

# **BOROUGH OF GLEN ROCK**

## **RECYCLING CENTER**

360 Doremus Avenue Glen Rock NJ, 07452

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

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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 the Borough of Glen Rock 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
<b>Recycling Center</b>	360 Doremus Avenue Glen Rock NJ, 07452	1,200	2013

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)
<b>Recycling Center</b>	3,881	45	\$2,259	2.1

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

Each measure recommended by CHA typically has a stand-alone simple payback period of 15 years or less. However, if the owner 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	Replace manual thermostat with programmable thermostat	3,361	1,520	2.2	0	2.2	Y
L1**	Lighting Replacements / Upgrades	819	669	1.2	115	1.1	N
L2**	Install Lighting Controls (Add Occupancy Sensors)	641	22	28.8	50	26.6	N
L3	Lighting Replacements with Controls (Occupancy Sensors)	1,461	736	2.0	165	1.8	Y
<b>Total**</b>		<b>4,822</b>	<b>2,256</b>	<b>2.1</b>	<b>165</b>	<b>2.1</b>	
<b>Total(Recommended)</b>		<b>4,822</b>	<b>2,256</b>	<b>2.1</b>	<b>165</b>	<b>2.1</b>	

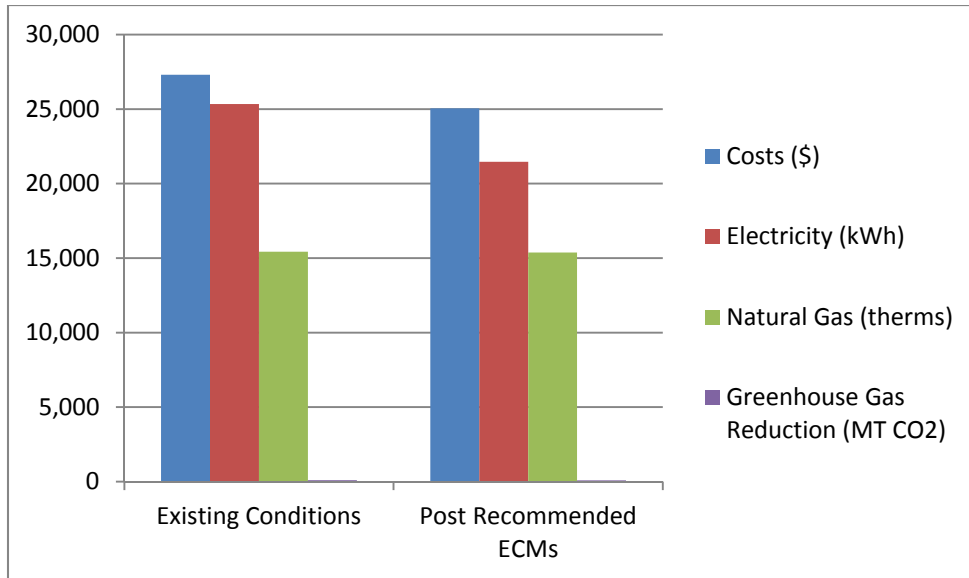
\* Incentive shown, if available, is per the New Jersey SmartStart Program.

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

In addition to the ECMs described above, this site was evaluated for a potential parking lot canopy solar photovoltaic (PV) system. It was determined that the parking lot is large enough to support at least a 140 kW system which will generate much more energy than what is used on site. For details on this renewable energy measure, please refer to section 7.1.1 below.

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

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs (\$)	27,309	25,053	8%
Electricity (kWh)	25,344	21,463	15%
Natural Gas (therms)	15,425	15,379	0.3%
Greenhouse Gas Reduction (MT CO <sub>2</sub> )	93	91	2%
Site EUI (kbtu/SF/Yr)	1357.5	1342.6	





## 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 E for representative photos of some of the existing conditions observed while onsite.

**Building Name:** Recycling Center  
**Address:** 360 Doremus Avenue, Glen Rock, NJ 07452  
**Gross Floor Area:** 1200 sq. ft.  
**Number of Floors:** Single story  
**Year Built:** 2013



### General

**Description of Spaces:** The building is used as an office building and has an office, locker room, utility room and two restrooms.

**Description of Occupancy:** The facility has 5 permanent employees.

**Number of Computers:** The building has no desktop and laptop computers.

**Building Usage:** Operating hours for the recycling center are as follows:

Tuesdays and Fridays: 7.30 AM – 3.30 PM

Thursdays: 7.30 AM – 7.00 PM

Saturdays: 8.00 AM – 5.00 PM

Sundays: 1.00 PM – 5.00 PM

The Center is closed on Mondays and Wednesdays.

**Construction:** Concrete masonry unit walls having a stone exterior façade.

**Roof:** The building has a pitched roof. The attic is insulated and appears to be in good condition. No ECM associated with the roof has been evaluated.

**Windows:** The building has double pane windows and they appear to be in good condition. No ECM related to windows has been evaluated.

**Exterior Doors:** Exterior main door is of steel construction and is in good condition. The door seals and sweeps also appear to be in good condition. No ECM related to exterior doors has been evaluated.

## **Heating Ventilation & Air Conditioning (HVAC) Systems**

**Heating:** The building is heated by the gas furnace of the Luxaire split AC system. The gas furnace is installed in the attic. The split AC system was installed in 2013 and appears to be in good condition. A portable electric heater of 1500 watts is provided in the office space. The electric heater is used on very cold days when the heat from the gas furnace is inadequate.

**Cooling:** The building is cooled by a 2 ton cooling capacity Luxaire split AC system. The outdoor unit is installed on grade and the indoor unit is installed in the attic. The system was installed in 2013 and appears to be in good condition. However, an ECM related to replacing the split system with a modern high efficiency system has been evaluated to improve energy savings.

**Ventilation:** Ventilation is natural ventilation through operable windows and frequent door openings. There is no ECM associated with the ventilation system.

**Exhaust:** This building has a fractional HP exhaust fan serving the restrooms. The fan is enclosed and therefore the capacity of fan motor is unknown. No ECM has been evaluated for the exhaust fan.

## **Controls Systems**

A mechanical thermostat is provided for the split AC system. To improve AC system operating efficiency and increase energy savings an ECM related to installing a programmable thermostat has been evaluated.

## **Domestic Hot Water Systems**

Domestic hot water to the entire building is provided by a Rheem gas fired water heater installed in the utility room. The water heater was installed in 2013 and is in good condition. No ECM related to replacing the water heater has been evaluated.

## **Kitchen Equipment**

There is no kitchen in this building.

## **Plug Load**

This building has a water cooler, refrigerator, microwave oven, toaster, coffee pot, television and a radio 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**

All plumbing fixtures in this building are low-water consuming fixtures. These plumbing fixtures are in like new condition.

### **Lighting Systems**

All spaces of the building except the locker room are provided with compact fluorescent lights. The locker room is provided with a T-8 fluorescent lighting fixture. One metal halide wall mounted light fixture is provided for exterior lighting of the building. All the lights in this building are controlled by manual switches except the exterior light which is controlled by a photocell. 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 Consumption	25,344	kWh
Annual Cost	14,169	\$
Blended Unit Rate	0.559	\$/kWh
Demand Rate	7.77	\$/kW
Peak Demand	83	kW
Natural Gas		
Annual Consumption	15,425	Therms
Annual Cost	13,140	\$
Unit Rate	0.85	\$/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)

See Appendix A for utility analysis summary tables.

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	\$0.559	\$0.13	Y
Natural Gas	\$/Therm	\$1.105	\$0.96	Y

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

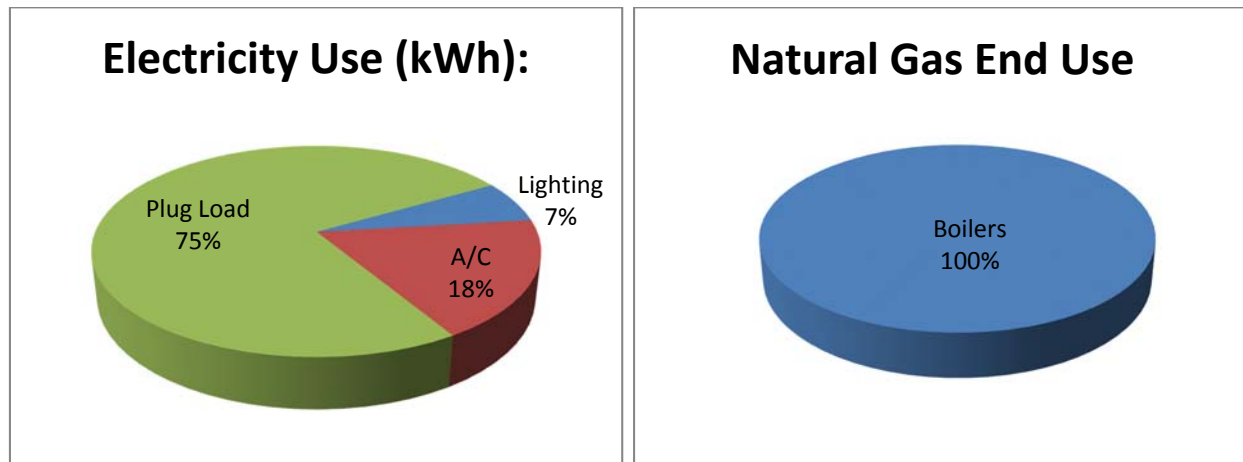
Additional information on selecting a third party energy supplier is available here:

<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/ft<sup>2</sup>/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 <sup>2</sup> /yr	Source EUI (kBtu/ft <sup>2</sup> /yr)	Energy Star Rating (1-100)
1,367.3	1,606.8	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 school building is 1,367.3 and source EUI is 1,606.8. The building has much higher EUIs than the national median EUIs (national median site EUI is 104.8 kBtu/ft<sup>2</sup> and national median source EUI is 123.1 kBtu/ft<sup>2</sup>). The EUI of this building is (+)1,205% higher than national median. It is assumed that the abnormally high EUIs at this site are attributed to either improperly reported energy consumption or significant site energy usage outside of the building that skews the rating on a square foot basis. The EUI could be 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 Replace manual thermostat with programmable thermostat

The building has a non-programmable thermostat that was improperly installed and is currently not controlling the heating equipment as it should be. In addition, there are numerous comfort issues as a result of the current location and the heating system is report to operate constantly with no reduction in temperature set point during unoccupied hours. This measure proposes relocation and installation of a 7 day programmable thermostat to allow for scheduling of occupied and unoccupied periods and associated temperature set point adjustments. Natural gas savings will result from lower space temperature settings during unoccupied periods. In addition to the relocation of the thermostat, it may be required to relocate some of the supply air ductwork in the space to improve occupant comfort completely. Implementation costs associated with this measure does not account for ductwork relocation, only installation of a new thermostat.

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

### ECM-1 Replace manual thermostat with programmable thermostat

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
3,361	0	2,648	46	1,520	3.5	0	2.2	1.4

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

This measure is recommended.

## 5.2.1 ECM-L1 Lighting Replacement / Upgrades

All spaces of the building except the locker room are provided with compact fluorescent lights. The locker room is provided with a T-8 fluorescent lighting fixture. One metal halide wall mounted light fixture is provided for exterior lighting of the building. All the lights in this building are controlled by manual switches except the exterior light which is controlled by a photocell.

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
819	0.5	1,114	0	669	11.3	115	1.2	1.1

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

This measure is not recommended in lieu of ECM L3.

### 5.2.2 ECM-L2 Install Lighting Controls (Occupancy Sensors)

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

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

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

### ECM-L2 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
641	0	40	0	22	(0.5)	50	28.8	26.6

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

This measure is not recommended in lieu of ECM L3.

### 5.2.3 ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

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

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

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
1,461	0.5	1,233	0	736	6.6	165	2.0	1.8

\* 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.

**5.3 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:

- Purchase Energy Star labeled appliances when replacement is needed.

## **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.

#### **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.

#### **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.

The Recycling Center qualifies for the direct install program since the peak electric demand in the evaluated 12 month period was below 200 KW.

### **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.

### **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 Parking Lot Solar Power Generation

The building was evaluated for the potential to install parking lot mounted 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 area determines how large of a solar array can be installed on any given space. The table below summarizes the approximate roof area available on the building and the associated solar array size that can be installed.

Available Area (Ft <sup>2</sup> )	Potential PV Array Size (kW)
17,975	140

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

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

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

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

#### **Photovoltaic (PV) Parking Lot Solar Power Generation – 140 kW System**

Budgetary Cost	Annual Utility Savings			Total Savings	New Jersey Renewable SREC	Payback (without SREC)	Payback (with SREC)	Recommended
	Electricity		Natural Gas					
\$	kW	kWh	Therms	\$	\$	Years	Years	Y/N
\$560,000	140	173,079	0	\$31,847	\$40,674	17.1	8.2	FS

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

### 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.

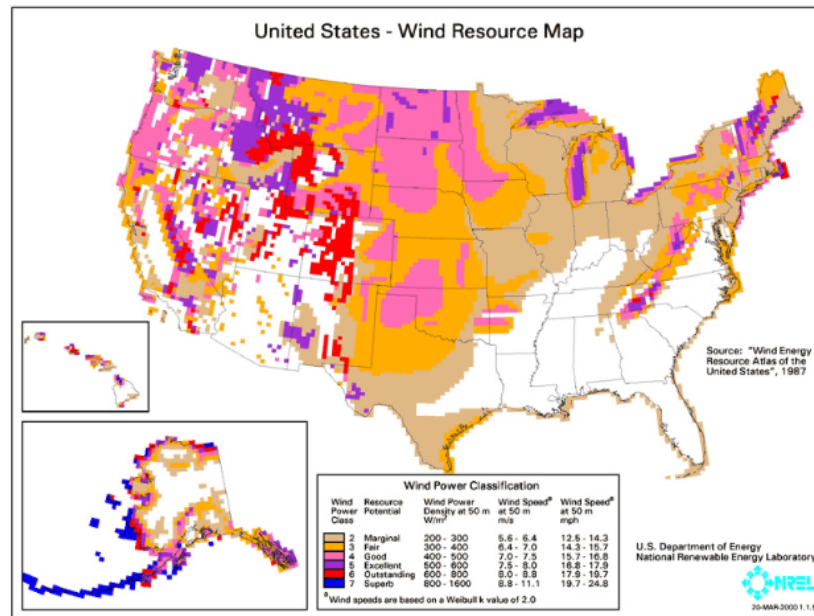
This measure is not recommended due to the relatively low domestic hot water usage.

## 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 the program application, the facilities peak demand is only 78.8 kW which is lower than the program requires for participation.

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 Glen Rock Recycling Center.

The following projects should be considered for implementation:

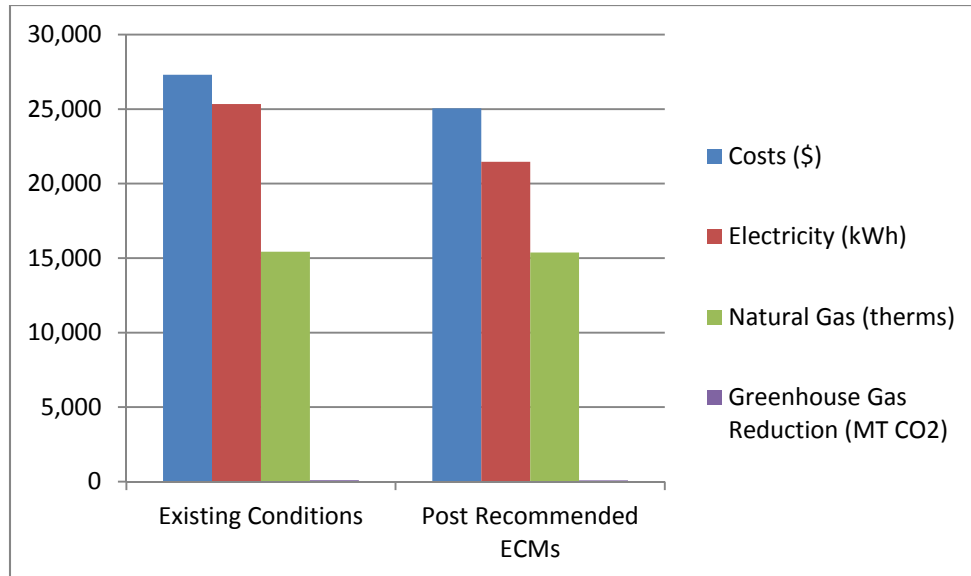
- Replace manual thermostat with programmable thermostat (and make duct modifications)
- Lighting Replacements with Controls (Occupancy Sensors)

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

<b>Electric Savings (kWh)</b>	<b>Natural Gas Savings (therms)</b>	<b>Total Savings (\$)</b>	<b>Payback (years)</b>
3,881	46	2,256	2.1

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

	<b>Existing Conditions</b>	<b>Post Recommended ECMs</b>	<b>Percent Savings</b>
Costs (\$)	27,309	25,053	8%
Electricity (kWh)	25,344	21,463	15%
Natural Gas (therms)	15,425	15,379	0.3%
Greenhouse Gas Reduction (MT CO <sub>2</sub> )	93	91	2%
Site EUI (kbtu/SF/Yr)	1357.5	1342.6	



Next Steps: This energy audit has identified several areas of potential energy savings. The 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 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

Electric Service

For Service at: Recycling Center  
Account No.: 65 464 420 00  
Meter No.: 778014360

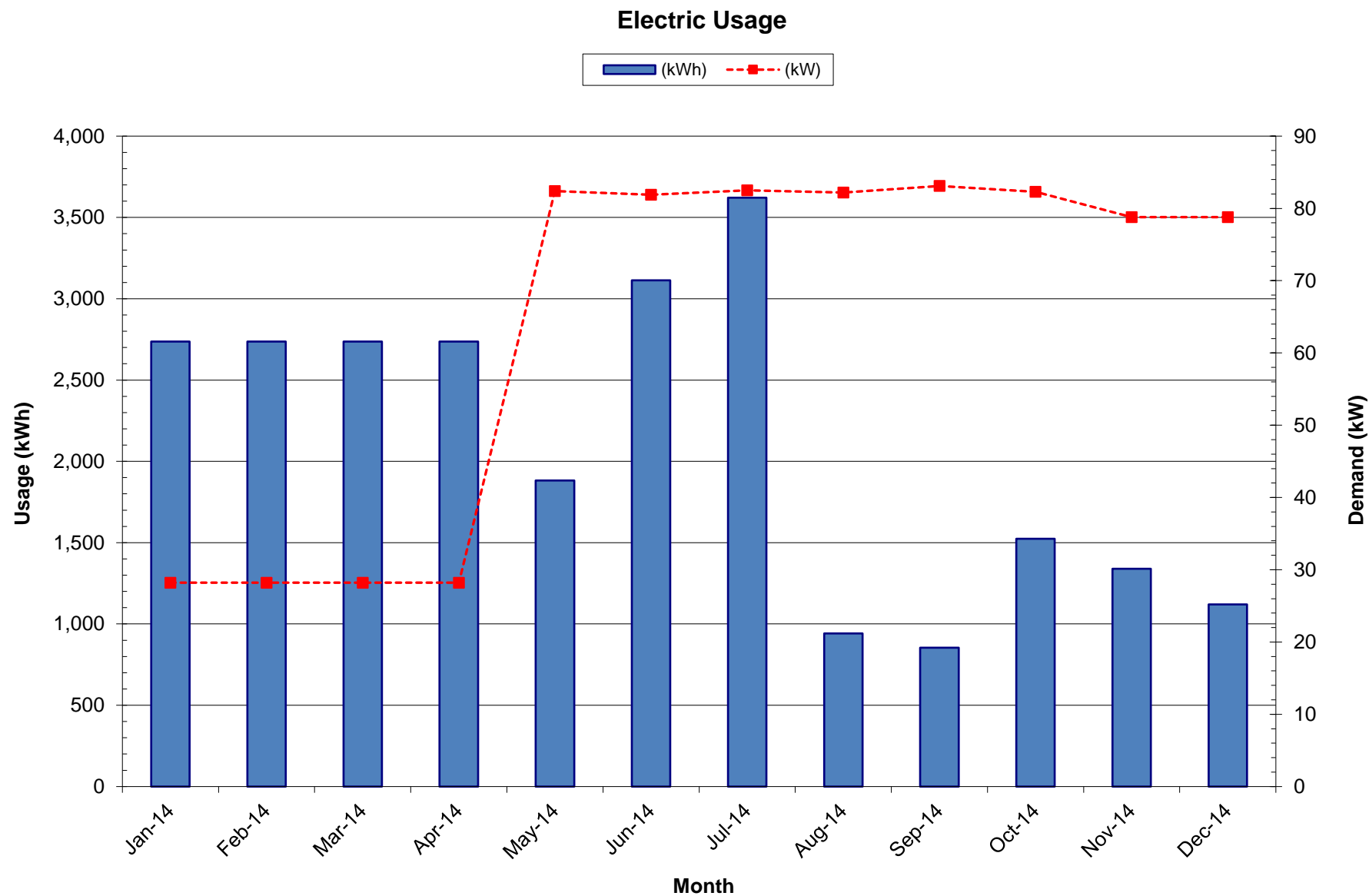
Delivery: PSE&G  
Supply: PSE&G

Account All					Provider Charges			Unit Costs				
Month	Consumption		Demand		Delivery	Supplier	Total	Demand	Consumption	Delivery	Supplier	Blended Rate
	(kWh)	(\$)	(kW)	(\$)	(\$)	(\$)	(\$)	(\$/kW)	(\$/kWh)	(\$/kWh)	(\$/kWh)	(\$/kWh)
January-14	2,737	30	28	122	127	104	231	4.336	0.011	0.046	0.038	0.084
February-14	2,737	30	28	122	127	104	231	4.336	0.011	0.046	0.038	0.084
March-14	2,737	30	28	122	127	104	231	4.336	0.011	0.046	0.038	0.084
April-14	2,737	30	28	122	127	104	231	4.336	0.011	0.046	0.038	0.084
May-14	1,882	20	82	353	422	918	1,340	4.280	0.011	0.224	0.488	0.712
June-14	3,113	53	82	998	1,125	988	2,113	12.184	0.017	0.361	0.317	0.679
July-14	3,622	61	83	1,013	1,157	1,017	2,174	12.280	0.017	0.319	0.281	0.600
August-14	942	16	82	1,018	1,062	864	1,926	12.382	0.017	1.127	0.917	2.044
September-14	854	15	83	1,029	1,069	859	1,928	12.382	0.017	1.252	1.006	2.258
October-14	1,524	16	82	357	412	897	1,309	4.336	0.010	0.270	0.589	0.859
November-14	1,340	14	79	342	387	851	1,237	4.336	0.010	0.288	0.635	0.923
December-14	1,120	12	79	342	380	838	1,218	4.336	0.010	0.339	0.748	1.088
Total (12 months)	25,344	\$326.49	83.1	\$5,940.00	\$6,520.34	\$7,648.40	\$14,168.74	\$7.766	\$0.013	\$0.257	\$0.302	\$0.559
Notes	1A	1B	2A	2B	\$3.00	\$4.00	\$5.00	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)

Estimated Values

#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)



**Local Government Energy Audit**  
**Borough of Glen Rock**

**Natural Gas Service**

**For Service at: Recycling Center**

**Account No.: 66-968-981-07**

**Meter No: 2917055**

**Delivery: PSE&G**

**Supply: PSE&G**

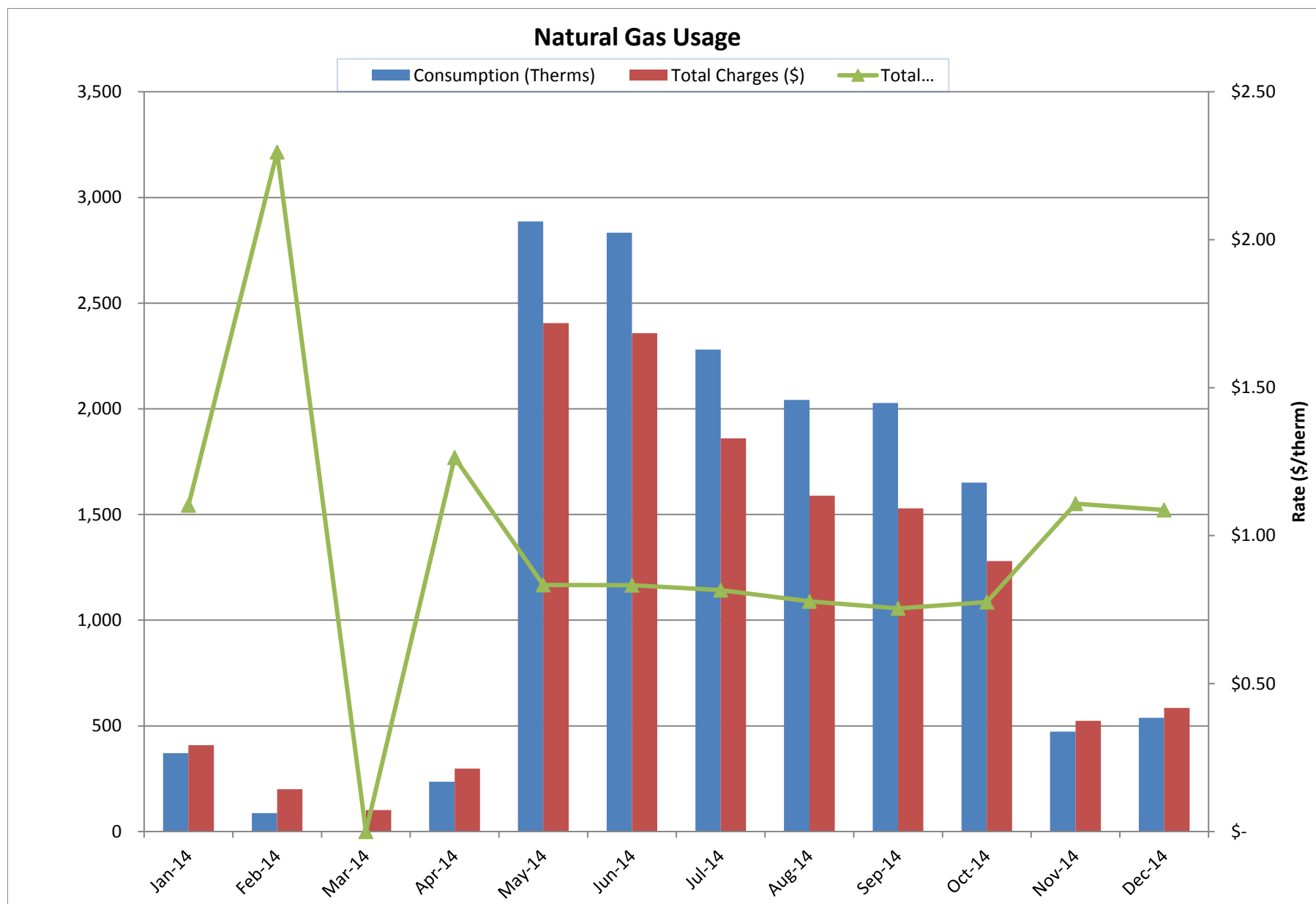
Month	Consumption (Therms)	Delivery Charge (\$)	Supply Charge (\$)	Total Charges (\$)	Delivery Rate (\$/Therm)	Supply Rate (\$/Therm)	Total Rate (\$/Therm)
January-14	371	\$173.49	235.55	\$409.04	0.468	0.635	1.103
February-14	87	\$134.72	65.01	\$199.73	1.549	0.747	2.296
March-14	0	\$101.76	0.00	\$101.76	#DIV/0!	#DIV/0!	#DIV/0!
April-14	236	\$131.21	167.09	\$298.30	0.556	0.708	1.264
May-14	2,886	\$400.96	2,004.72	\$2,405.68	0.139	0.695	0.834
June-14	2,833	\$385.40	1,972.77	\$2,358.17	0.136	0.696	0.832
July-14	2,280	\$323.73	1,536.30	\$1,860.03	0.142	0.674	0.816
August-14	2,042	\$298.64	1,290.17	\$1,588.81	0.146	0.632	0.778
September-14	2,028	\$297.36	1,231.97	\$1,529.33	0.147	0.607	0.754
October-14	1,651	\$261.05	1,019.06	\$1,280.11	0.158	0.617	0.775
November-14	473	\$232.57	291.50	\$524.07	0.492	0.616	1.108
December-14	538	\$238.98	345.76	\$584.74	0.444	0.643	1.087
<b>Total (last 12-months)</b>	<b>15,425.0</b>	<b>\$ 2,979.87</b>	<b>\$ 10,159.90</b>	<b>\$ 13,139.77</b>	<b>0.193</b>	<b>0.659</b>	<b>0.852</b>

22.7%

77.3%

100.0%





**PSE&G ELECTRIC SERVICE TERRITORY**

**Last Updated: 7/21/15**

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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



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

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

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

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

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## **APPENDIX B**

### **Equipment Inventory**

CHA Project # 30655  
Recycling Center  
360 Doremus Avenue, Glen Rock, NJ 07452

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
HVAC Split AC Unit	1	Luxaire	TCJD24S41S3A	W1G2013867	Split AC unit with gas heating	24 MBH cooling	11 EER`	Outdoor unit on grade, Indoor unit in attic	Whole building	2012	12		2015	3	15
Electric portable heater	1	N/A	N/A	N/A	Electric Heater	1500 Watts	N/A	Offices	Offices	2012	10		2015	3	13
Domestic Water Heater	1	Rheem	43VP50E2	RHLNQ231203899	Gas fired water heater	50 gallon storage, 42,000 BTU natural gas input	0.67 Energy Factor	Utility Room	Domestic Hot Water to building	2012	12		2015	3	15

## **APPENDIX C**

### **ECM Calculation & Cost Estimate Summary Page**

Glen Rock  
CHA Project Number: 30655

Rate of Discount (used for NPV) 3.0%

Utility Costs		Yearly Usage	Existing MT CO <sub>2</sub> e	Metric Ton Carbon Dioxide Equivalent	Building Area	Annual Utility Cost		
\$	0.559	\$/kWh blended		0.000420205	1,200	Electric	Natural Gas	Fuel Oil
\$	0.559	\$/kWh supply	25,344	10.65		\$ 14,169	\$ 13,140	
\$	7.77	\$/kW	78.8					
\$	0.85	\$/Therm	15,425	82.29	0.00533471			
		\$/kgals						
		\$/Gal						

Recycle Center																							
Recommend?  Y or N		Item	Savings					Cost	Simple Payback	Life Expectancy	Equivalent CO <sub>2</sub> (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				\$
Y	ECM-1	Replace manual thermostat with programmable thermostat	0.0	2,648	46	0	0	1,520	\$ 3,361	2.2	10	1.4	\$ -	N	2.2	0.0	26,482	459	0	\$ 15,197	3.5	\$9,602	44.0%
N	ECM-L1	Lighting Replacements / Upgrades	0.5	1,114	0	0	0	669	\$ 819	1.2	15.0	0.5	115.0	N	1.1	7.5	16,710	0	0	\$ 10,041	11.3	\$7,287	95.1%
N	ECM-L2	Install Lighting Controls (Add Occupancy Sensors)	0.0	40	0	0	0	22	\$ 641	28.8	15.0	0.0	50.0	N	26.6	0.0	597	0	0	\$ 334	(0.5)	(\$326)	-6.4%
Y	ECM-L3	Lighting Replacements with Controls (Occupancy Sensors)	0.5	1,233	0	0	0	736	\$ 1,461	2.0	15.0	0.5	165.0	N	1.8	7.5	18,495	0	0	\$ 11,039	6.6	\$7,490	56.7%
Total (Not Including [B] Option ECMs or L1, L2)			0.5	3,881	46	0	0	\$ 2,256	\$ 4,822	2.1	12.5	2	\$ 165		2.1	8	44,977	459	-	\$ 26,236	4.4	\$17,796	48.0%
Recommended Measures (highlighted green above)			0.5	3,881	46	0	0	\$ 2,256	\$ 4,822	2.1	12.5	2	\$ 165	0	2.1	8	44,977	459	-	\$ 26,236	4.4	\$17,796	48.0%
% of Existing			1%	15.31%	0.30%																		

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

Multipliers	
Material:	1.027
Labor:	1.246
Equipment:	1.124

Heating System Efficiency	80%
Cooling Eff (kW/ton)	1.2

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

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



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	
			No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Retrofit control device	Notes
			No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)		
117LED	Offices	Offices	8	CF 23	CFS23/1	23	0.18	SW	2080	383	OCC	
117LED	Locker Room	Locker	3	CF 23	CFS23/1	23	0.07	SW	2080	144	OCC	
46LED	Utility Room	Storage Areas	1	W 32 P F 2 (ELE)	F42ILL	59	0.06	SW	2080	123	OCC	
117LED	Men's Restroom	Restrooms	6	CF 23	CFS23/1	23	0.14	SW	2080	287	OCC	
117LED	Women's Restroom	Restrooms	6	CF 23	CFS23/1	23	0.14	SW	2080	287	OCC	
227LED	Exterior Lights	Outdoor Lighting	1	70 W MH Wall Pack	MH70/1	95	0.10	PHC	4368	415	PHC	
	Total		25				0.68			1,638		



		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
Area Description		No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh			Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/Space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/Space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * (\$/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
117LED	Offices	8	CF 23	CFS23/1	23	0.2	SW	2080	382.7	8	CF 23	CFS23/1	23	0.2	OCC	1456	267.9	114.8	0.0	\$14.12	\$128.25	\$10.00	9.1	8.4
117LED	Locker Room	3	CF 23	CFS23/1	23	0.1	SW	2080	143.5	3	CF 23	CFS23/1	23	0.1	OCC	2080	143.5	0.0	0.0	\$0.00	\$128.25	\$10.00		#DIV/0!
46LED	Utility Room	1	W 32 P F 2 (ELE)	F42ILL	59	0.1	SW	2080	122.7	1	W 32 P F 2 (ELE)	F42ILL	59	0.1	OCC	1456	85.9	36.8	0.0	\$4.53	\$128.25	\$10.00	28.3	28.1
117LED	Men's Restroom	6	CF 23	CFS23/1	23	0.1	SW	2080	267.0	6	CF 23	CFS23/1	23	0.1	OCC	1456	200.9	86.1	0.0	\$10.59	\$128.25	\$10.00	12.1	11.2
117LED	Women's Restroom	6	CF 23	CFS23/1	23	0.1	SW	2080	287.0	6	CF 23	CFS23/1	23	0.1	OCC	1456	200.9	86.1	0.0	\$10.59	\$128.25	\$10.00	12.1	11.2
227LED	Exterior Lights	1	70 W MH Wall Pack	MH70/1	95	0.1	PHC	4368	415.0	1	70 W MH Wall Pack	MH70/1	95	0.1	PHC	4368	415.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!
Total		25				0.7			1638.0	25.0				0.7	0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!				
																	1314.1	323.9	0.0	39.8	641.3	50.0		
																		Demand Savings		0.0	\$0			
																		kWh Savings		324	\$40			
																		Total Savings			\$40		16.1	14.8

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
Area Description		No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/Space) * (Annual Hours)	No. of fixtures after the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/Space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) *	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
117LED	Offices	8	CF 23	CFS23/1	23	0.2	SW	2080	383	8	1A19LED	1A19LED	8	0.1	OCC	1,456	93	290	0.1	\$ 39.98	\$ 209.25	\$ 10	5.2	5.0
117LED	Locker Room	3	CF 23	CFS23/1	23	0.1	SW	2080	144	3	1A19LED	1A19LED	8	0.0	OCC	2,080	50	94	0.0	\$ 13.15	\$ 158.63	\$ 10	12.1	11.3
46LED	Utility Room	1	W 32 P F 2 (ELE)	F42ILL	59	0.1	SW	2080	123	1	4 ft LED Tube	200732x2	30	0.0	OCC	1,456	44	79	0.0	\$ 10.78	\$ 291.60	\$ 25	27.1	24.7
117LED	Men's Restroom	6	CF 23	CFS23/1	23	0.1	SW	2080	287	6	1A19LED	1A19LED	8	0.0	OCC	1,456	70	217	0.1	\$ 29.98	\$ 189.00	\$ 10	6.3	6.0
117LED	Women's Restroom	6	CF 23	CFS23/1	23	0.1	SW	2080	287	6	1A19LED	1A19LED	8	0.0	OCC	1,456	70	217	0.1	\$ 29.98	\$ 189.00	\$ 10	6.3	6.0
227LED	Exterior Lights	1	70 W MH Wall Pack	MH70/1	95	0.1	PHC	4368	415	1	FXLED18	FXLED18/1	18	0.0	PHC	4,368	79	336	0.1	\$ 44.17	\$ 423.23	\$ 100	9.6	7.3
S	Total	25				0.7			1,638	25				0.2	0	#N/A	405		0.5	168	1,461	\$165		#VALUE!
S																		Demand Savings		0.5	\$16			
S																		kWh Savings		1,233	\$152			
S																		Total Savings			\$168		8.7	7.7

## **APPENDIX D**

### **Photovoltaic Analysis**



Photovoltaic (PV) Solar Power Generation - Screening Assessment

Borough of Glen Rock  
Recycling Center - Parking Lot

Cost of Electricity	\$0.184	/kWh
Electricity Usage	25,334	kWh/yr
System Unit Cost	\$4,000	/kW

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary	Annual Utility Savings				Estimated	Total		New Jersey	Payback	Payback
Cost					Maintenance	Savings	Federal Tax	Renewable	(without	(with
					Savings		Credit	** SREC	incentive)	incentive)
\$	kW	kWh	therms	\$	\$	\$	\$	\$	Years	Years
\$560,000	140.0	173,079	0	\$31,847	0	\$31,847	\$0	\$40,674	17.6	7.7

\*\* Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= \$235 /1000kwh

Area Output\*  
1,965 m2  
21,147 ft2

Perimeter Output\*  
184 m  
602 ft

Available Space for PV:  
(Area Output ) x 85%  
17,975 ft2

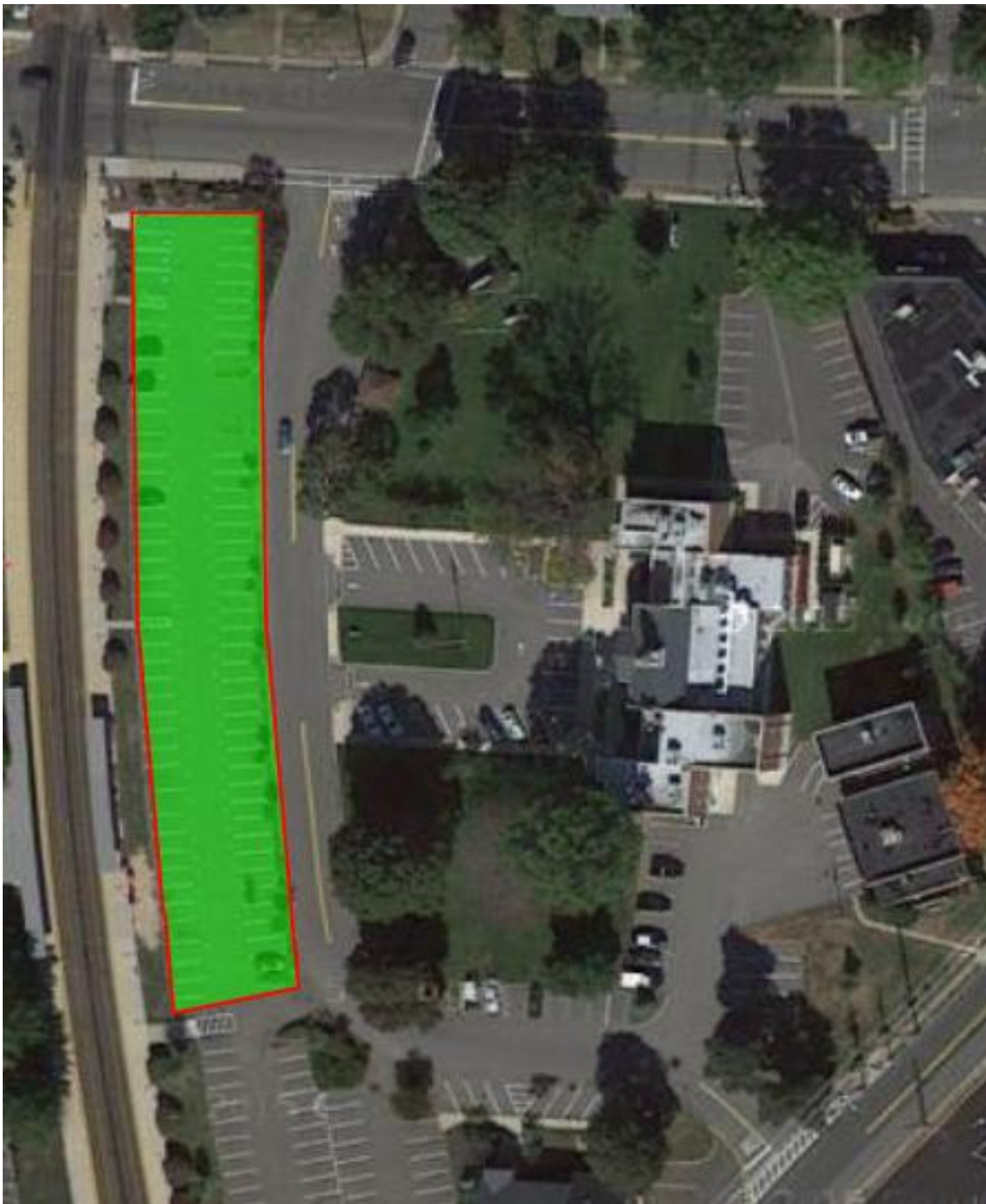
Approximate System Size: Is the space flat? (Yes/No) Yes  
8 watt/ft2  
143,798 DC watts  
140 kW Enter into PV Watts

PV Watts Inputs\*\*\*  
Array Tilt Angle 20 Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)  
Array Azimuth 180 Enter into PV Watts (default)  
Zip Code 07452 Enter into PV Watts  
DC/AC Derate Factor 0.83 Enter info PV Watts

PV Watts Output  
173,079 annual kWh calculated in PV Watts program

% Offset Calc  
Usage 25,334 (from utilities)  
PV Generation 173,079 (generated using PV Watts )  
% offset 683%

\* <http://www.freemaptools.com/area-calculator.htm>  
\*\* <http://www.flettexchange.com>  
\*\*\* [http://gisatnrel.nrel.gov/PVWatts\\_Viewer/index.html](http://gisatnrel.nrel.gov/PVWatts_Viewer/index.html)





Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at <http://sam.nrel.gov>) that allow for more precise and complex modeling of PV systems.

Disclaimer: The PVWatts® Model ("Model") is provided by the National Renewable Energy Laboratory ("NREL"), which is operated by the Alliance for Sustainable Energy, LLC ("Alliance") for the U.S. Department Of Energy ("DOE") and may be used for any purpose whatsoever.

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any support, consulting, training or assistance of any kind with regard to the use of the Model or any updates, revisions or new versions of the Model.

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RESULTS

173,078 kWh per Year \*

Month	Solar Radiation ( kWh / m <sup>2</sup> / day )	AC Energy ( kWh )	Energy Value ( \$ )
January	2.91	10,724	1,973
February	3.51	11,491	2,114
March	4.21	15,064	2,772
April	4.19	14,272	2,626
May	5.95	20,414	3,756
June	6.27	20,304	3,736
July	5.24	17,553	3,230
August	4.75	15,934	2,932
September	5.09	16,530	3,041
October	3.55	12,377	2,277
November	2.73	9,401	1,730
December	2.49	9,015	1,659
Annual	4.24	173,079	\$ 31,846

User Comments

Glen Rock Recycling Center - Parking Lot PV System

Location and Station Identification

Requested Location	360 Doremus Avenue Glen Rock NJ, 07452
Weather Data Source	(TMY3) CALDWELL/ESSEX CO., NJ 10 mi
Latitude	40.88° N
Longitude	74.28° W

PV System Specifications (Commercial)

DC System Size	140 kW
Module Type	Premium
Array Type	Fixed (open rack)
Array Tilt	20°
Array Azimuth	180°
System Losses	14%
Inverter Efficiency	96%
DC to AC Size Ratio	1.1

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.18 \$/kWh
Initial Cost	4.00 \$/Wdc

## **APPENDIX E**

### **Photos**



## APPENDIX F – PHOTOS



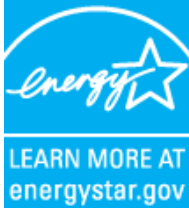
1. DHW Heater



2. Air Conditioning Unit

## **APPENDIX F**

### **EPA Benchmarking Report**



# ENERGY STAR<sup>®</sup> Statement of Energy Performance

# N/A

## Recycling Center

**Primary Property Function:** Other - Public Services  
**Gross Floor Area (ft<sup>2</sup>):** 1,200  
**Built:** 1929

ENERGY STAR<sup>®</sup>  
Score<sup>1</sup>

**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**  
Recycling Center  
360 Doremus Avenue  
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:** 4615787

### Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel		National Median Comparison	
1,367.3 kBtu/ ft <sup>2</sup>	Electric - Grid (kBtu)	98,245 (6%)	National Median Site EUI (kBtu/ft <sup>2</sup> )	104.8
	Natural Gas (kBtu)	1,542,500 (94%)	National Median Source EUI (kBtu/ft <sup>2</sup> )	123.1
			% Diff from National Median Source EUI	1205%
Source EUI	Annual Emissions			
1,606.8 kBtu/ ft <sup>2</sup>	Greenhouse Gas Emissions (Metric Tons CO <sub>2</sub> e/year)		95	

### 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)