

**TOWNSHIP OF MARLBORO**

**MARLBORO FIRST AID SQUAD**

**146 WYNCREST ROAD**  
**MARLBORO, NJ 07746**

**FACILITY ENERGY REPORT**

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**I. HISTORIC ENERGY CONSUMPTION/COST**

The energy usage for the facility has been tabulated and plotted in graph form as depicted within this section. Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner.

Electric Utility Provider:	Jersey Central Power & Light
Electric Utility Rate Structure:	General Service Secondary 3 Phase
Third Party Supplier:	Viridian Energy

Natural Gas Utility Provider:	New Jersey Natural Gas (NJNG)
Utility Rate Structure:	General Service Secondary (GSS)
Third Party Supplier:	N/A

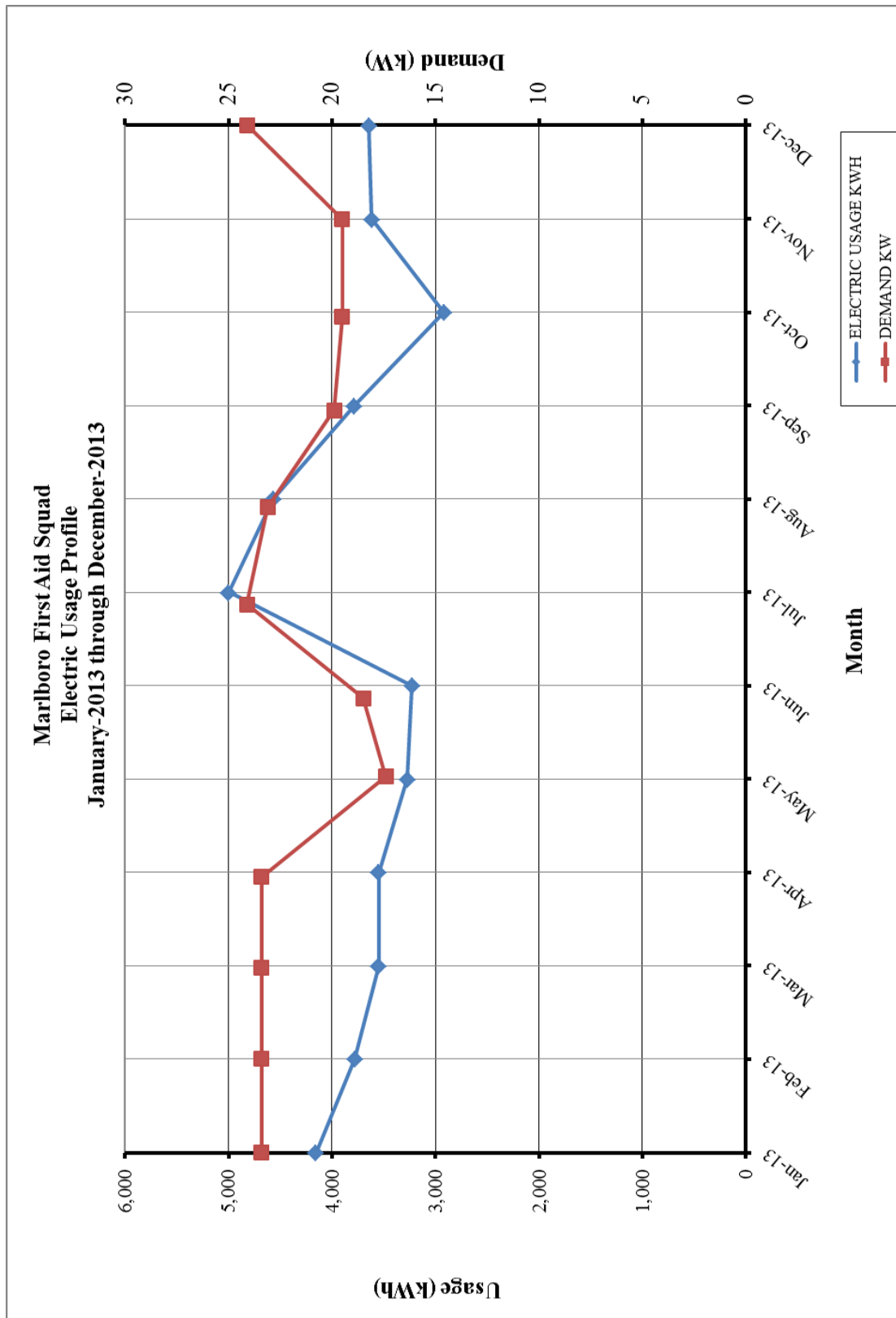
The electric usage profile represents the actual electrical usage for the facility. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

The gas usage profile within each facility report shows the actual natural gas energy usage for the facility. The gas utility measures consumption in cubic feet x 100 (CCF), and converts the quantity into Therms of energy. One Therm is equivalent to 100,000 BTUs of energy.

**Table 1**  
**Electricity Billing Data**

<b>ELECTRIC USAGE SUMMARY</b>			
Utility Provider: Jersey Central Power & Light Rate: General Service Secondary 3 Phase Meter No: G28639376 Account No: 100 011 800 289 Third Party Utility Provider: Viridian Energy TPS Meter / Acct No: 36566332183751			
<b>MONTH OF USE</b>	<b>CONSUMPTION KWH</b>	<b>DEMAND KW</b>	<b>TOTAL BILL</b>
Jan-13	4,156	23.4	\$621
Feb-13	3,779	23.4	\$582
Mar-13	3,547	23.4	\$555
Apr-13	3,548	23.4	\$555
May-13	3,274	17.4	\$533
Jun-13	3,226	18.5	\$570
Jul-13	5,000	24.1	\$880
Aug-13	4,568	23.1	\$828
Sep-13	3,782	19.9	\$691
Oct-13	2,917	19.5	\$553
Nov-13	3,618	19.5	\$656
Dec-13	3,644	24.1	\$646
<b>Totals</b>	<b>45,059</b>	<b>24.1 Max</b>	<b>\$7,670</b>
<b>AVERAGE DEMAND      21.6 KW average</b> <b>AVERAGE RATE      \$0.170 \$/kWh</b>			

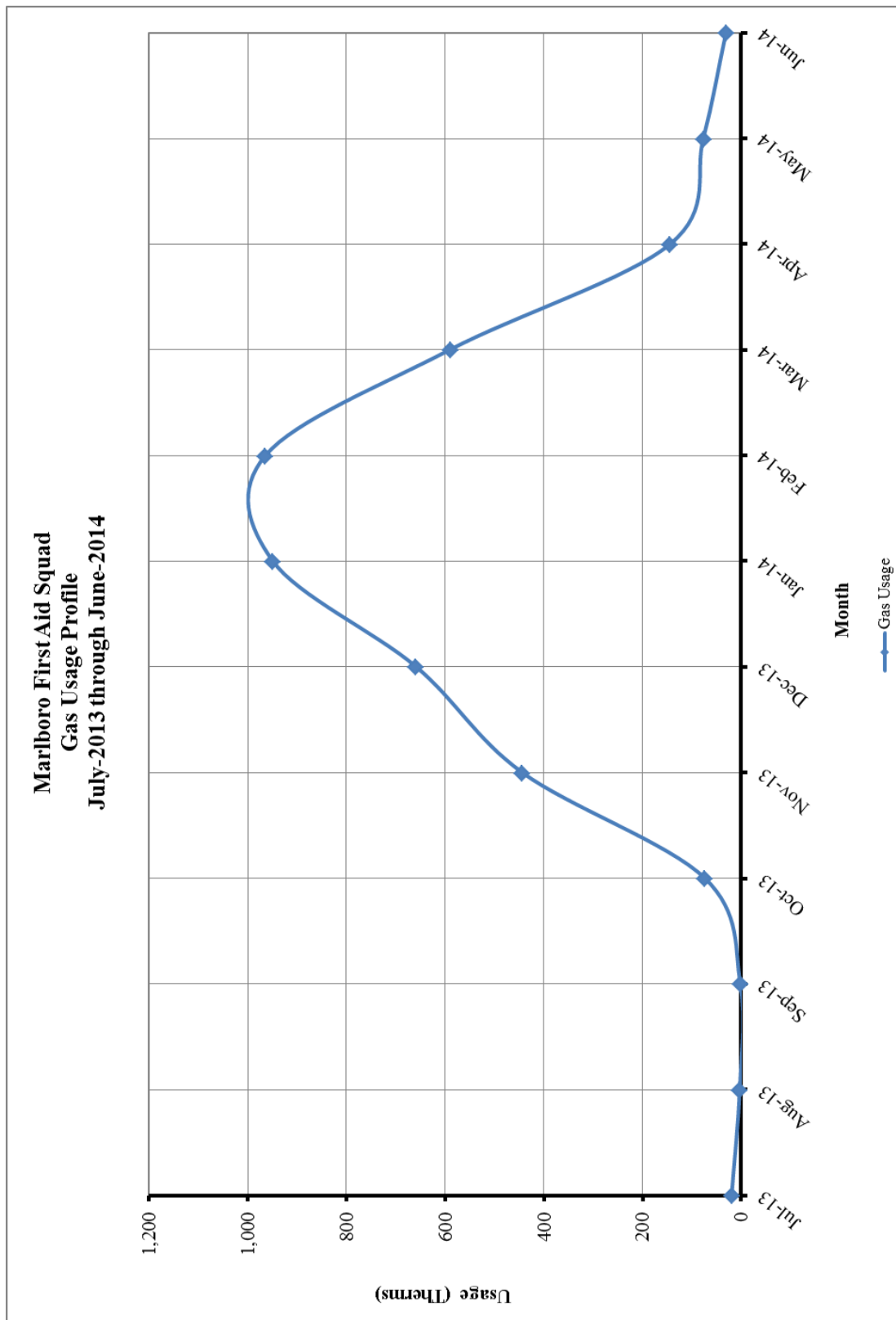
**Figure 1**  
**Electricity Usage Profile**



**Table 2**  
**Natural Gas Billing Data**

<b>NATURAL GAS USAGE SUMMARY</b>		
Utility Provider: New Jersey Natural Gas (NJNG)		
Rate: GSS		
Meter No: 00658304		
Account No: 20-3487-4105-14		
Third Party Utility Provider: N/A		
TPS Meter No: N/A		
<b>MONTH OF USE</b>	<b>CONSUMPTION (THERMS)</b>	<b>TOTAL BILL</b>
Jul-13	19.51	\$46.45
Aug-13	3.25	\$28.58
Sep-13	2.16	\$27.38
Oct-13	74.02	\$105.96
Nov-13	444.28	\$496.75
Dec-13	659.15	\$694.42
Jan-14	949.59	\$982.57
Feb-13	964.13	\$997.24
Mar-14	589.94	\$619.90
Apr-14	143.80	\$170.01
May-14	76.84	\$102.48
Jun-14	30.93	\$56.19
<b>TOTALS</b>	<b>3,957.60</b>	<b>\$4,327.93</b>
<b>AVERAGE RATE:</b>	<b>\$1.09</b>	<b>\$/THERM</b>

**Figure 2**  
**Natural Gas Usage Profile**



## II. FACILITY DESCRIPTION

The Marlboro First Aid Squad is located at 146 Wyncrest Road in Marlboro Township, New Jersey. This 5,112 SF facility was built in 1988 with no additions. The building is a single-story facility with a ground level two-bay garage area. The facility is mostly comprised of offices and open office space, conference room, file storage, and a two-bay garage for the emergency vehicles.

### Occupancy Profile

The Marlboro First Aid Squad is a volunteer facility but the typical hours of operation for most of the facility are Monday through Friday between 8:00 am and 5:00 pm. There are approximately 3 to 5 employees that normally occupy the facility.

### Building Envelope

Exterior walls are masonry brick faced with a concrete block construction. The windows throughout the facility are in average condition. Typical windows are double pane, 1/4" with aluminum frames. The roof is a built-up bitumen system over insulation and metal decking supported by structural steel joists. The amount of insulation under the roof could not be determined.

### HVAC Systems

The office portion of the facility is heated/cooled by packaged gas-fired, DX rooftop units as follows:

<u>Unit ID</u>	<u>Mfg.</u>	<u>Cooling Capacity</u>	<u>Heating Capacity</u>	<u>Heating/Cooling Eff.</u>
RTU-1	Trane	Estimate ~5-Tons	No Tag	Est~80%/9.5 EER
RTU-2	Trane	Estimate ~10-Tons	No Tage	Est~80%/8.0 EER

The two-bay garage is heated by a Reznor Model F130 gas-fired unit heater rated at 130 MBH and approximately 80% efficient and another ceiling hung unit heater which did not have any model information.

### Exhaust System

Toilet exhaust air is relieved through roof-mounted exhaust fans.

### HVAC System Controls

The heating and cooling is controlled by various thermostats throughout the facility.



Domestic Hot Water

The domestic hot water is provided by a gas fired A.O. Smith Model BT 199 880 tank water heater with a capacity of 84 gallons and rated at 199 MBH located in the mechanical room.

Lighting

Refer to the Investment Grade lighting Audit Appendix for a detailed list of the lighting throughout the facility and estimated operating hours per space.

### III. MAJOR EQUIPMENT LIST

The equipment list contains major energy consuming equipment that through implementation of energy conservation measures could yield substantial energy savings. The list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment in some cases if a manufactures date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Refer to the **Major Equipment List Appendix** for this facility.

#### IV. ENERGY CONSERVATION MEASURES

Energy Conservation Measures are developed specifically for this facility. The energy savings and calculations are highly dependent on the information received from the site survey and interviews with operations personnel. The assumptions and calculations should be reviewed by the owner to ensure accurate representation of this facility. The following ECMs were analyzed:

**Table 1**  
**ECM Financial Summary**

<b>ENERGY CONSERVATION MEASURES (ECM's)</b>					
<b>ECM NO.</b>	<b>DESCRIPTION</b>	<b>NET INSTALLATION COST<sup>A</sup></b>	<b>ANNUAL SAVINGS<sup>B</sup></b>	<b>SIMPLE PAYBACK (Yrs)</b>	<b>SIMPLE LIFETIME ROI</b>
ECM #1	Lighting Upgrade - General	\$12,185	\$1,871	6.5	130.3%
ECM #2	Lighting Upgrade - Exterior	\$6,670	\$2,201	3.0	395.0%
ECM #3	Lighting Controls Upgrade	\$80	\$155	0.5	2806.3%
ECM #4	Unit Heater Replacement	\$5,500	\$384	14.3	-9.2%
ECM #5	Rooftop Unit Replacements	\$28,810	\$784	36.7	-59.2%
ECM #6	Energy Star Refrigerators	\$610	\$25	24.4	-59.0%
ECM #7	Vending Miser Controls	\$300	\$435	0.7	1350.6%
<b>RENEWABLE ENERGY MEASURES (REM's)</b>					
<b>ECM NO.</b>	<b>DESCRIPTION</b>	<b>NET INSTALLATION COST</b>	<b>ANNUAL SAVINGS</b>	<b>SIMPLE PAYBACK (Yrs)</b>	<b>SIMPLE LIFETIME ROI</b>
REM #1	31.2 kW PV System	\$161,765	\$13,115	12.3	21.6%

**Notes:** A. Cost takes into consideration applicable NJ Smart Start<sup>TM</sup> incentives.

B. Savings takes into consideration applicable maintenance savings.

**Table 2**  
**ECM Energy Summary**

<b>ENERGY CONSERVATION MEASURES (ECM's)</b>				
<b>ECM NO.</b>	<b>DESCRIPTION</b>	<b>ANNUAL UTILITY REDUCTION</b>		
		<b>ELECTRIC DEMAND (KW)</b>	<b>ELECTRIC CONSUMPTION (KWH)</b>	<b>NATURAL GAS (THERMS)</b>
ECM #1	Lighting Upgrade - General	5.6	11,007	0
ECM #2	Lighting Upgrade - Exterior	5.0	12,948	0
ECM #3	Lighting Controls Upgrade	0.0	913	0
ECM #4	Unit Heater Replacement	0.0	0	349
ECM #5	Rooftop Unit Replacements	7.7	4,613	0
ECM #6	Energy Star Refrigerators	0.0	148	0
ECM #7	Vending Miser Controls	0.0	2,560	0
<b>RENEWABLE ENERGY MEASURES (REM's)</b>				
<b>ECM NO.</b>	<b>DESCRIPTION</b>	<b>ANNUAL UTILITY REDUCTION</b>		
		<b>ELECTRIC DEMAND (KW)</b>	<b>ELECTRIC CONSUMPTION (KWH)</b>	<b>NATURAL GAS (THERMS)</b>
REM #1	31.2 kW PV System	31.2	36,321	0

**Table 3**  
**ECM Emissions Summary**

<b>ENERGY CONSERVATION MEASURES (ECM's)</b>				
<b>ECM NO.</b>	<b>DESCRIPTION</b>	<b>GREENHOUSE GAS EMISSIONS REDUCTION</b>		
		<b>CO<sub>2</sub> EMISSIONS (LBS)</b>	<b>NO<sub>x</sub> EMISSIONS (LBS)</b>	<b>SO<sub>2</sub> EMISSIONS (LBS)</b>
ECM #1	Lighting Upgrade - General	16,731	31	72
ECM #2	Lighting Upgrade - Exterior	19,681	36	84
ECM #3	Lighting Controls Upgrade	1,388	3	6
ECM #4	Unit Heater Replacement	4,083	3	0
ECM #5	Rooftop Unit Replacements	7,012	13	30
ECM #6	Energy Star Refrigerators	225	0	1
ECM #7	Vending Miser Controls	3,891	7	17
<b>Notes:</b>	A. Emissions Reduction based on NJCEP published factors for electric & gas.			

**Table 4**  
**Facility Project Summary**

<b>FACILITY PROJECT SUMMARY TABLE</b>					
<b>ENERGY CONSERVATION MEASURES</b>	<b>ANNUAL ENERGY SAVINGS (\$)</b>	<b>PROJECT COST (\$)</b>	<b>SMART START INCENTIVES</b>	<b>CUSTOMER COST</b>	<b>SIMPLE PAYBACK</b>
Lighting Upgrade - General	\$1,871	\$12,185	\$0	\$12,185	6.5
Lighting Upgrade - Exterior	\$2,201	\$7,870	\$1,200	\$6,670	3.0
Lighting Controls Upgrade	\$155	\$100	\$20	\$80	0.5
Unit Heater Replacement	\$384	\$7,000	\$1,500	\$5,500	14.3
Rooftop Unit Replacements	\$784	\$30,000	\$1,190	\$28,810	36.7
Energy Star Refrigerators	\$25	\$610	\$0	\$610	24.4
Vending Miser Controls	\$435	\$300	\$0	\$300	0.7
<b>Total Project</b>	<b>\$5,855</b>	<b>\$58,065</b>	<b>\$3,910</b>	<b>\$54,155</b>	<b>9.2</b>

Note the measure totals in this table do not take into account interactive effects of measures; see Method of Analysis Section III in Executive Report for further explanation.

This project does not qualify for additional incentives through the Pay for Performance Program; please see the Installation Funding Options section for additional program options.

## ECM #1: Lighting Upgrade – General

### Description:

The majority of the interior lighting throughout the Marlboro First Aid Squad is provided with fluorescent fixtures with older generation, T12 lamps and magnetic ballasts. These fixtures can be replaced and retrofit with new LED type fixtures and lamps.

This ECM includes replacing and retrofitting the interior lighting with new LED type lamps and fixtures. It is recommended the Township consult with a professional engineer prior to retrofitting or replacing fixtures to ensure code required minimum light levels will be met.

### Energy Savings Calculations:

The **Investment Grade Lighting Audit Appendix** outlines the hours of operation, proposed retrofits, costs, savings, and payback periods for each set of fixtures in the each building.

LIGHTING UPGRADE SAVINGS SUMMARY	
DESCRIPTION	SAVINGS
Electric Demand Savings (kW)	5.6
Electric Usage Savings (kWh)	11,007
Electric Cost Savings (\$)	\$1,871

### Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$12,185
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$12,185
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$1,871
Total Yearly Savings (\$/Yr):	\$1,871
Estimated ECM Lifetime (Yr):	15
Simple Payback	6.5
Simple Lifetime ROI	130.3%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$28,065
Internal Rate of Return (IRR)	13%
Net Present Value (NPV)	\$10,150.88

## ECM #2: Lighting Upgrade – Exterior Lighting

### Description:

The exterior lighting at the Marlboro First Aid Squad is currently lit by metal halide and high pressure sodium fixtures. The exterior would be better served with more efficient LED lighting system. Concord Engineering recommends upgrading the lighting to an energy-efficient LED lighting system that includes LED lamps and fixtures for the existing exterior lighting.

This ECM would replace the existing exterior lamps and fixtures with equivalent LED lamps and fixtures.

### Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in **Investment Grade Lighting Audit Appendix** that outlines the proposed retrofits, costs, savings, and payback periods.

LIGHTING UPGRADE SAVINGS SUMMARY	
DESCRIPTION	SAVINGS
Electric Demand Savings (kW)	5.0
Electric Usage Savings (kWh)	12,948
Electric Cost Savings (\$)	\$2,201

### Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$7,870
NJ Smart Start Equipment Incentive (\$):	\$1,200
Net Installation Cost (\$):	\$6,670
Maintenance Savings (\$/Yr):	\$0
Energy Savings (\$/Yr):	\$2,201
Total Yearly Savings (\$/Yr):	\$2,201
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.0
Simple Lifetime ROI	395.0%
Simple Lifetime Maintenance Savings	\$0
Simple Lifetime Savings	\$33,015
Internal Rate of Return (IRR)	33%
Net Present Value (NPV)	\$19,605.40



## ECM #3: Lighting Controls Upgrade – Occupancy Sensors

### Description:

Some of the lights in the Marlboro First Aid Squad are left on unnecessarily. In many cases the lights are left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. This is common in rooms that are occupied for only short periods and only a few times per day. In some instances lights are left on due to the misconception that it is better to keep the lights on rather than to continuously switch lights on and off. Although increased switching reduces lamp life, the energy savings outweigh the lamp replacement costs. The payback timeframe for when to turn the lights off is approximately two minutes. If the lights are expected to be off for at least a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is adequate to provide reduced lighting levels when full light output is not needed. Occupancy sensors detect motion and will switch the lights on when the room is occupied. Occupancy sensors can either be mounted in place of a current wall switch, or on the ceiling to cover large areas.

The U.S. Department of Energy sponsored a study to analyze energy savings achieved through various types of building system controls. The referenced savings is based on the “Advanced Sensors and Controls for Building Applications: Market Assessment and Potential R&D Pathways,” document posted for public use April 2005. The study has found that commercial buildings have the potential to achieve significant energy savings through the use of building controls. The average energy savings are as follows based on the report:

- Occupancy Sensors for Lighting Control                      20% - 28% energy savings.

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 20% of the total light energy controlled by occupancy sensors.

This ECM includes installation of ceiling or switch mount sensors for mostly offices. Sensors shall be manufactured by SensorSwitch, Watt Stopper or equivalent. The **Investment Grade Lighting Audit Appendix** of this report includes the summary of lighting controls implemented in this ECM and outlines the proposed controls, costs, savings, and payback periods. The calculations adjust the lighting power usage by the applicable percent savings for each area that includes lighting controls.

### Energy Savings Calculations:

$$\text{Energy Savings} = (\% \text{ Savings} \times \text{Controlled Light Energy (kWh/Yr)})$$

$$\text{Savings} = \text{Energy Savings (kWh)} \times \text{Ave Elec Cost} \left( \frac{\$}{\text{kWh}} \right)$$

<b>LIGHTING CONTROLS SAVINGS SUMMARY</b>	
<b>DESCRIPTION</b>	<b>SAVINGS</b>
Electric Usage Savings (kWh)	913
Electric Cost Savings (\$)	\$155

**Rebates and Incentives:**

From the **NJ Smart Start® Program Incentives Appendix**, the installation of a lighting control device warrants the following incentive:

**Smart Start Incentive**

$$= (\# \text{ Wall mount sensors} \times \$20 \text{ per sensor}) \\ + (\# \text{ Ceiling mount sensors} \times \$35 \text{ per sensor})$$

**Energy Savings Summary:**

<b>ECM #3 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$100
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$20
<b>Net Installation Cost (\$):</b>	\$80
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$155
<b>Total Yearly Savings (\$/Yr):</b>	\$155
<b>Estimated ECM Lifetime (Yr):</b>	15
<b>Simple Payback</b>	0.5
<b>Simple Lifetime ROI</b>	2806.3%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$2,325
<b>Internal Rate of Return (IRR)</b>	194%
<b>Net Present Value (NPV)</b>	\$1,770.38

## ECM #4: Infra-Red Radiant Unit Heaters

### Description:

The Marlboro First Aid Squad has a two vehicle bays containing two (2) gas fired unit heaters (total) mounted from the ceiling steel structure. The two unit heaters have 130 MBH input and 104 MBH output. One unit heater has and one has not yet surpassed their ASHRAE service life but can benefit from infrared heating. These units are used to keep the garage at 65°F in the wintertime.

This ECM would upgrade the Marlboro First Aid Squad by installing more efficient gas-fired, infrared tube heaters rated at 90% thermal efficiency. When compared to convective heating systems, Infrared heaters provide more efficient heating in large areas and warehouses because they only heat people and objects (not air). The installation will require venting and unit combustion air piping. Basis of design for replacement of the existing unit heaters with infrared tube heating is the Sterling SLR100 infrared heater or equivalent.

### Energy Savings Calculations:

INFRA-RED RADIANT UNIT HEATER CALCULATIONS			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
ECM INPUTS	Existing Unit Heaters	New Radiant Heating System	-
Existing Nat Gas (Therms)	1,208	-	-
Efficiency (%)	80%	90%	10%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	-
Equivalent Building Heat Usage (MMBTUs)	97	97	-
Ave. Gas Cost (\$/Therm)	1.10	1.10	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	EXISTING	PROPOSED	SAVINGS
Natural Gas Usage (Therms)	1,208	859	349
Energy Cost (\$)	\$1,328	\$945	\$384
COMMENTS:			

**Energy Savings Summary:**

<b>ECM #4 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$7,000
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$1,500
<b>Net Installation Cost (\$):</b>	\$5,500
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$384
<b>Total Yearly Savings (\$/Yr):</b>	\$384
<b>Estimated ECM Lifetime (Yr):</b>	13
<b>Simple Payback</b>	14.3
<b>Simple Lifetime ROI</b>	-9.2%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$4,992
<b>Internal Rate of Return (IRR)</b>	-1%
<b>Net Present Value (NPV)</b>	(\$1,416.18)

## ECM #5: Packaged Rooftop Unit Replacements

### Description:

The Marlboro First Aid Squad has two (2) Trane packaged rooftop units which serve several areas within the building. The rooftop units did not contain any model or size information but based on the condition of the equipment and age of the building these units are at least 20 years old. Therefore, these rooftop units have surpassed their ASHRAE service life expectancy of 15 years. Replacing these units with newer more efficient units would result in significant energy savings.

The units currently installed have lower efficiencies compared to modern high-efficiency units. New units provide higher full load and part load efficiencies due to advances in inverter motor technologies, higher efficiency refrigerants such as R410A which would be used in place of R12 that is currently used in the unit.

This ECM includes replacement of the older rooftop units with new higher efficiency rooftops. It is recommended to fully evaluate the capacity needed for the new rooftop units prior to moving forward with this ECM. A summary of the unit replacement for this ECM can be found in the table below:

IMPLEMENTATION SUMMARY					
ECM INPUTS	SERVICE FOR	NUMBER OF UNITS	COOLING CAPACITY, BTU/HR	TOTAL CAPACITY, TONS	REPLACE UNIT WITH
RTU-1	Packaged Rooftop	1	60,000	5.0	Lennox Strategos or Equivalent
RTU-2	Packaged Rooftop	1	120,000	10.0	Lennox Strategos or Equivalent
<b>Total</b>		<b>2</b>	<b>180,000</b>	<b>15.0</b>	

The high-efficiency rooftops used as the basis for the calculation are Lennox Strategos. The unit pricing and install cost were estimated based on current rates quotes and labor rates. The payback may change based on actual unit pricing and installed costs if the ECM is implemented.

### Energy Savings Calculations:

#### Cooling Energy Savings:

Seasonal energy consumption of the air conditioners at the cooling mode is calculated with the equation below:

$$\text{Energy Savings, kWh} = \text{Cooling Capacity, } \frac{\text{BTU}}{\text{Hr}} \times \left( \frac{1}{\text{SEER}_{\text{Old}}} - \frac{1}{\text{SEER}_{\text{New}}} \right) \times \frac{\text{Operation Hours}}{1000 \frac{\text{W}}{\text{kWh}}}$$

$$\text{Demand Savings, kW} = \frac{\text{Energy Savings (kWh)}}{\text{Hours of Cooling}}$$

$$\text{Cooling Cost Savings} = \text{Energy Savings, kWh} \times \text{Cost of Electricity} \left( \frac{\$}{\text{kWh}} \right)$$

ENERGY SAVINGS CALCULATIONS							
ECM INPUTS	EXISTING COOLING CAPACITY, BTU/Hr	ANNUAL COOLING HOURS	EXISTING UNIT EFFICIENCY	NEW UNIT EFFICIENCY	# OF UNITS	ENERGY SAVINGS kWh	DEMAND SAVINGS kW
RTU-1	60,000	600	9.5 SEER	15.5 SEER	1	1,467	2.4
RTU-2	120,000	600	8 EER	12.3 EER	1	3,146	5.2
<b>Total</b>					2	4,613	7.7

### Project Cost, Incentives and Maintenance Savings

From the NJ Smart Start<sup>®</sup> Program appendix, the replacement of split system AC units and unitary systems with high efficiency AC systems falls under the category “Unitary HVAC Split System” and warrants an incentive based on efficiency (EER/SEER). The program incentives are calculated as follows:

$$\text{Smart Start}^{\text{®}} \text{ Incentive} = (\text{Cooling Tons} \times \$/\text{Ton Incentive})$$

AC UNITS REBATE SUMMARY				
UNIT DESCRIPTION	UNIT EFFICIENCY	REBATE \$/TON	PROPOSED CAPACITY TONS	TOTAL REBATE \$
≥ 5.4 to < 11.25 tons	11.5 EER	73	10.0	\$730
5.4 tons or less Unitary AC and Split System	≥14 SEER	\$92	5.0	\$460
<b>TOTAL</b>			<b>15</b>	<b>\$1,190</b>

**Energy Savings Summary:**

<b>ECM #5 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$30,000
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$1,190
<b>Net Installation Cost (\$):</b>	\$28,810
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$784
<b>Total Yearly Savings (\$/Yr):</b>	\$784
<b>Estimated ECM Lifetime (Yr):</b>	15
<b>Simple Payback</b>	36.7
<b>Simple Lifetime ROI</b>	-59.2%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$11,760
<b>Internal Rate of Return (IRR)</b>	-10%
<b>Net Present Value (NPV)</b>	(\$19,450.66)

## ECM #6: Energy Star Refrigerator

### Description:

The Marlboro First Aid Squad has a Hotpoint Model HTS18GBS residential style refrigerator with an adjusted rating of 539 kWh per year that is 9 years old. This unit is an older model that is not nearly as energy efficient as those manufactured today.

The proposed replacement is a one-for-one unit of similar size and dimensions that has the most up-to-date Energy Star Rating. The Frigidaire model FFHT1513LQ or equivalent should be considered as the replacement for this measure. (Note: There are currently no NJ OCE incentives for commercial property refrigerator replacement.)

### Energy Savings Calculations:

ENERGY STAR REFRIGERATOR CALCULATION			
ECM INPUTS	EXISTING	PROPOSED	SAVINGS
Quantity	1	1	
Manufacturer	Hotpoint	Frigidaire	
Type	Top Freezer	Top Freezer	
Model	HTS18GBS	FFHT1814LW	
Size (Cu-Ft)	18.2	18.2	
Per Unit Electric Usage (kWh)	539	391	
Electric Rate (\$/kWh)	\$0.170	\$0.170	
ENERGY SAVINGS CALCULATIONS			
Electric Usage (kWh)	539	391	148
Energy Cost (\$)	\$92	\$66	\$25
<b>COMMENTS:</b>	Calculations based Energy Star Website <a href="http://www.energystar.gov/index.cfm?fuseaction=refrig.calculator">http://www.energystar.gov/index.cfm?fuseaction=refrig.calculator</a>		



**Energy Savings Summary:**

<b>ECM #6 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$610
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$0
<b>Net Installation Cost (\$):</b>	\$610
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$25
<b>Total Yearly Savings (\$/Yr):</b>	\$25
<b>Estimated ECM Lifetime (Yr):</b>	10
<b>Simple Payback</b>	24.4
<b>Simple Lifetime ROI</b>	-59.0%
<b>Simple Lifetime Maintenance Savings</b>	0
<b>Simple Lifetime Savings</b>	\$250
<b>Internal Rate of Return (IRR)</b>	-14%
<b>Net Present Value (NPV)</b>	(\$396.74)

## ECM #7: Vending Miser Controls

### Description:

The Marlboro First Aid Squad currently utilizes vending machines in select areas within the building. Vending machines are located in the administration lunch room which can be in use for a limited time during the day. The installation of the Vending Miser system will help reduce the operating hours of vending machines.

Cold beverage machines regularly operate inefficiently trying to maintain a constant cool temperature within the machine and snack machines with no cooling usually have lights that operate 24/7. The VendingMiser® system incorporates innovative energy-saving technology into a small plug-and-play device that in conjunction with a passive infrared sensor regulate the operation of the cold beverage and snack machines based on occupancy and room temperature. This ECM approximates the installation of one (1) for the cold beverage machine and one (1) for the snack machine.

### Energy Savings Calculations:

Cold Drink and Snack Vending Machine Energy Conservation Project					
		Input Variables			
Energy Analysis Prepared For:		Energy Costs (\$0.000 per kwh)		\$0.170	
		Facility Occupied Hours per Week		60	
Marlboro First Aid Squad		Number of Cold Drink Vending Machines		1	
		Number of Uncooled Snack Machines		1	
www.VendingMiserStore.com		Power Requirements of Cold Drink Machine (avg watts)		427	
		Power Requirements of Snack Machine (avg watts)		100	
		VendingMiser Sale Price (for cold drink machines)		\$200.00	
		OfficeMiser Sale Price (for snack machines)		\$100.00	
Savings Analysis					
	Before	After			
Cold Drink Machines	\$636.32	\$296.60	Cost of Operation		
	3,743	1,745	kWh		
		53%	% Energy Savings		
Snack Machines	\$148.51	\$53.04	Cost of Operation		
	874	312	kWh		
		64%	% Energy Savings		
Project Summary					
Present kWh	Projected kWh	kWh Savings per Year			
4,617	2,057	2,560			
Present Cost	Projected Costs	Annual Savings	Per Cent Savings	Total Project Cost	Break Even (Months)
\$784.84	\$349.64	\$435.19	55%	\$300.00	8.3

**Energy Savings Summary:**

<b>ECM #7 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	\$300
<b>NJ Smart Start Equipment Incentive (\$):</b>	\$0
<b>Net Installation Cost (\$):</b>	\$300
<b>Maintenance Savings (\$/Yr):</b>	\$0
<b>Energy Savings (\$/Yr):</b>	\$435
<b>Total Yearly Savings (\$/Yr):</b>	\$435
<b>Estimated ECM Lifetime (Yr):</b>	10
<b>Simple Payback</b>	0.7
<b>Simple Lifetime ROI</b>	1350.6%
<b>Simple Lifetime Maintenance Savings</b>	\$0
<b>Simple Lifetime Savings</b>	\$4,352
<b>Internal Rate of Return (IRR)</b>	145%
<b>Net Present Value (NPV)</b>	\$3,412.26

## REM #1: 31.2 kW Solar System

### Description:

The Marlboro First Aid Squad has available parking lot space that could accommodate solar arrays. Based on the available area a 31.2 kilowatt solar array could be installed. The array will produce approximately 36,321 kilowatt-hours annually that will reduce the overall electric usage of the facility by 80.61%.

### Energy Savings Calculations:

See **Renewable / Distributed Energy Measures Calculations Appendix** for detailed financial summary and proposed solar layout areas. Financial results in table below are based on 100% financing of the system over a fifteen year period.

### Energy Savings Summary:

REM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$161,765
NJ Smart Start Equipment Incentive (\$):	\$0
Net Installation Cost (\$):	\$161,765
Maintenance Savings (\$/Yr):	\$6,940
Energy Savings (\$/Yr):	\$6,175
Total Yearly Savings (\$/Yr):	\$13,115
Estimated ECM Lifetime (Yr):	15
Simple Payback	12.3
Simple Lifetime ROI	21.6%
Simple Lifetime Maintenance Savings	\$104,106
Simple Lifetime Savings	\$196,724
Internal Rate of Return (IRR)	2.6%
Net Present Value (NPV)	(\$5,199.64)

## V. ADDITIONAL RECOMMENDATIONS

The following recommendations include no cost/low cost measures, Operation & Maintenance (O&M) items, and water conservation measures with attractive paybacks. These measures are not eligible for the Smart Start Buildings incentives from the office of Clean Energy but save energy none the less.

- A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
- B. Maintain all weather stripping on windows and doors.
- C. Clean all light fixtures to maximize light output.
- D. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.
- E. Turn off computers when not in use. Ensure computers are not running in screen saver mode.
- F. Replace any old CRT Monitors with LED/LCD Type Monitors, which can draw as much as a quarter the power of an equivalent CRT monitor.
- G. Ensure outside air dampers are functioning properly and only open during occupied mode.

## **APPENDIX A**

**ECM COST & SAVINGS BREAKDOWN**

CONCORD ENGINEERING GROUP

Marlboro Township - Marlboro First Aid Squad

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^N \frac{C_n}{(1 + IRR)^n}$	$\sum_{n=0}^N \frac{C_n}{(1 + DR)^n}$
		(\$)	(\$)	(\$)	(\$)	(\$/Yr)	(\$/Yr)	(\$/Yr)		(\$)	(\$)	(%)	(Yr)	(\$)	(\$)
ECM #1	Lighting Upgrade - General	\$8,650	\$3,535	\$0	\$12,185	\$1,871	\$0	\$1,871	15	\$28,065	\$0	130.3%	6.5	12.85%	\$10,150.88
ECM #2	Lighting Upgrade - Exterior	\$5,100	\$2,770	\$1,200	\$6,670	\$2,201	\$0	\$2,201	15	\$33,015	\$0	395.0%	3.0	32.51%	\$19,605.40
ECM #3	Lighting Controls Upgrade	\$50	\$50	\$20	\$80	\$155	\$0	\$155	15	\$2,325	\$0	2806.3%	0.5	193.75%	\$1,770.38
ECM #4	Unit Heater Replacement	\$5,500	\$1,500	\$1,500	\$5,500	\$384	\$0	\$384	13	\$4,992	\$0	-9.2%	14.3	-1.36%	(\$1,416.18)
ECM #5	Rooftop Unit Replacements	\$20,000	\$10,000	\$1,190	\$28,810	\$784	\$0	\$784	15	\$11,760	\$0	-59.2%	36.7	-9.56%	(\$19,450.66)
ECM #6	Energy Star Refrigerators	\$610	\$0	\$0	\$610	\$25	\$0	\$25	10	\$250	\$0	-59.0%	24.4	-13.62%	(\$396.74)
ECM #7	Vending Miser Controls	\$300	\$0	\$0	\$300	\$435	\$0	\$435	10	\$4,352	\$0	1350.6%	0.7	145.04%	\$3,412.26
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	31.2 kW PV System	\$161,765	\$0	\$0	\$161,765	\$6,175	\$6,940	\$13,115	15	\$196,724	\$104,106	21.6%	12.3	2.55%	(\$5,199.64)

- Notes:**
- 1) The variable Cn in the formulas for Internal Rate of Return and Net Present Value stands for the cash flow during each period.
  - 2) The variable DR in the NPV equation stands for Discount Rate
  - 3) For NPV and IRR calculations: From n=0 to N periods where N is the *lifetime of ECM* and Cn is the *cash flow during each period*.

## **APPENDIX B**



# Concord Engineering Group, Inc.

520 BURNT MILL ROAD  
VOORHEES, NEW JERSEY 08043  
PHONE: (856) 427-0200  
FAX: (856) 427-6508



## SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives from July 1, 2013 to June 30, 2014:

### **Electric Chillers**

Water-Cooled Chillers	\$16 - \$170 per ton
Air-Cooled Chillers	\$8 - \$52 per ton

Energy Efficiency must comply with ASHRAE 90.1-2007

### **Gas Cooling**

Gas Absorption Chillers	\$185 - \$450 per ton
Gas Engine-Driven Chillers	Calculated through custom measure path)

### **Desiccant Systems**

\$1.00 per cfm – gas or electric
----------------------------------

### **Electric Unitary HVAC**

Unitary AC and Split Systems	\$73 - \$92 per ton
Air-to-Air Heat Pumps	\$73 - \$92 per ton
Water-Source Heat Pumps	\$81 per ton
Packaged Terminal AC & HP	\$65 per ton
Central DX AC Systems	\$40- \$72 per ton
Dual Enthalpy Economizer Controls	\$250
Occupancy Controlled Thermostat (Hospitality & Institutional Facility)	\$75 per thermostat
A/C Economizing Controls	≤ 5 tons \$85/unit; >5 tons \$170/unit

Energy Efficiency must comply with ASHRAE 90.1-2007

### **Gas Heating**

Gas Fired Boilers < 300 MBH	\$2.00 per MBH, but not less than \$300 per unit
Gas Fired Boilers ≥ 300 - 1500 MBH	\$1.75 per MBH
Gas Fired Boilers ≥1500 - ≤ 4000 MBH	\$1.00 per MBH
Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	\$400 per unit, AFUE ≥ 95%
Boiler Economizing Controls	\$1,200 - \$2,700
Low Intensity Infrared Heating	\$300 - \$500 per unit

### Ground Source Heat Pumps

Closed Loop	\$450 per ton, EER $\geq$ 16 \$600 per ton, EER $\geq$ 18 \$750 per ton, EER $\geq$ 20
-------------	--

Energy Efficiency must comply with ASHRAE 90.1-2007

### Variable Frequency Drives

Variable Air Volume	\$65 - \$155 per hp
Chilled-Water Pumps $\geq$ 20 hp	\$60 per VFD rated hp
Rotary Screw Air Compressors $\geq$ 25 hp	\$5,250 to \$12,500 per drive
Cooling Towers $\geq$ 10 hp	\$60 per VFD rated hp
Boiler Fans $\geq$ 5 HP	\$65 to \$155 per hp
Boiler Feed Water Pumps $\geq$ 5 HP	\$60 to \$155 per hp
Commercial Kitchen Hood up to 50 HP	Retrofit \$55 – \$300 per hp New Hood \$55 - \$250 per hp

### Natural Gas Water Heating

Gas Water Heaters $\leq$ 50 gallons, 0.67 energy factor or better	\$50 per unit
Gas-Fired Water Heaters $>$ 50 gallons	\$1.00 - \$2.00 per MBH
Gas-Fired Booster Water Heaters	\$17 - \$35 per MBH
Gas Fired Tankless Water Heaters	\$300 per unit

### Prescriptive Lighting

T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	\$10 per fixture
For retrofit of T-8 fixtures by permanent de-lamping & new reflectors (Electronic ballast replacement required)	\$15 per fixture
T-5 and T-8 High Bay Fixtures	\$16 - \$200 per fixture
Metal Halide w/Pulse Start Including Parking Lot (For fixtures $\geq$ 150w)	\$25 per fixture
HID $\geq$ 100w Replace with new induction fixture. (must be 30% less watts/fixture than HID system)	\$70 per fixture
HID $\geq$ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	\$50 per fixture

### Prescriptive Lighting - LED

LED Display Case Lighting	\$30 per display case
LED Shelf-Mtd. Display & Task Lights	\$15 per linear foot
LED Portable Desk Lamp	\$20 per fixture
LED Wall-wash Lights	\$30 per fixture
LED Recessed Down Lights	\$35 per fixture
LED Outdoor Pole/Arm-Mounted Area and Roadway Luminaries	\$175 per fixture
LED Outdoor Pole/Arm-Mounted Decorative Luminaries	\$175 per fixture
LED Outdoor Wall-Mounted Area Luminaries	\$100 per fixture
LED Parking Garage Luminaries	\$100 per fixture
LED Track or Mono-Point Directional Lighting Fixtures	\$50 per fixture
LED High-Bay and Low-Bay Fixtures for Commercial & Industrial Bldgs.	\$150 per fixture
LED High-Bay-Aisle Lighting	\$150 per fixture
LED Stairwell and Passageway Luminaires	\$40 per fixture
LED Bollard Fixtures	\$50 per fixture
Luminaires for Ambient Lighting of Interior Commercial Spaces (1x4, 2x2, 2x4)	\$50 per fixture
LED Fuel Pump Canopy	\$100 per fixture
LED Screw-based & Pin-based (PAR, MR, BR, R) Standards (A-Style) and Decorative Lamps	\$10 per lamp for R/PAR20,MR/PAR16,Globe,Candelabra or Misc \$20 per lamp for R/BR/PAR 30, R/BR/PAR 38-40, A-Lamp
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	\$30 per 4 foot \$42 per 5 foot \$65 per 6 foot
LED Retrofit Kits	To be evaluated through the customer measure path

### Lighting Controls – Occupancy Sensors

Wall Mounted (Existing Facilities Only)	\$20 per control
Remote Mounted (Existing Facilities Only)	\$35 per control
Daylight Dimming Controls	\$45 per fixture controlled
Occupancy Based hi-low Dimming Control	\$35 per fixture controlled
Occupancy Sensor Remote Mounted	\$35 per control

### Refrigeration Doors/Covers

Energy-Efficient Doors/Covers for Installation on Open Refrigerated Cases	\$100 per door
Aluminum Night Curtains for Installation on Open Refrigerated Cases	\$3.50 per linear foot

### Refrigeration Controls

Door Heater Controls	\$50 per control
Electric Defrost Controls	\$50 per control
Evaporator Fan Controls	\$75 per control
Novelty Cooler Shutoff	\$50 per control

### Other Equipment Incentives

Performance Lighting	\$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1- 2007 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive
Custom Measures	\$0.16 KWh and \$1.60/Therm of 1st year savings, or a buy down to a 1 year payback on estimated savings. Minimum required savings of 75,000 KWh or 1,500 Therms and an IRR of at least 10%.

## **APPENDIX C**



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

# N/A

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

## Marlboro First Aid Squad

**Primary Property Function:** Other - Public Services  
**Gross Floor Area (ft<sup>2</sup>):** 5,400  
**Built:** 1989

**For Year Ending:** December 31, 2013  
**Date Generated:** July 28, 2014

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

### Property & Contact Information

**Property Address**  
Marlboro First Aid Squad  
146 Wyncrest Road  
Marlboro, New Jersey 07746

**Property Owner**  
Marlboro Township  
1979 Township Drive  
Marlboro, NJ 07446  
( ) -

**Primary Contact**  
Jonathan Capp  
1979 Township Drive  
Marlboro, NJ 07446  
732-536-0200  
jcapp@marlboro-nj.gov

**Property ID:** 4091469

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

Site EUI	Annual Energy by Fuel		National Median Comparison	
68 kBtu/ft <sup>2</sup>	Natural Gas (kBtu)	213,245 (58%)	National Median Site EUI (kBtu/ft <sup>2</sup> )	63.9
	Electric - Grid (kBtu)	153,741 (42%)	National Median Source EUI (kBtu/ft <sup>2</sup> )	123.1
			% Diff from National Median Source EUI	6%
Source EUI	Annual Emissions			
130.9 kBtu/ft <sup>2</sup>	Greenhouse Gas Emissions (Metric Tons CO <sub>2</sub> e/year)		31	

### Signature & Stamp of Verifying Professional

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

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

#### Licensed Professional

\_\_\_\_\_  
,  
( ) -  
\_\_\_\_\_



Professional Engineer Stamp  
(if applicable)

## **APPENDIX D**

## **MAJOR EQUIPMENT LIST**

### **Concord Engineering Group**

#### **Marlboro First Aid Squad**

### **Rooftop Units**

<b>Tag</b>			
<b>Unit Type</b>	Rooftop Unit	Rooftop Unit	
<b>Qty</b>	1	1	
<b>Location</b>	Roof	Roof	
<b>Area Served</b>	Lounge	Large Office	
<b>Manufacturer</b>	Trane	Trane	
<b>Model #</b>	-	-	
<b>Serial #</b>	-	-	
<b>Cooling Type</b>	DX, R-22	DX, R-22	
<b>Cooling Capacity (Tons)</b>	~5	~10	
<b>Cooling Efficiency (SEER/EER)</b>	-	-	
<b>Heating Type</b>	Natural Gas	Natural Gas	
<b>Heating Input (MBH)</b>	-	-	
<b>Efficiency</b>	-	-	
<b>Fuel</b>	Natural Gas	Natural Gas	
<b>Approx Age</b>	20	20	
<b>ASHRAE Service Life</b>	15	15	
<b>Remaining Life</b>	(5)	(5)	
<b>Comments</b>	No Tag on this unit. Unit tonnage approximated.	No Tag on this unit. Unit tonnage approximated.	

**Note:**

"N/A" = Not Applicable.

"-" = Info Not Available



# **MAJOR EQUIPMENT LIST**

## **Concord Engineering Group**

### **Marlboro First Aid Squad**

#### **Domestic Water Heaters**

<b>Tag</b>			
<b>Unit Type</b>	Tank Hot Water Heater		
<b>Qty</b>	1		
<b>Location</b>	Storage		
<b>Area Served</b>	Domestic Loop		
<b>Manufacturer</b>	A.O. Smith		
<b>Model #</b>	BT 199 880		
<b>Serial #</b>	MD89-0031175-880		
<b>Size (Gallons)</b>	84		
<b>Input Capacity (MBH/KW)</b>	199 MBH		
<b>Recovery (Gal/Hr)</b>	180.9		
<b>Efficiency %</b>	80%		
<b>Fuel</b>	Natural Gas		
<b>Approx Age</b>	25		
<b>ASHRAE Service Life</b>	12		
<b>Remaining Life</b>	(13)		
<b>Comments</b>			

**Note:**

"N/A" = Not Applicable.

"-" = Info Not Available

# **MAJOR EQUIPMENT LIST**

## **Concord Engineering Group**

### **Marlboro First Aid Squad**

#### **Unit Heater**

<b>Tag</b>	<b>UH-1</b>	<b>UH-2</b>	
<b>Unit Type</b>	Unit Heater	Unit Heater	
<b>Qty</b>	1	1	
<b>Location</b>	Main Garage	Main Garage	
<b>Area Served</b>	Main Garage	Main Garage	
<b>Manufacturer</b>	Reznor	-	
<b>Model #</b>	F130	-	
<b>Serial #</b>	AOA31K6N05730	-	
<b>Input Capacity (MBH)</b>	130	-	
<b>Output Capacity (MBH)</b>	104	-	
<b>Fuel</b>	Natural Gas	Natural Gas	
<b>Approx. Efficiency %</b>	80.0%	-	
<b>Approx Age</b>	25	5	
<b>ASHRAE Service Life</b>	13	13	
<b>Remaining Life</b>	(12)	8	
<b>Comments</b>		No Tag on this unit.	

**Note:**

"N/A" = Not Applicable.

"-" = Info Not Available

## **APPENDIX E**

CEG Project #: 1C13521  
Facility Name: Marlboro First Aid Squad  
Address: 146 Wyncrest Road  
City, State, Zip: Marlboro, NJ 07746


Fixture Reference #	Location	Average Burn Hours	EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, \$	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$
118.14	Garage Bays	2000	8' Channel, 1 Lamp, 60w T12, Mag. Ballast, Surface Mnt., No Lens	1	70	14	0.98	1,960	Replace Fixture	1x4 Surface LED 48w	1	48	14	0.67	1,344	0.31	616	\$105	1	Existing Occupancy Controls	0	20.0%	269	\$46
121.31	Oxygen Tanks	2000	1x4, 2-Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	2	78	1	0.08	156	Replace Fixture	1x4 Pendant LED 48w	1	48	1	0.05	96	0.03	60	\$10	0	No New Controls	0	0.0%	0	\$0
142.21	Duty Room	1000	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	4	156	6	0.94	936	Retrofit Kit - Remove Lense Bypass Ballast	Phillips LED Evokit 2x4 P 42L 39W840 2 0-10 5 G2	1	39	6	0.23	234	0.70	702	\$119	1	Existing Occupancy Controls	0	20.0%	47	\$8
227.21	Restroom	400	2x2, 2 Lamp, 32w T8 U-Tube, Elec. Ballast, Recessed Mnt., Prismatic Lens	2	65	1	0.07	26	Retrofit Kit - Remove Lense Bypass Ballast	Phillips LED Evokit 2x2 P 32L 31W840 2 0-10 7 G2	1	31	1	0.03	12	0.03	14	\$2	6	Dual Technology Occupancy Sensor - Switch Mnt.	1	20.0%	2	\$0
142.21	Call Center	8760	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	4	156	4	0.62	5,466	Retrofit Kit - Remove Lense Bypass Ballast	Phillips LED Evokit 2x4 P 42L 39W840 2 0-10 5 G2	1	39	4	0.16	1,367	0.47	4,100	\$697	0	No New Controls	0	0.0%	0	\$0
55	Vestibule - Front	2600	Recessed Down Light, 65w R30	1	65	1	0.07	169	Relamp	9w LED R30 - Dimmable	1	9	1	0.01	23	0.06	146	\$25	0	No New Controls	0	0.0%	0	\$0
142.21	Meeting room	1000	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	4	156	21	3.28	3,276	Retrofit Kit - Remove Lense Bypass Ballast	Phillips LED Evokit 2x4 P 42L 39W840 2 0-10 5 G2	1	39	21	0.82	819	2.46	2,457	\$418	1	Existing Occupancy Controls	0	20.0%	164	\$28
142.21	Kitchen/Vending	1000	2x4, 4 Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Prismatic Lens	4	156	3	0.47	468	Retrofit Kit - Remove Lense Bypass Ballast	Phillips LED Evokit 2x4 P 42L 39W840 2 0-10 5 G2	1	39	3	0.12	117	0.35	351	\$60	1	Existing Occupancy Controls	0	20.0%	23	\$4
127.21	Men's Restroom	400	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	2	72	3	0.22	86	Retrofit Kit - Remove Lense Bypass Ballast	Phillips LED Evokit 2x2 P 32L 31W840 2 0-10 7 G2	1	31	3	0.09	37	0.12	49	\$8	1	Existing Occupancy Controls	0	20.0%	7	\$1
127.21	Women's Restroom	400	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	2	72	3	0.22	86	Retrofit Kit - Remove Lense Bypass Ballast	Phillips LED Evokit 2x2 P 32L 31W840 2 0-10 7 G2	1	31	3	0.09	37	0.12	49	\$8	1	Existing Occupancy Controls	0	20.0%	7	\$1
127.21	Cust Closet	600	2x2, 2 Lamp, 34w T12 U-Tube, Mag. Ballast, Recessed Mnt., Prismatic Lens	2	72	1	0.07	43	Retrofit Kit - Remove Lense Bypass Ballast	Phillips LED Evokit 2x2 P 32L 31W840 2 0-10 7 G2	1	31	1	0.03	19	0.04	25	\$4	0	No New Controls	0	0.0%	0	\$0
55	Vestibule - Rear	2600	Recessed Down Light, 65w R30	1	65	1	0.07	169	Relamp	9w LED R30 - Dimmable	1	9	1	0.01	23	0.06	146	\$25	0	No New Controls	0	0.0%	0	\$0
121.42	Corridor	2600	1x4, 2-Lamp, 34w T12, Mag. Ballast, Wall Mnt., Parabolic Lens	2	78	21	1.64	4,259	Bypass Ballast, Relamp	4' Alledra 18w LED; LL-T-X-T8-Y-SW-120-Z-S-N	2	36	21	0.76	1,966	0.88	2,293	\$390	1	Existing Occupancy Controls	0	20.0%	393	\$67
700	Exterior	2600	100w HPS Bollard	1	120	4	0.48	1,248	Bypass Ballast, Relamp	25w LED Self Ballasted, Multi-volt; retrofit	1	25	4	0.10	260	0.38	988	\$168	0	No New Controls	0	0.0%	0	\$0
701	Exterior	2600	175w MH RDL mogel	1	195	10	1.95	5,070	Re-lamp & Bypass ballast	40w LED Par 56 Self-ballast Mogul Base Lamp	1	41	10	0.41	1,066	1.54	4,004	\$681	0	No New Controls	0	0.0%	0	\$0
702	Exterior	2600	500w Quartz Flood Light	1	500	1	0.50	1,300	Replace Fixture	RAB 39w LED Flood	1	39	1	0.04	101	0.46	1,199	\$204	0	No New Controls	0	0.0%	0	\$0
703	Exterior	2600	150w HPS Wallpack	1	185	3	0.56	1,443	Replace Fixture	RAB 39w LED Wallpack	1	39	3	0.12	304	0.44	1,139	\$194	0	No New Controls	0	0.0%	0	\$0
704	Exterior	2600	400w HPS Shoebox	1	465	4	1.86	4,836	Replace Fixture	RAB 110w LED Area Light	1	110	4	0.44	1,144	1.42	3,692	\$628	0	No New Controls	0	0.0%	0	\$0
705	Exterior	2600	400w MH Wallpack	1	465	1	0.47	1,209	Replace Fixture	RAB 110w LED Wallpack	1	110	1	0.11	286	0.36	923	\$157	0	No New Controls	0	0.0%	0	\$0
706	Exterior	2600	100w MH Wallpack	1	120	1	0.12	312	Replace Fixture	26w LED Wall Pack	1	26	1	0.03	68	0.09	244	\$42	0	No New Controls	0	0.0%	0	\$0

Fixture Reference #	Location	Average Burn Hours	EXISTING FIXTURES						PROPOSED FIXTURE RETROFIT						RETROFIT ENERGY SAVINGS			PROPOSED LIGHTING CONTROLS						
			Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Work Description	Equipment Description	Lamps per Fixture	Watts per Fixture	Qty of Fixtures	Total kW	Usage kWh/Yr	Energy Savings, kW	Energy Savings, kWh	Energy Savings, \$	Control Ref #	Controls Description	Qty of Controls	Hour Reduction %	Energy Savings, kWh	Energy Savings, \$
707	Exterior	2600	150w HPS Flood	1	185	2	0.37	962	Replace Fixture	RAB 39w LED Flood	1	39	2	0.08	203	0.29	759	\$129	0	No New Controls	0	0.0%	0	\$0
TOTAL						106	15	33,481					106	4	9,526	11	23,955	\$4,072			1	2	913	\$155

## **APPENDIX F**

Location Description	Area (Sq FT)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW <sub>DC</sub>	Total Annual kWh	Total KW <sub>AC</sub>	Panel Weight (41.9 lbs)	W/SQFT
Marlboro First Aid	3375	SHARP ND-240QCJ	130	17.5	2,280	31.20	36,321	25.3	5,447	13.68



 = Proposed PV Parking Canopy Layout

Notes:

1. Estimated kWh based on the National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.