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*January 20, 2010*

**Local Government Energy Program  
Energy Audit Final Report**

*For*

***Main Netcong Fire House  
Netcong, NJ 07857***

***Project Number: LGEA25***



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## **INTRODUCTION**

On September 8<sup>th</sup> and 15<sup>th</sup> Steven Winter Associates, Inc. (SWA) performed an energy audit and assessment of the Main Netcong Fire House building.

This report addresses the Main Netcong Fire House building located at 40 Maple Avenue, Netcong, NJ 07857. The current conditions and energy-related information were collected in order to analyze and facilitate the implementation of energy conservation measures for the building.

The Main Netcong Fire House building was built in 1967, renovated in 2003, and houses fire truck bays and offices on the main floor and a banquet hall with kitchen and bar on the second floor for volunteer members' activities. The building consists of 5,400 square feet of conditioned space (even though the Request for Proposal issued only included 3,000 square feet).

The building is operated by Netcong Volunteer Company #1 for approximately twenty hours per week by three volunteer firemen. Every couple of months, volunteer fire department members usually hold one special event in the main hall on the second floor.

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

## EXECUTIVE SUMMARY

The energy audit performed by Steven Winter Associates (SWA) encompasses the Main Netcong Fire House building located at 40 Maple Avenue, Netcong, NJ 07857. The Main Netcong Fire House building is a two story building with a combined floor area of 5,400 square feet. The original structure was built in 1967 with additions / renovations in 2003.

Based on the field visits performed by the SWA staff on September 8<sup>th</sup> and 15<sup>th</sup> 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.

From Sept 2008 to Aug 2009 the Main Netcong Fire House building consumed 32,002 kWh or \$5,809 worth of electricity and 5,109 therms or \$6,973 worth of natural gas. The joint energy consumption for the building, including both electricity and natural gas, was 620 MMBtu of energy that cost a total of \$12,783.

SWA has entered energy information about the Main Netcong Fire House building in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. This facility is comprised of non-eligible (Other) space type. SWA encourages the Borough of Netcong to continue entering utility data in *Energy Star Portfolio Manager* in order to track weather normalized source energy use over time. EPA is continually working to expand the available space types.

The Site Energy Use Intensity is 114.8 kBtu/ft<sup>2</sup>yr compared to the national average of a fire house / police station building consuming 78 kBtu/ft<sup>2</sup>yr. Implementing this report's highly recommended Energy Conservations Measures (ECMs) will reduce use by approximately 17.1 kBtu/ft<sup>2</sup>yr, with an additional 15.7 kBtu/ft<sup>2</sup>yr from the recommended ECMs and 4.5 kBtu/ft<sup>2</sup>yr from improved door insulation and reduced attic venting. These recommendations could account for at least 37.3 kBtu/ft<sup>2</sup>yr reduction, which when implemented would make the building energy consumption better than the national average.

Based on the assessment of the Main Netcong Fire House building, SWA has separated the recommendations into three categories (See Section 4 for more details). These are summarized as follows:

### **Category I Recommendations: Capital Improvement Measures**

- Roof Integrity - The roof condition was discovered to be poor. SWA recommends that the Borough of Netcong put aside funds for a roof replacement and installation of new insulation, batt R-49 or better.
- Replace Domestic Hot Water (DHW) heater - as it has reached the end of its useful operating life. SWA recommends its replacement with a gas fired Energy Star EF 0.63 rated unit with a 4.6 year payback.
- Premium Motors - Select NEMA Premium motors when replacing motors that have reached the end of their useful operating lives.

### **Category II Recommendations: Operations and Maintenance**

- Safety - Insure that there is a functioning / calibrated CO detector with alarm in the building.
- Kitchen Oven / Range - Please verify need of propane, when building is supplied with natural gas.
- Ventilation - SWA recommends that the 2<sup>nd</sup> floor fan ventilator be removed and the egg-crate ceiling tiles be replaced with regular ceiling tiles, in order to keep valuable conditioned air inside the building.
- Roof Maintenance - SWA recommends regular maintenance to verify water is draining correctly.

- Downspouts - Repair / install missing downspouts and repair areas of brick veneer damage to prevent water / moisture infiltration and insulation damage.
- Under-roof-sheathing Ventilation - Adequate under-roof-sheathing ventilation is accomplished most effectively by installing soffit and ridge vents that let air move freely from soffits out the ridge vent.
- Weather Stripping / Air Sealing - Doors and vestibules should be observed annually for deficient weather-stripping and replaced as needed. Any other accessible gaps or penetrations in the thermal envelope penetrations should also be sealed with caulk or spray foam.
- Water Efficient Fixtures & Controls - Retrofitting with more efficient water-consumption fixtures / appliances will save both energy and money through reduced energy consumption for water heating
- Domestic Hot Water - Set the heater to produce water at or below 120 °F.
- Energy Star labeled appliances such as refrigerators should replace older energy inefficient equipment.
- Smart power electric strips with occupancy sensors should be used to power down computer equipment when left unattended for extended periods of time.
- Create an educational program that teaches how to minimize energy use. The US Department of Energy offers free information.

### **Category III Recommendations: Energy Conservation Measures - Upgrades with associated energy savings**

At this time, SWA highly recommends a total of **7** Energy Conservation Measures (ECMs) for the Main Netcong Fire House building that are summarized in the following Table 1. The total investment cost for these ECMs with incentives is **\$48,555**. SWA estimates a first year savings of **\$49,251** with a simple payback of **1 year**. SWA estimates that implementing the highly recommended ECMs will reduce the carbon footprint of the Main Netcong Fire House building by **41,456 lbs of CO<sub>2</sub>**. SWA also recommends another **3** ECMs with 5-10 year payback that are summarized in Table 2.

There are various incentives that the Borough of Netcong could apply for that could also help lower the cost of installing the ECMs. SWA recommends that the Borough of Netcong apply 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. A new NJ Clean Power program, Direct Install, to be rolled out soon, could also assist to cover 80% of the capital investment.

Specifically, the building could qualify for \$60 for installing the recommended wall-mounted occupancy sensors, \$20 for installing LED Exit signs, \$120 for replacing T12 with T8 fixtures and \$50 for installing an Energy Star gas fired hot water heater. The Main Netcong Fire House could also take advantage of incentives based on the installation of a photovoltaic (PV) system. Currently, the New Jersey Office of Clean Energy offers a Renewable Energy Incentive program that would pay \$5,000 for the installation of a 5kW PV system. There is also an incentive that issues a Solar Renewable Energy Certificate for every 1,000kWh (1MWh) of electricity generated that can be sold or traded for the current market rate of electricity. \$3,600 of SRECs may be received annually; however it requires proof of performance, application approval and negotiations with the utility. Wind Upfront Incentive Program, Expected performance buy-down (EPBB) is modeled on an annual kWh production of 1-16,000 kWh and may pay \$3.20/kWh upfront incentive level. However, it requires proof of performance, application approval and negotiations with the utility. There is also a utility-sponsored loan program through JCP&L that would allow the building to pay for the installation of the PV or Wind system through a loan issued by JCP&L.

The following two tables summarize the proposed Energy Conservation Measures (ECM) and their economic relevance.

**Table 1 - Highly Recommended 0-5 Year Payback ECMs**

ECM #	ECM description	Installed Cost		1st year energy savings						SPP	LoM	Lifetime	ROI %	Annual Carbon Reduced (lbs of CO2)
		Estimate \$	Source	Use	Unit	Demand / mo	Unit	Savings / year \$	kBtu /sq ft			Cost Savings \$		
1	Install Drinks Vending machine misers	\$265	<a href="http://www.usatech.com">www.usatech.com</a>	3,181	kWh	1.7	kW	579	2.0	0.5	12	5,695	171	4,358
2.1	install 3 occupancy sensors, with INCENTIVES	\$270	RS Means, Lit Search, NJ Clean Energy Program	2,751	kWh	1.5	kW	501	1.7	0.5	12	4,924	144	3,768
2.2	replace 4 incand and halogen lamps to CFL	\$80	RS Means, Lit Search	511	kWh	0.3	kW	102	0.3	0.8	7	629	98	700
3	Install 5 kW Wind System with INCENTIVE (upfront \$3.20/kWh)	\$40,000	Similar Projects	13,000	kWh	5.0	kW	43,966	8.2	0.9	25	748,801	70.9	17,810
4	install 3 programmable thermostat in truck bays and 2nd floor areas	\$450	Similar Projects	277	kWh	0.1	kW	790	4.0	0.6	12	7,767	136	2,825
				209	therms	-	-							
5	Retro-Commissioning	\$6,750	Similar Projects	3,200	kWh	1.7	kW	3,097	11.5	2.2	12	30,466	29.3	10,363
				511	therms	-	-							
2.3	replace building internal lights: T12s to T8s with INCENTIVES (incl. 75% labor)	\$740	RS Means, Lit Search, NJ Clean Energy Program	1,191	kWh	0.6	kW	217	0.8	3.4	20	3,167	16.4	1,632
	<b>Total Proposed</b>	<b>\$48,555</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>10.9</b>	<b>kW</b>	<b>\$49,251</b>	<b>28.6</b>	<b>1.0</b>	<b>21</b>	<b>748,652</b>	<b>68.2</b>	<b>41,456</b>

**Definitions:** SPP - Simple Payback (years); LoM: Life of Measure (years); ROI: Return on Investment (%)  
**Assumptions:** Discount Rate: 3.2% per DOE FEMP; Energy Price Escalation Rate: 0% per DOE FEMP Guidelines  
**Note:** A 0.0 electrical demand / month indicates that it is very low / negligible

**Table 2 - Recommended 5-10 Year Payback ECMs**

ECM #	M description	Installed Cost		1st year energy savings						SPP	LoM	Lifetime	ROI, %	Annual Carbon Reduced (lbs of CO2)
		Estimate \$	Source	Use	Unit	Demand / mo	Unit	Savings / year \$	kBtu /sq ft			Cost Savings \$		
6	install 5 kW PV System (with \$1/W INCENTIVE and \$600/1MWh SREC)	\$30,000	Similar projects	5,902	kWh	5.0	kW	4,674	3.7	6.4	25	79,608	6.6	8,086
7	replace 2 old refrigerators with Energy Star models	\$1,000	Manufacturer and Store Info	732	kWh	0.4	kW	133	0.5	7.5	15	1,568	3.8	1,003
2.4	replace 1 Fluorescent EXIT sign with LED type, with INCENTIVES	\$100	RS Means, Lit Search, NJ Clean Energy Program	61	kWh	0.0	kW	11	0.0	9.0	20	163	3.2	84

# 1. HISTORIC ENERGY CONSUMPTION

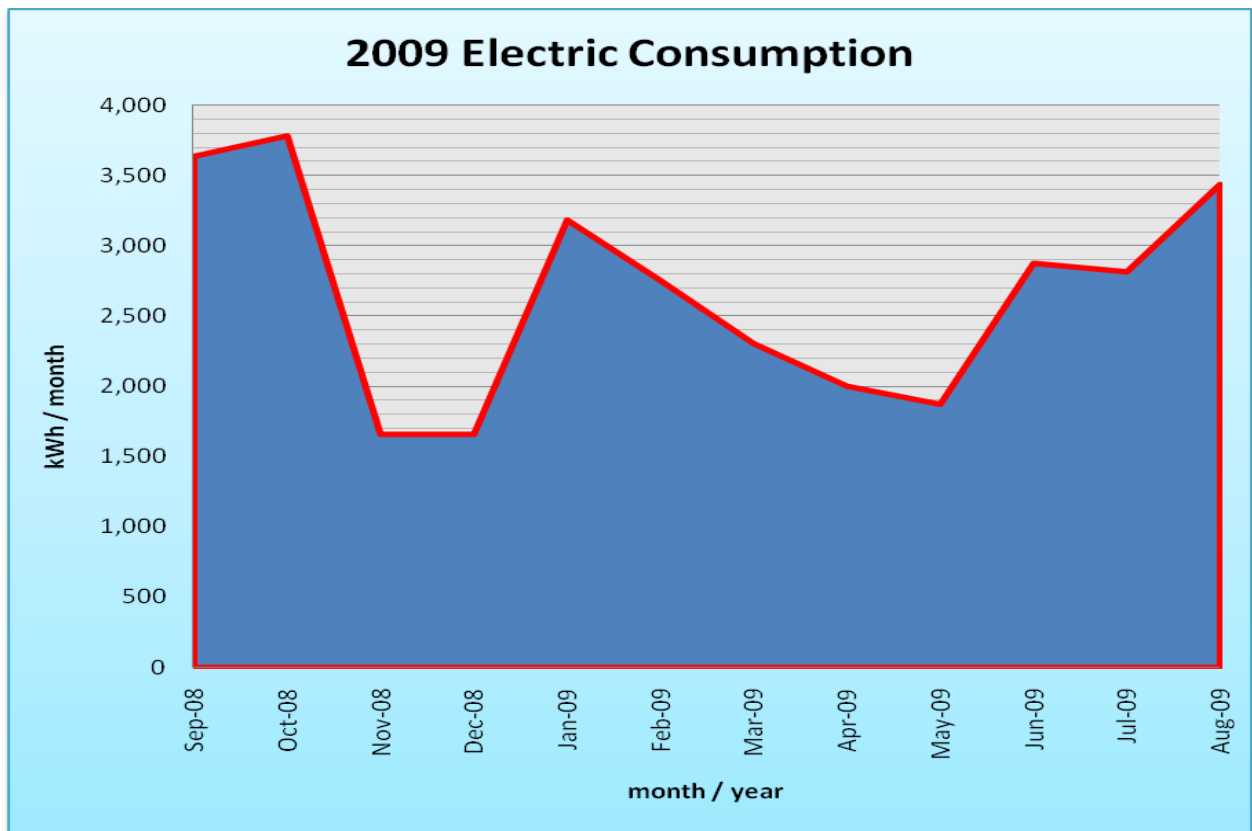
## 1.1. Energy usage and cost analysis

SWA analyzed utility bills from October 2007 through August 2009 that were received from the utilities supplying the Main Netcong Fire House building with electric and natural gas.

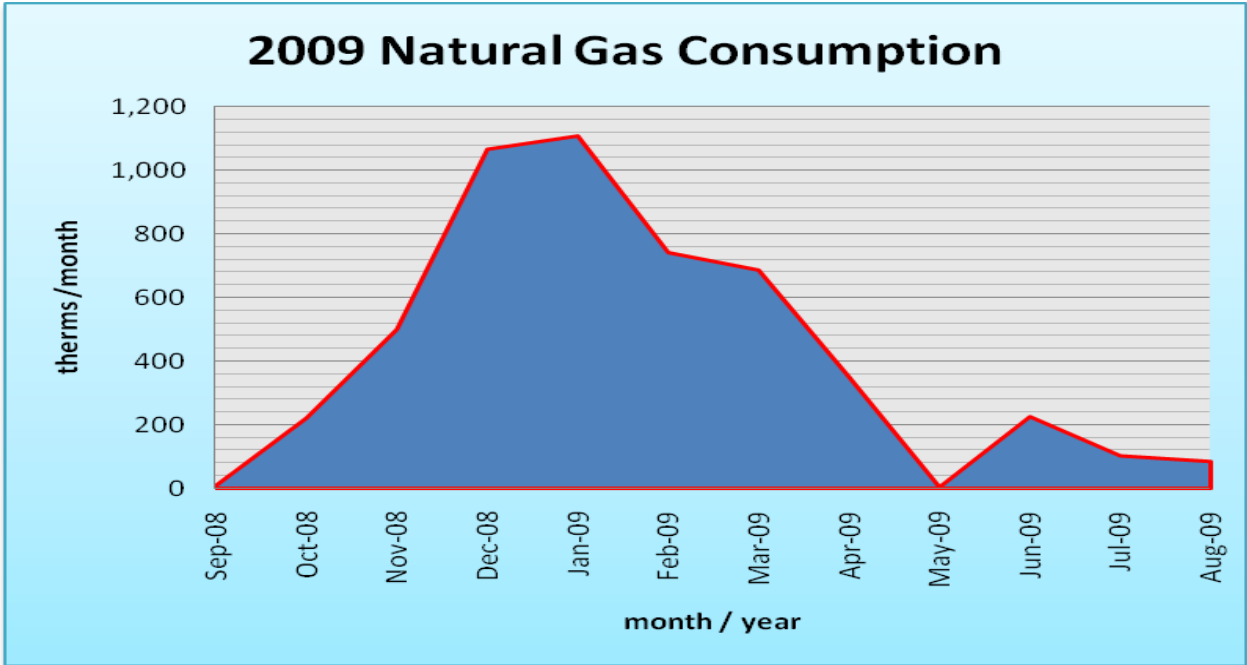
Electricity - The Main Netcong Fire House building is currently served by one electric meter. The Main Netcong Fire House building currently buys electricity from JCP&L at **an average rate of \$0.182/kWh** based on 12 months of utility bills from Sept 2008 to Aug 2009. The Main Netcong Fire House building purchased **approximately 32,002 kWh or \$5,809 worth of electricity** in the previous year. The average monthly demand was 17 kW.

Natural Gas - The Main Netcong Fire House building is currently served by one meter for natural gas. The Main Netcong Fire House building currently buys natural gas from NJNG at **an average aggregated rate of \$1.365/therm** based on 12 months of utility bills from Sept 2008 to Aug 2009. The Main Netcong Fire House building purchased **approximately 5,109 therms or \$6,973 worth of natural gas** in the previous year.

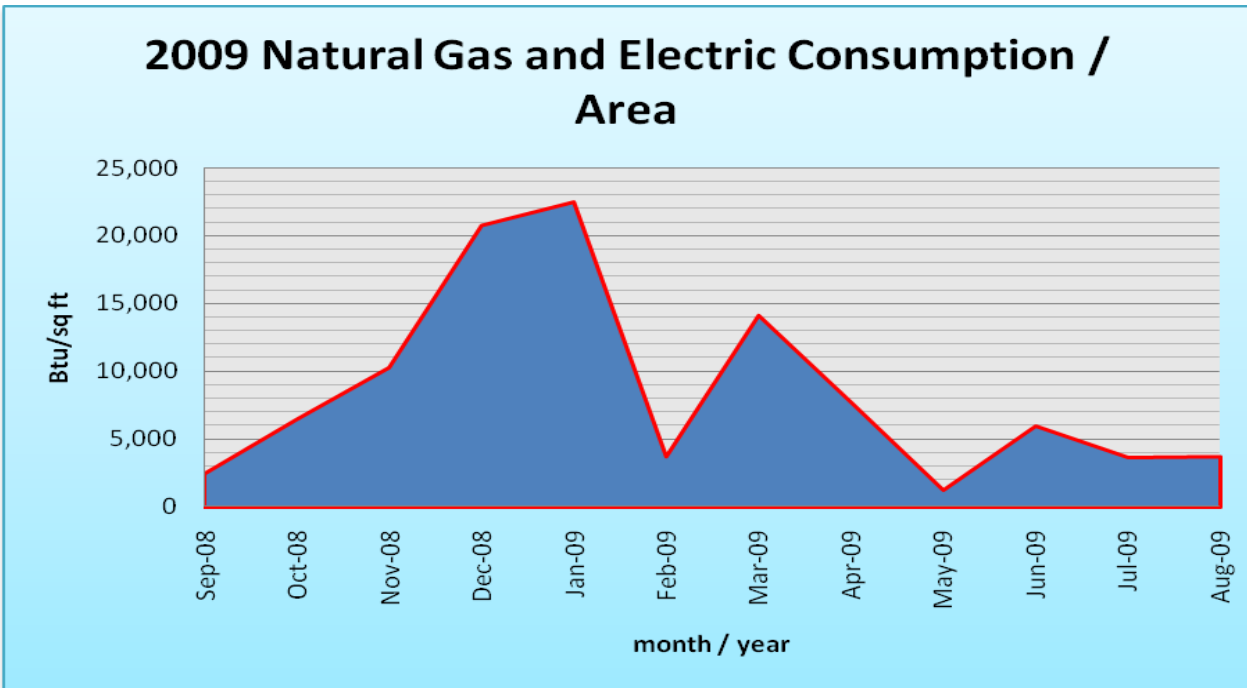
The following chart shows electricity use for the Main Netcong Fire House building based on utility bills for the 12 month period of September 2008 - August 2009.



The following chart shows the natural gas consumption for the Main Netcong Fire House building based on utility bills for the 12 month period of September 2008 - August 2009.

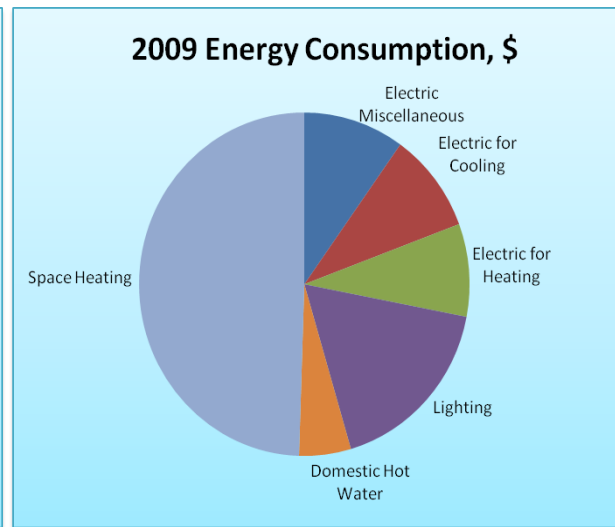
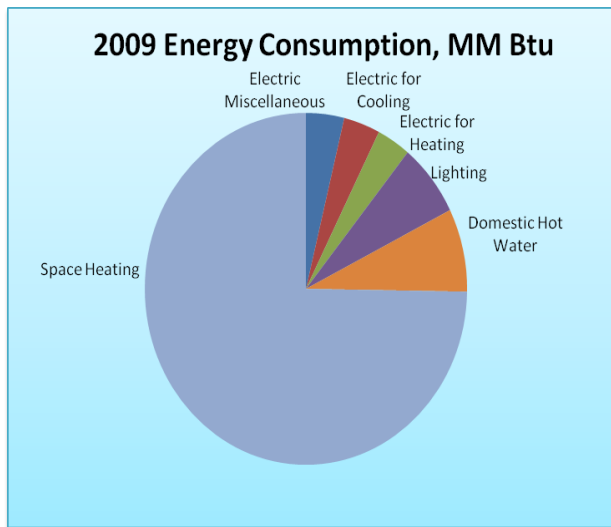


The following chart shows combined natural gas and electric consumption in Btu/ft<sup>2</sup> for the Main Netcong Fire House building based on utility bills for the 12 month period of September 2008 - August 2009.



The following table and chart pies show energy use for the Main Netcong Fire House building based on utility bills for the 12 month period of September 2008 - August 2009. Note electrical cost at \$53/MMBtu of energy is more than 3.5 times as expensive to use as natural gas at \$14/MMBtu. It is assumed that the electrical miscellaneous usage includes building fans that operate throughout the year.

2009 Annual Energy Consumption / Costs					
	MM Btu	% MM Btu	\$	% \$	\$/MM Btu
Electric Miscellaneous	24	4%	\$1,261	10%	\$53
Electric for Cooling	23	4%	\$1,207	9%	\$53
Electric for Heating	21	3%	\$1,117	9%	\$53
Lighting	42	7%	\$2,225	17%	\$53
Domestic Hot Water	47	8%	\$647	5%	\$14
Building Space Heating	463	75%	\$6,326	49%	\$14
Totals	620	100%	\$12,783	100%	\$21
Total Electric Use	109	18%	\$5,809	45%	\$53
Total Gas Use	511	82%	\$6,973	55%	\$14
Totals	620	100%	\$12,783	100%	\$21



## 1.2. Utility rate

The Main Netcong Fire House building currently purchases electricity from JCP&L at a general service market rate for electricity use (kWh) with a separate (kW) demand charge. The Main Netcong Fire House building currently pays an average rate of approximately \$0.182/kWh based on the previous 12 months of utility bills for 2009.

The Main Netcong Fire House building currently purchases natural gas supply from NJNG at a general service market rate for natural gas (therms). NJNG also acts as the transport company. There is one gas meter that provides natural gas service to the Main Netcong Fire House building currently. The average aggregated rate (supply and transport) for the meter is approximately of \$1.365/therm based on 12 months of utility bills of September 2008 - August 2009.

Some of the minor unusual utility fluctuations that showed up for a couple of months on the utility bills may be due to adjustments between estimated and actual meter readings.

### **1.3. Energy benchmarking**

SWA has entered energy information about the Main Netcong Fire House building in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. This facility (fire house) is comprised of non-eligible (Other) space type. Fire House space or "Other" can be used to classify a facility or a portion of a facility where the primary activity does not fall into any of the available space types. Consequently, the Main Netcong Fire House building is not eligible to receive a national energy performance rating at this time.

The Site Energy Use Intensity is 114.8 kBtu/ft<sup>2</sup>yr compared to the national average of a fire house / police station building consuming 78 kBtu/ft<sup>2</sup>yr. Implementing this report's recommendations will reduce use by approximately 37.3 kBtu/ft<sup>2</sup>yr, which when implemented would make the building energy consumption better than the national average. SWA encourages the Borough of Netcong to continue entering utility data in *Energy Star Portfolio Manager* in order to track weather normalized source energy use over time. EPA is continually working to expand the available space types. As new space types become available, the Borough of Netcong will be able to reclassify spaces accordingly if they have previously been entered as "Other". Per the LGEA program requirements, SWA has assisted the Borough of Netcong to create an *Energy Star Portfolio Manager* account and share the Main Netcong Fire House facilities information to allow future data to be added and tracked using the benchmarking tool. SWA has shared this Portfolio Manager site information with the Borough of Netcong (user name of "netcongboro" with a password of "EAUDIT2009") and TRC Energy Services (user name of TRC-LGEA).



## STATEMENT OF ENERGY PERFORMANCE Borough of Netcong - Fire House

Building ID: 1857644  
For 12-month Period Ending: August 31, 2009<sup>1</sup>  
Date SEP becomes ineligible: N/A

Date SEP Generated: October 06, 2009

Facility	Facility Owner	Primary Contact for this Facility
Borough of Netcong - Fire House 40 Maple Avenue Netcong, NJ 07857	N/A	N/A

Year Built: 1967  
Gross Floor Area (ft<sup>2</sup>): 5,400

Energy Performance Rating<sup>2</sup> (1-100) N/A

### Site Energy Use Summary<sup>3</sup>

Electricity - Grid Purchase (kBtu)	109,191
Natural Gas (kBtu) <sup>4</sup>	510,829
Total Energy (kBtu)	620,020

### Energy Intensity<sup>4</sup>

Site (kBtu/ft <sup>2</sup> /yr)	115
Source (kBtu/ft <sup>2</sup> /yr)	167

### Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO <sub>2</sub> e/year)	44
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### Electric Distribution Utility

Jersey Central Power & Lt Co

### National Average Comparison

National Average Site EUI	78
National Average Source EUI	157
% Difference from National Average Source EUI	6%
Building Type	Fire Station/Police Station

Stamp of Certifying Professional

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

### Meets Industry Standards<sup>5</sup> for Indoor Environmental Conditions:

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

### Certifying Professional

N/A

#### Notes:

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

The government estimates the average time needed to fill out this form is 6 hours (includes the time for entering energy data, PE facility inspection, and notarizing the SEP) and we come with suggestions for reducing this level of effort. Send comments (including OMB control number) to the Director, Collection Strategies Division, U.S., EPA (2822), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.

EPA Form 5900-16

## 2. FACILITY AND SYSTEMS DESCRIPTION

### 2.1. Building Characteristics

The two story 5,400 square feet Main Netcong Fire House building was built by members in 1967 and renovated in 2003. Besides the fire truck bays and offices on the main floor the building houses a banquet hall with kitchen and bar on the second floor for volunteer members' activities.

### 2.2. Building occupancy profiles

Occupancy for the Main Netcong Fire House building is 3 volunteers for approximately 20 hours per week. There is usually one special event held in the main banquet hall on the second floor every couple of months for volunteer fire department members.

### 2.3. Building envelope

#### 2.3.1. Exterior Walls

Similar to the Borough Hall across the street, both, side and rear exterior walls are finished with painted 8" CMU (concrete masonry unit) block with 2x framing, insulation behind it. Interior finishes are either exposed CMU or GWB (gypsum wall board). The front wall is finished with brick veneer over 8". The front and rear gables are finished with vertical siding over un-insulated 2x wood framing. The interior walls of the crawl space attic are unfinished.

Due to warm temperature conditions at the time of the field visits, insulation levels and uniformity in walls could not be verified with help of infrared technology. If desired, the borough could contract a separate envelope inspection during cooler months.

The painted CMU wall on the exterior shows signs of prolonged water exposure in some areas. On one side of the fire house extensive algae type growth established itself under one of the original windows. SWA recommends replacing that part of wall completely at the time of replacing the original window. On both sides of the fire house the lower rows of CMU blocks show pealed paint and algae/ mold growth. This can be contributed to roof water runoff, see Section 2.3.2 for more details. The minor crack on top of one of the windows should be filled with proper mortar/ epoxy. In the rear, a condensate drip line protruding from the gable causes damage as the water hits the ground. SWA recommends installing a dedicated drain line into a drywell, existing drain or tying it in with the recommended down spouts. These kinds of issues should be fixed and inspections conducted regularly to prevent potential energy compromising and costly water / moisture infiltration problems.



*Condensate Drip Damage*



*Roof Water Runoff Damage*



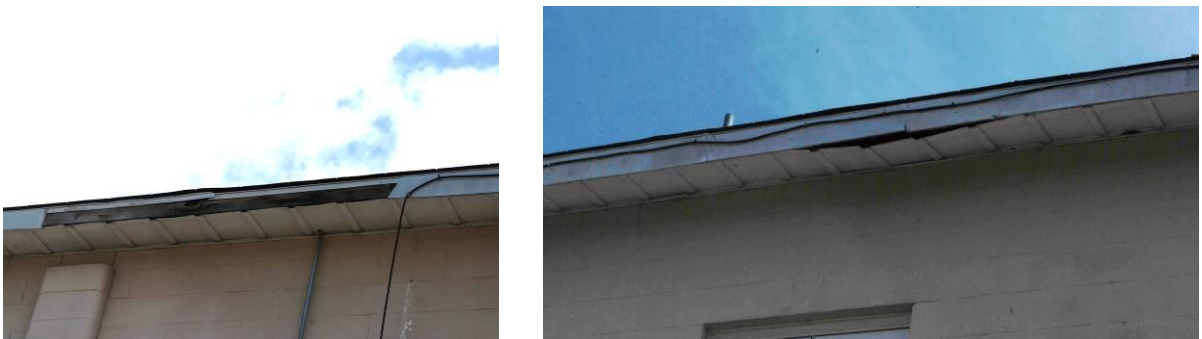
*Excessive Algae Growth under Window*

### 2.3.2. Roof

The wood truss, low sloped asphalt shingle covered roof condition was discovered to be in need of repair. It shows signs of leakage and the loose rock wool insulation dates back to the 1960's. As mentioned under 2.3.1 Exterior Walls, a separate envelope inspection should be conducted during cooler months. SWA suggests basing further insulation related improvement discussions on the outcome of those future findings.

As mentioned in the Borough Hall report, warranty, performance and longevity of asphalt shingle roofs might be compromised by inadequate under-roof-sheathing ventilation. This is accomplished most effectively by installing soffit and ridge vents that let air move freely from soffits up and out the ridge vent. Neither soffit vents nor a continuous ridge vent were identified. SWA discourages passive or active gable vents as they were found not to be effective in reducing excessive attic heat. SWA suggests installing a ridge vent and inspecting the existing soffit vent for maximum performance.

Additionally, SWA recommends installing rain gutters on both sides of the building with down spouts. Water damage on exterior walls close to the ground was found in those areas, see 2.3.1. Exterior Walls for more details. At the time of installing gutters, SWA recommends fixing all missing and damaged fascia trim, possibly also a result of uncontrolled roof water runoff.



*Missing and Damaged Fascia Trim*

### 2.3.3. Base

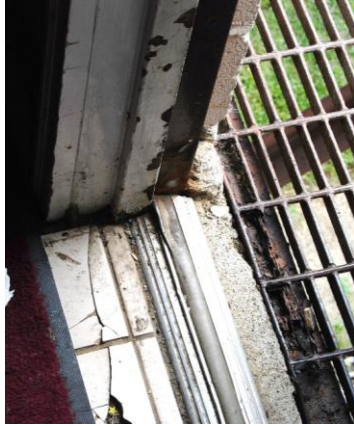
The building's base is assumed to be a 4" concrete slab-on grade with a perimeter footing. There weren't any reported problems with water penetration or moisture despite the issues raised in 2.3.1. Exterior Walls.

### 2.3.4. Windows

The building's double glazed, double / single hung, vinyl clad windows were installed during the 2003 upgrade. All the windows inspected showed proper caulking and sealing around both interior and exterior perimeters and no signs of condensation or other problems. SWA recommends continuing the upgrade for all windows in the building.

### 2.3.5. Exterior doors

The aluminum framed exterior doors were observed to be in poor condition and need to have missing or worn weather stripping installed in addition to adjusting doors to properly close 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 doors will help ensure that the building is kept insulated.



*Missing or Worn Weather-Stripping at all Doors*

### 2.3.6. Building air tightness

Based on a visual inspection, the Main Netcong Fire House building was observed not to be a well-sealed building as mentioned under 2.3.5 Exterior Doors. Additionally, using manufacturer's approved materials and methods; SWA recommends air sealing all envelope penetrations around plumbing, HVAC, structural and electrical installations.

## 2.4. HVAC Systems

### 2.4.1. Heating

Building heat is delivered via hot water from a Weil-McLain, Model EGH-105-PIN boiler, to 3 zones via 3 B&G circulation pumps. The downstairs garage and truck bays are heated by 3 ceiling mounted hot water heaters controlled by a manual zone thermostat. The downstairs bathroom 1 ceiling heater is also controlled by another manual zone thermostat. The 2<sup>nd</sup> floor banquet hall is heated by baseboard heat and controlled also by a manual zone thermostat.

### 2.4.2. Cooling

Only the 2<sup>nd</sup> floor is air conditioned. Two air conditioning units mounted above the drop ceiling maintain both the banquet hall and the kitchen area cool. Two condensing units at ground level in the back of the building provide cool refrigerant to the Air Handling Unit (AHU) cooling coils in the attic crawl space. A programmable thermostat controls the air conditioned room temperature. On the day of SWA's visit the building was empty and the banquet hall temperature was set to maintain 72°F.

### **2.4.3. Ventilation**

The Main Netcong Fire House building is provided with outside air via the 2<sup>nd</sup> floor AHUs. Also, there are a number of egg-crate ceiling tiles on the 2<sup>nd</sup> floor that allow conditioned air to be drawn out of the room via the crawl space / plenum above the ceiling and vent outside. To facilitate air being drawn out of the 2<sup>nd</sup> floor main room an exhaust fan on a timer can be turned on as needed. This system was set up when people smoked in the banquet hall. SWA recommends that the system be removed and the egg-crate ceiling tiles be replaced with regular ceiling tiles covered with the proper insulation, in order to keep valuable conditioned air inside the building.

There isn't an exhaust fan for the truck bays, which would necessitate opening the garage doors whenever the engines are turned on. SWA recommends installation of a CO detector with alarm for the truck bay area.

### **2.4.4. Domestic Hot Water**

There is a natural gas fired domestic hot water (DHW) heater with 40 gallons storage located in the ground floor mechanical room supplying the building sinks (with the downstairs shower abandoned). This unit is operating beyond its useful operating life and should be replaced prior to catastrophic failure and associated damage.

## **2.5. Electrical systems**

### **2.5.1. Lighting**

*Interior Lighting* - The Main Netcong Fire House building currently consists of mostly updated T8 fluorescent fixtures with electronic ballasts. There are a few halogen and incandescent bulbs found in exterior fixtures. SWA recommends replacement of all halogen and incandescent bulbs with compact fluorescents. SWA also recommends installing occupancy sensors in bathrooms, closets, offices and areas that are occupied only part of the day and payback on savings are justified. Since truck bays are used sporadically throughout the day and lighting is commonly left on far beyond the necessary hours of operation, SWA recommends installing occupancy sensors with time delay and acoustic capabilities. Typically, occupancy sensors have an adjustable time delay that shuts down the lights automatically if no motion or sound is detected within a set time period. See attached lighting schedule in Appendix A for a complete inventory of lighting throughout the building and estimated power consumption.

*Exit Lights* - Exit signs were found to have fluorescent bulbs. SWA recommends replacing all fluorescent Exit signs with LED bulbs.

*Exterior Lighting* - The exterior lighting surveyed during the building audit were found to be a mix of metal halide, halogen and incandescent lamps. Since this lighting is mainly for Safety as well as for Security, SWA has deemed it not cost effective to replace the exterior metal halide lamp lighting at this time. SWA recommends the replacement of all halogen and incandescent flood lights with compact fluorescent lights. Exterior lighting is controlled by astronomical timers and a few seldom used manual switches. There is not any immediate need to upgrade these lighting or astronomical timers. Also, other street and area lighting shine on the building's perimeter.

### **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 315 kWh / yr. When compared to the average electrical consumption of older equipment, Energy Star equipment results in a large savings. Building management should select Energy Star label appliances and equipment when replacing: 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>. Also, energy vending miser devices are now available for conserving energy usage by Drinks and Snacks vending machines. When equipped with the vending miser devices, vending machines use less energy and are comparable in daily energy performance to new ENERGY STAR qualified machines.

Computers left on in the building 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 meeting areas use approximately 3-5 watts of electricity when turned off. SWA recommends all computers and all 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. The Main Netcong Fire House building computers are generally programmed for the power save mode, to shut down after a period of time that they have not been used.

### **2.5.3. Elevators**

The Main Netcong Fire House building does not have any installed elevators.

### **2.5.4. Others electrical systems**

There is a emergency generator operated on diesel located at the back of the building that is capable of backing up the entire building.

The Main Netcong Fire House building could be eligible for enrollment in a Demand Response Program, if this Katolight 60 kVA generator together with the Netcong Borough Hall building (across the street) Kohler 70 kVA emergency generator would be wired in such a way to offer capability to shed a minimum of 100 kW electric demand when requested by the utility during peak demand periods, which is the typical threshold for considering this option. This setup could allow the Borough of Netcong to negotiate a reimbursement program with the utility company.

There are not currently any other electrical systems installed at the Main Netcong Fire House.

### 3. EQUIPMENT LIST

#### Inventory

Building System	Description	Location	Model #	Fuel	Space Served	Year Installed	Estimated Remaining Useful Life %
Heating	Boiler - hot water, 450,000 Btu/hr input	downstairs mech rm	Weil-McLain EGH-105-PIN	Natural Gas	Netcong Fire House	1994	40%
Heating	3 hot water circulation pumps	downstairs mech rm	B&G Cat. MOT-C-101	Electric	Netcong Fire House	1994	40%
Heating	4 hot water ceiling heaters (3 for truck bays, 1 for bathroom)	truck bays, 1st flr bathroom	Trane	Electric	Netcong Fire House, 1st flr	1994	40%
Cooling	2 Air Handling Units	attic crawl space	Goodman	Electric	Netcong Fire House, 2nd flr	2005	80%
Cooling	Goodman condenser	back of bldg	GSX130601AB, fan motor 1/4 Hp, 13 SEER, R-410 refrig.	Electric	Banquet Hall	2005	80%
Cooling	Ducane condenser	back of bldg	AC10B60, fan 1/4 Hp	Electric	Banquet Hall, Kitchen	2005	80%
Ventilation	attic exhaust fan pulls air through banquet hall ceiling egg crate tile and exhaust outside, on manual switch	attic crawl space	-	Electric	Netcong Fire House, 2nd flr	1966	0%, operating past expected useful life
Domestic Hot Water	AO Smith 40 gal, 32,000 btu/hr input; rated at 268 therms/yr consumption on a scale of 238-273	downstairs mech rm	FSG 40 240	Natural Gas	Netcong Fire House	1994	0%, operating past expected useful life
Pressurized Air	air compressor and tank	downstairs mech rm	PRO 4000, 14 cfm, 60V tank	Electric	Netcong Fire House	1994	30%
Generator	Katolight 60 kVA	back of bldg	SED60FGJ4 Stanadyne engine, Marathon electric generator	Electric / Diesel	Netcong Fire House	2006	90%
Lighting	See details - Appendix A	see Appendix A	-	Electric	Netcong Fire House	varies	varies, average 60%

**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

Based on the assessment of the Main Netcong Fire House, SWA has separated the investment opportunities into three recommended categories:

1. Capital Improvements - Upgrades not directly associated with energy savings
2. Operations and Maintenance - Low Cost / No Cost Measures
3. Energy Conservation Measures - Higher cost upgrades with associated energy savings

##### **Category I Recommendations: Capital Improvements**

- Roof Integrity - The wood truss, low sloped asphalt shingle covered roof condition was discovered to be in poor condition. It shows signs of leakage and the loose rock wool insulation dates back to the 1960's. SWA recommends that the Borough of Netcong put aside capital funds for a roof replacement and installation of new insulation, batt R-49 or better.
- Replace Domestic Hot Water (DHW) heater - as it has reach the end of its useful operating life. SWA recommends its replacement with a natural gas fired Energy Star EF 0.63 rated unit with a 40 gallon storage tank and 40,000 Btu/hr input.

The Main Netcong Fire House building A O Smith hot water heater with a 40 gal storage tank is located in the ground floor boiler room and supplying the building sinks (one downstairs shower is disconnected). This unit is operating beyond its useful operating life and should be replaced prior to a catastrophic failure and associated damage. SWA recommends its replacement with a natural gas fired Energy Star EF 0.63 rated unit with a 40 gallon (since use is relatively low) storage tank and 40,000 Btu/hr input. SWA also evaluated replacing the old heater with a 40 gal, 40,000 Btu/hr condensing EF 0.96 heater type unit; however the payback is in excess of 11 years. Replacing the existing heater in kind with labor evaluated at prevailing wages is estimated to cost \$950. For an additional \$100 (inclusive of \$50 NJ Smart Start rebate) the recommended Energy Star model has a 4.6 year payback based on fuel savings.

- Premium Motors - Select NEMA Premium motors when replacing motors that have reached the end of their useful operating lives.

##### **Category II Recommendations: Operations and Maintenance**

- Safety - Insure that there is a functioning / calibrated CO detector with alarm in the building since garage area does not have an exhaust fan now. SWA recommends that the Main Netcong Fire House consider installing an exhaust fan in the future, controlled by the CO sensor.
- Kitchen Oven / Range - Please verify need of propane hook-up when building is supplied with natural gas.
- Ventilation - SWA recommends that the 2<sup>nd</sup> floor fan ventilator be removed and the egg-crate ceiling tiles be replaced with regular ceiling tiles covered with the proper insulation, in order to keep valuable conditioned air inside the building.
- Roof Maintenance - SWA recommends regular maintenance to verify water is draining correctly.
- Downspouts - Repair / install missing downspouts and repair areas of brick veneer damage to prevent water / moisture infiltration and insulation damage.
- Under-roof-sheathing Ventilation - Performance and longevity of asphalt shingle roofs might be compromised by inadequate under-roof-sheathing ventilation. This is accomplished most effectively by installing soffit and ridge vents that let air move freely from soffits up and out the ridge vent.

- Weather Stripping / Air Sealing - SWA observed that exterior door weather-stripping in places was beginning to deteriorate. Doors and vestibules should be observed annually for deficient weather-stripping and replaced as needed. The perimeter of all window frames should also be regularly inspected and any missing or deteriorated caulking should be re-caulked to provide an unbroken seal around the window frames. Any other accessible gaps or penetrations in the thermal envelope penetrations should also be sealed with caulk or spray foam.
- Water Efficient Fixtures & Controls - Adding controlled on / off timers on all lavatory faucets is a cost-effective way to reduce domestic hot water demand and save water. Building staff can also easily install faucet aerators and / or low-flow fixtures to reduce water consumption. There are many retrofit options, which can be installed now or incorporated as equipment is replaced. Routine maintenance practices that identify and quickly address water leaks are a low-cost way to save water and energy. Retrofitting with more efficient water-consumption fixtures / appliances will save both energy and money through reduced energy consumption for water heating, while also decreasing water / sewer bills.
- Domestic Hot Water - Consider setting the heater to produce hot water at or below 120°F.
- Energy Star labeled appliances such as refrigerators should replace older energy inefficient equipment.
- Smart power electric strips with occupancy sensors should be used to power down computer equipment when left unattended for extended periods of time.
- Create an educational program that teaches how to minimize their energy use. The US Department of Energy offers free information for hosting energy efficiency educational programs and plans, for more information please visit: <http://www1.eere.energy.gov/education/>

**Category III Recommendations: Energy Conservation Measures**

**Summary table**

<b>ECM#</b>	<b>Description of Highly Recommended 0-5 Year Payback ECMs</b>
<b>1</b>	<b>Install vending Drinks machine energy miser</b>
<b>2.1, 2.2 &amp; 2.3</b>	<b>Install lighting CFLs, occupancy sensors and replace T12 with T8 fixtures</b>
<b>3</b>	<b>Install 5 kW Wind system</b>
<b>4</b>	<b>Install programmable thermostats in building</b>
	<b>Description of Recommended 5-10 Year Payback ECMs</b>
<b>5</b>	<b>Undertake retro-commissioning of building systems and controls to optimize performance</b>
<b>6</b>	<b>Install 5 kW Photovoltaic system</b>
<b>7</b>	<b>Replace old refrigerators</b>
<b>2.4</b>	<b>Upgrade Exit fluorescent signs to LED</b>

## ECM#1: Install Vending Miser

### Description:

There is one old style Drinks vending machine in the Main Netcong Fire House 2<sup>nd</sup> floor kitchen. Energy vending miser devices are now available for conserving energy with these vending machines. There isn't a need to purchase new machines to reduce operating costs and greenhouse gas emissions. When equipped with the vending miser devices, refrigerated beverage vending machines use less energy and are comparable in daily energy performance to new ENERGY STAR qualified machines. Vending miser devices incorporate innovative energy-saving technology into small plug-and-play devices that installs in minutes, either on the wall or on the vending machine. Vending miser devices use a Passive Infrared Sensor (PIR) to: Power down the machine when the surrounding area is vacant; Monitor the room's temperature; Automatically repower the cooling system at one- to three-hour intervals, independent of sales; Ensure the product stays cold.

If there is a decision in the future to install a snacks vending machine, than with the snacks vending miser device, maximum energy savings can be achieved, that result in reduced operating costs and decreased greenhouse gas emissions with existing machines. Snacks vending miser devices also use a Passive Infrared Sensor (PIR) to determine if there is anyone within 25 feet of the machine. It waits for 15 minutes of vacancy, then powers down the machine. If a customer approaches the machine while powered down, the snacks vending miser will sense the presence and immediately power up.

### Installation cost:

Estimated installed cost: \$265

Source of cost estimate: [www.usatech.com](http://www.usatech.com) and established costs

### Economics (without incentives):

ECM description	Installed Cost		1st year energy savings						SPP	LoM	Lifetime	ROI %	Annual Carbon Reduced (lbs of CO2)
	Estimate \$	Source	Use	Unit	Demand / mo	Unit	Savings / year \$	kBtu /sq ft			Cost Savings \$		
install Drinks Vending machine misers	\$265	<a href="http://www.usatech.com">www.usatech.com</a>	3,181	kWh	1.7	kW	579	2.0	0.5	12	5,695	171	4,358

**Assumptions:** SWA assumes energy savings based modeling calculator found at [www.usatech.com](http://www.usatech.com) or [http://www.usatech.com/energy\\_management/energy\\_calculator.php](http://www.usatech.com/energy_management/energy_calculator.php)

**Rebates/financial incentives:** *This measure does not qualify for a rebate or financial incentive 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: Building Lighting Upgrades

### Description:

On the day of the site visit, SWA completed a lighting inventory of the Main Netcong Fire House building (see Appendix A). The existing lighting consists of mostly T8 fluorescent fixtures with electronic ballasts, and a few halogen and incandescent lights and T12s. Many of the lights in the Main Netcong Fire House building appear to have been upgraded to T8 fixtures. SWA has performed an evaluation of upgrading incandescent bulbs to CFLs, installing occupancy sensors in truck bay areas, offices and bathrooms that may be left unoccupied a considerable amount of time throughout the day and replacing fluorescent EXIT sign with LED type. The labor in all these installations was evaluated using prevailing electrical contractor wages. The Borough of Netcong may decide to perform this work with in-house resources from its Maintenance Department on a scheduled, longer timeline than otherwise performed by a contractor, to obtain savings. SWA recommends at a minimum that the halogen and incandescent bulbs be replaced with CFLs and occupancy sensors be installed in a number of truck bay areas. See Appendix A for recommendations.

### Installation cost:

Estimated installed cost: \$1,190

Source of cost estimate: *RS Means; Published and established costs*

### Economics (Some of the options considered with incentives):

ECM description	Installed Cost		1st year energy savings						SPP	LoM	Lifetime	ROI %	Annual Carbon Reduced (lbs of CO2)
	Estimate \$	Source	Use	Unit	Demand /mo	Unit	Savings / year \$	kBtu /sq ft			Cost Savings \$		
2.1 - install 3 occupancy sensors, with INCENTIVES	\$270	RS Means, Lit Search, NJ Clean Energy Program	2,751	kWh	1.5	kW	501	1.7	0.5	12	4,924	144	3,768
2.2 - replace 4 incand and halogen lamps to CFL	\$80	RS Means, Lit Search	511	kWh	0.3	kW	102	0.3	0.8	7	629	98	700
2.3 - replace building internal lights: T12s to T8s with INCENTIVES (incl. 75% labor)	\$740	RS Means, Lit Search, NJ Clean Energy Program	1,191	kWh	0.6	kW	217	0.8	3.4	20	3,167	16.4	1,632
2.4 - replace 1 fluorescent EXIT sign with LED type, with INCENTIVES	\$100	RS Means, Lit Search, NJ Clean Energy Program	61	kWh	0.0	kW	11	0.0	9.0	20	163	3.2	84
Total Proposed	\$1,190		4,514	kWh	2.4	kW	830	2.9	1.4	17	10,907	47	6,185

**Assumptions:** SWA calculated the savings for this measure using measurements taken the day of the field visit and using the billing analysis. SWA also assumed an aggregated 1/4 hr/yr to replace aging burnt out lamps vs. newly installed and included this with the annual savings.

**Rebates/financial incentives:**

*NJ Clean Energy - Wall Mounted occupancy sensors (\$20 per control)  
Maximum incentive amount is \$60.*

*NJ Clean Energy - LED Exit signs (\$10-\$20 per fixture)  
Maximum incentive amount is \$20.*

*NJ Clean Energy – Prescriptive Lighting Incentive, Incentive based on installing T5 or T8 lamps with electronic ballasts in existing facilities (\$10-\$30 per fixture, depending on quantity of lamps). Maximum incentive amount is \$120.*

**Options for funding the Lighting 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#3: Install 5kW Wind System**

*Please see section 5: RENEWABLE AND DISTRIBUTED ENERGY MEASURES*

**ECM#4: Install Programmable Thermostats in Several Building Zones**

**Description:**

The Main Netcong Fire House building 3 heating zones are controlled by individual wall mounted manual thermostat. These spaces have dedicated zone pumps coming off one boiler. Temperature controls in these spaces are without setback and have poor accuracy. These spaces are generally unoccupied. Temperatures are not setback at night or after-hours and additional energy is used to keep the spaces warm, which would not be expanded if controls could be properly operated.

SWA proposes that the Borough of Netcong replace the existing manual thermostats with a strategically placed, Energy Star, programmable- wall mounted and tampering secure thermostats that will greatly improve the control, heat and cool energy expanded in the spaces.

**Installation cost:**

Estimated installed cost: \$450

Source of cost estimate: *RS Means; Published and established costs*

**Economics (without incentives):**

ECM description	Installed Cost		1st year energy savings						SPP	LoM	Lifetime	ROI %	Annual Carbon Reduced (lbs of CO2)
	Estimate \$	Source	Use	Unit	Demand /mo	Unit	Savings / year \$	kBtu /sqft			Cost Savings \$		
install 3 programmable thermostat in truck bays and 2nd floor areas	\$450	Similar Projects	277	kWh	0.1	kW	790	4.0	0.6	12	7,767	136	2,825
			209	therms	-	-							

**Assumptions:** Since the utility bills have some accounting fluctuations, it is difficult to determine the energy used for heating / cooling the Main Netcong Fire House building. SWA estimated the heating / cooling energy usage from the electric and natural gas bills. SWA assumed typical heating savings of 9% for scheduled setbacks and controls. Estimated programmable thermostat cost / installation are based on similar project. SWA also assumed on the average 1/4 hr/wk operational savings when systems are operating per design and schedule vs. the need to make more frequent manual adjustments and included this with the annual savings.

**Rebates / financial incentives:**

*There are currently no incentives for this measure at this time. However, periodically the local utility and the state of NJ have incentives for this measure. Generally there are incentives for the residential sector.*

**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#5: Retro-Commissioning

### Description:

Retro-commissioning is a process that seeks to improve how building equipment and systems function together. Depending on the age of the building, retro-commissioning can often resolve problems that occurred during design or construction and / or address problems that have developed throughout the building's life. Owners often undertake retro-commissioning to optimize building systems, reduce operating costs, and address comfort complaints from building occupants.

Since the systems at the Main Netcong Fire House building have undergone renovations in recent years, and the building continues to have concerns with thermal comfort control, SWA recommends undertaking retro-commissioning to optimize system operation as a follow-up to completion of the upgrades. The retro-commissioning process should include a review of existing operational parameters for both newer and older installed equipment. During retro-commissioning, the individual loop temperatures should also be reviewed to identify opportunities for optimizing system performance.

### Installation cost:

Estimated installed cost: \$7,375

Source of cost estimate: Similar projects

### Economics (without incentives):

ECM description	Installed Cost		1st year energy savings						SPP	LoM	Lifetime	ROI %	Annual Carbon Reduced (lbs of CO2)
	Estimate \$	Source	Use	Unit	Demand /mo	Unit	Savings / year \$	kBtu /sq ft			Cost Savings \$		
Retro-Commissioning	\$6,750	Similar Projects	3,200	kWh	1.7	kW	3,097	11.5	2.2	12	30,466	29.3	10,363
			511	therms	-	-							

**Assumptions:** Since the utility bills have some accounting fluctuations, it is difficult to determine the amount of energy used for heating and cooling the Main Netcong Fire House building. Based on experience with similar buildings, SWA estimated the heating and cooling energy consumption. Typical savings for retro-commissioning range from 5-20%, as a percentage of the total space conditioning consumption. SWA assumed 10% savings. Estimated costs for retro-commissioning range from \$0.50-\$2.00 per square foot. SWA assumed \$1.25 per square foot of a total square footage of 5,400. SWA also assumed on the average 1 hr/wk operational savings when systems are operating per design vs. the need to make more frequent adjustments and included this with the annual savings.

**Rebates / financial incentives:** *There are currently no incentives 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#6: *Install 5kW PV System*

*Please see section 5: RENEWABLE AND DISTRIBUTED ENERGY MEASURES*

## ECM#7: *Replace Old Refrigerators with Energy Star Models*

**Description:**

On the day of the site visit, SWA observed that there are two old refrigerators, one in the kitchen and another on the 1<sup>st</sup> floor which are not Energy Star rated (using approximately 773 kWh/yr each). Appliances, such as refrigerators, that are over 10 years of age should be replaced with newer efficient models with the Energy Star label. SWA recommends the replacement of the existing refrigerators with 18.2 cu. ft. top freezer refrigerator ENERGY STAR®, Mfr. model #6897, 407 kWh / yr, or equivalent. Besides saving energy, the replacement will also keep the kitchen and other areas cooler. When compared to the average electrical consumption of older equipment, Energy Star equipment results in 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>.

**Installation cost:**

Estimated installed cost: \$1,000

Source of cost estimate: *Manufacturer and Store established costs*

**Economics:**

ECM description	Installed Cost		1st year energy savings						SPP	LoM	Lifetime	ROI %	Annual Carbon Reduced (lbs of CO2)
	Estimate \$	Source	Use	Unit	Demand / mo	Unit	Savings / year \$	kBtu /sq ft			Cost Savings \$		
replace 2 old refrigerators with Energy Star models	\$1,000	Manufacturer and Store Info	732	kWh	0.4	kW	133	0.5	7.5	15	1,568	3.8	1,003

**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 - There aren't any incentives at this time offered by the state of NJ for this energy conservation measure.*

**Options for funding the Lighting 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>

## 5. RENEWABLE AND DISTRIBUTED ENERGY MEASURES

### 5.1. Existing systems

There aren't currently any existing renewable energy systems.

### 5.2. Wind

#### ***ECM#3: Install 5kW Wind system***

##### **Description:**

Wind power production may be applicable for the Main Netcong Fire House building location, because of the thermal winds generated in the area. Currently, the Main Netcong Fire House building does not use any renewable energy systems. Updated renewable energy systems such as “magnetic” vertical axis wind turbines (MVAWT) can be mounted on building roofs offset a portion of the purchased electricity for the building. Power stations generally have two separate electrical charges: usage and demand. Usage is the amount of electricity in kilowatt-hours that a building uses from month to month. Demand is the amount of electrical power that a building uses at any given instance in a month period. During the summer periods, when electric demand at a power station is high due to the amount of air conditioners, lights, equipment, etc... being used within the region, demand charges go up to offset the utility's cost to provide enough electricity at that given time. Wind systems not only offset the amount of electricity use by a building, but also reduce the building's electrical demand, resulting in a higher cost savings as well. SWA presents below the economics of installing a 5kW Wind system to offset electrical demand for the building and reduce the annual net electric consumption for the building, however there are insufficient guaranteed incentives for NJ rebates at this time for this investment. The Main Netcong Fire House building is not eligible for a 30% federal tax credit. The Main Netcong Fire House building may consider applying for a grant and / or engage a Wind Power generator / leaser who would install the Wind system and then sell the power at a reduced rate.

There are many possible locations for a 5kW Wind system installation on top of the building ample roof area. The supplier would need to first determine via recorded analysis at the proposed location(s) consistency and wind speeds available. Area winds of 10 mph will run turbines smoothly and capture the needed power. This is a roof-mounted wind turbine (used for generating electricity) that spins around a vertical axis like a merry-go-round instead of like a windmill, as do more traditional horizontal axis wind turbines (HAWTs). A typical 5kW MVAWT wind system has a 20 ft diameter turbine by 10 ft tall.

The installation of a renewable Wind power generating system could serve as a good educational tool and exhibit for the community. **It is very important that Wind measurements and recordings are taken at the chosen location for at least a couple of months to assure that sufficient wind and speed is available for proper operation and to meet incentive requirements.**

##### **Installation cost:**

Estimated installed cost: \$40,000

Source of cost estimate: Similar projects

**Economics (with incentives):**

ECM description	Installed Cost		1st year energy savings						SPP	LoM	Lifetime	ROI %	Annual Carbon Reduced (lbs of CO2)
	Estimate \$	Source	Use	Unit	Demand /mo	Unit	Savings / year \$	kBtu /sqft			Cost Savings \$		
Install 5 kW Wind System with INCENTIVE (upfront \$3.20/kWh)	\$40,000	Similar Projects	13,000	kWh	5.0	kW	43,966	8.2	0.9	25	748,801	70.9	17,810

**Assumptions:** SWA estimated the cost and savings of the system based on past wind projects. SWA projected physical dimensions based on a 5kW-Enviro Energies turbine system. **SWA assumes that the relatively low height (~30 ft) compared to the taller horizontal axis turbines is acceptable to the NJ BPU as long as the average documented annual wind speed is 11 mph at the hub.**

**Rebates/financial incentives:**

*NJ Clean Energy - Renewable Energy Incentive Program, Incentive at this time only for vertically spinning high altitude turbines*

<http://www.njcleanenergy.com/renewable-energy/programs/renewable-energy-incentive-program>

*NJ Clean Energy - Wind Upfront Incentive Program, Expected performance buy-down (EPBB) is modeled on an annual kWh production of 1-16,000 kWh for a \$3.20/kWh upfront incentive level. This has been incorporated in the above costs, however it requires proof of performance, application approval and negotiations with the utility.*

**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>

### 5.3. Solar Photovoltaic

#### ECM#6: *Install 5kW PV system*

##### **Description:**

Currently, the Main Netcong Fire House building does not use any renewable energy systems. Renewable energy systems such as photovoltaic panels, can be mounted on the building roofs, and can offset a portion of the purchased electricity for the building. Power stations generally have two separate electrical charges: usage and demand. Usage is the amount of electricity in kilowatt-hours that a building uses from month to month. Demand is the amount of electrical power that a building uses at any given instance in a month period. During the summer periods, when electric demand at a power station is high due to the amount of air conditioners, lights, equipment, etc... being used within the region, demand charges go up to offset the utility's cost to provide enough electricity at that given time. Photovoltaic systems not only offset the amount of electricity use by a building, but also reduce the building's electrical demand, resulting in a higher cost savings as well. SWA presents below the economics, and recommends at this time that Borough of Netcong further review installing a 5kW PV system to offset electrical demand and reduce the annual net electric consumption for the building, and review guaranteed incentives from NJ rebates to justify the investment. The Main Netcong Fire House building is not eligible for a 30% federal tax credit. Instead, the Borough of Netcong may consider applying for a grant and / or engage a PV generator / leaser who would install the PV system and then sell the power at a reduced rate. JCP&L provides the ability to buy SRECs at \$600 / MWh or best market offer.

There are many possible locations for a 5kW PV installation on the building roofs. A commercial multi-crystalline 123 watt panel (17.2 volts, 7.16 amps) has 10.7 square feet of surface area (11.51 watts per square foot). A 5kW system needs approximately 41 panels which would take up 435 square feet. The installation of a renewable Solar Photovoltaic power generating system could serve as a good educational tool and exhibit for the community.

##### **Installation cost:**

Estimated installed cost: \$30,000  
 Source of cost estimate: Similar projects

##### **Economics (with incentives):**

ECM description	Installed Cost		1st year energy savings						SPP	LoM	Lifetime	ROI %	Annual Carbon Reduced (lbs of CO2)
	Estimate \$	Source	Use	Unit	Demand /mo	Unit	Savings / year \$	kBtu /sqft			Cost Savings \$		
Install 5 kW PV System (with \$1/W INCENTIVE and \$600/1MWh SREC)	\$30,000	Similar projects	5,902	kWh	5.0	kW	4,674	3.7	6.4	25	79,608	6.6	8,086

**Assumptions:** SWA estimated the cost and savings of the system based on past PV projects. SWA projected physical dimensions based on a typical Polycrystalline Solar Panel (123 Watts, model #ND-

123UJF). PV systems are sized based on Watts and physical dimensions for an array will differ with the efficiency of a given solar panel (W/sq ft).

**Rebates/financial incentives:**

*NJ Clean Energy - Renewable Energy Incentive Program, Incentive based on \$1.00 / watt Solar PV application. Incentive amount for this application is \$5,000.*

<http://www.njcleanenergy.com/renewable-energy/programs/renewable-energy-incentive-program>

*NJ Clean Energy - Solar Renewable Energy Certificate Program. Each time a solar electric system generates 1000kWh (1MWh) of electricity, a SREC is issued which can then be sold or traded separately from the power. The buildings must also become net-metered in order to earn SRECs as well as sell power back to the electric grid. \$3,600 has been incorporated in the above costs, however it requires proof of performance, application approval and negotiations with the utility.*

**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>

**5.4. Solar Thermal Collectors**

**Description:**

*Solar thermal collectors are not cost effective for this building and would not be recommended due to the insufficient and not constant use of domestic hot water throughout the building to justify the expenditure.*

**5.5. Combined Heat and Power**

**Description:**

*CHP is not applicable for this building because of existing split system cooling, and insufficient domestic hot water use.*

**5.6. Geothermal**

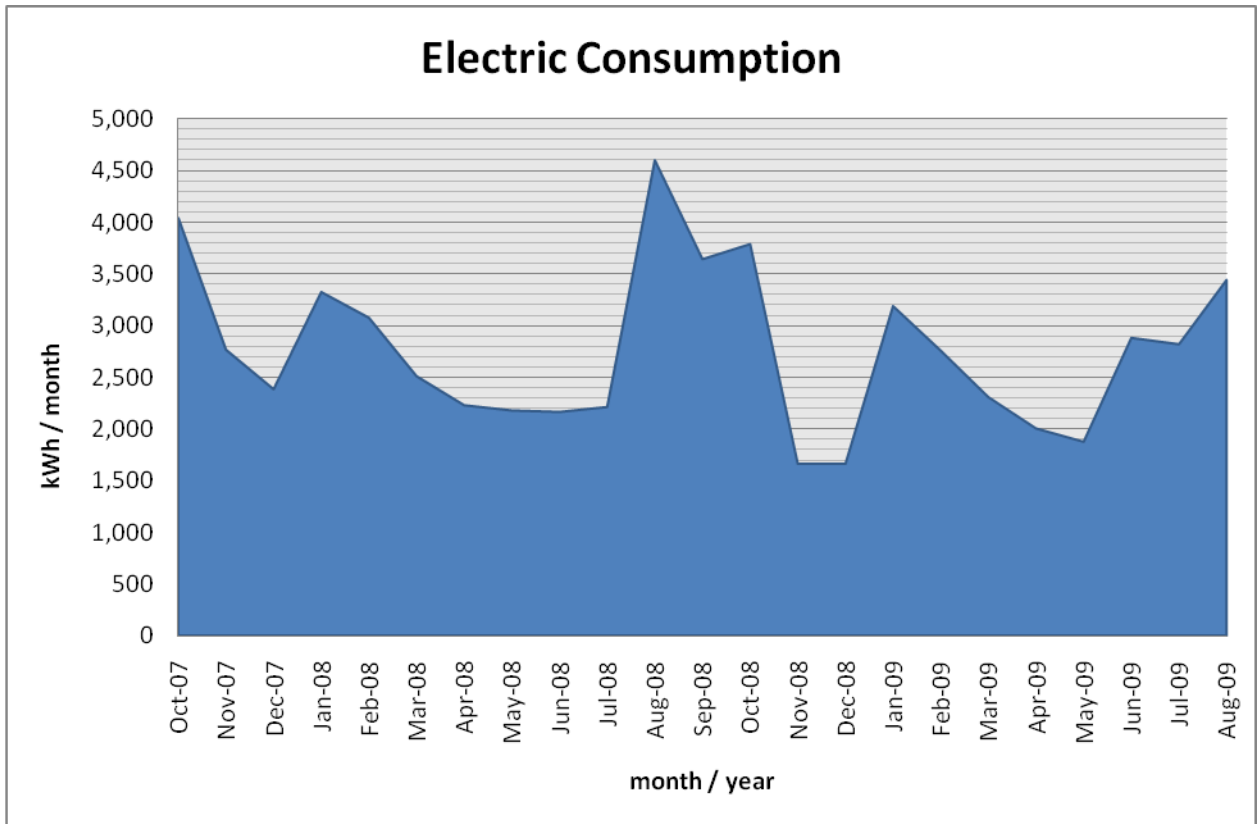
**Description:**

*Geothermal is not applicable for this building because it would not be cost effective, since it would require replacement of the existing HVAC system which still has as a whole a number of useful operating years.*

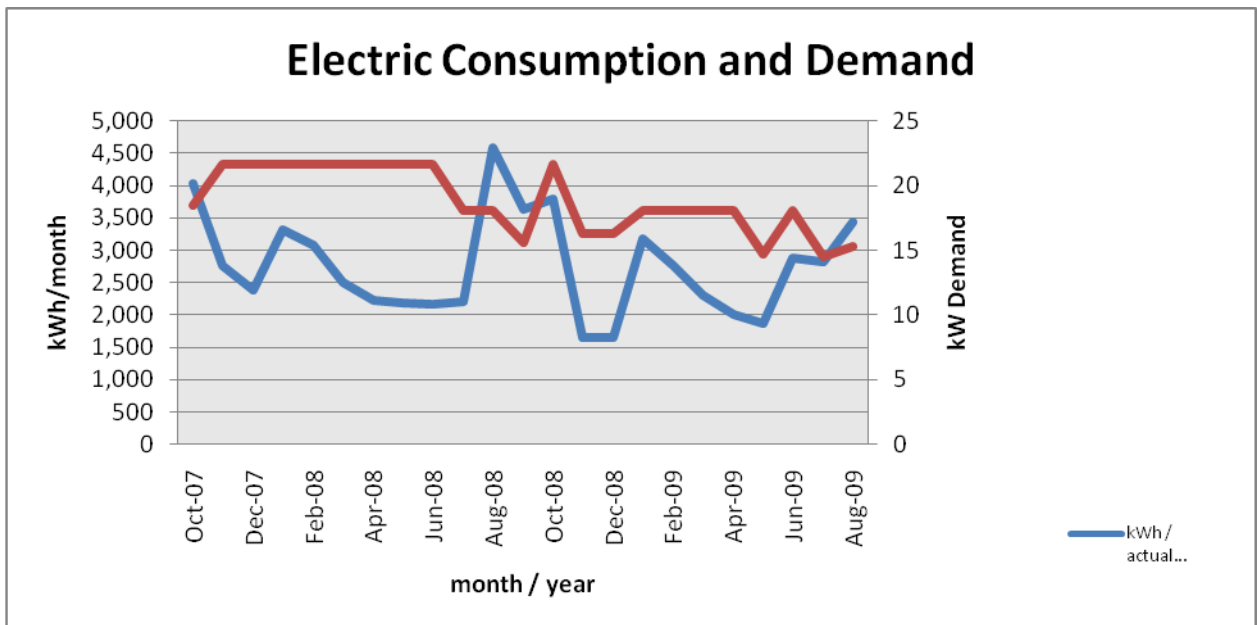
**6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES**

**6.1. Load profiles**

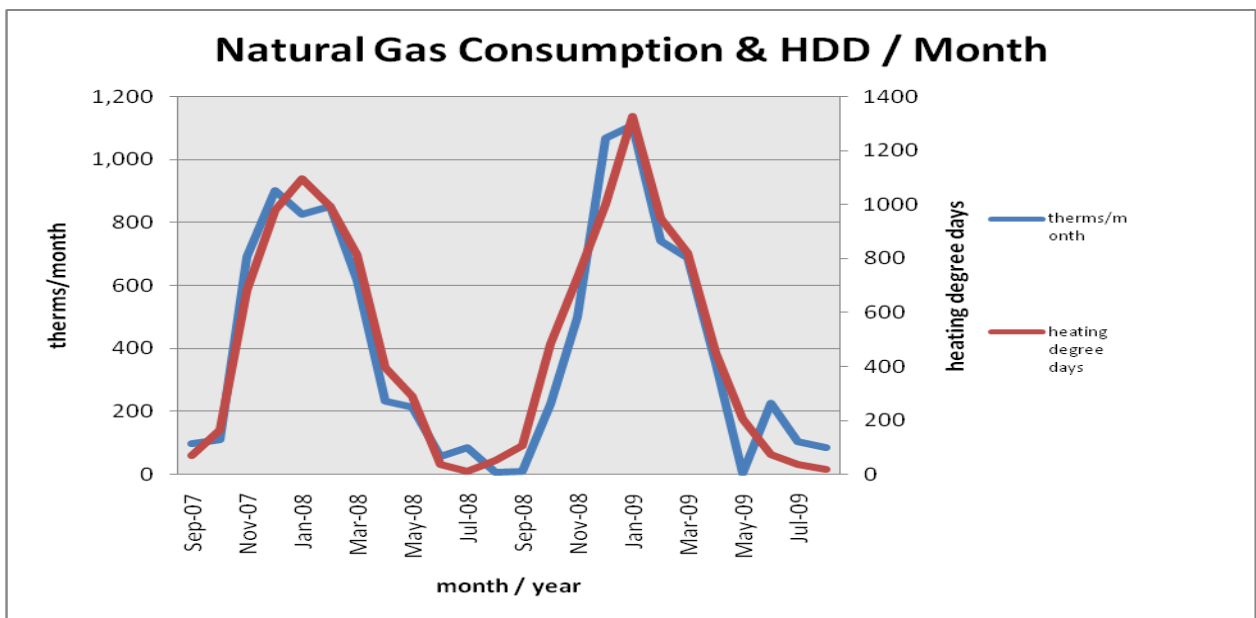
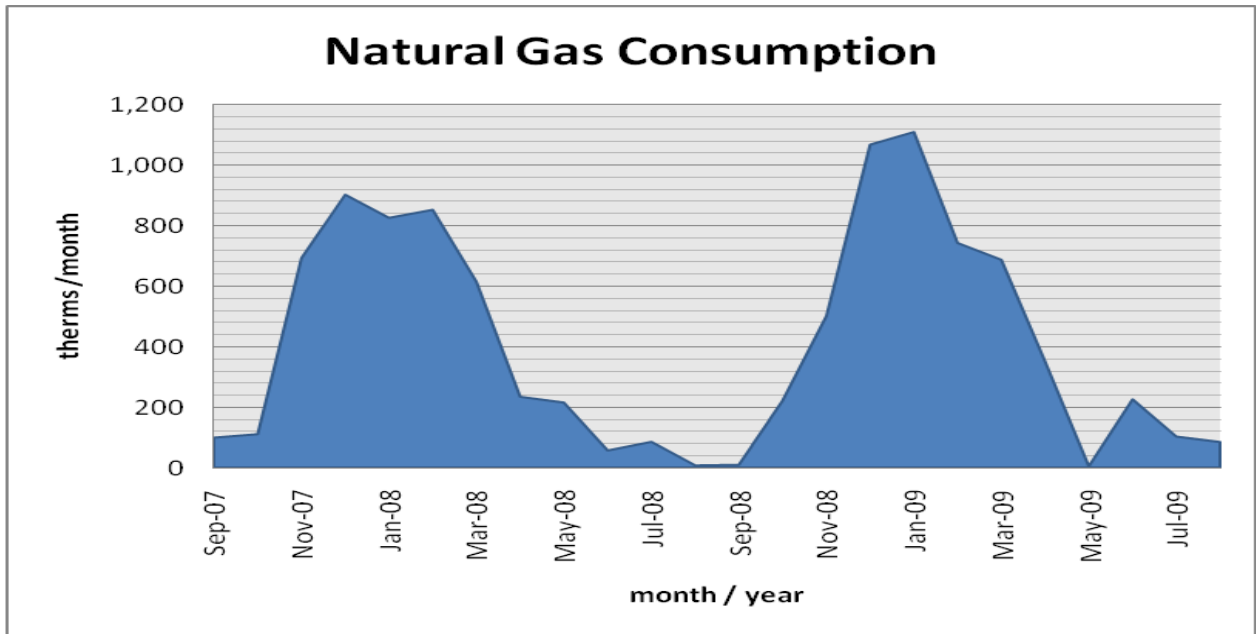
The following are charts that show the annual electric and natural gas load profiles for the Main Netcong Fire House building.



Some minor unusual electric fluctuations shown may be due to adjustments between estimated and actual meter readings. Also, note on the following chart how the electrical Demand peaks (except for a few unusual fluctuation anomalies) follow the electrical consumption peaks.

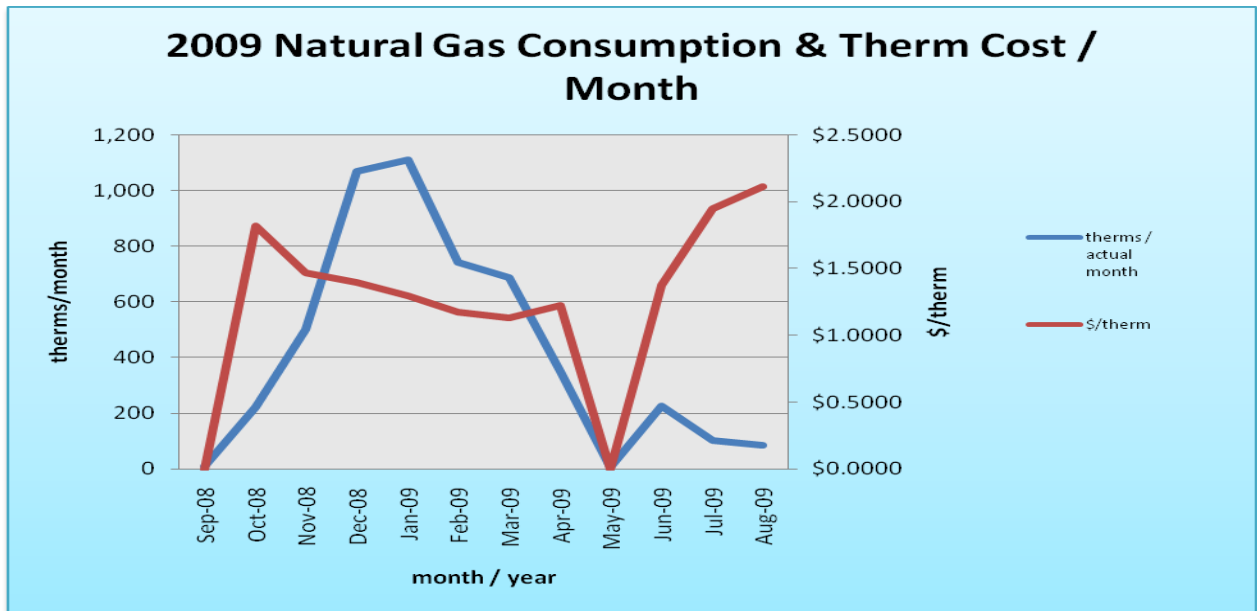


The following is a chart of the natural gas annual load profile for the building, peaking in the coldest months of the year and a chart showing gas consumption following the “heating degree days” curve.



## 6.2. Tariff analysis

Currently, natural gas is provided to the Main Netcong Fire House building via one gas meter with NJNG acting as the supply and transport company. Gas is provided by NJNG at a general service rate. The suppliers' general service rate for natural gas charges a market-rate price based on use and the Main Netcong Fire House building billing does not breakdown demand costs for all periods. 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 building's boiler. The high gas price per therm fluctuations in the summer may be due to high energy costs that occurred in 2008 and low use caps for the non-heating months. Thus the building pays for fixed costs such as meter reading charges during the summer months. So June, July and August cap payments are relatively high in the following chart.

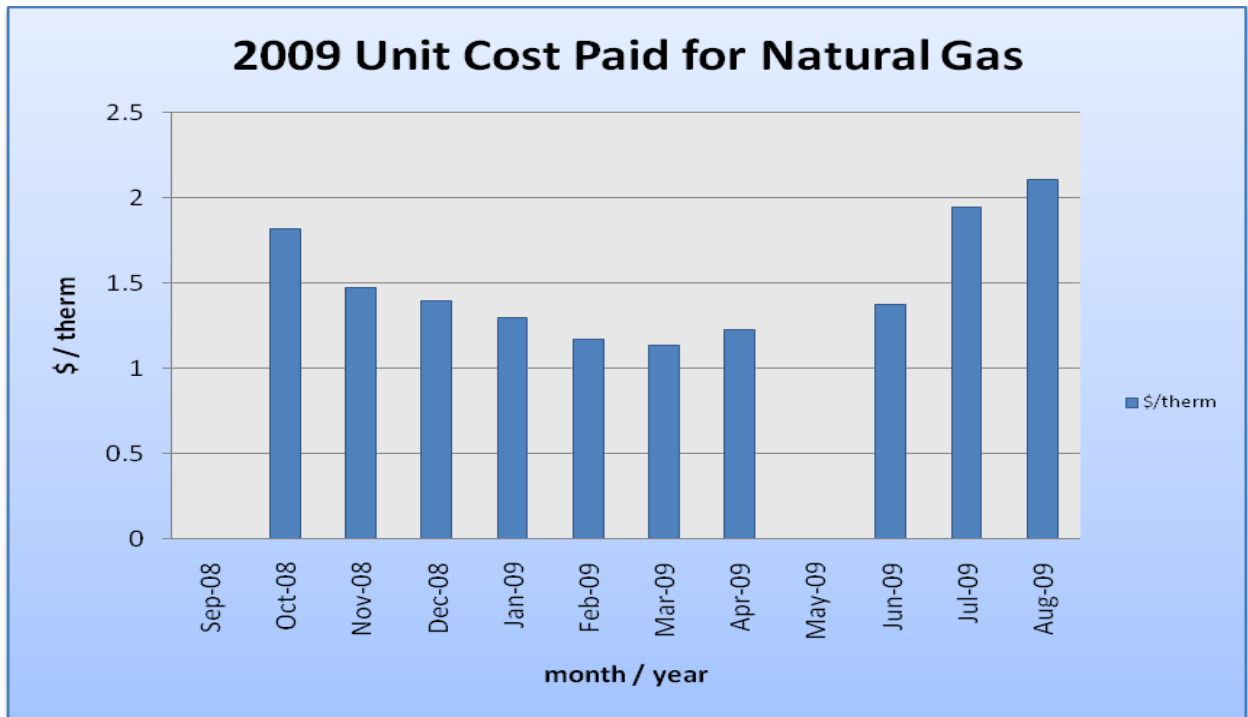
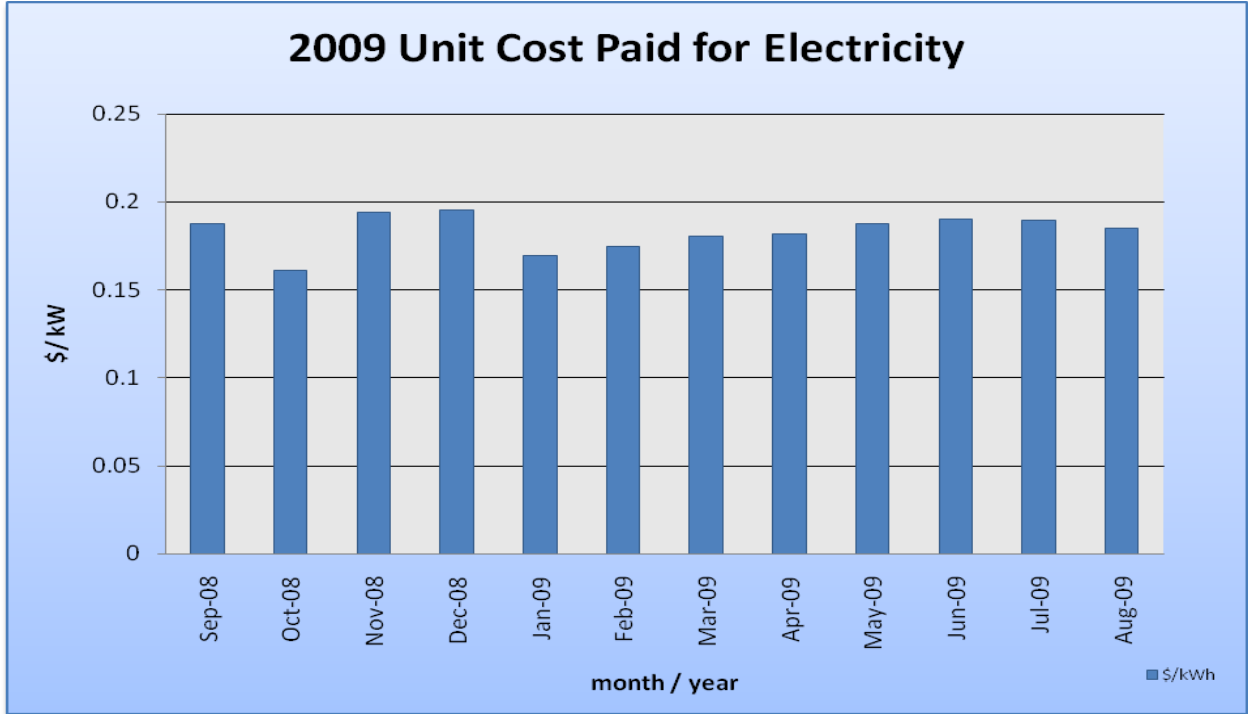


The Main Netcong Fire House building is direct-metered (via one main meter) and currently purchases electricity from JCP&L at a general service rate. The general service rate for electric charges are market-rate based on use and the Main Netcong Fire House building billing does show a breakdown of demand costs. Demand prices are reflected in the utility bills and can be verified by observing the price fluctuations throughout the year. Typically, the electricity prices increase during the cooling months when electricity is used by the HVAC condensing units and air handlers.

### 6.3. Energy Procurement strategies

The Main Netcong Fire House building receives natural gas via one incoming meter. NJNG supplies the gas and transports it. There is not an ESCO engaged in the process. An Energy Services Company (ESCO) is a consultancy group that engages in a performance based contract with a client firm to implement measures which reduce energy consumption and costs in a technically and financially viable manner. Electricity is also purchased via one incoming meter directly for the Main Netcong Fire House building from JCP&L without an ESCO. SWA analyzed the utility rate for natural gas and electricity supply over an extended period. Electric bill analysis shows fluctuations up to 32% over the most recent 12 month period. Natural gas bill analysis shows fluctuations up to 48% over the most recent 12 month period. Some of these fluctuations may have been caused by adjustments between estimated and actual meter readings, others may be due to unusual high and escalating energy costs in 2008. The average estimated NJ commercial utility rates for electric and gas are \$0.150/kWh and \$1.550/therm respectively. This building's annual utility costs are \$1,021 higher for electric and \$940 lower for natural gas for a total of \$81 higher, when compared to the average estimated NJ commercial utility rates. SWA recommends that the Borough of Netcong further explore opportunities of purchasing both natural gas and electricity from ESCOs in order to reduce rate fluctuation and ultimately reduce the annual cost of energy for the Main Netcong Fire House building. Appendix B contains a complete list of third party energy suppliers for the Borough of Netcong service area. The Main Netcong Fire House may want to consider partnering with other school districts, municipalities, townships and communities to aggregate a substantial electric and natural gas use for better leveraging in negotiations with ESCOs and of improving the pricing structures. This sort of activity is happening in many parts of the country and in New Jersey. Also, the Main Netcong Fire House building could be eligible for enrollment in a Demand Response Program, if the Katolight 60 kVA generator together with the Borough Hall (across the street) Kohler 70 kVA emergency generator would be wired in such a way to offer capability to shed a minimum of 100 kW

electric demand when requested by the utility during peak demand periods, which is the typical threshold for considering this option. This setup could allow the Borough of Netcong to negotiate a reimbursement program with the utility company. The following charts show the Main Netcong Fire House building monthly spending per unit of energy from Sept 2008 to Aug 2009.



## 7. METHOD OF ANALYSIS

### 7.1. Assumptions and tools

Energy modeling tool: established / standard industry assumptions  
Cost estimates: RS Means 2009 (Facilities Maintenance & Repair Cost Data)  
RS Means 2009 (Building Construction Cost Data)  
RS Means 2009 (Mechanical Cost Data)  
Published and established specialized equipment material and labor costs  
Cost estimates also based on utility bill analysis and prior experience with similar projects

### 7.2. 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

Netcong Fire House Existing Lighting Conditions													Proposed Lighting											
#	Bldg	Fir	Location in Building	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Type of Lamp	Watts /Lamp	Hrs/ Day	Energy Use (Watt hours / day)	Con-trols	Day-lighting possible?	Fixture Type	Ballast Type	No. of Fixtures	No. of Lamps	Type of Lamp	Watts/ Lamp	Hrs/ Day	Energy Use (Watt hours/ day)	Con-trols	Total Power (Watts)	further W-hr/day reduction with occupancy sensors
1	NFH	GF	Truck Bay	T8 4'	E	13	2	F	32	12	9984	S	no	T8 4'	E	13	2	F	32	12	9984	S	832	2,496
2	NFH	GF	Truck Bay	T12 8'	E	4	2	F	68	24	13056	S	no	T8 4'	E	4	4	F	32	24	9792	S	512	2,448
3	NFH	GF	Truck Bay	T8 2'	E	1	1	F	16	24	384	S	no	T8 2'	E	1	1	F	16	24	384	S	16	96
4	NFH	GF	Office	T8 4'	E	4	2	F	32	2	512	S	no	T8 4'	E	4	2	F	32	2	512	S	256	
5	NFH	GF	Bathroom	T8 4'	E	4	2	F	32	2	512	S	no	T8 4'	E	4	2	F	32	2	512	S	256	
6	NFH	GF	Boiler Rm	T8 4'	E	2	1	F	32	1	64	S	no	T8 4'	E	2	1	F	32	1	64	S	64	
7	NFH	2nd	Main Rm	T8 4'	E	19	4	F	32	2	4864	S	no	T8 4'	E	19	4	F	32	2	4864	S	2432	
8	NFH	2nd	Kitchen	T8 4'	E	1	4	F	32	1	128	S	no	T8 4'	E	1	4	F	32	1	128	S	128	
9	NFH	2nd	Bathroom	T8 4'	E	4	4	F	32	2	1024	S	no	T8 4'	E	4	4	F	32	2	1024	S	512	
10	NFH	2nd	Main Rm	Fluoresc. Exit	E	1	1	F	12	24	288	none	no	LED Exit	-	1	1	LED	5	24	120	none	5	
11	NFH	ext	Wall Sconce	Incand	none	2	1	I	60	12	1440	Timer	N/A	CFL	-	2	1	CFL	15	12	360	Timer	30	
12	NFH	ext	Flood Light	Metal Halide	E	1	1	MH	70	2	140	S	N/A	Metal Halide	-	1	1	MH	70	2	140	S	70	
13	NFH	ext	Flood Light	Metal Halide	E	4	1	MH	70	2	560	S	N/A	Metal Halide	-	4	1	MH	70	2	560	S	280	
14	NFH	ext	Flood Light	Metal Halide	E	1	1	MH	70	2	140	S	N/A	Metal Halide	-	1	1	MH	70	2	140	S	70	
15	NFH	ext	Flood Light	Halogen	-	2	1	Hal	120	2	480	S	N/A	CFL	-	2	1	CFL	40	2	160	S	80	
TOTALS exterior																								
TOTALS interior																								
annual consumption (kWh)																								
estimated cost (\$/year)																								
Netcong Fire House total light power (Watt)																								
Netcong Fire House light power density (Watt/sq ft)																								
Proposed Annual Savings (kWh)																								
Proposed Annual Cost Savings (\$)																								
Proposed Investment (\$)																								
surface area (sq ft)																								
Legend: NFH - Netcong Fire House, M - Magnetic, E - Electronic ; F - fluorescent, incand - incandescent, CFL - compact fluorescent lamp, HPS - high pressure sodium, MH - Metal Halide, S - on/off Switch, Hal - Halogen, GF - Ground Floor, ext - exterior, I - incandescent, OS - Occupancy motion sensor Switch;																								

Note: Last table column shows additional electrical savings if the decision is to change out switches to occupancy sensors.

**Appendix B: Third Party Energy Suppliers (ESCOs)**

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

<b>JCP&amp;L ELECTRICAL SERVICE TERRITORY</b>		
<b>Last Updated: 06/15/09</b>		
<p><b>Hess Corporation</b> 1 Hess Plaza Woodbridge, NJ 07095 (800) 437-7872 <a href="http://www.hess.com">www.hess.com</a></p>	<p><b>BOC Energy Services, Inc.</b> 575 Mountain Avenue Murray Hill, NJ 07974 (800) 247-2644 <a href="http://www.boc.com">www.boc.com</a></p>	<p><b>Commerce Energy, Inc.</b> 4400 Route 9 South, Suite 100 Freehold, NJ 07728 (800) 556-8457 <a href="http://www.commerceenergy.com">www.commerceenergy.com</a></p>
<p><b>Constellation NewEnergy, Inc.</b> 900A Lake Street, Suite 2 Ramsey, NJ 07446 (888) 635-0827 <a href="http://www.newenergy.com">www.newenergy.com</a></p>	<p><b>Direct Energy Services, LLC</b> 120 Wood Avenue Suite 611 Iselin, NJ 08830 (866) 547-2722 <a href="http://www.directenergy.com">www.directenergy.com</a></p>	<p><b>FirstEnergy Solutions Corp.</b> 300 Madison Avenue Morristown, NJ 07962 (800) 977-0500 <a href="http://www.fes.com">www.fes.com</a></p>
<p><b>Glacial Energy of New Jersey, Inc.</b> 207 LaRoche Avenue Harrington Park, NJ 07640 (877) 569-2841 <a href="http://www.glacialenergy.com">www.glacialenergy.com</a></p>	<p><b>Integrus Energy Services, Inc.</b> 99 Wood Ave, South, Suite 802 Iselin, NJ 08830 (877) 763-9977 <a href="http://www.integrusenergy.com">www.integrusenergy.com</a></p>	<p><b>Strategic Energy, LLC</b> 55 Madison Avenue, Suite 400 Morristown, NJ 07960 (888) 925-9115, <a href="http://www.sel.com">www.sel.com</a></p>
<p><b>Liberty Power Holdings, LLC</b> Park 80 West, Plaza II, Suite 200 Saddle Brook, NJ 07663 (866) 769-3799 <a href="http://www.libertypowercorp.com">www.libertypowercorp.com</a></p>	<p><b>Pepco Energy Services, Inc.</b> 112 Main St. Lebanon, NJ 08833 (800) ENERGY-9 (363-7499) <a href="http://www.pepco-services.com">www.pepco-services.com</a></p>	<p><b>PPL EnergyPlus, LLC</b> 811 Church Road Cherry Hill, NJ 08002 (800) 281-2000 <a href="http://www.pplenergyplus.com">www.pplenergyplus.com</a></p>
<p><b>Sempra Energy Solutions</b> The Mac-Cali Building 581 Main Street, 8<sup>th</sup> Floor Woodbridge, NJ 07095 (877) 273-6772 <a href="http://www.semprasolutions.com">www.semprasolutions.com</a></p>	<p><b>South Jersey Energy Company</b> One South Jersey Plaza Route 54 Folsom, NJ 08037 (800) 800-756-3749 <a href="http://www.southjerseyenergy.com">www.southjerseyenergy.com</a></p>	<p><b>Suez Energy Resources NA, Inc.</b> 333 Thornall Street 6th Floor Edison, NJ 08837 (888) 644-1014 <a href="http://www.suezenergyresources.com">www.suezenergyresources.com</a></p>
<p><b>UGI Energy Services, Inc.</b> 704 East Main Street, Suite 1 Moorestown, NJ 08057 (856) 273-9995 <a href="http://www.ugienergyservices.com">www.ugienergyservices.com</a></p>	<p><b>American Powernet Management, LP</b> 437 North Grove St. Berlin, NJ 08009 (800) 437-7872 <a href="http://www.hess.com">www.hess.com</a></p>	<p><b>ConEdison Solutions</b> Cherry Tree, Corporate Center 535 State Highway 38 Cherry Hill, NJ 08002 (888) 665-0955 <a href="http://www.conedsolutions.com">www.conedsolutions.com</a></p>
<p><b>Credit Suisse, (USA) Inc.</b> 700 College Road East Princeton, NJ 08450 212-538-3124 <a href="http://www.creditsuisse.com">www.creditsuisse.com</a></p>	<p><b>Sprague Energy Corp.</b> 12 Ridge Road Chatham Township NJ 07928 (800) 225-1560 <a href="http://www.spragueenergy.com">www.spragueenergy.com</a></p>	

**NJ NATURAL GAS CO. NATURAL GAS SERVICE TERRITORY**

**Last Updated: 06/15/09**

<p><b>Cooperative Industries</b> 412-420 Washington Avenue Belleville, NJ 07109 800-6-BUYGAS (6-289427) <a href="http://www.cooperativenet.com">www.cooperativenet.com</a></p>	<p><b>Direct Energy Services, LLP</b> 120 Wood Avenue, Suite 611 Iselin, NJ 08830 866-547-2722 <a href="http://www.directenergy.com">www.directenergy.com</a></p>	<p><b>Gateway Energy Services Corp.</b> 44 Whispering Pines Lane Lakewood, NJ 08701 800-805-8586 <a href="http://www.gesc.com">www.gesc.com</a></p>
<p><b>UGI Energy Services, Inc. d/b/a/ GASMARK</b> 704 East Main Street, Suite 1 Moorestown, NJ 08057 856-273-9995 <a href="http://www.ugienergyservices.com">www.ugienergyservices.com</a></p>	<p><b>Hess Energy, Inc.</b> One Hess Plaza Woodbridge, NJ 07095 800-437-7872 <a href="http://www.hess.com">www.hess.com</a></p>	<p><b>Intelligent Energy</b> 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024 800-724-1880 <a href="http://www.intelligentenergy.org">www.intelligentenergy.org</a></p>
<p><b>Metromedia Energy, Inc.</b> 6 Industrial Way Eatontown, NJ 07724 877-750-7046 <a href="http://www.metromediaenergy.com">www.metromediaenergy.com</a></p>	<p><b>MxEnergy, Inc.</b> 510 Thornall Street, Suite 270 Edison, NJ 08837 800-375-1277 <a href="http://www.mxenergy.com">www.mxenergy.com</a></p>	<p><b>NATGASCO (Mitchell Supreme)</b> 532 Freeman Street Orange, NJ 07050 800-840-4GAS <a href="http://www.natgasco.com">www.natgasco.com</a></p>
<p><b>NJ Gas &amp; Electric</b> 1 Bridge Plaza, Fl. 2 Fort Lee, NJ 07024 866-568-0290 <a href="http://www.NewJerseyGasElectric.com">www.NewJerseyGasElectric.com</a></p>	<p><b>Pepco Energy Services, Inc.</b> 112 Main Street Lebanon, NJ 08833 800-363-7499 <a href="http://www.pepco-services.com">www.pepco-services.com</a></p>	<p><b>PPL EnergyPlus, LLC</b> 811 Church Road - Office 105 Cherry Hill, NJ 08002 800-281-2000 <a href="http://www.pplenergyplus.com">www.pplenergyplus.com</a></p>
<p><b>South Jersey Energy Company</b> One South Jersey Plaza, Route 54 Folsom, NJ 08037 800-756-3749 <a href="http://www.sjindustries.com/sje.htm">www.sjindustries.com/sje.htm</a></p>	<p><b>Sprague Energy Corp.</b> 12 Ridge Road Chatham Township, NJ 07928 800-225-1560 <a href="http://www.spragueenergy.com">www.spragueenergy.com</a></p>	<p><b>Woodruff Energy</b> 73 Water Street Bridgeton, NJ 08302 800-557-1121 <a href="http://www.woodruffenergy.com">www.woodruffenergy.com</a></p>