	
Proposed Avg. Hot water heater efficiency	96%		Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Proposed Fuel Use	1,513	Therms	Standby Losses and inefficient DHW heater eliminated
Utility Cost	\$1.08	\$/Therm	
Existing Operating Cost of DHW	\$1,943	\$/yr	
Proposed Operating Cost of DHW	\$1,633	\$/yr	

Savings Summary:

Utility	Energy Savings	Cost Savings
Therms/yr	287	\$310

Glen Rock
 CHA Project Number: 30655
 Fire Department

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-2: Replace Gas-Fired DHW Heater w/ Tank Condensing Gas-Fired DHW Heater - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Gas-Fired DHW Heater Removal	1	LS		\$ 50		\$ -	\$ 62	\$ -	\$ 62	RS Means 2012
High Efficiency Gas-Fired DHW Heater	1	EA	\$ 4,000	\$ 280		\$ 4,108	\$ 349	\$ -	\$ 4,457	RS Means 2012
Miscellaneous Electrical	1	LS	\$ 300			\$ 308	\$ -	\$ -	\$ 308	RS Means 2012
Venting Kit	1	EA	\$ 450	\$ 650		\$ 462	\$ 810	\$ -	\$ 1,272	RS Means 2012
Miscellaneous Piping and Valves	1	LS	\$ 200			\$ 205	\$ -	\$ -	\$ 205	RS Means 2012

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

\$ 6,305	Subtotal
\$ 2,207	35% Contingency
\$ 8,511	Total

ECM-3: Install Piping Insulation (Bare Pipe)

Description This ECM evaluates insulating heating system piping which is not currently insulated to reduce heat loss from piping and heat gain to the spaces.

Given	Fuel Energy Cost	=	\$	1.08	\$/Therm (Nat'l Gas)
	Operation (Hours/Week)	=	45	Hours/Week	
	Operation (Heating Weeks/Year)	=	52	Weeks/Year	
	Operation (Hours/Year)	=	2340	Hours/Year	
	Heating Media	=	Water		
	Piping Material	=	Mild Steel		
	Ambient Temperature	=	72	°F	
	Pipe Diameter	=	Pipe #1: 2.00 inches	Pipe #2: 1 1/2 inches	Pipe #3: 1.00 inches
	Pipe Length	=	50.00 feet	65.00 feet	60.00 feet
			Pipe #4: 2.00 inches		0.00 feet
Assumption	Min. Pipe Insulation Recommended	=	1.50 inches	1.00 inches	1.00 inches
	Circulating Temperature	=	150	°F	
	Heating Efficiency	=	94%		
	Pipe Insulation Conductivity	=	0.29	Btu*in./(h*ft²°F)	

Formula
Piping Correction Factor = (Current Transmission Coefficient / Reference Transmission Coefficient)
Temperature Correction Factor = (Circulating Temperature - Ambient Temperature) / (Circulating Temperature - Reference Temperature)
Hourly Heat Loss per pipe size and length = (Heat loss per foot [from chart]) x (Piping Correction Factor) x (Temperature Correction Factor) x (Pipe Length)
Seasonal Heat Loss = (Hourly Heat Loss Total) x (Operating hours) / (Heating Efficiency) / (1,000 btu/Mbtu)
Energy Loss = (Seasonal Heat Loss) / (Conversion Factor [MBtu/Unit])
Energy Loss Cost = (Energy Loss) x (cost/unit)

Calculation	Existing	Current Transmission Coefficient	Reference Transmission Coefficient	
	Piping Correction Factor = (2.00 /	2.00)	1.00
	Temperature Correction Factor = (150 -	72) / (150 -	80)
				1.11
	Heat Loss Pipe #1 (Hourly)	= (84.92) x (1.00) x (1.11) x (50.00) =	4,731 Btuh	
	Heat Loss Pipe #2 (Hourly)	= (67.23) x (1.00) x (1.11) x (65.00) =	4,869 Btuh	
	Heat Loss Pipe #3 (Hourly)	= (48.87) x (1.00) x (1.11) x (60.00) =	3,267 Btuh	
	Heat Loss Pipe #4 (Hourly)	= (84.92) x (1.00) x (1.11) x (0.00) =	- Btuh	
				12,868 Btuh
	Seasonal Heat Loss	= (12,868) x (2,340) / (94%) / (1,000) =	32,032 Mbtu	
	Existing Energy Loss	= (32,032) / (100) =	320 Therm	
	Existing Energy Loss Cost	= (320) x (\$ 1.08) =	\$ 346	
	New	Heat Loss per foot	Piping CF	Temperature CF
	Heat Loss Pipe #1 (Hourly)	= (13.00) x (1.00) x (1.11) x (50.00) =	724 Btuh	
	Heat Loss Pipe #2 (Hourly)	= (14.00) x (1.00) x (1.11) x (65.00) =	1,014 Btuh	
	Heat Loss Pipe #3 (Hourly)	= (11.00) x (1.00) x (1.11) x (60.00) =	735 Btuh	
	Heat Loss Pipe #4 (Hourly)	= (13.00) x (1.00) x (1.11) x (0.00) =	- Btuh	
				2,474 Btuh
	Seasonal Heat Loss	= (2,474) x (2,340) / (94%) / (1,000) =	6,158 Mbtu	
	New Energy Loss	= (6,158) / (100) =	62 Therm	
	New Energy Loss Cost	= (62) x (\$ 1.08) =	\$ 66	

Result	Existing Heat Loss	320 Therm	\$ 346
	New Heat Loss	62 Therm	\$ 66
	Savings	100%	259 Therm
			\$ 279
			80.8%

Conversion Factors

\$/MCF (Nat'l Gas)	1	1,030,000	btu/MCF	MCF	Mbh/MCF	1,030	MMbh/MCF	####
\$/CCF (Nat'l Gas)	2	103,000	btu/CCF	CCF	Mbh/CCF	103	MMbh/CCF	####
\$/CF (Nat'l Gas)	3	1,030	btu/CF	CF	Mbh/CF	1,030	MMbh/CF	####
\$/Therm (Nat'l Gas)	4	100,000	btu/Therm	Therm	Mbh/Therm	100	MMbh/Therm	####
\$/gal (LP Gas)	5	91,500	btu/gallon	gallons	Mbh/gallon	91.5	MMbh/gallon	####
\$/gal (Fuel Oil #2)	6	139,000	btu/gallon	gallons	Mbh/gallon	139	MMbh/gallon	####
\$/lb Steam	7	975	btu/lb Steam	lb Steam	Mbh/lb Steam	0.975	MMbh/lb Steam	####
\$/1000 lbs Steam	8	975,000	btu/1000 lbs Steam	1000 lbs Steam	Mbh/1000 lbs Steam	975	MMbh/1000 lbs S	####

This chart is not used but is left for future reference

Pipe Diameter	Initial Bare	Final (1) R=2	Final (2) ASHRAE standard	ASHRAE standard 40-80	Final (2) ASHRAE stnd x pipe length	Initial Bare x pipe length	Select one pipe length from below:
(l.d.)	BTU/hr/ft²°F	BTU/hr/ft²°F	BTU/hr/ft²°F	Relative thickness in inches	BTU/hr²°F		25 ft 50 ft 100 ft 150 ft 200 ft
	1/2	0.27	0.18	0.15	0.75	30.0	54.0 44%
	3/4	0.61	0.27	0.21	0.75	42.0	122.0 66%
	1	0.77	0.30	0.23	0.75	46.0	154.0 70%
	1 1/2	1.06	0.34	0.20	1.00	40.0	212.0 81%
	2	1.30	0.36	0.21	1.00	42.0	260.0 84%
	3	1.86	0.39	0.22	1.00	44.0	372.0 88%
	4	2.30	0.41	0.22	1.00	44.0	460.0 90%
	6	3.35	0.44	0.23	1.00	46.0	670.0 93%

Glen Rock

CHA Project Number: 30655

Fire Department

ECM-3: Install Piping Insulation (Bare Pipe) - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Polyethylene Pipe Insulation (1" Pipe)	60.00	LF	\$ 4.12	\$ 4.12		\$ 254	\$ 308	\$ -	\$ 562	RS Means 2012
Polyethylene Pipe Insulation (1-1/2" Pipe)	65.00	LF	\$ 4.41	\$ 4.41		\$ 294	\$ 357	\$ -	\$ 652	RS Means 2012
Polyethylene Pipe Insulation (2" Pipe)	50.00	LF	\$ 4.67	\$ 4.67		\$ 240	\$ 291	\$ -	\$ 531	RS Means 2012
						\$ -	\$ -	\$ -	\$ -	

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

\$ 531	Subtotal
\$ 186	35% Contingency
\$ 717	Total

**Glen Rock
CHA Project Number: 30655
Fire Department**

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per April, 2012. Building must have a minimum average electric demand of 100 kW. This minimum is waived for buildings owned by local governments or non-profit organizations. Values used in this calculation are for ALL identified measures except for alternate ECMs, regardless of payback or IRR. P4P estimated incentives represent a best case scenario, and will likely be lower depending on which measures are included. The savings displayed here are not guaranteed to qualify for P4P incentives if IRR or payback requirements are not met.

Total Building Area (Square Feet)	9,604
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilities (BPU)

Incentive #1		
Audit is funded by NJ BPU	\$0.10	\$/sqft

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	\$11,850	\$6,797
Existing Usage (from utility)	69,040	6,295
Proposed Savings	18,355	931
Existing Total MMBtus	865	
Proposed Savings MMBtus	156	
% Energy Reduction	18.0%	
Proposed Annual Savings	\$4,185	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved Incentive	
	\$/kWh	\$/therm	\$/kWh	\$/therm	\$/kWh	\$/therm	\$/kWh	\$/therm
Incentive #2	\$0.09	\$0.90	\$0.005	\$0.05	\$0.11	\$1.25	\$0.11	\$1.05
Incentive #3	\$0.09	\$0.90	\$0.005	\$0.05	\$0.11	\$1.25	\$0.11	\$1.05

	Incentives \$		
	Elec	Gas	Total
Incentive #1	\$0	\$0	\$5,000
Incentive #2	\$1,928	\$978	\$2,906
Incentive #3	\$1,928	\$978	\$2,906
Total All Incentives	\$3,856	\$1,956	\$10,812

Total Project Cost	\$76,012
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		Allowable Incentive
% Incentives #1 of Utility Cost*	26.8%	\$5,000
% Incentives #2 of Project Cost**	3.8%	\$2,906
% Incentives #3 of Project Cost**	3.8%	\$2,906
Total Eligible Incentives***		\$10,812
Project Cost w/ Incentives		\$65,200

Project Payback (years)	
w/o Incentives	18.2
w/ Incentives	15.6

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

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

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

*** Maximum allowable amount of Incentive #1 is \$50,000 if not funded by NJ BPU, and \$25,000 if it is.

Maximum allowable amount of Incentive #2 & #3 is \$1 million per gas account and \$1 million per electric account; maximum 2 million per project

Cost of Electricity: \$0.123 \$/kWh
\$3.03 \$/kW

Field Code	Area Description Unique description of the location - Room number/Room name: Floor number (if applicable)	Usage Describe Usage Type using Operating Hours	EXISTING CONDITIONS								Retrofit Control Retrofit control device	Notes
			No. of Fixtures No. of fixtures before the retrofit	Standard Fixture Code Lighting Fixture Code	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Fixt No.)	Exist Control Pre-inst. control device	Annual Hours Estimated annual hours for the usage group	Annual kWh (kW/space) * (Annual Hours)		
50LED	834 Bay Rescue	General Common	14	W 32 W F 2 (ELE)	F42LL	60	0.84	SW	3640	3,058	NONE	
50LED	831-833 Main Bay Rescue	General Common	20	W 32 W F 2 (ELE)	F42LL	60	1.20	SW	3640	4,368	NONE	
18LED	OEM	General Common	2	T 32 R F 4 (ELE)	F44ILL	112	0.22	SW	3640	815	NONE	
117LED	BLR Room	General Common	3	CF 23	CFS23/1	23	0.07	SW	3640	251	NONE	
88LED	Stair 1	Stairway	4	CF 13 1 LAMP	CFQ13/1-L	15	0.06	SW	5824	349	NONE	
40LED	2nd Floor Meet Room	Conference	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	2912	175	NONE	
40LED	2nd Floor Meet Room	Conference	6	T 32 R F 2 (ELE)	F42LL	60	0.36	SW	2912	1,048	NONE	
40LED	2nd Floor Meet Room	Conference	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	2912	524	NONE	
71LED	2nd Floor Meet Room	Conference	2	I 60	I60/1	60	0.12	SW	2912	349	NONE	
71LED	2nd Floor Meet Room	Conference	2	I 60	I60/1	60	0.12	SW	2912	349	NONE	
261LED	2nd Floor Meet Room	Conference	3	PAR 38 SP	H100/1	100	0.30	SW	2912	874	NONE	
261LED	2nd Floor Meet Room	Conference	3	PAR 38 SP	H100/1	100	0.30	SW	2912	874	NONE	
261LED	2nd Floor Meet Room	Conference	3	PAR 38 SP	H100/1	100	0.30	SW	2912	874	NONE	
71LED	Storage Room	Storage Areas	2	I 60	I60/1	60	0.12	SW	2912	349	NONE	
88LED	Men's Bathroom	Restroom	4	CF 13 1 LAMP	CFQ13/1-L	15	0.06	OCC	4300	258	NONE	
88LED	Men's Bathroom	Restroom	4	CF 13 1 LAMP	CFQ13/1-L	15	0.06	OCC	4300	258	NONE	
88LED	Jan Cl	Linen/Utility/Wet/Janitor/Electrical w/ OCC	1	CF 13 1 LAMP	CFQ13/1-L	15	0.02	OCC	750	11	NONE	
88LED	Women's Bathroom	Restroom	3	CF 13 1 LAMP	CFQ13/1-L	15	0.05	OCC	4300	194	NONE	
88LED	Women's Bathroom	Restroom	1	CF 13 1 LAMP	CFQ13/1-L	15	0.02	OCC	4300	65	NONE	
50LED	Kitchen	Kitchen	1	W 32 W F 2 (ELE)	F42LL	60	0.06	SW	3640	218	NONE	
50LED	Kitchen	Kitchen	3	W 32 W F 2 (ELE)	F42LL	60	0.18	SW	3640	655	NONE	
50LED	Corridor	Hallways	1	W 32 W F 2 (ELE)	F42LL	60	0.06	SW	3360	202	NONE	
88LED	Lounge	Staff Lounge	10	CF 13 1 LAMP	CFQ13/1-L	15	0.15	SW	5000	750	NONE	
274LED	Lounge	Staff Lounge	10	SP H50/1	H50/1	50	0.50	SW	5000	2,500	NONE	
71LED	Lounge	Staff Lounge	2	I 60	I60/1	60	0.12	SW	5000	600	NONE	
274LED	Lounge Display	General Common	12	SP H50/1	H50/1	50	0.60	SW	3640	2,184	NONE	
40LED	Officers Room	General Common	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	3640	655	NONE	
40LED	Officers Room	General Common	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	3640	655	NONE	
40LED	Officers Room	General Common	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	3640	655	NONE	
198LED	Storage	Storage Areas	2	2T 17 R F 2 (ELE)	F22LL	31	0.06	SW	2912	181	NONE	
117LED	Storage	Storage Areas	1	CF 23	CFS23/1	23	0.02	SW	2912	67	NONE	
50LED	Call Room	General Common	5	W 32 W F 2 (ELE)	F42LL	60	0.30	SW	3640	1,092	NONE	
117LED	Call Room Bathroom	Restroom	2	CF 23	CFS23/1	23	0.05	SW	4300	198	NONE	
50LED	Storage	Storage Areas	3	W 32 W F 2 (ELE)	F42LL	60	0.18	SW	2912	524	NONE	
50LED	IT Room	General Common	1	W 32 W F 2 (ELE)	F42LL	60	0.06	SW	3640	218	NONE	
64LED	Exterior Lighting	Outdoor Lighting	5	175 MH	MH175/1	215	1.08	SW	4368	4,696	NONE	
Total			148				8.40			31,093		

APPENDIX E

Photos



APPENDIX F – PHOTOS



1. IR Gas Heating Unit



2. Wall Heating Unit 1



3. Boiler



4. Uninsulated Piping



5. DHW Heater



6. Wall Heating Unit 2



7. RTU 1



8. RTU 2



9. RTU 2



10. Generator

APPENDIX F

EPA Benchmarking Report





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energystar.gov

ENERGY STAR® Statement of Energy Performance

N/A

Fire Department

Primary Property Function: Fire Station
Gross Floor Area (ft²): 9,604
Built: 1929

ENERGY STAR®
Score¹

For Year Ending: December 31, 2014
Date Generated: October 29, 2015

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

Property & Contact Information

Property Address

Fire Department
1 Harding Plaza
Glen Rock, New Jersey 07452

Property Owner

Borough of Glen Rock
1 Harding Plaza
Glen Rock, NJ 07452
(201) 670-3956

Primary Contact

Lenora Benjamin
1 Harding Plaza
Glen Rock, NJ 07452
(201) 670-3956
srivera@chacompanies.com

Property ID: 4614892

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

90.1 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu) 235,564 (27%)
Natural Gas (kBtu) 629,500 (73%)

National Median Comparison

National Median Site EUI (kBtu/ft²) 95.3
National Median Source EUI (kBtu/ft²) 154.4
% Diff from National Median Source EUI -6%

Source EUI

145.8 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year) 65

Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

Lenora Benjamin
1 Harding Plaza
Glen Rock, NJ 07452
(201) 670-3956
srivera@chacompanies.com



**Professional Engineer Stamp
(if applicable)**