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**Local Government Energy Program
Energy audit report**

For

***Department of Public Works
Holmdel
Holmdel, NJ 07733***

Project Number: LGEA03



TABLE OF CONTENTS

INTRODUCTION 3
EXECUTIVE SUMMARY 4
1. HISTORIC ENERGY CONSUMPTION 7
1.1. ENERGY USAGE AND COST ANALYSIS..... 7
1.2. UTILITY RATE 8
1.3. ENERGY BENCHMARKING..... 8
2. FACILITY AND SYSTEMS DESCRIPTION 9
2.1. BUILDING CHARACTERISTICS 9
2.2. BUILDING OCCUPANCY PROFILES 9
2.3. BUILDING ENVELOPE 9
2.3.1. EXTERIOR WALLS 9
2.3.2. ROOF 9
2.3.3. BASE 9
2.3.4. WINDOWS 9
2.3.5. EXTERIOR DOORS..... 10
2.3.6. BUILDING AIR TIGHTNESS..... 10
2.4. HVAC SYSTEMS 10
2.4.1. HEATING 10
2.4.2. COOLING..... 11
2.4.3. VENTILATION 11
2.4.4. DOMESTIC HOT WATER 11
2.5. ELECTRICAL SYSTEMS 12
2.5.1. LIGHTING..... 12
2.5.2. APPLIANCES AND PROCESS..... 12
2.5.3. ELEVATORS 12
2.5.4. OTHER ELECTRICAL SYSTEMS 12
3. EQUIPMENT LIST 13
4. ENERGY CONSERVATION MEASURES..... 14
4.1. EXISTING SYSTEMS 17
4.2. SOLAR PHOTOVOLTAIC 17
4.3. SOLAR THERMAL COLLECTORS 17
4.4. COMBINED HEAT AND POWER 17
4.5. GEOTHERMAL 17
4.6. WIND 17
5. ENERGY PURCHASING AND PROCUREMENT STRATEGIES 17
5.1. LOAD PROFILES 17
5.2. TARIFF ANALYSIS 19
5.3. ENERGY PROCUREMENT STRATEGIES..... 19
6. METHOD OF ANALYSIS 21
6.1. ASSUMPTIONS AND TOOLS 21
6.2. DISCLAIMER 21
APPENDIX A: LIGHTING STUDY 22
APPENDIX B: THIRD PARTY ENERGY SUPPLIERS (ESCOS)..... 24

INTRODUCTION

On May 13th Steven Winter Associates, Inc. (SWA) performed an energy audit and assessment of the Holmdel Township buildings located in Holmdel, NJ. Current conditions and energy-related information was collected in order to analyze and facilitate the implementation of energy conservation measures for the building.

Energy data collected in the field was imported into the eQUEST energy conservation software to generate a baseline model of the building. SWA simulated the installation of energy improvement measures on the baseline model of the building. Energy saving calculations and projected economics are automated and served as the basis for our conclusions.

There are five separate buildings that were evaluated for this energy audit; Town Hall, Department of Public Works (DPW), the Senior Community Center, Swim Club, and Middle Road Pump Station. The buildings were built at different times with several additions or expansions. Each building is unique in area and also building construction.

The present report is for the Department of Public Works building only.

The DPW building is an older building that has had some renovation work as recent as 2008. The building houses administrative offices, work stations and garages. The building operates typically from 7am-3:30pm on weekdays with the exception of extra hours for snow removal, etc. during the winter.

The goal of this energy audit is to provide sufficient information to make decisions regarding the implementation of the most appropriate and most cost effective energy conservation measures for the building.

EXECUTIVE SUMMARY

This document contains the energy audit report for the Holmdel Department of Public Works located at 14 Crawfords Corner Road, Holmdel, NJ 07733. The Department of Public Works is a one story building that contains approximately 11,880 square feet. Based on the field visit performed by Steven Winter Associates (SWA) staff on May 13th, 2009 and the results of a comprehensive energy analysis, this report describes the site's current conditions and recommendations for improvements. Suggestions for measures related to energy conservation and improved comfort are provided in the scope of work. Energy and resource savings are estimated for each measure that results in a reduction of heating, cooling, and electric usage.

The energy audit performed by SWA encompasses five buildings of various ages and constructions. A report has been generated for each building in order to fully document the existing conditions and recommended Energy Conservation Measures (ECMs). Based on the field visits performed by Steven Winter Associates (SWA) staff on May 13th, 2009 and the results of a comprehensive energy analysis, this report describes the site's current conditions and recommendations for improvements. Suggestions for measures related to energy and conservation and improved comfort are provided in the scope of work. Energy and resource savings are estimated for each measure that results in a reduction of heating, cooling and electric usage.

In the most recent year (June 2008-June 2009), the DPW electric meter recorded approximately 63,747 kWh or \$11,674 worth of electricity. The total amount of gas recorded by the DPW gas meter was 9,591 therms or \$13,272 worth of natural gas. The average aggregated cost of electricity was calculated to be \$0.19/kWh and the average aggregated cost of natural gas was calculated to be \$1.64/therm. With electricity and gas combined, the building consumed 1,177 MMBtus of energy at a total cost of \$24,946 in the most recent year.

SWA benchmarked Holmdel DPW building using the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The Portfolio Manager was not capable of generating a benchmark score for the building since the building is a mixed use building. The benchmark rating is based on the facility's source energy use, level of business activity, and geographical location. The Portfolio Manager is also capable of generating a site energy use intensity number using 2008 as a baseline year.

In order to compare commercial buildings equitably, the *Portfolio Manager* ratings convey the consumption of each type of energy in a single common unit. The EPA uses source energy to represent the total amount of raw fuel required to operate the building. The site energy use intensity for DPW building is 99.4 kBtu/sq.ft/year. After energy efficiency improvements are made, future utility bills can be added to the Portfolio Manager and the site energy use intensity for a different time period can be compared to the year 2008 baseline to track the changes in energy consumption associated with the energy improvements.

SWA recommends a total of 2 Energy Conservation Measures (ECMs) for Holmdel Department of Public Works. The total investment cost for these ECMs is **\$15,505**. SWA estimates a first year savings of **\$1,650** with a simple payback of **9.4 years**. SWA also estimates that Holmdel DPW building will be able to reduce their carbon footprint by **13,772 lbs of CO₂ annually**.

There are various incentives that the Department of Public Works could apply for that could also help lower the cost of installing the ECMs. SWA recommends that the DPW applies for the NJ SmartStart program through the New Jersey Office of Clean Energy. This incentive can help provide technical assistance for the building in the implementation phase of any energy conservation project.

When pursuing incentives through the SmartStart program, SWA encourages building managers to contact the program provider to obtain more detailed information on the program guidelines and request pre-approval for all planned upgrades. At the time of this report, there are prescriptive measure incentives that would pay the DPW up to \$2,130 for lighting upgrades. Incentives are also available for the installation of occupancy sensors and dimming controls. Incentives for lighting controls vary and are based on the quantity and type of controls installed.

For further information on both custom and prescriptive incentives, please visit:

<http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/equipment-incentives/equi>

The New Jersey Clean Energy website also provides information on incentives for renewable energy. Visit the website to download a copy of the Renewable Energy Incentive Program (REIP) Guidebook. Incentives include up to \$1.00 per watt for eligible photovoltaic projects.

Holmdel Township personnel should become familiar with New Jersey Clean Energy programs if they are considering building new facilities or doing major renovations. For further information about specific program information, please visit:

<http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings>

The following table summarizes the proposed Energy Conservation Measures (ECM) and their economical relevance.

ECM Table without Incentives															
ECM #	ECM description	Installed Cost		1st year energy and cost savings						Simple Payback (SPP)	Life of Measure (LoM)	Lifetime Cost Savings (\$)	Return on Invest (ROI)	Annual Carbon Reduction (lbs of CO2)	
		Estimated Cost (\$)	Source	Electric Savings			Fuel Savings		Cost Savings (\$)						
				Consumption	Demand		Natural Gas								
1	Insulate 100' hot water pipe inside mechanical room	\$ 1,080	RS Means	0	kWh	0	kW	400	Therms	\$ 656	1.6	10	\$ 5,539	41.3%	4,409
2	Upgrade existing lighting	\$ 14,425	RS Means	5,229	kWh	0	kW	0	Therms	\$ 994	14.5	20	\$ 14,511	0.0%	9,363
Total Scope of Work		\$ 15,505	-	-	-	0.0	-			\$ 1,650	9.4		\$ 20,050		13,772

Definitions:

SPP: Simple Payback (years)
 LoM: Life of Measure (years)
 ROI: Return on Investment (%)

Assumptions:

Discount rate = 3.2% per DOE FEMP guidelines
 Energy price escalation rate = 0% per DOE FEMP guidelines
 Average Electric Rate = 0.19 \$/kWh
 Average Fuel Rate = 1.64 \$/Therm
 Carbon Dioxide per unit Electricity = 1.7905 lbs of CO2/kWh
 Carbon Dioxide per unit of Fuel = 11.023 lbs of CO2/unit fuel

1. HISTORIC ENERGY CONSUMPTION

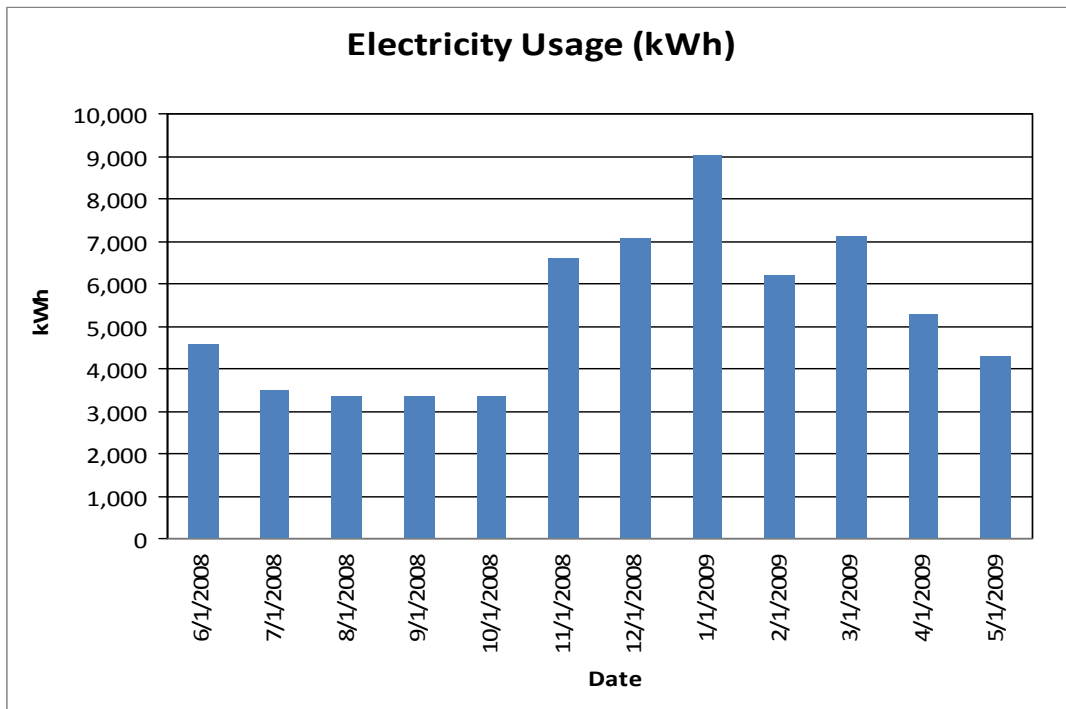
1.1. Energy usage and cost analysis

SWA analyzed utility bills from June 2008 through June 2009 that were received from Holmdel Township.

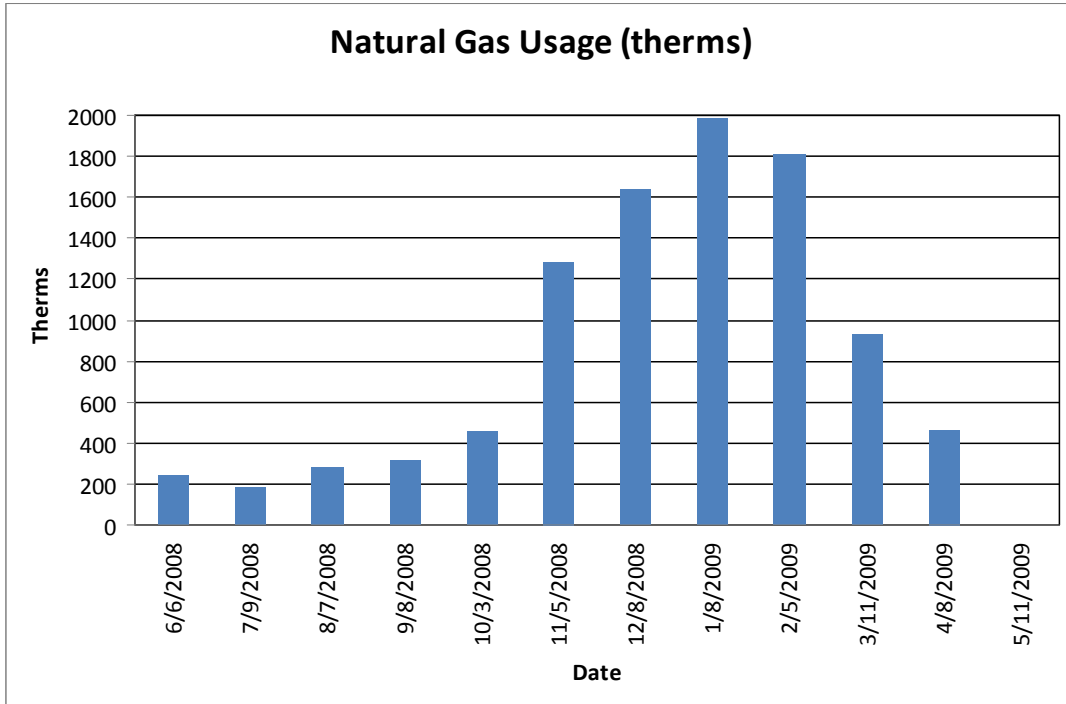
Electricity –The DPW electric meter currently buys electricity from JCP&L at **an average rate of \$.19/kWh** based on the previous 12 months worth of utility bills. The DPW electric meter purchased **approximately 63,747 kWh or \$11,675 worth of electricity** in the previous year.

Natural Gas –The DPW gas meter currently buys natural gas from NJNG at **an average aggregated rate of \$1.64/therm** based on the previous 12 months worth of utility bills. The DPW gas meter purchased **approximately 9,591 therms or \$13,272 worth of natural gas** in the previous year. Natural gas is primarily used for heating and domestic hot water production within the building.

The following chart shows electricity usage for the DPW electric meter based on utility bills for the 12 month period of June 2008 – June 2009.



The following chart shows natural gas usage for the DPW meter based on utility bills for the 12 month period of June 2008 – June 2009.



1.2. Utility rate

Electricity is received from the DPW electric meter which is purchased from JCP&L at a general service market rate for electricity usage (kWh) with a separate (kW) demand charge. The electric meter charges are currently an average rate of approximately \$0.19/kWh based on the previous 12 months of utility bills.

Natural gas is received from the DPW gas meter which is purchased at a general service market rate for natural gas (therms). The DPW currently pays an average aggregated rate of approximately of \$1.64/therm based on the previous 12 months of utility bills.

1.3. Energy benchmarking

The DPW information and utility data were entered into the U.S. Environmental Protection Agency’s (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The building data could be documented; however, a performance score could not be generated since the building is mixed-use and cannot be easily categorized. The Energy Star Portfolio Manager currently is not capable of generating a benchmark score for certain building types such as mixed use buildings. SWA recommends that Holmdel Township create a Portfolio Manager account at the link below. When an account is created, SWA can share the Holmdel Township facilities and allow future data to be added and tracked using the benchmarking tool.

http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager

2. FACILITY AND SYSTEMS DESCRIPTION

2.1. Building Characteristics

The single story Department of Public Works building houses administrative offices, work stations and garages. The building consists of a total area of 11,880 square feet.

2.2. Building occupancy profiles

The peak occupancy for the DPW building is approximately 30 people during weekdays from 7am to 3:30pm. The building is operated outside of these hours occasionally during the winter when snowplows or salt are needed in the town.

2.3. Building envelope

2.3.1. Exterior walls

The DPW building's exterior walls consist in some areas of 4" face brick and clapboard siding finish in other areas. The walls are framed with 6" wood studs spaced 16" on center with 5 1/2" of R-19 fiberglass batt insulation in each stud bay. In areas that contain a garage, the area is mainly constructed of CMU block with no insulation.

2.3.2. Roof

The DPW building consists of an approximately 4/12 pitch gable roof. The medium brown colored asphalt shingle roof is constructed with either 2" rigid or 6" fiberglass batt insulation between the wood rafters. On the day of the site visit, SWA inspected the roof and observed no major deficiencies.

2.3.3. Base

The building's base is a 4" concrete slab-on-grade with perimeter foundation. No insulation was detected. There were no reported problems with water penetration or moisture.

2.3.4. Windows

The double-paned glass windows are fixed aluminum-framed units with no insulating properties. There were reports of window related problems in the rear of the building; windows in the front have recently been replaced. It is not cost-effective at this point in time to replace the rest of the windows but the windows should be sealed well to the building to prevent any air leakage around them.



Typical seal around windows

2.3.5. Exterior doors

The doors are aluminum-framed units with no insulating properties. The exterior doors of the building were observed to have the original weather-stripping, which is no longer performing as intended. SWA recommends that the exterior doors of the building be weather-stripped in order to decrease the amount of conditioned air that is lost around each door. SWA also recommends checking the weather-stripping of each door on a regular basis and replacing any broken seals immediately. Tight seals around the door will help ensure that the building is kept tight and insulated over time.

2.3.6. Building air tightness

The DPW building was observed to be a relatively tight building. There are obviously places where conditioned air can easily leak to the outside air such as the garage areas. Employees should be conscious of leaving doors open and make sure that conditioned air, especially heated air in the garages, is kept within the building as much as possible. There were no major observed deficiencies of air tightness within the building.

2.4. HVAC systems

2.4.1. Heating

There are two newer high efficiency hot water boilers in the mechanical room to provide space heating through out the entire facility. There are nine forced air hot water unit ventilators, wall mounted type, for the garage bays. One of these units is a UV heat unit used for the largest garage bay. The Men's Room shower area has high wall-mounted, continuous hot water radiators supplied from the boilers. The hot water boilers, domestic hot water heater and circulation pumps are all newly installed. There is approximately 100' of un-insulated copper pipe used for hot water in the boiler room that allows energy to escape off the surface of the pipe.



Two NTI high efficiency boilers

2.4.2. Cooling

The only areas of the building that are cooled are the office areas. There are three small DX window units for individual office rooms and 1 small split condensing unit. The garage areas consist of low and high bay doors that are generally left open during the summer to allow fresh air in as well as let hot air escape.



Typical DX window unit

2.4.3. Ventilation

Exhaust fans in toilet rooms induce fresh air into the spaces and window units bring fresh outdoor air into the office spaces. Garage doors are opened during warm weather in order to bring fresh air into the building as well.

2.4.4. Domestic Hot Water

Domestic Hot Water (DHW) is provided by a newer A O Smith electric water heater that uses approximately 5047 kWh/yr and is Energy Star approved. Typically DHW use in the building is minimal and is mainly used for washing hands.

More efficient water-consuming fixtures and appliances save both energy and money through reduced energy consumption for water heating, as well decreased water and sewer bills. SWA recommends adding controlled on/off timers on all lavatory faucets to reduce domestic hot water demand and save water. Building staff can also easily install faucet aerators and/or low-flow fixtures to reduce hot water

consumption. In addition, routine maintenance practices that identify and quickly address water leaks are a low-cost way to save water and energy.

2.5. Electrical systems

2.5.1. Lighting

The DPW building contains a mix of more efficient T8 fluorescent lighting with electronic ballasts and older T12 fluorescent lighting with magnetic ballasts. According to building staff, all of the T12 lighting was currently retrofitted with new magnetic ballasts and T12 high output bulbs. SWA recommends that all T12 lighting and magnetic ballasts be upgraded. T8 lighting will have a similar light output, save energy and also produce a better quality light. A better quality light source could be beneficial to the workers of the building that work on trucks as well as mechanical equipment brought into the garage. SWA observed LED exit signs installed in the building which are currently the most efficient option. There was approximately fifteen 100W flood lights used for exterior lighting. All exterior lighting was already installed with either a motion sensor or photocell so that exterior lighting is only needed for night time and security. SWA recommends that the flood lights are replaced with reflective CFL bulbs with equivalent light output.

2.5.2. Appliances and process

Appliances, such as refrigerators, that are over 10 years of age should be replaced with newer efficient models with the Energy Star label. For example, Energy Star refrigerators use as little as 315kwh/hr. When compared to the average electrical consumption of older equipment, Energy Star equipment results in a large savings. Look for the Energy Star label when replacing appliances and equipment, including: window air conditioners, refrigerators, printers, computers, copy machines, etc. More information can be found in the “Products” section of the Energy Star website at: <http://www.energystar.gov>

Computers left on consume a lot of energy. A typical desk top computer uses 65 to 250 watts and uses the same amount of energy when the screen saver is left on. Televisions in classrooms use approximately 3-5 watts of electricity when turned off. SWA recommends all computers and appliances (i.e. fridges, coffee makers, televisions, etc.) be plugged in to power strips and turned off each evening just as the lights are turned off.

2.5.3. Elevators

The DPW building does not contain elevators since it consists of only one story.

2.5.4. Other electrical systems

There are currently no other electrical systems in the building.

3. EQUIPMENT LIST

INVENTORY

Building System	Description	Model#	Fuel	Space served	Estimated Remaining useful life %
Heating	Two (2) new wall-mounted gas fired HW boilers, 92.7 AFUE	NTI – Trinity TI, 200 MBTU/hr	Natural Gas	All areas	80%
Heating	Seven (7) HW unit ventilators	Modine	Hot Water	Maintenance Bays	20%
Heating	One (1) large Reznor HW unit	Reznor	Hot Water	Maintenance Bays	20%
Heating	One (1) small Daytherm HW UV unit for largest bay	Daytherm	Hot Water	Maintenance Bays	20%
Heating	Three (3) HW circulator pumps	Bell & Gosset	Electric	All areas	80%
Cooling	Three (3) small DX window units, 1 small split condensing unit	Lennox Condenser HS 26-036-2P	Electric	Office Areas	50%
Domestic Hot Water	One (1) A O Smith Electric Water Heater, using approximately 5074 kWh/year	A O Smith	Electric	All Areas	80%

Note:

The remaining useful life of a system (in %) is an estimate based on the system date of built and existing conditions derived from visual inspection.

4. ENERGY CONSERVATION MEASURES

Summary table

ECM#	Description
1	Insulate 100' of hot water pipe inside mechanical room
2	Upgrade existing lighting

ECM#1: Insulate 100' hot water pipe inside mechanical room

Description:

The mechanical room contains copper manifold pipes in size from 1.5” to 2.5” in diameter. These pipes carry hot water to all rooms and spaces in the building. However, a length of about 100’ inside the mechanical room is bare without any insulation. Un-insulated pipes that carry liquid for either heating or cooling should always be well-insulated to prevent valuable energy from being lost. SWA recommends that these pipes are insulated in order to reduce energy and save energy cost.

Installation cost:

Estimated installed cost: \$1,080
 Source of cost estimate: *RS Means*

Economics:

1st year energy and cost savings					Simple Payback (SPP)	Life of Meas. (LoM)	Lifetime Cost Savings	Return on Invest (ROI)	
Electricity Savings		Fuel Savings		Cost Savings					
Consumption	Demand	Natural Gas							
0	kWh	0	kW	400 Therms	\$656	1.65	10	\$5,539	41.29%

Assumptions: SWA calculated the savings for this measure using measurements taken the day of the field visit and using the billing analysis. SWA assumes that winter heat loss (@110 btu/hr/ft for average 2” pipe and for 100 foot of bare copper pipe) = 300 MBTU/hr. SWA assumes year long heat loss (@60 btu/hr/ft for average 2” pipe) except winter months = 100 MBTU/hr.

Rebates/financial incentives:

There are currently no incentives available for this measure at this time.

Options for funding ECM:

This project may benefit from enrolling in NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.

<http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings>

ECM#2: Upgrade existing lighting

Description:

The DPW building contains a mix of efficient and inefficient lighting. SWA recommends that all T12 fluorescent lighting with magnetic ballasts are replaced with T8 fixtures with electronic ballasts. T8 fluorescent fixtures are capable of the same light output with a better light quality with a smaller operating cost. There are currently 71 T12 fixtures that can be replaced. SWA also recommends replacing the fifteen 100W exterior flood lights with reflective CFL bulbs with the same light output.

Installation cost:

Estimated installed cost: \$14,425
 Source of cost estimate: *RS Means*

Economics:

1st year energy and cost savings						Simple Payback (SPP)	Life of Meas. (LoM)	Lifetime Cost Savings	Return on Invest (ROI)	
Electricity Savings		Fuel Savings		Cost Savings						
Consumption	Demand	Natural Gas								
5,229	kWh	0	kW	0	Therms	\$994	14.52	20	\$14,511	0.03%

Assumptions: SWA calculated the savings for this measure using measurements taken the day of the field visit and using the billing analysis.

Rebates/financial incentives:

*NJ Clean Energy – SmartStart Building Program – Incentive for T-5 and T-8 lamps with electronic ballast in existing facilities (\$10 - \$30 per fixture, depending on quantity of lamps)
 Maximum incentive amount is \$2,130*

Options for funding ECM:

*This project may benefit from enrolling in NJ SmartStart program with Technical Assistance to offset a portion of the cost of implementation.
<http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings>*

RENEWABLE AND DISTRIBUTED ENERGY MEASURES

4.1. Existing systems

There are currently no existing renewable energy systems.

4.2. Solar Photovoltaic

Solar Photovoltaic (PV) technology is not cost effective for this project since the electric demand within the building is small and the maximum sized solar array for the roof would not generate enough electricity to become cost effective. The small roof area prohibits photovoltaic panels from being a cost-effective option.

4.3. Solar Thermal Collectors

Solar thermal collectors are not cost effective for this project and would not be recommended due to the low amount of domestic hot water use throughout the building.

4.4. Combined Heat and Power

CHP is not applicable for this building because of the current HVAC configuration.

4.5. Geothermal

Geothermal is not applicable for this building because it would not be cost effective to change to a geothermal system.

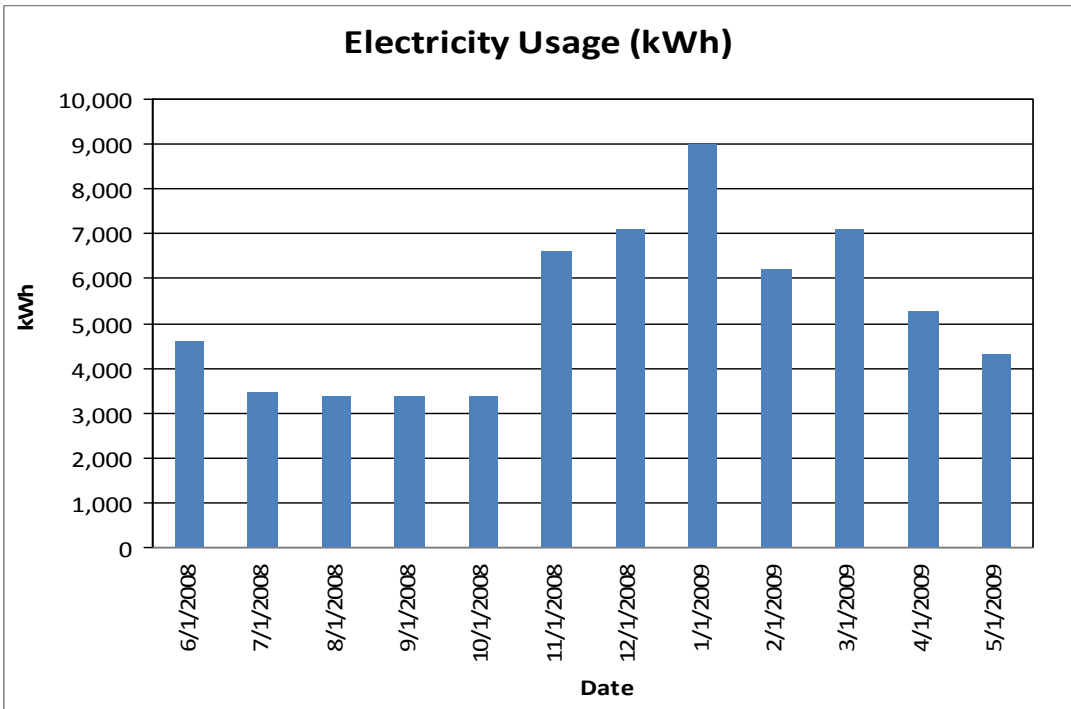
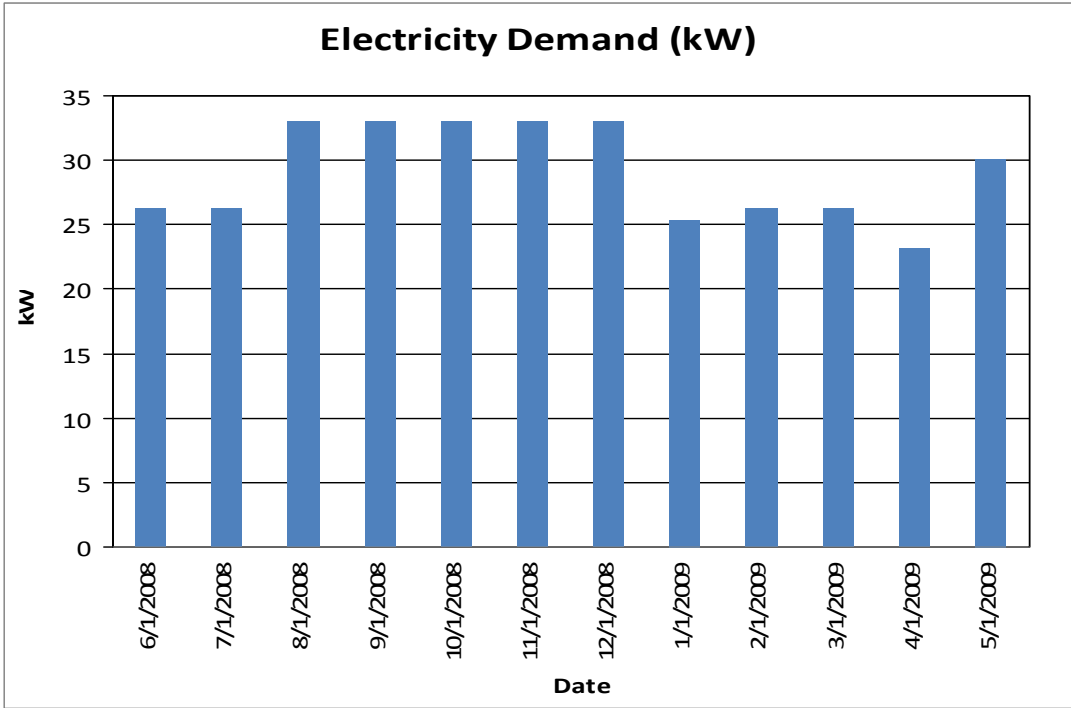
4.6. Wind

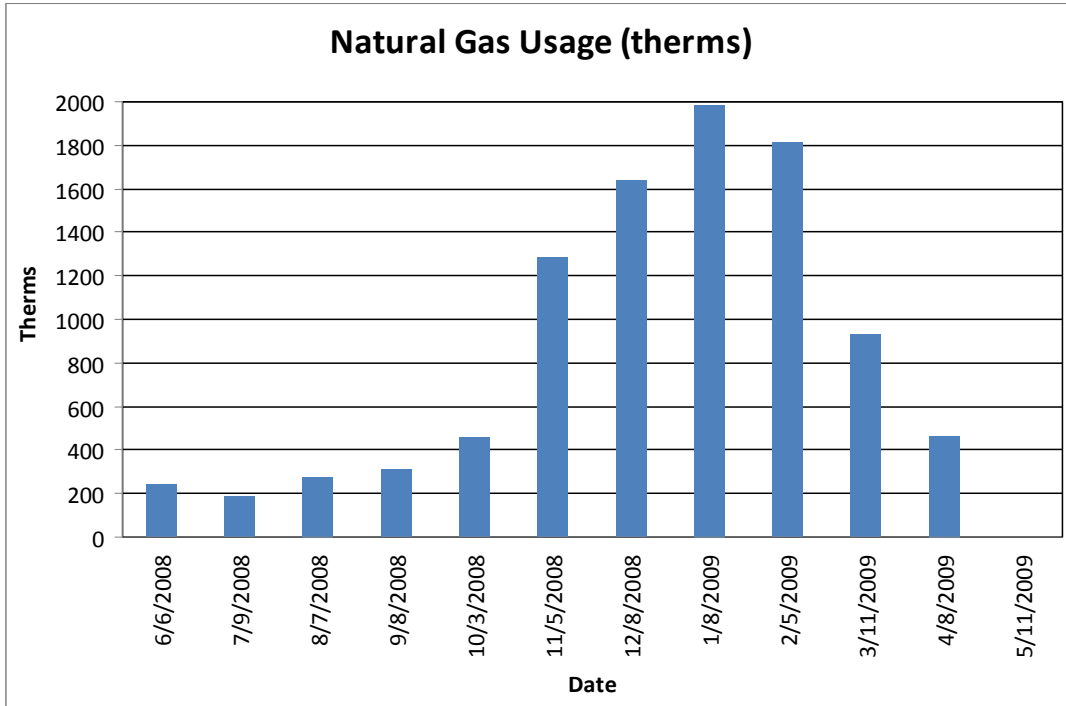
Wind power production is not appropriate for this location, because required land is not available for the wind turbine. Also available wind energy resource is very low.

5. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

5.1. Load profiles

The average electrical peak demand for the previous year was 29 kW and the maximum peak demand was 33 kW. The electric and gas load profiles for this project are presented in the following charts. The first chart shows electric demand (in kW) for the previous 12 months and the other two charts show electric and gas usage (in kWh), respectively.





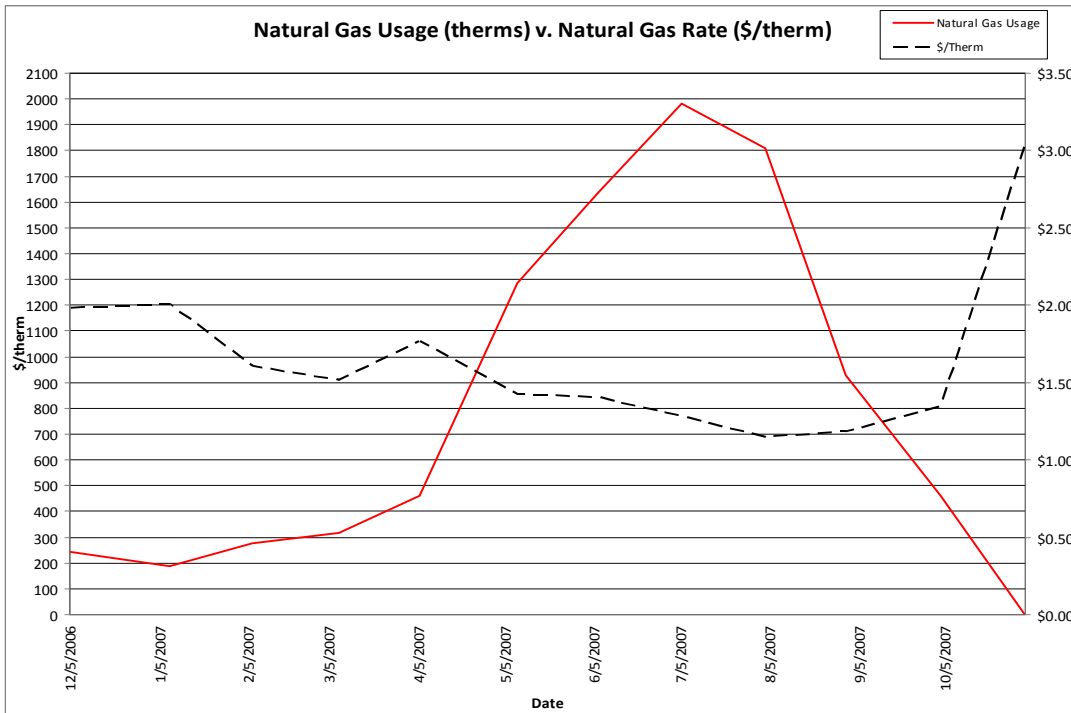
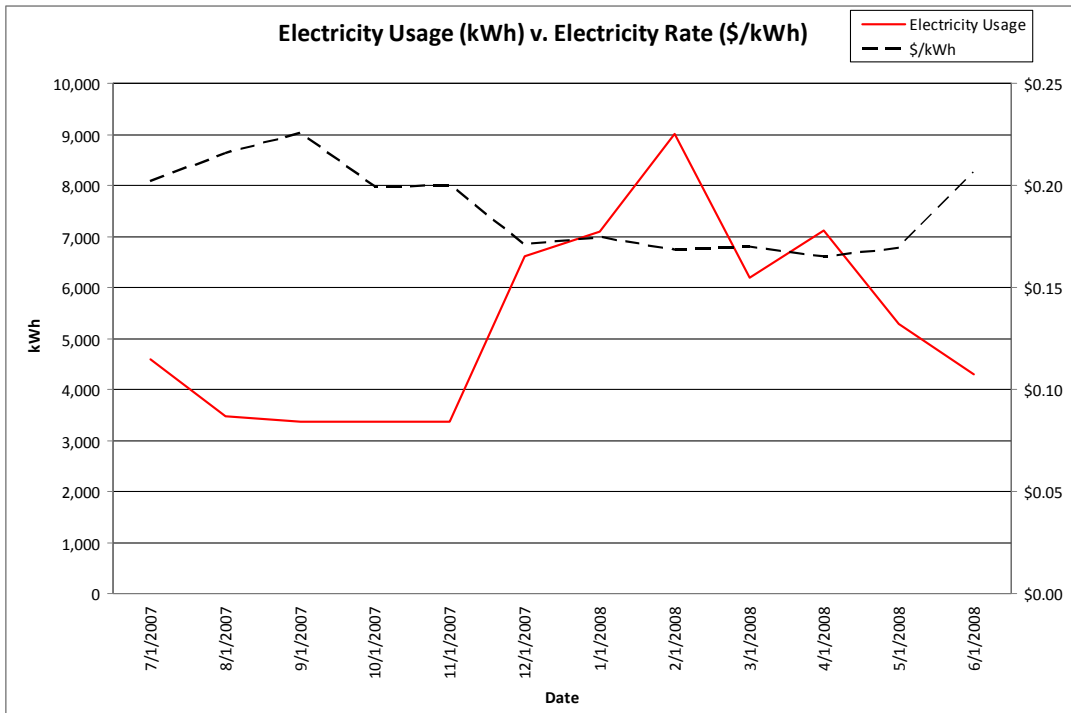
5.2. Tariff analysis

Currently, natural gas and electricity is provided to the DPW building through the DPW gas and electric meters. Natural gas is purchased for the DPW meter from NJNG at a general service rate. The general service rate for natural gas charges a market-rate price based on usage and the DPW billing does not breakdown demand costs. Demand prices are reflected in the utility bills and can be verified by observing the price fluctuations throughout the year. Typically, the natural gas prices increase during the heating months when natural gas is used by the rooftop air-handling units.

Electricity is purchased for the DPW meter from JCP&L at a general service rate. The general service rate for electricity charges a market-rate price based on usage and the DPW billing does not breakdown demand costs. Demand prices are reflected in the utility bills and can be verified by observing the price fluctuations throughout the year.

5.3. Energy Procurement strategies

The DPW building purchases natural gas via the DPW gas meter from NJNG. Electricity is received from the DPW electric meter directly from JCP&L and no ESCO is used. SWA analyzed the utility rate for electricity over the previous 12 months. Electric bill analysis shows fluctuations of over 56% over the most recent 12 month period. SWA recommends that DPW building explore the opportunity of purchasing electricity from an ESCO in order to reduce electric rate fluctuation and ultimately reduce the annual cost of energy for the building. Natural Gas Bill analysis shows fluctuations of over 73% over the most recent 12 month period. SWA recommends that DPW building explore the opportunity of purchasing natural gas from an ESCO in order to reduce natural gas fluctuation and ultimately reduce the annual cost of energy for the building. Appendix B contains a complete list of third party energy suppliers for JCP&L and NJNG service.



The building would not be eligible for enrollment in a Demand Response Program because the minimum electric demand each month does not greatly exceed 50 kW, which is the typical threshold for considering this option.

6. METHOD OF ANALYSIS

6.1. Assumptions and tools

Energy modeling tool: eQUEST V3.6
Cost estimates: RS Means 2009 (Facilities Maintenance & Repair Cost Data)
RS Means 2009 (Building Construction Cost Data)
RS Means 2009 (Mechanical Cost Data)
Cost estimates also based on utility bill analysis and prior experience with similar projects

6.2. Disclaimer

This engineering audit was prepared using the most current and accurate fuel consumption data available for the site. The estimates that it projects are intended to help guide the owner toward best energy choices. The costs and savings are subject to fluctuations in weather, variations in quality of maintenance, changes in prices of fuel, materials, and labor, and other factors. Although we cannot guarantee savings or costs, we suggest that you use this report for economic analysis of the building and as a means to estimate future cash flow.

THE RECOMMENDATIONS PRESENTED IN THIS REPORT ARE BASED ON THE RESULTS OF ANALYSIS, INSPECTION, AND PERFORMANCE TESTING OF A SAMPLE OF COMPONENTS OF THE BUILDING SITE. ALTHOUGH CODE-RELATED ISSUES MAY BE NOTED, SWA STAFF HAVE NOT COMPLETED A COMPREHENSIVE EVALUATION FOR CODE-COMPLIANCE OR HEALTH AND SAFETY ISSUES. THE OWNER(S) AND MANAGER(S) OF THE BUILDING(S) CONTAINED IN THIS REPORT ARE REMINDED THAT ANY IMPROVEMENTS SUGGESTED IN THIS SCOPE OF WORK MUST BE PERFORMED IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS THAT APPLY TO SAID WORK. PARTICULAR ATTENTION MUST BE PAID TO ANY WORK WHICH INVOLVES HEATING AND AIR MOVEMENT SYSTEMS, AND ANY WORK WHICH WILL INVOLVE THE DISTURBANCE OF PRODUCTS CONTAINING MOLD, ASBESTOS, OR LEAD.

Appendix A: Lighting study

Existing Lighting Conditions													
#	Building	Level/Floor	Location in Building	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Type of Lamp	Watts/Lamp	Hrs/Day	Energy Use (kWh/year)	Controls	Total Power (Watts)
1	DPW	Main	Garage	4' linear T12	magnetic	52	2	Fluorescent	40	9	9,772	Switch	4,160
2	DPW	Main	Garage	8' linear T12	magnetic	1	2	Fluorescent	72	9	338	Switch	144
3	DPW	Main	Left Office	4' linear T12	magnetic	2	4	Fluorescent	40	9	752	Switch	320
4	DPW	Main	Right Office	4' linear T12	magnetic	2	4	Fluorescent	40	9	752	Switch	320
5	DPW	Main	Hallway to Garage	4' linear T12	magnetic	1	4	Fluorescent	40	9	376	Switch	160
6	DPW	Main	Far right office	4' linear T12	magnetic	2	4	Fluorescent	40	9	752	Switch	320
7	DPW	Main	Break Room	4' linear T12	magnetic	6	4	Fluorescent	40	9	2,255	Switch	960
8	DPW	Main	Break Room	LED Exit Sign	-	2	1	LED	5	24	63	None	10
9	DPW	Main	Bathroom/Locker Area	4' linear T12	magnetic	4	2	Fluorescent	40	9	752	Switch	320
10	DPW	Main	Storage Bay	4' linear T8	electronic	8	2	Fluorescent	32	9	1,203	Switch	512
11	DPW	Main	Storage Bay	4' linear T8	electronic	18	2	Fluorescent	32	9	2,706	Switch	1,152
12	DPW	Main	Sign Shop	4' linear T8	electronic	4	2	Fluorescent	32	9	601	Switch	256
13	DPW	Main	Meeting Room	4' linear T8	electronic	5	2	Fluorescent	32	9	752	Switch	320
14	DPW	Main	Meeting Room - Storage	4' linear T8	electronic	1	2	Fluorescent	32	9	150	Switch	64
15	DPW	Main	Storage	4' linear T8	electronic	4	2	Fluorescent	32	9	601	Switch	256
16	DPW	Main	Boiler Room	4' linear T12	magnetic	2	2	Fluorescent	40	9	376	Switch	160
17	DPW	Out Building	Salt Storage	400W Multi-Vapor	-	2	1	Fluorescent	400	9	1,879	Switch	800
18	DPW	Out Building	Pole Barn	8' linear T12	magnetic	1	2	Fluorescent	72	9	338	Switch	144
19	DPW	Main	Exterior Lighting	100W Flood	-	15	1	Flood	75	12	3,524	Photocell/motion	1,125

Proposed Lighting Conditions													
#	Building	Level/Floor	Location in Building	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Type of Lamp	Watts/Lamp	Hrs/Day	Energy Use (kWh/year)	Controls	Total Power (W)
1	DPW	Main	Garage	4' linear T8	electronic	52	2	Fluorescent	32	9	7,817	Switch	3,328
2	DPW	Main	Garage	8' linear T8	electronic	1	2	Fluorescent	59	9	277	Switch	118
3	DPW	Main	Left Office	4' linear T8	electronic	2	4	Fluorescent	32	9	601	Switch	256
4	DPW	Main	Right Office	4' linear T8	electronic	2	4	Fluorescent	32	9	601	Switch	256
5	DPW	Main	Hallway to Garage	4' linear T8	electronic	1	4	Fluorescent	32	9	301	Switch	128
6	DPW	Main	Far right office	4' linear T8	electronic	2	4	Fluorescent	32	9	601	Switch	256
7	DPW	Main	Break Room	4' linear T8	electronic	6	4	Fluorescent	32	9	1,804	Switch	768
8	DPW	Main	Break Room	LED Exit Sign	-	2	1	LED	5	24	63	None	10
9	DPW	Main	Bathroom/Locker Area	4' linear T8	electronic	4	2	Fluorescent	32	9	601	Switch	256
10	DPW	Main	Storage Bay	4' linear T8	electronic	8	2	Fluorescent	32	9	1,203	Switch	512
11	DPW	Main	Storage Bay	4' linear T8	electronic	18	2	Fluorescent	32	9	2,706	Switch	1,152
12	DPW	Main	Sign Shop	4' linear T8	electronic	4	2	Fluorescent	32	9	601	Switch	256
13	DPW	Main	Meeting Room	4' linear T8	electronic	5	2	Fluorescent	32	9	752	Switch	320
14	DPW	Main	Meeting Room - Storage	4' linear T8	electronic	1	2	Fluorescent	32	9	150	Switch	64
15	DPW	Main	Storage	4' linear T8	electronic	4	2	Fluorescent	32	9	601	Switch	256
16	DPW	Main	Boiler Room	4' linear T8	electronic	2	2	Fluorescent	32	9	301	Switch	128
17	DPW	Out Building	Salt Storage	400W Multi-Vapor	-	2	1	Fluorescent	400	9	1,879	Switch	800
18	DPW	Out Building	Pole Barn	8' linear T8	electronic	1	2	Fluorescent	59	9	277	Switch	118
19	DPW	Main	Exterior Lighting	32W CFL	-	15	1	Reflective CFL	32	12	1,503	Photocell/motion	480

Existing Use (kWh/year)	27,941
Proposed Use (kWh/year)	22,641
Existing Cost (\$/year)	\$5,309
Proposed Cost (\$/year)	\$4,302
Savings (kWh/year)	5,299
Savings (\$/year)	\$1,007
Existing Lighting Power Density (W/sqft)	1.0
Proposed Lighting Power Density (W/sqft)	0.8

Appendix B: Third Party Energy Suppliers (ESCOs)

Third Party Electric Suppliers for JCPL Service Territory	Telephone & Web Site
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com
BOC Energy Services, Inc. 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.boc.com
Commerce Energy, Inc. 4400 Route 9 South, Suite 100 Freehold, NJ 07728	(800) 556-8457 www.commerceenergy.com
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(888) 635-0827 www.newenergy.com
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com
FirstEnergy Solutions 300 Madison Avenue Morristown, NJ 07926	(800) 977-0500 www.fes.com
Glacial Energy of New Jersey, Inc. 207 LaRoche Avenue Harrington Park, NJ 07640	(877) 569-2841 www.glacialenergy.com
Integrus Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrusenergy.com
Liberty Power Holdings, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(800) 363-7499 www.libertypowercorp.com
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) 363-7499 www.pepco-services.com
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com
Sempra Energy Solutions 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.semprasolutions.com
South Jersey Energy Company One South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 756-3749 www.southjerseyenergy.com
Suez Energy Resources NA, Inc. 333 Thornall Street, 6th Floor Edison, NJ 08837	(888) 644-1014 www.suezenergyresources.com

Third Party Gas Suppliers for NJNG Service Territory	Telephone & Web Site
Cooperative Industries 412-420 Washington Avenue Belleville, NJ 07109	(800) 628-9427 www.cooperativenet.com
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com
UGI Energy Services, Inc. d/b/a/ GASMARK 704 East Main Street, Suite 1 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com
Intelligent Energy 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024	(800) 724-1880 www.intelligentenergy.org
Metromedia Energy, Inc. 6 Industrial Way Eatontown, NJ 07724	(877) 750-7046 www.metromediaenergy.com
MxEnergy, Inc. 510 Thornall Street, Suite 270 Edison, NJ 08837	(800) 375-1277 www.mxenergy.com
NATGASCO (Mitchell Supreme) 532 Freeman Street Orange, NJ 07050	(800) 840-4427 www.natgasco.com
NJ Gas & Electric 1 Bridge Plaza, Fl. 2 Fort Lee, NJ 07024	(866) 568-0290 www.NewJerseyGasElectric.com
Pepco Energy Services, Inc. 112 Main Street Lebanon, NJ 08833	(800) 363-7499 www.pepco-services.com
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com
South Jersey Energy Company One South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 756-3749 www.southjerseyenergy.com
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	(800) 225-1560 www.spragueenergy.com
Woodruff Energy 73 Water Street Bridgeton, NJ 08302	(800) 557-1121 www.woodruffenergy.com