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*June 28, 2010*

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

***Borough of Park Ridge  
Pistol Range  
53 Park Avenue  
Park Ridge, NJ 07656***

***Project Number: LGEA62***



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## EXECUTIVE SUMMARY

The Borough of Park Ridge Pistol Range is a single-story building comprising a total conditioned floor area of 4,300 square feet. The original structure was built in the 1960's and there have been no major renovations or additions since then. The following chart provides an overview of current energy usage in the building based on the analysis period of January 2009 through January 2010:

**Table 1: State of Building—Energy Usage**

|           | Electric Usage, kWh/yr | Gas Usage, therms/yr | Current Annual Cost of Energy, \$ | Site Energy Use Intensity, kBtu/sq ft yr | Joint Energy Consumption, MMBtu/yr |
|-----------|------------------------|----------------------|-----------------------------------|------------------------------------------|------------------------------------|
| Current   | 28,161                 | 496                  | \$33,367                          | 31.0                                     | 146                                |
| Proposed  | 26,228                 | 496                  | \$33,112                          | 29.5                                     | 139                                |
| Savings   | 1,933                  | 0                    | \$255                             | 1.5                                      | 7                                  |
| % Savings | 7%                     | 0.0%                 | 1%                                | 5%                                       | 5%                                 |

SWA has also entered energy information about the Pistol Range in the U.S. Environmental Protection Agency's (EPA) *ENERGY STAR® Portfolio Manager* energy benchmarking system. The Pistol Range is comprised of non-eligible ("Other") space type. The resulting score is 31.0 kBtu/sqft-yr, which is better than the national average of an "Other" building by 70%.

Based on the current state of the building and its energy use, SWA recommends implementing various energy conservation measures from the savings detailed in Table 1. The measures are categorized by payback period in Table 2 below:

**Table 2: Energy Conservation Measure Recommendations**

| ECMs      | First Year Savings (\$) | Simple Payback Period (years) | Initial Investment, \$ | CO2 Savings, lbs/yr |
|-----------|-------------------------|-------------------------------|------------------------|---------------------|
| 0-5 Year  | 615                     | 2.0                           | 1,254                  | 715                 |
| 5-10 Year | 28                      | 7.2                           | 200                    | 376                 |
| >10 year  | 227                     | 20.9                          | 4,758                  | 116                 |
| Total     | 870                     | 7.1                           | 6,212                  | 1,208               |

SWA estimates that implementing the recommended ECMs is equivalent to avoiding the need of 2 trees to absorb the annual CO<sub>2</sub> generated.

Other recommendations to increase building efficiency pertaining to operations and maintenance and capital improvements are listed below:

## **Further Recommendations:**

SWA recommends that the Pistol Range further explore the following:

- Capital Improvements
  - Install NEMA Premium motors when replacements are required
  - Install downspouts and downspout deflectors to minimize uncontrolled roof water run-off
  - Tightly pack and add insulation in ceiling rafters, using a minimum of R-13
- Operations and Maintenance
  - Insulate hot water pipes for boiler and hot water heater
  - Clean and maintain gutters, downspouts and downspout deflectors
  - Repair cracked and deteriorated stucco on exterior walls
  - Insect nesting should be removed and remaining cavities patched and air-sealed
  - Replace missing/damaged roof shingles
  - Slope perimeter grade away from building to maximize site drainage
  - Maintain roofs
  - Maintain sealants at all windows for airtight performance
  - Thoroughly and evenly insulate space above the ceiling tiles and plug all ceiling penetration
  - Maintain downspouts and cap flashing
  - Provide weather-stripping/air-sealing
  - Repair/seal wall cracks and penetrations
  - Provide water-efficient fixtures and controls
  - Purchase the most energy-efficient Energy Star labeled appliances, when equipment is installed or replaced
  - Use smart power electric strips
  - Create an energy educational program

## **Financial Incentives and Other Program Opportunities**

There are various incentive programs that the Borough of Park Ridge could apply for that could also help lower the cost of installing the ECMs.

Although the Borough of Park Ridge is their own electric provider and does not pay a societal benefit charge, as of April 1, 2010, the Borough's buildings are eligible for NJ Clean Energy Program incentives. The funds for this change are provided by the American Recovery and Reinvestment Act, ARRA. Therefore, applicants are subject to federal ARRA terms and conditions. The Borough of Park Ridge should investigate the procedure to obtain NJ Clean Energy incentives such as Direct Install and Pay for Performance under ARRA conditions. For more information including other programs that are available because the Borough is a regulated gas customer, call 866-NJSMART or visit [NJCleanEnergy.com](http://NJCleanEnergy.com).

SWA could work with the Borough of Park Ridge, as already done with other clients, to provide all required data and applications for incentives such as Pay for Performance and other programs, as a continuation to this audit. Please refer to Appendix F for details.

## INTRODUCTION

Launched in 2008, the Local Government Energy Audit (LGEA) Program provides subsidized energy audits for municipal and local government-owned facilities, including offices, courtrooms, town halls, police and fire stations, sanitation buildings, transportation structures, schools and community centers. The Program can subsidize up to 100% of the cost of the audit. The Board of Public Utilities (BPUs) Office of Clean Energy has assigned TRC Energy Services to administer the Program.

Steven Winter Associates, Inc. (SWA) is a 38-year-old architectural/engineering research and consulting firm, with specialized expertise in green technologies and procedures that improve the safety, performance, and cost effectiveness of buildings. SWA has a long-standing commitment to creating energy-efficient, cost-saving and resource-conserving buildings. As consultants on the built environment, SWA works closely with architects, developers, builders, and local, state, and federal agencies to develop and apply sustainable, 'whole building' strategies in a wide variety of building types: commercial, residential, educational and institutional.

SWA performed an energy audit and assessment for the Pistol Range at 53 Park Avenue Park Ridge, NJ. The process of the audit included facility visits on March 10, 2010 and March 24, 2010, benchmarking and energy bills analysis, assessment of existing conditions, energy modeling, energy conservation measures and other recommendations for improvements. The scope of work includes providing a summary of current building conditions, current operating costs, potential savings, and investment costs to achieve these savings. The facility description includes energy usage, occupancy profiles and current building systems along with a detailed inventory of building energy systems, recommendations for improvement and recommendations for energy purchasing and procurement strategies.

The goal of this Local Government Energy Audit is to provide sufficient information to the Borough of Park Ridge to make decisions regarding the implementation of the most appropriate and most cost-effective energy conservation measures for the Pistol Range.

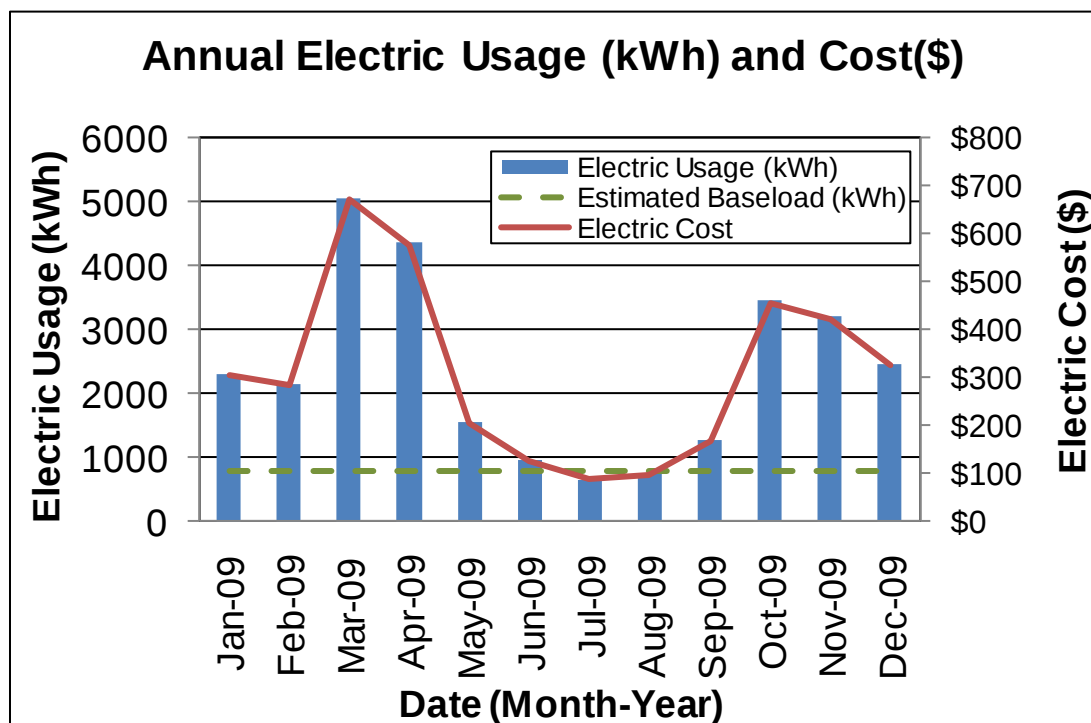
## HISTORICAL ENERGY CONSUMPTION

### Energy usage, load profile and cost analysis

SWA reviewed utility bills from January 2008 through January 2010 that were received from the utility companies supplying the Pistol Range with electric and natural gas. A 12 month period of analysis from January 2009 through January 2010 was used for all calculations and for purposes of benchmarking the building.

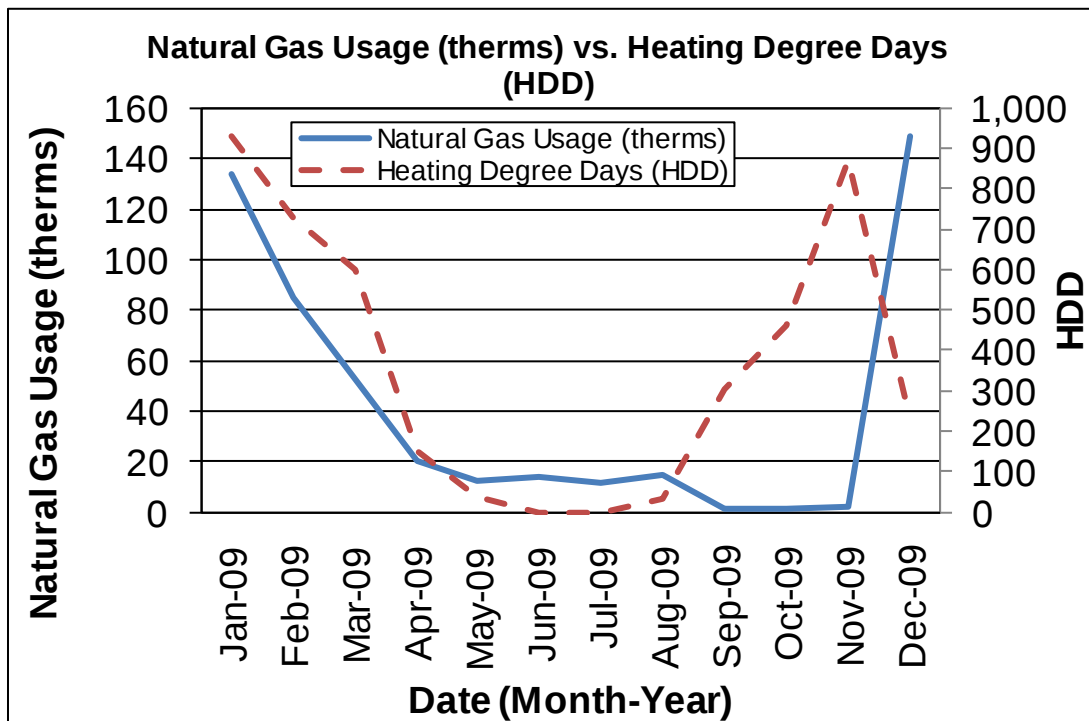
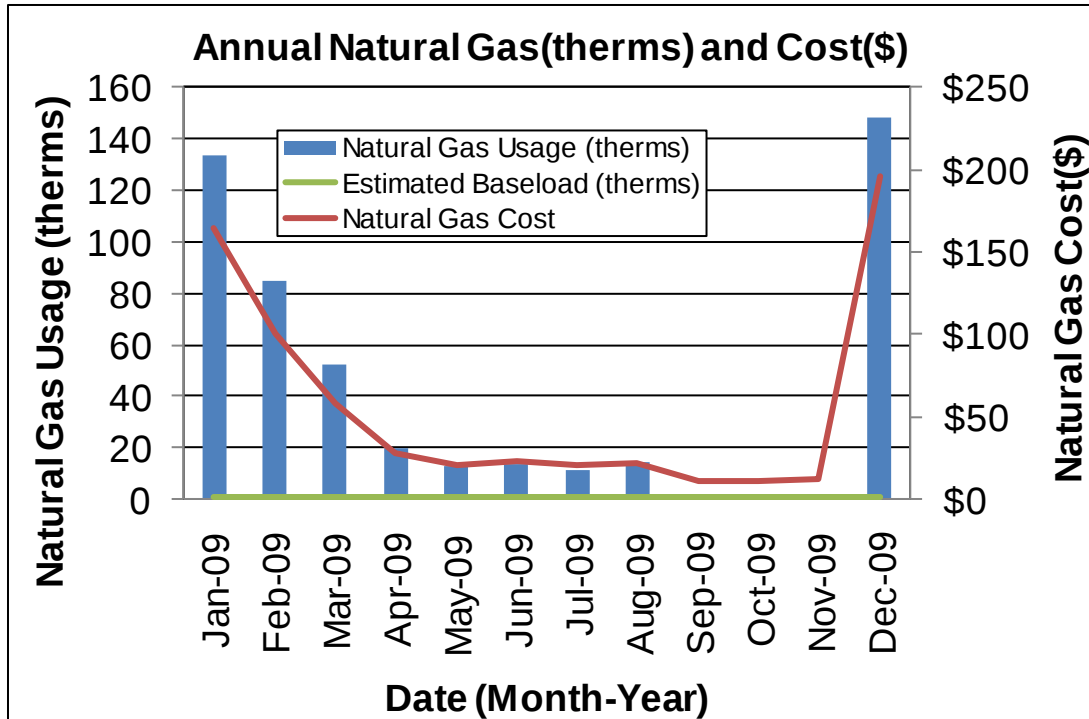
Electricity - The Pistol Range is currently served by two electric meters. The Pistol Range currently buys electricity from Park Ridge Electric at **an average aggregated rate of \$0.132/kWh**. The Pistol Range purchased **approximately 28,161 kWh, or \$3,729 worth of electricity**, in the previous year. The average monthly demand was 127.0 kW and the annual peak demand was 241.6 kW.

The chart below shows the monthly electric usage and costs. The dashed green line represents the approximate baseload or minimum electric usage required to operate the Pistol Range. There is a higher electric load in winter months since according to demand costs, the shooting range ventilation system is used mostly during winter months.



Natural gas - The Pistol Range is currently served by one meter for natural gas. The Pistol Range currently buys natural gas from PSE&G at **an average aggregated rate of \$1.348/therm**. The Pistol Range purchased **approximately 496 therms, or \$668 worth of natural gas**, in the previous year.

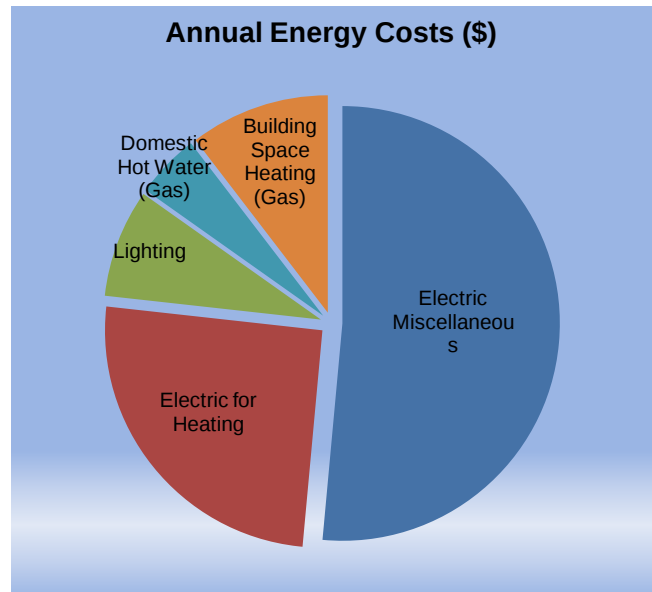
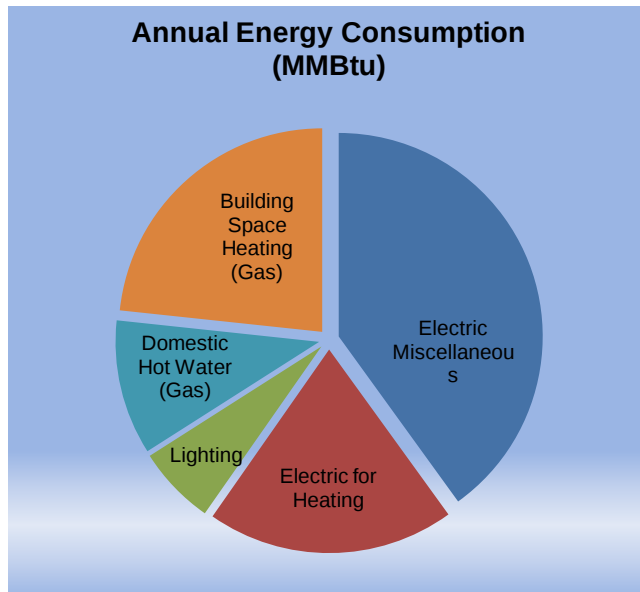
The chart below shows the monthly natural gas usage and costs. The green line represents the approximate baseload or minimum natural gas usage required to operate the Pistol Range.



The chart above shows the monthly natural gas usage along with the heating degree days or HDD. Heating degree days is the difference of the average daily temperature and a base temperature, on a particular day. The heating degree days are zero for the days when the average temperature exceeds the base temperature. SWA's analysis used a base temperature of 65 degrees Fahrenheit.

The following graphs, pie charts, and table show energy use for the Pistol Range based on utility bills for the 12 month period. Note: electrical cost at \$39/MMBtu of energy is three times as expensive as natural gas at \$13/MMBtu

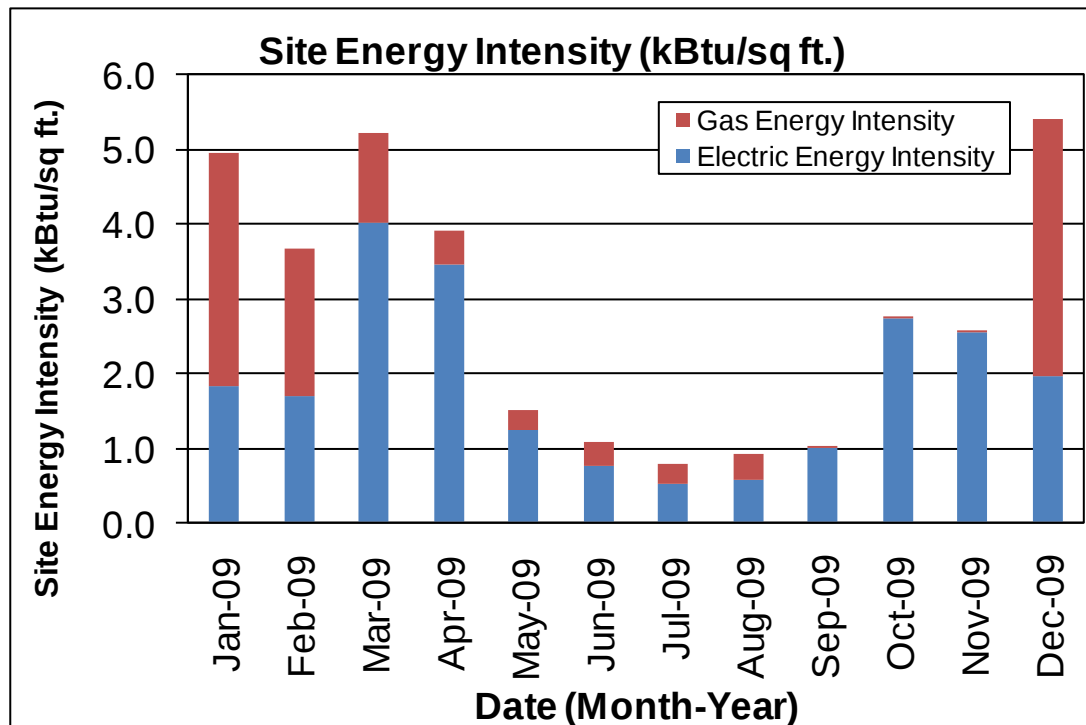
| Annual Energy Consumption / Costs |            |             |                |             |           |
|-----------------------------------|------------|-------------|----------------|-------------|-----------|
|                                   | MMBtu      | % MMBtu     | \$             | % \$        | \$/MMBtu  |
| Electric Miscellaneous            | 58         | 40%         | \$2,263        | 51%         | 39        |
| Electric For Heating              | 29         | 20%         | \$1,112        | 25%         | 39        |
| Lighting                          | 9          | 6%          | \$354          | 8%          | 39        |
| Domestic Hot Water (Gas)          | 16         | 11%         | \$210          | 5%          | 13        |
| Building Space Heating (Gas)      | 34         | 23%         | \$458          | 10%         | 13        |
| <b>Totals</b>                     | <b>146</b> | <b>100%</b> | <b>\$4,398</b> | <b>100%</b> |           |
|                                   |            |             |                |             |           |
| <b>Total Electric Usage</b>       | <b>96</b>  | <b>66%</b>  | <b>\$3,729</b> | <b>85%</b>  | <b>39</b> |
| <b>Total Gas Usage</b>            | <b>50</b>  | <b>34%</b>  | <b>\$668</b>   | <b>15%</b>  | <b>13</b> |
| <b>Totals</b>                     | <b>146</b> | <b>100%</b> | <b>\$4,398</b> | <b>100%</b> |           |



## Energy benchmarking

SWA has entered energy information about the Pistol Range in the U.S. Environmental Protection Agency's (EPA) *ENERGY STAR® Portfolio Manager* energy benchmarking system. This facility is categorized as a non-eligible ("Other") space type. Because it is an "Other" space type, there is no rating available. Consequently, the Pistol Range is not eligible to receive a national energy performance rating at this time. The Site Energy Use Intensity is 31.0 kBtu/ft<sup>2</sup>-yr compared to the national average of an "Other" building consuming 104.0 kBtu/ft<sup>2</sup>-yr.

Due to the nature of its calculation based upon a survey of existing buildings of varying usage, the national average for "Other" space types is very subjective, and is not an absolute bellwether for gauging performance. Additionally, should the Borough of Park Ridge desire to reach this average there are other large scale and financially less advantageous improvements that can be made, such as envelope window, door and insulation upgrades that would help the building reach this goal.



Per the LGEA program requirements, SWA has assisted the Borough of Park Ridge to create an *ENERGY STAR® Portfolio Manager* account and share the Pistol Range facilities information to allow future data to be added and tracked using the benchmarking tool. SWA has shared this Portfolio Manager account information with the Borough of Park Ridge (user name of "parkridgeboro" with a password of "1parkridge1") and TRC Energy Services (user name of "TRC-LGEA").

## Tariff analysis

As part of the utility bill analysis, SWA evaluated the current utility rates and tariffs. Tariffs are typically assigned to buildings based on size and building type.

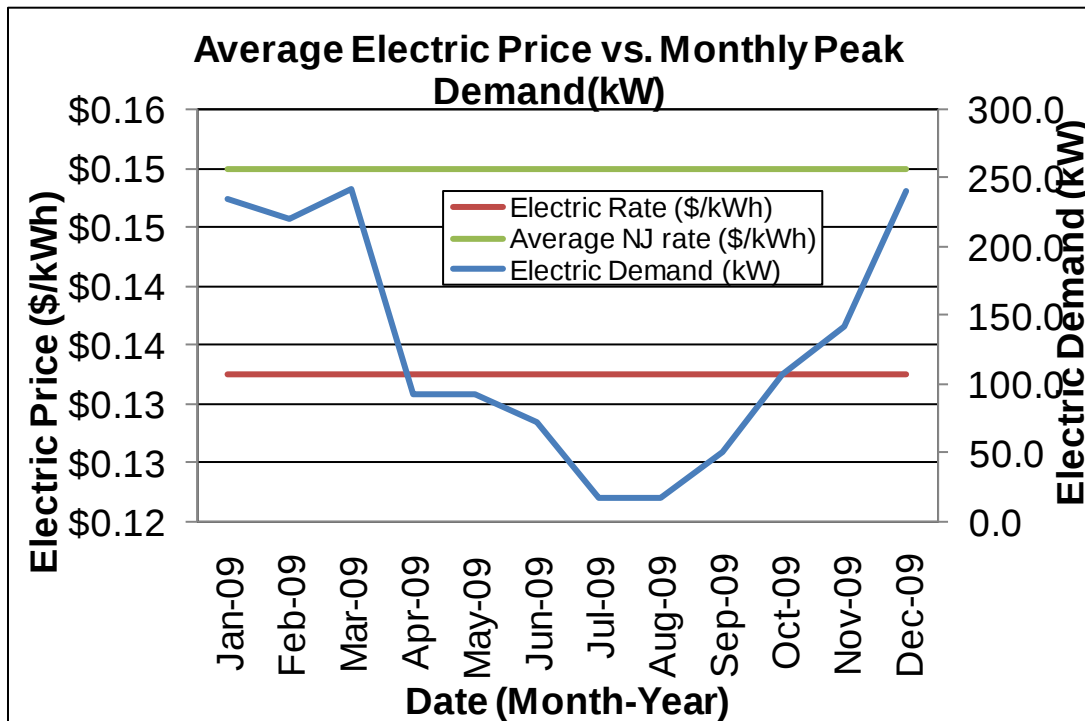
Tariff analysis is performed to determine if the rate that a municipality is contracted to pay with each utility provider is the best rate possible resulting in the lowest costs for electric and gas provision. Typically, the natural gas prices increase during the heating months when natural gas is used by the hot water boiler units. Some high gas price per therm fluctuations in the summer may be due to high energy costs that recently occurred and low use caps for the non-heating months. Typically, electricity prices also increase during the cooling months when electricity is used by the HVAC condensing units and air handlers.

Currently, the Borough of Park Ridge is its own electric supplier and therefore is exempt from regional and demand service charges. The building is direct metered and is charged a constant rate throughout the year, with no fluctuations due to season or usage.

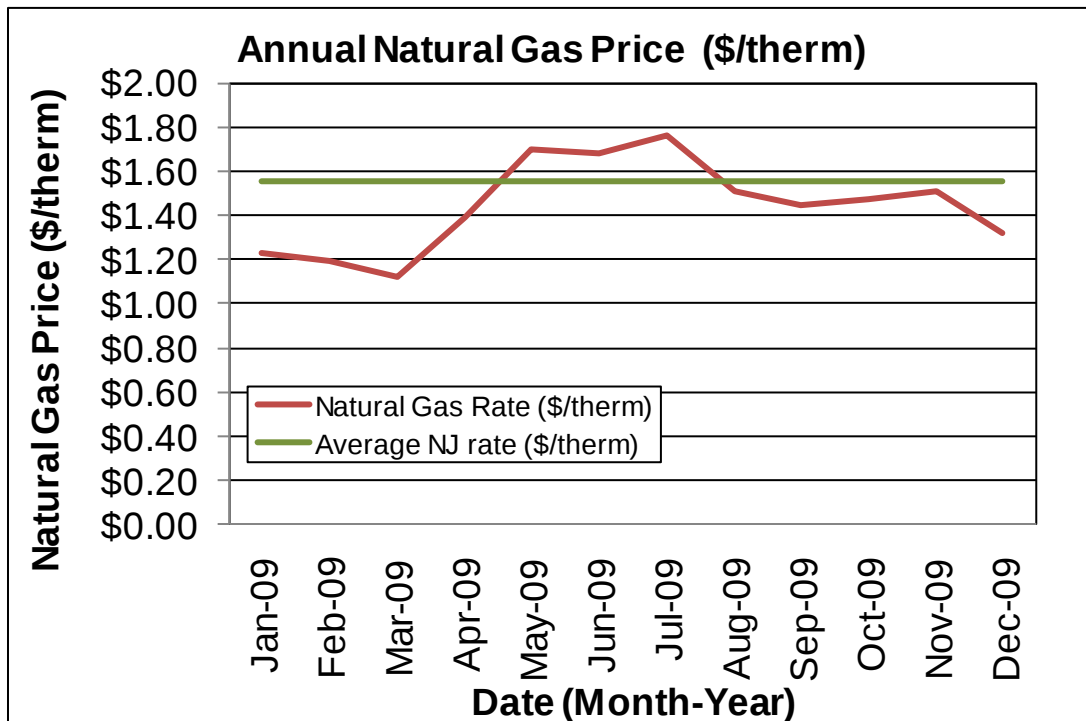
### Energy Procurement strategies

Billing analysis is conducted using an average aggregated rate that is estimated based on the total cost divided by the total energy usage per utility per 12 month period. Average aggregated rates do not separate demand charges from usage, and instead provide a metric of inclusive cost per unit of energy. Average aggregated rates are used in order to equitably compare building utility rates to average utility rates throughout the state of New Jersey.

Since the Borough of Park Ridge is its own electricity provider, the electric rate for the building is highly competitive at \$0.132/kWh, which is less than the average estimated NJ commercial electric rate of \$0.150/kWh. There are no cost fluctuations due to demand or usage reflected in the provided electric bills. The demand peaks in the winter are primarily due to operation of the Ventilation System. Therefore it appears that the facility is used the most in the winter months.



The average estimated NJ commercial utility rates for gas are \$1.550/therm, while Pistol Range pays a rate of \$1.348/therm. Natural gas bill analysis shows fluctuations up to 32% over the most recent 12 month period.



Utility rate fluctuations may have been caused by adjustments between estimated and actual meter readings; others may be due to unusual high and recent escalating energy costs.

SWA recommends that the Pistol Range further explore opportunities of purchasing natural gas from third-party supplier in order to further reduce rate fluctuation and ultimately reduce the annual cost of energy for the Pistol Range. Appendix C contains a complete list of third-party energy suppliers for the Borough of Park Ridge service area.

## EXISTING FACILITY AND SYSTEMS DESCRIPTION

This section gives an overview of the current state of the facility and systems. Please refer to the Proposed Further Recommendations section for recommendations for improvement.

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Based on visits from SWA on March 10, 2010 and March 24, 2010, the following data was collected and analyzed.

### Building Characteristics

The single-story, (slab on grade), 4,300 square feet Pistol Range Building was originally constructed in the 1960's with additions/alterations completed in 1987. It houses a meeting room, utility closets, attic and shooting range.



Side Façade (typ.)



Front Façade



Side Façade (typ.)

### Building Occupancy Profiles

Its occupancy is approximately five to ten visitors for only two hours a week. Only approved staff and members have access to the building.

## Building Envelope

Due to unfavorable weather conditions (min. 18 deg. F delta-T in/outside and no/low wind), no exterior envelope infrared (IR) images were taken during the field audit.

### Exterior Walls

The exterior wall envelope is mostly constructed of stucco, over concrete block with some accents of vinyl siding with an unconfirmed level of insulation. The interior is mostly synthetic wall panels and painted CMU (Concrete Masonry Unit).

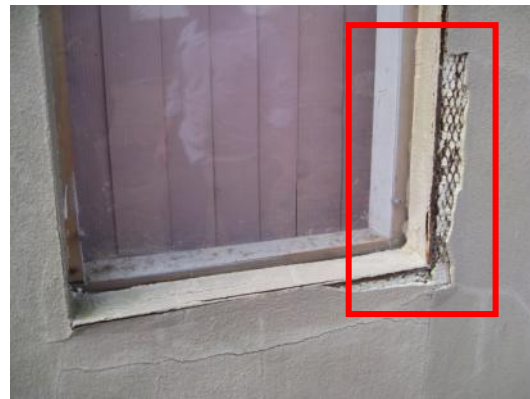
*Note:* Wall insulation levels could not be verified in the field or on construction plans, and are based upon similar wall types and time of construction.

Exterior and interior wall surfaces were inspected during the field audit. They were found to be in overall acceptable condition with some signs of uncontrolled moisture, air-leakage and other energy-compromising issues detected on all facades.

The following specific exterior wall problem spots and areas were identified:



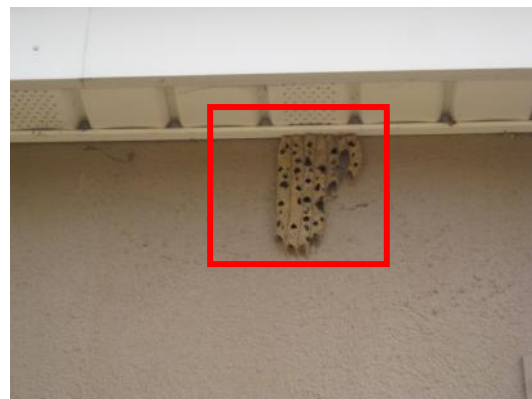
Uncontrolled roof water run-off due to missing/ineffective downspout deflector



Damaged exterior wall finishes



Damaged stucco finish



Insect nesting in exterior wall cracks and cavities

## Roof

The building's roof is predominantly a medium-pitch gable type over a wood structure, with an asphalt shingle finish. It was constructed in 1985. Eight inches of fiberglass batt attic/ceiling insulation and no detectable roof insulation.

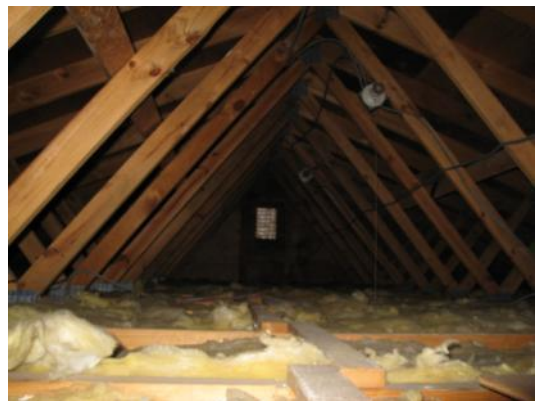
Note: Roof insulation levels could not be verified in the field or on construction plans, and are based upon similar wall types and time of construction.

Roofs, related flashing, gutters and downspouts were inspected during the field audit. They were reported to be in overall acceptable condition, with only a few signs of uncontrolled moisture, air-leakage or other energy-compromising issues.

The following specific roof problem spots were identified:



Uneven attic insulation found



Uneven attic insulation found



Clogged gutters



Missing/damaged roof shingles

## Base

The building's base is composed of a slab-on-grade floor with a perimeter foundation and no detectable slab edge/perimeter insulation.

Slab/perimeter insulation levels could not be verified in the field or on construction plans, and are based upon similar wall types and time of construction.

The building's base and its perimeter were inspected for signs of uncontrolled moisture or water presence and other energy-compromising issues. Overall the base was reported to be in acceptable condition with some signs of uncontrolled moisture, air-leakage and/ or other energy-compromising issues visible from the exterior only.

The following specific base problem spots were identified:



Moisture damage at base of exterior wall



Potential water/moisture seepage through cracks detected in the slab

## Windows

The building contains basically one type of window.

1. Several fixed type windows with a wood frame, bullet proof plexi-glass with interior roller blinds. The windows are located throughout the building and are original.

Windows, shading devices, sills, related flashing and caulking were inspected as far as accessibility allowed for signs of moisture, air-leakage and other energy compromising issues. Overall, the windows were found to be in good condition with no signs of uncontrolled moisture, air-leakage and/ or other energy-compromising issues.

## Exterior doors

The building contains only one type of exterior door.

1. Two hollow metal type exterior doors. They are located on the main floor and are original.

All exterior doors, thresholds, related flashing, caulking and weather-stripping were inspected for signs of moisture, air-leakage and other energy-compromising issues. Overall, the doors were found to be in good condition with no signs of uncontrolled moisture, air-leakage and/ or other energy-compromising issues.

## **Building air-tightness**

Overall the field auditors found the building to be reasonably air-tight, considering the building's use and occupancy, as described in more detail earlier in this chapter.

The air tightness of buildings helps maximize all other implemented energy measures and investments, and minimizes potentially costly long-term maintenance, repair and replacement expenses.

## **Mechanical Systems**

### **Heating Ventilation Air Conditioning**

The Pistol Range is does not have a cooling system. The occupied spaces are only provided heat and ventilation. There have been no reports of comfort issues in the space.

### **Equipment**

Heat is provided by a Crown hot water boiler which supplies hot water to the perimeter baseboards to offset envelope heat loss. The boiler was installed in 2008 and has a 61,000 Btu/hr capacity and 82% thermal efficiency. The flue pipe has an automatic flue damper which ensures that outside air does not enter the building through the flue when the unit is not operating.



Crown Hot Water Boiler and Perimeter Baseboards

In 2001 a Reznor ventilation system was installed with a built-in furnace. The unit is 100% outside air and uses a 20 HP fan designed to blow the dust and metal particles out of the shooting room. Two large rooftop exhaust fans then expel the air to the atmosphere. There was no access to the rooftop fans due to being installed on a sloped roof; it is assumed that each fan has a 10 HP motor, to match the capacity of the supply fan.



Reznor Ventilation Unit with furnace (left) and two exhaust fans on roof (right)

There is also one small electric heater mounted on the wall in the mechanical room. A comprehensive Equipment List can be found in Appendix A.

### **Distribution Systems**

Since there is only heat in the building there is no real ductwork distribution system. Visible from the attic, there is a small duct off of the 100% air unit ducted to the hallway for general building ventilation.

### **Controls**

There is one central programmable thermostat which regulates the operation of the boiler. The thermostat is set to 60 deg F during unoccupied hours.



Programmable thermostat

Also, the ventilation system is control with a timer dial with a maximum run time of one hour. There is no indication that the Reznor units have variable speed control.



Exhaust System Control Panel

## Domestic Hot Water

The domestic hot water (DHW) for the Pistol Range is provided by an electric Bradford White heater with 40 gallons storage and 4.5kW capacity and appears in good condition.



DHW Heater in Mech Closet

## Electrical systems

### Lighting

See attached lighting schedule in Appendix B for a complete inventory of lighting throughout the building including estimated power consumption and proposed lighting recommendations.

*Interior Lighting* - The Pistol Range currently contains mostly T12 fixtures for space lighting with several Metal Halide fixtures for intensified lighting in the shooting range. Based on measurements of lighting levels for each space, there are no vastly over-illuminated areas.



Space lighting, T12 fixtures (left); Shooting range Metal halide fixtures (right)

*Exit Lights* - Exit signs are photo luminescent and require no electricity

*Exterior Lighting* - The exterior lighting surveyed during the building audit was found to be Metal Halide fixtures. Exterior lighting is controlled by timers.



Metal Halide Fixture mounted on exterior wall

### **Appliances and process**

SWA has conducted a general survey of larger, installed equipment. Appliances and other miscellaneous equipment account for a significant portion of electrical usage within the building. Typically, appliances are referred to as “plug-load” equipment, since they are not inherent to the building’s systems, but rather plug into an electrical outlet. Equipment such as process motors, computers, computer servers, radio and dispatch equipment, refrigerators, vending machines, printers, etc. all create an electrical load on the building

that is hard to separate out from the rest of the building's energy usage based on utility analysis.

### **Elevators**

The Pistol Range does not have an installed elevator.

### **Other electrical systems**

There are not currently any other significant energy-impacting electrical systems installed at the Pistol Range other than a transformer for the Reznor ventilation system. There was no access to the transformer during the field visit.

## **RENEWABLE AND DISTRIBUTED ENERGY MEASURES**

Renewable energy is defined as any power source generated from sources which are naturally replenished, such as sunlight, wind and geothermal. Technology for renewable energy is improving, and the cost of installation is decreasing, due to both demand and the availability of state and federal government-sponsored funding. Renewable energy reduces the need for using either electricity or fossil fuel, therefore lowering costs by reducing the amount of energy purchased from the utility company. Technology such as photovoltaic panels or wind turbines, use natural resources to generate electricity on the site. Geothermal systems offset the thermal loads in a building by using water stored in the ground as either a heat sink or heat source. Solar thermal collectors heat a specified volume of water, reducing the amount of energy required to heat water using building equipment. Cogeneration or CHP allows you to generate electricity locally, while also taking advantage of heat wasted during the generation process.

### **Existing systems**

Currently there are no renewable energy systems installed in the building.

### **Evaluated Systems**

#### **Solar Photovoltaic**

Photovoltaic panels convert light energy received from the sun into a usable form of electricity. Panels can be connected into arrays and mounted directly onto building roofs, as well as installed onto built canopies over areas such as parking lots, building roofs or other open areas. Electricity generated from photovoltaic panels is generally sold back to the utility company through a net meter. Net-metering allows the utility to record the amount of electricity generated in order to pay credits to the consumer that can offset usage and demand costs on the electric bill.

The electric bill analysis indicates that the building is most often used during winter and shoulder months. Due to the intermittent use of the Pistol Range, there is not a consistent load in summer months to use the power generated from the solar panels.

#### **Solar Thermal Collectors**

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

#### **Geothermal**

The Pistol Range is not a good candidate for geothermal installation since it would require replacement of the entire existing HVAC system, of which major components still have between 40% and 90% remaining useful life.

#### **Combined Heat and Power**

The Pistol Range is not a good candidate for CHP installation and would not be cost-effective due to the size and low operating hours of the building.

## PROPOSED ENERGY CONSERVATION MEASURES

Energy Conservation Measures (ECMs) are recommendations determined for the building based on improvements over current building conditions. ECMs have been determined for the building based on installed cost, as well as energy and cost-savings opportunities.

### Recommendations: Energy Conservation Measures

| ECM# | Description of Highly Recommended 0-5 Year Payback ECMs      |
|------|--------------------------------------------------------------|
| 1    | Lighting Upgrades: Replace 16 MH lights with T5 fixtures     |
|      | Description of Recommended 5-10 Year Payback ECMs            |
| 2    | Lighting Upgrades: Install Motion Sensor for Exterior Lights |
|      | >10 Year Payback ECMs                                        |
| 3    | Lighting Upgrades: Replace 8 Inc with CFL                    |
| 4    | Replace Ventilation System Fan Motors with High Efficiency   |
| 5    | Lighting Upgrades: Replace 21 T12 Fixtures with T8           |

#### Assumptions:

Discount Rate: 3.2%; Energy Price Escalation Rate: 0%

#### Note:

A 0.0 electrical demand reduction/month indicates that it is very low/negligible

### **ECM#1: Building Lighting Upgrades: Replace MH Fixtures with T5**

On the days of the site visits, SWA completed a lighting inventory of the Pistol Range (see Appendix B). The shooting range room has 16 high intensity Metal Halide fixtures. SWA recommends replacing each of the lights with 3 lamp 2'T5 lights with electronic ballasts. The 3 lamp 2'T5 lamps operate at a lower wattage for the same lumen output and allow the option for bi-level control. The labor in all these installations was evaluated using prevailing electrical contractor wages. The Borough 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.

#### **Installation cost:**

Estimated installed cost: \$1,254 (includes \$500 of labor)

Source of cost estimate: RS Means; Published and established costs, NJ Clean Energy Program

| ECM # | est. installed cost, \$ | est. incentives, \$ | net est. ECM cost with incentives, \$ | kWh, 1st yr savings | kW, demand reduction/mo | therms, 1st yr savings | kBtu/sq ft, 1st yr savings | est. operating cost, 1st yr savings, \$ | total 1st yr savings, \$ | life of measure, yrs | est. lifetime energy cost savings, \$ | simple payback, yrs | annual return on investment, % | CO <sub>2</sub> reduced, lbs/yr |
|-------|-------------------------|---------------------|---------------------------------------|---------------------|-------------------------|------------------------|----------------------------|-----------------------------------------|--------------------------|----------------------|---------------------------------------|---------------------|--------------------------------|---------------------------------|
| 1     | 1,510                   | 256                 | 1,254                                 | 399                 | 0.08                    | 0                      | 0.3                        | 563                                     | 615                      | 15                   | 9230.7                                | 2                   | 87                             | 715                             |

**Assumptions:** SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA also assumed an aggregated 5 hrs/yr to replace aging burnt out lamps vs. newly installed.

#### **Rebates/financial incentives:**

- NJ Clean Energy - Metal Halide with T5 (\$16 per fixture) - Maximum incentive amount is \$256.

Please see Appendix F for more information on Incentive Programs.

### **ECM#2: Building Lighting Upgrades: Install Motion Sensor for Exterior Lights**

On the days of the site visits, SWA completed a lighting inventory of the Pistol Range (see Appendix B). Based on discussions with building staff, the exterior lights currently operate by automatic timer, which means they operate each night. Because of the infrequency of use of the building, however, an estimated one third of the hour of operation of the lamps can be saved by using a motion sensor to control the exterior lights. This measure will directly reduce energy use and also prolong the life of the metal halide lamps.

#### **Installation cost:**

Estimated installed cost: \$200 (includes \$50 of labor)

Source of cost estimate: RS Means; Published and established costs, NJ Clean Energy Program

| ECM # | est. installed cost, \$ | est. incentives, \$ | net est. ECM cost with incentives, \$ | kWh, 1st yr savings | kW, demand reduction/mo | therms, 1st yr savings | kBtu/sq ft, 1st yr savings | est. operating cost, 1st yr savings, \$ | total 1st yr savings, \$ | life of measure, yrs | est. lifetime energy cost savings, \$ | simple payback, yrs | annual return on investment, % | CO <sub>2</sub> reduced, lbs/yr |
|-------|-------------------------|---------------------|---------------------------------------|---------------------|-------------------------|------------------------|----------------------------|-----------------------------------------|--------------------------|----------------------|---------------------------------------|---------------------|--------------------------------|---------------------------------|
| 2     | 220                     | 20                  | 200                                   | 210                 | 0.04                    | 0                      | 0.2                        | 0                                       | 28                       | 15                   | 416                                   | 7.2                 | 7                              | 376                             |

**Assumptions:** SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis.

**Rebates/financial incentives:**

- *NJ Clean Energy – Motion Sensor (\$20 per sensor) - Maximum incentive amount is \$20.*

**ECM#3: Building Lighting Upgrades: Replace Inc with CFL**

On the days of the site visits, SWA completed a lighting inventory of the Pistol Range (see Appendix B). There are several incandescent bulbs in use throughout the building. SWA recommends replacing these bulbs with CFL bulbs for a 2/3 reduction in energy use with the same lumen output. The CFL lamps also have a longer lifespan than incandescent bulbs.

**Installation cost:**

Estimated installed cost: \$297 (includes \$50 of labor)

Source of cost estimate: *RS Means; Published and established costs, NJ Clean Energy Program*

| ECM # | est. installed cost, \$ | est. incentives, \$ | net est. ECM cost with incentives, \$ | kWh, 1st yr savings | kW, demand reduction/mo | therms, 1st yr savings | kBtu/sq ft, 1st yr savings | est. operating cost, 1st yr savings, \$ | total 1st yr savings, \$ | life of measure, yrs | est. lifetime energy cost savings, \$ | simple payback, yrs | annual return on investment, % | CO <sub>2</sub> reduced, lbs/yr |
|-------|-------------------------|---------------------|---------------------------------------|---------------------|-------------------------|------------------------|----------------------------|-----------------------------------------|--------------------------|----------------------|---------------------------------------|---------------------|--------------------------------|---------------------------------|
| 3     | 297                     | 0                   | 297                                   | 65                  | 0.01                    | 0                      | 0.1                        | 20                                      | 29                       | 5                    | 144                                   | 10.3                | -3                             | 116                             |

**Assumptions:** SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis.

**Rebates/financial incentives:**

- *None at this time*

#### **ECM#4: Replace Ventilation System Motors with High Efficiency Models**

The Reznor Ventilation system for the shooting range uses three large motors. The supply fan motor is a standard efficiency 20 HP motor, and the two exhaust fans are each assumed to have 10 HP standard efficiency motors. Based on the electric meter for the system, these fans operate for a total of 500 full load hours. Savings can be achieved by replacing these motors with premium efficiency motors between 91% and 93% efficient, once they have reached the end of their operating life.

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

Estimated installed cost: \$2,800 (includes \$500 of labor)

Source of cost estimate: DOE Motor Master

| ECM # | est. installed cost, \$ | est. incentives, \$ | net est. ECM cost with incentives, \$ | kWh, 1st yr savings | kW, demand reduction/mo | therms, 1st yr savings | kBtu/sq ft, 1st yr savings | est. operating cost, 1st yr savings, \$ | total 1st yr savings, \$ | life of measure, yrs | est. lifetime energy cost savings, \$ | simple payback, yrs | annual return on investment, % | CO <sub>2</sub> reduced, lbs/yr |
|-------|-------------------------|---------------------|---------------------------------------|---------------------|-------------------------|------------------------|----------------------------|-----------------------------------------|--------------------------|----------------------|---------------------------------------|---------------------|--------------------------------|---------------------------------|
| 4     | 2,800                   | 325                 | 2,475                                 | 993                 | 0.28                    | 0                      | 0.8                        | 0                                       | 131                      | 20                   | 1,009                                 | 18.9                | -3                             | 1,778                           |

##### **Assumptions:**

SWA calculated the savings for this measure using nameplate data taken and using the billing analysis. The DOE Motor Master International selection and calculator was used. Based on billing analysis the motors operate for 500 full load hours annually.

##### **Rebates/financial incentives:**

- NJ Clean Energy – 10 HP HE Motor - \$100, 20 HP HE Motor \$125 - \$325 total

### ECM#5: Building Lighting Upgrades: Replace T12 with T8

On the days of the site visits, SWA completed a lighting inventory of the Pistol Range (see Appendix B). Most of the area lighting in the Pistol Range is provided by 21 T12 lamps with magnetic ballasts. SWA recommends replacing T12 fixtures with T8 fixtures with electronic ballasts. The T8 electronic ballasts use a third less of the energy of the magnetic ballasts, and the lamps have a longer lifespan. Due to these characteristics savings can be realized via a one-to-one substitution.

#### Installation cost:

Estimated installed cost: \$1,986 (includes \$750 of labor)

Source of cost estimate: RS Means; Published and established costs, NJ Clean Energy Program

| ECM # | est. installed cost, \$ | est. incentives, \$ | net est. ECM cost with incentives, \$ | kWh, 1st yr savings | kW, demand reduction/mo | therms, 1st yr savings | kBtu/sq ft, 1st yr savings | est. operating cost, 1st yr savings, \$ | total 1st yr savings, \$ | life of measure, yrs | est. lifetime energy cost savings, \$ | simple payback, yrs | annual return on investment, % | CO <sub>2</sub> reduced, lbs/yr |
|-------|-------------------------|---------------------|---------------------------------------|---------------------|-------------------------|------------------------|----------------------------|-----------------------------------------|--------------------------|----------------------|---------------------------------------|---------------------|--------------------------------|---------------------------------|
| 5     | 2,616                   | 630                 | 1,986                                 | 265                 | 0.06                    | 0                      | 0.2                        | 32                                      | 67                       | 15                   | 2,622                                 | 29.5                | 4                              | 475                             |

**Assumptions:** SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis.

#### Rebates/financial incentives:

- NJ Clean Energy – T12 to T8 - \$30 per fixture - \$630 total

## **PROPOSED FURTHER RECOMMENDATIONS**

### **Capital Improvements**

Capital Improvements are recommendations for the building that may not be cost-effective at the current time, but that could yield a significant long-term payback. These recommendations should typically be considered as part of a long-term capital improvement plan. Capital improvements should be considered if additional funds are made available, or if the installed costs can be shared with other improvements, such as major building renovations. SWA recommends the following capital improvements for the Pistol Range:

- Install premium motors when replacements are required - Select NEMA Premium motors when replacing motors that have reached the end of their useful operating lives.
- Install downspouts and downspout deflectors to minimize uncontrolled roof water run-off causing exterior wall damage.
- Tightly pack and add insulation in ceiling rafters, using a minimum of R-13.

### **Operations and Maintenance**

Operations and Maintenance measures consist of low/no cost measures that are within the capability of the current building staff to handle. These measures typically require little investment, and they yield a short payback period. These measures may address equipment settings or staff operations that, when addressed will reduce energy consumption or costs.

- Insulate hot water pipes for boiler and hot water heater as per manufacturer's recommendations.
- Clean and maintain gutters, downspouts and downspout deflectors to minimize uncontrolled roof water run-off causing exterior wall damage.
- Repair cracked and deteriorated stucco on exterior walls.
- Insect nesting should be removed and remaining cavities patched and air-sealed.
- Replace missing/damaged roof shingles.
- Slope perimeter grade away from building to maximize site drainage.
- Maintain roofs - SWA recommends regular maintenance to verify water is draining correctly.
- Provide weather-stripping/air-sealing - 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.
- Repair/seal wall cracks and penetrations - SWA recommends as part of the maintenance program installing weep holes, installing proper flashing and correct masonry efflorescence, and

sealing wall cracks and penetrations wherever necessary in order to keep insulation dry and effective.

- SWA recommends that the building considers purchasing the most energy-efficient equipment, including ENERGY STAR® labeled appliances, when equipment is installed or replaced. More information can be found in the “Products” section of the ENERGY STAR® website at: <http://www.energystar.gov>.
- Create an energy educational program - that teaches how to minimize energy use. The U.S. 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/>.

## APPENDIX A: EQUIPMENT LIST

### Inventory

| Building System    | Description                                                                                                                                                                                                          | Location             | Model #                               | Fuel                  | Space Served                            | Date Installed | Estimated Remaining Useful Life % |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------|-----------------------|-----------------------------------------|----------------|-----------------------------------|
| Domestic Hot Water | DHW heater 40 Gal, 4.5 kW                                                                                                                                                                                            | Utility Closet       | Bradford White; M140T6DS13; TG6311286 | Electric              | Bathroom Sink                           | 1987           | 10%                               |
| Heating            | Hot Water Boiler, 61,000 Btu/hr, 82% Eff., with motorized flue damper                                                                                                                                                | Mech Rm Closet       | Crown, AWI061SNST1PSU CROWN0004649 37 | Natural Gas           | Meeting Room                            | 2008           | 90%                               |
| Heating            | Baseboard hot water perimeter heating                                                                                                                                                                                | All Areas            | NA                                    | NA                    | Meeting Area                            | 1987           | 15%                               |
| Heating            | Wall Mounted Electric Radiant Heater                                                                                                                                                                                 | Mech Rm Closet       | NA                                    | Electric              | Mech Rm Closet                          | 1987           | 15%                               |
| Ventilation        | 100% Outside Air Fan with Direct-Fired Heater. Draws out lead dust from range and exhausts to atmosphere through large exhaust fans; 11,000 CFM to 20,000 CFM , 20 HP Motor, 750,000Btu/hr max in, 30,000 Btu/hr Min | Outside Back of Bldg | Reznor, RDF3-180-3, BED82V1N)27       | Electric/ Natural Gas | Shooting Range, one tap serving hallway | 2001           | 40%                               |
| Ventilation        | Two large Exhaust Fans - No Access - Assumed to be 20HP total                                                                                                                                                        | Roof                 | No Access - pitched roof              | Electric              | Shooting Range                          | 2001           | 40%                               |
| Lighting           | T12 and MH                                                                                                                                                                                                           | All Areas            | Appendix B                            | Electric              | All Areas                               | varies         | varies                            |

**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.

## Appendix B: Lighting Study

| Location                                                                                      |       |                            | Existing Fixture Information |         |           |               |                        |                |          |                           |                           |                 |             |                     | Retrofit Information |                 |           |         |          |               |                        |                |                           |                           |               |             |                     |                       |                        | Annual Savings      |  |  |
|-----------------------------------------------------------------------------------------------|-------|----------------------------|------------------------------|---------|-----------|---------------|------------------------|----------------|----------|---------------------------|---------------------------|-----------------|-------------|---------------------|----------------------|-----------------|-----------|---------|----------|---------------|------------------------|----------------|---------------------------|---------------------------|---------------|-------------|---------------------|-----------------------|------------------------|---------------------|--|--|
| Marker                                                                                        | Floor | Room Identification        | Fixture Type                 | Ballast | Lamp Type | # of Fixtures | # of Lamps per Fixture | Watts per Lamp | Controls | Operational Hours per Day | Operational Days per Year | Ballast Wattage | Total Watts | Energy Use kWh/year | Category             | Fixture Type    | Lamp Type | Ballast | Controls | # of Fixtures | # of Lamps per Fixture | Watts per Lamp | Operational Hours per Day | Operational Days per Year | Ballast Watts | Total Watts | Energy Use kWh/year | Fixture Savings (kWh) | Controls Savings (kWh) | Total Savings (kWh) |  |  |
| 1                                                                                             | 1     | Entrance Rm                | Recessed                     | M       | 4'T12     | 6             | 2                      | 40             | Sw       | 4                         | 120                       | 12              | 552         | 265                 | T8                   | Recessed        | 4'T8      | E       | Sw       | 6             | 2                      | 32             | 4                         | 120                       | 5             | 414         | 199                 | 66                    | 0                      | 66                  |  |  |
| 2                                                                                             | 1     | Ammo Closet                | Ceiling Mounted              | S       | Inc       | 1             | 1                      | 60             | Sw       | 1                         | 60                        | 0               | 60          | 4                   | CFL                  | Ceiling Mounted | CFL       | S       | Sw       | 1             | 1                      | 20             | 1                         | 60                        | 0             | 20          | 1                   | 2                     | 0                      | 2                   |  |  |
| 3                                                                                             | 1     | Hallyway                   | Recessed                     | M       | 4'T12     | 2             | 2                      | 40             | Sw       | 4                         | 120                       | 12              | 184         | 88                  | T8                   | Recessed        | 4'T8      | E       | Sw       | 2             | 2                      | 32             | 4                         | 120                       | 5             | 138         | 66                  | 22                    | 0                      | 22                  |  |  |
| 4                                                                                             | 1     | Boiler Rm                  | Recessed                     | M       | 8'T12     | 1             | 2                      | 80             | Sw       | 2                         | 60                        | 20              | 180         | 22                  | T8                   | Recessed        | 8'T8      | E       | Sw       | 1             | 2                      | 59             | 2                         | 60                        | 7             | 125         | 15                  | 7                     | 0                      | 7                   |  |  |
| 5                                                                                             | 1     | Boiler Rm                  | Recessed                     | M       | 4'T12     | 1             | 2                      | 40             | Sw       | 2                         | 60                        | 12              | 92          | 11                  | T8                   | Recessed        | 4'T8      | E       | Sw       | 1             | 2                      | 32             | 2                         | 60                        | 5             | 69          | 8                   | 3                     | 0                      | 3                   |  |  |
| 6                                                                                             | 1     | Bathroom                   | Ceiling Mounted              | S       | Inc       | 2             | 1                      | 60             | Sw       | 4                         | 120                       | 0               | 120         | 58                  | CFL                  | Ceiling Mounted | CFL       | S       | Sw       | 2             | 1                      | 20             | 4                         | 120                       | 0             | 40          | 19                  | 38                    | 0                      | 38                  |  |  |
| 7                                                                                             | 1     | Mech Rm                    | Ceiling Mounted              | S       | Inc       | 1             | 1                      | 60             | Sw       | 2                         | 60                        | 0               | 60          | 7                   | CFL                  | Ceiling Mounted | CFL       | S       | Sw       | 1             | 1                      | 20             | 2                         | 60                        | 0             | 20          | 2                   | 5                     | 0                      | 5                   |  |  |
| 8                                                                                             | 1     | Attic                      | Ceiling Mounted              | S       | Inc       | 4             | 1                      | 60             | Sw       | 2                         | 60                        | 0               | 240         | 29                  | CFL                  | Ceiling Mounted | CFL       | S       | Sw       | 4             | 1                      | 20             | 2                         | 60                        | 0             | 80          | 10                  | 19                    | 0                      | 19                  |  |  |
| 9                                                                                             | 1     | Shooting Room              | Recessed                     | M       | 4'T12     | 8             | 2                      | 40             | Sw       | 4                         | 120                       | 12              | 736         | 353                 | T8                   | Recessed        | 4'T8      | E       | Sw       | 8             | 2                      | 32             | 4                         | 120                       | 5             | 552         | 265                 | 88                    | 0                      | 88                  |  |  |
| 10                                                                                            | 1     | Shooting Room- Spot Lights | Ceiling Mounted              | S       | MH        | 16            | 1                      | 75             | Sw       | 4                         | 120                       | 21              | 1,536       | 737                 | T5                   | Ceiling Mounted | 2'T5      | E       | Sw       | 16            | 3                      | 14             | 4                         | 120                       | 2             | 704         | 338                 | 399                   | 0                      | 399                 |  |  |
| 11                                                                                            | 1     | Shooting Room              | Recessed                     | M       | 8'T12     | 3             | 2                      | 80             | Sw       | 4                         | 120                       | 20              | 540         | 259                 | T8                   | Recessed        | 8'T8      | E       | Sw       | 3             | 2                      | 59             | 4                         | 120                       | 7             | 375         | 180                 | 79                    | 0                      | 79                  |  |  |
| 12                                                                                            | Ext   | Exterior                   | Pole Mounted                 | S       | MH        | 2             | 1                      | 100            | T        | 9                         | 365                       | 28              | 256         | 841                 | N/A                  | Pole Mounted    | MH        | S       | MS       | 2             | 1                      | 100            | 7                         | 365                       | 28            | 256         | 631                 | 0                     | 210                    | 210                 |  |  |
| Totals:                                                                                       |       |                            |                              |         |           | 47            | 18                     | 735            |          |                           |                           | 137             | 4,556       | 2,674               |                      |                 |           |         |          | 47            | 20                     |                |                           |                           | 64            | 2,793       | 1,734               | 729                   | 210                    | 940                 |  |  |
| Rows Highlighted Yellow Indicate an Energy Conservation Measure is recommended for that space |       |                            |                              |         |           |               |                        |                |          |                           |                           |                 |             |                     |                      |                 |           |         |          |               |                        |                |                           |                           |               |             |                     |                       |                        |                     |  |  |

| Proposed Lighting Summary Table              |  |                 |                 |
|----------------------------------------------|--|-----------------|-----------------|
| Total Surface Area (SF)                      |  | 4,300           |                 |
| Average Power Cost (\$/kWh)                  |  | 0.1320          |                 |
| <b>Exterior Lighting</b>                     |  | <b>Existing</b> | <b>Proposed</b> |
| Exterior Annual Consumption (kWh)            |  | 841             | 631             |
| Exterior Power (watts)                       |  | 256             | 256             |
| <b>Total Interior Lighting</b>               |  | <b>Existing</b> | <b>Proposed</b> |
| Annual Consumption (kWh)                     |  | 1,833           | 1,104           |
| Lighting Power (watts)                       |  | 4,300           | 2,537           |
| Lighting Power Density (watts/SF)            |  | 1.00            | 0.59            |
|                                              |  |                 |                 |
| Estimated Cost of Fixture Replacement (\$)   |  | 3,537           |                 |
| Estimated Cost of Controls Improvements (\$) |  | 200             |                 |
| <b>Total Consumption Cost Savings (\$)</b>   |  | <b>739</b>      |                 |

| Legend                      |                |                |                |                |                              |                |                                             |
|-----------------------------|----------------|----------------|----------------|----------------|------------------------------|----------------|---------------------------------------------|
| Fixture Type                |                | Lamp Type      |                |                | Control Type                 | Ballast Type   | Retrofit Category                           |
| Ceiling Suspended           | Recessed       | CFL            | 3'T12          | 8'T5           | Autom. Timer (T)             | S (Self)       | N/A (None)                                  |
| Exit Sign                   | Sconce         | Inc            | 3'T12 U-Shaped | 8'T5 U-Shaped  | Bi-Level (BL)                | E (Electronic) | T8 (Install new T8)                         |
| High Bay                    | Spotlight      | LED            | 3'T5           | 8'T8           | Contact (Ct)                 | M (Magnetic)   | T5 (Install new T5)                         |
| Parabolic Ceiling Mounted   | Track          | HPS            | 3'T5 U-Shaped  | 8'T8 U-Shaped  | Daylight & Motion (M)        |                | CFL (Install new CFL)                       |
| Parabolic Ceiling Suspended | Vanity         | MH             | 3'T8           | Circline - T5  | Daylight & Switch (DLSw)     |                | LEDex (Install new LED Exit)                |
| Pendant                     | Wall Mounted   | MV             | 3'T8 U-Shaped  | Circline - T8  | Daylight Sensor (DL)         |                | LED (Install new LED)                       |
| Recessed Parabolic          | Wall Suspended | 1'T12          | 4'T5           | Circline - T12 | Delay Switch (DSw)           |                | D (Delamping)                               |
| Ceiling Mounted             | Wallpack       | 1'T12 U-Shaped | 4'T5 U-Shaped  | Fl.            | Dimmer (D)                   |                | C (Controls Only)                           |
| Chandelier                  |                | 1'T5           | 6'T12          | Hal            | Motion Sensor (MS)           |                | PSMH (Install new Pulse-Start Metal Halide) |
| Equipment / Fume Hood       |                | 1'T5 U-Shaped  | 6'T12 U-Shaped | Induction      | Motion& Switch (MSw)         |                |                                             |
| Flood                       |                | 1'T8           | 6'T5           | Infrared       | None (N)                     |                |                                             |
| Landscape                   |                | 1'T8 U-Shaped  | 6'T5 U-Shaped  | LPS            | Occupancy Sensor (OS)        |                |                                             |
| Low Bay                     |                | 2'T12 U-Shaped | 6'T8           | Mixed Vapor    | Occupancy Sensor - CM (OSCM) |                |                                             |
| Parabolic Wall Mounted      |                | 2'T5           | 6'T8 U-Shaped  | Neon           | Photocell (PC)               |                |                                             |
| Pole Mounted                |                | 2'T5 U-Shaped  | 8'T12          | Quartz Halogen | Switch (Sw)                  |                |                                             |
| Pole Mounted Off Building   |                | 2'T8 U-Shaped  | 8'T12 U-Shaped |                |                              |                |                                             |

## APPENDIX C: THIRD PARTY ENERGY SUPPLIERS

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

| Third Party Gas Suppliers for PSEG Service Territory                                      | Telephone & Web Site                                                                             |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>Cooperative Industries</b><br>412-420 Washington Avenue<br>Belleville, NJ 07109        | (800) 628-9427<br><a href="http://www.cooperativenet.com">www.cooperativenet.com</a>             |
| <b>Direct Energy Services, LLC</b><br>120 Wood Avenue, Suite 611<br>Iselin, NJ 08830      | (866) 547-2722<br><a href="http://www.directenergy.com">www.directenergy.com</a>                 |
| <b>Dominion Retail, Inc.</b><br>395 Highway 170, Suite 125<br>Lakewood, NJ 08701          | (866) 275-4240<br><a href="http://www.retail.dom.com">www.retail.dom.com</a>                     |
| <b>Gateway Energy Services Corp.</b><br>44 Whispering Pines Lane<br>Lakewood, NJ 08701    | (800) 805-8586<br><a href="http://www.gesc.com">www.gesc.com</a>                                 |
| <b>UGI Energy Services, Inc.</b><br>704 East Main Street, Suite 1<br>Moorestown, NJ 08057 | (856) 273-9995<br><a href="http://www.ugienergyservices.com">www.ugienergyservices.com</a>       |
| <b>Great Eastern Energy</b><br>116 Village Riva, Suite 200<br>Princeton, NJ 08540         | (888) 651-4121<br><a href="http://www.greateastern.com">www.greateastern.com</a>                 |
| <b>Hess Corporation</b><br>1 Hess Plaza<br>Woodbridge, NJ 07095                           | (800) 437-7872<br><a href="http://www.hess.com">www.hess.com</a>                                 |
| <b>Hudson Energy Services, LLC</b><br>545 Route 17 South<br>Ridgewood, NJ 07450           | (877) 483-7669<br><a href="http://www.hudsonenergyservices.com">www.hudsonenergyservices.com</a> |
| <b>Intelligent Energy</b><br>2050 Center Avenue, Suite 500<br>Fort Lee, NJ 07024          | (800) 724-1880<br><a href="http://www.intelligentenergy.org">www.intelligentenergy.org</a>       |
| <b>Keil &amp; Sons</b><br>1 Bergen Blvd.<br>Fairview, NJ 07002                            | (877) 797-8786<br><a href="http://www.systrumenergy.com">www.systrumenergy.com</a>               |
| <b>Metro Energy Group, LLC</b><br>14 Washington Place<br>Hackensack, NJ 07601             | (888) 536-3876<br><a href="http://www.metroenergy.com">www.metroenergy.com</a>                   |
| <b>MxEnergy, Inc.</b><br>510 Thornall Street, Suite 270<br>Edison, NJ 08837               | (800) 375-1277<br><a href="http://www.mxenergy.com">www.mxenergy.com</a>                         |
| <b>NATGASCO (Mitchell Supreme)</b><br>532 Freeman Street<br>Orange, NJ 07050              | (800) 840-4427<br><a href="http://www.natgasco.com">www.natgasco.com</a>                         |
| <b>Pepco Energy Services, Inc.</b><br>112 Main Street<br>Lebanon, NJ 08833                | (800) 363-7499<br><a href="http://www.pepco-services.com">www.pepco-services.com</a>             |

| Third Party Gas Suppliers for PSEG Service Territory                                       | Telephone & Web Site                                                                       |
|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>PPL EnergyPlus, LLC</b><br>811 Church Road<br>Cherry Hill, NJ 08002                     | (800) 281-2000<br><a href="http://www.pplenergyplus.com">www.pplenergyplus.com</a>         |
| <b>Sempra Energy Solutions</b><br>581 Main Street, 8th Floor<br>Woodbridge, NJ 07095       | (877) 273-6772<br><a href="http://www.semprasolutions.com">www.semprasolutions.com</a>     |
| <b>South Jersey Energy Company</b><br>One South Jersey Plaza, Route 54<br>Folsom, NJ 08037 | (800) 756-3749<br><a href="http://www.southjerseyenergy.com">www.southjerseyenergy.com</a> |
| <b>Sprague Energy Corp.</b><br>12 Ridge Road<br>Chatham Township, NJ 07928                 | (800) 225-1560<br><a href="http://www.spragueenergy.com">www.spragueenergy.com</a>         |
| <b>Stuyvesant Energy LLC</b><br>10 West Ivy Lane, Suite 4<br>Englewood, NJ 07631           | (800) 646-6457<br><a href="http://www.stuyfuel.com">www.stuyfuel.com</a>                   |
| <b>Woodruff Energy</b><br>73 Water Street<br>Bridgeton, NJ 08302                           | (800) 557-1121<br><a href="http://www.woodruffenergy.com">www.woodruffenergy.com</a>       |

## APPENDIX D: GLOSSARY AND METHOD OF CALCULATIONS

**Net ECM Cost:** The net ECM cost is the cost experienced by the customer, which is typically the total cost (materials + labor) of installing the measure minus any available incentives. Both the total cost and the incentive amounts are expressed in the summary for each ECM.

**Annual Energy Cost Savings (AECS):** This value is determined by the audit firm based on the calculated energy savings (kWh or Therm) of each ECM and the calculated energy costs of the building.

**Lifetime Energy Cost Savings (LECS):** This measure estimates the energy cost savings over the lifetime of the ECM. It can be a simple estimation based on fixed energy costs. If desired, this value can factor in an annual increase in energy costs as long as the source is provided.

**Simple Payback:** This is a simple measure that displays how long the ECM will take to break-even based on the annual energy and maintenance savings of the measure.

**ECM Lifetime:** This is included with each ECM so that the owner can see how long the ECM will be in place and whether or not it will exceed the simple payback period. Additional guidance for calculating ECM lifetimes can be found below. This value can come from manufacturer's rated lifetime or warranty, the ASHRAE rated lifetime, or any other valid source.

**Operating Cost Savings (OCS):** This calculation is an annual operating savings for the ECM. It is the difference in the operating, maintenance, and / or equipment replacement costs of the existing case versus the ECM. In the case where an ECM lifetime will be longer than the existing measure (such as LED lighting versus fluorescent) the operating savings will factor in the cost of replacing the units to match the lifetime of the ECM. In this case or in one where one-time repairs are made, the total replacement / repair sum is averaged over the lifetime of the ECM.

**Return on Investment (ROI):** The ROI is expressed as the percentage return of the investment based on the lifetime cost savings of the ECM. This value can be included as an annual or lifetime value, or both.

**Net Present Value (NPV):** The NPV calculates the present value of an investment's future cash flows based on the time value of money, which is accounted for by a discount rate (assumes bond rate of 3.2%).

**Internal Rate of Return (IRR):** The IRR expresses an annual rate that results in a break-even point for the investment. If the owner is currently experiencing a lower return on their capital than the IRR, the project is financially advantageous. This measure also allows the owner to compare ECMs against each other to determine the most appealing choices.

**Gas Rate and Electric Rate (\$/therm and \$/kWh):** The gas rate and electric rate used in the financial analysis is the total annual energy cost divided by the total annual energy usage for the 12 month billing period studied. The graphs of the monthly gas and electric rates reflect the total monthly energy costs divided by the monthly usage, and display how the average rate fluctuates throughout the year. The average annual rate is the only rate used in energy savings calculations.

### Calculation References

| Term           | Definition                                                                 |
|----------------|----------------------------------------------------------------------------|
| ECM            | Energy Conservation Measure                                                |
| AOCS           | Annual Operating Cost Savings                                              |
| AECS           | Annual Energy Cost Savings                                                 |
| LOCS*          | Lifetime Operating Cost Savings                                            |
| LECS           | Lifetime Energy Cost Savings                                               |
| LCS            | Lifetime Cost Savings                                                      |
| NPV            | Net Present Value                                                          |
| IRR            | Internal Rate of Return                                                    |
| DR             | Discount Rate                                                              |
| Net ECM Cost   | Total ECM Cost – Incentive                                                 |
| LECS           | AECS X ECM Lifetime                                                        |
| AOCS           | LOCS / ECM Lifetime                                                        |
| LCS            | LOCS+LECS                                                                  |
| Simple Payback | Net ECM Cost / (AECS + AOCS)                                               |
| Lifetime ROI   | (LECS + LOCS – Net ECM Cost) / Net ECM Cost                                |
| Annual ROI     | (Lifetime ROI / Lifetime) = [(AECS + OCS) / Net ECM Cost – (1 / Lifetime)] |

\* The lifetime operating cost savings are all avoided operating, maintenance, and/or component replacement costs over the lifetime of the ECM. This can be the sum of any annual operating savings, recurring or bulk (i.e. one-time repairs) maintenance savings, or the savings that comes from avoiding equipment replacement needed for the existing measure to meet the lifetime of the ECM (e.g. lighting change outs).

### Excel NPV and IRR Calculation

In Excel, function =IRR (values) and =NPV(rate, values) are used to quickly calculate the IRR and NPV of a series of annual cash flows. The investment cost will typically be a negative cash flow at year 0 (total cost - incentive) with years 1 through the lifetime receiving a positive cash flow from the annual energy cost savings and annual maintenance savings. The calculations in the example below are for an ECM that saves \$850 annually in energy and maintenance costs (over a 10 year lifetime) and takes \$5,000 to purchase and install after incentives:

|    | A | B | C | D | E    | F             | G | H | I               |
|----|---|---|---|---|------|---------------|---|---|-----------------|
| 1  |   |   |   |   |      |               |   |   |                 |
| 2  |   |   |   |   |      |               |   |   |                 |
| 3  |   |   |   |   |      |               |   |   |                 |
| 4  |   |   |   |   | Year | Cash Flow     |   |   |                 |
| 5  |   |   |   |   | 0    | \$ (5,000.00) |   |   | Investment Cost |
| 6  |   |   |   |   | 1    | \$ 850.00     |   |   |                 |
| 7  |   |   |   |   | 2    | \$ 850.00     |   |   |                 |
| 8  |   |   |   |   | 3    | \$ 850.00     |   |   |                 |
| 9  |   |   |   |   | 4    | \$ 850.00     |   |   |                 |
| 10 |   |   |   |   | 5    | \$ 850.00     |   |   |                 |
| 11 |   |   |   |   | 6    | \$ 850.00     |   |   |                 |
| 12 |   |   |   |   | 7    | \$ 850.00     |   |   |                 |
| 13 |   |   |   |   | 8    | \$ 850.00     |   |   |                 |
| 14 |   |   |   |   | 9    | \$ 850.00     |   |   |                 |
| 15 |   |   |   |   | 10   | \$ 850.00     |   |   |                 |
| 16 |   |   |   |   | IRR  | 11.03%        |   |   |                 |
| 17 |   |   |   |   | NPV  | \$2,250.67    |   |   |                 |

ECM Lifetime: 10 years (rows 5-14)

Cash Flow: Annual Energy Cost Savings + Annual Maintenance Savings

Formula:  
 =IRR(F4:F14)  
 =NPV(0.03,F5:F14)+F4

## Solar PV ECM Calculation

There are several components to the calculation:

|                 |                                                                                                                                                                                                                                                                                                                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Costs:          | Material of PV system including panels, mounting and net-metering + Labor                                                                                                                                                                                                                                              |
| Energy Savings: | Reduction of kWh electric cost for life of panel, 25 years                                                                                                                                                                                                                                                             |
| Incentive 1:    | NJ Renewable Energy Incentive Program (REIP), for systems of size 50kW or less, \$1/Watt incentive subtracted from installation cost                                                                                                                                                                                   |
| Incentive 2:    | Solar Renewable Energy Credits (SRECs) – Market-rate incentive. Calculations assume \$600/Megawatt hour consumed per year for a maximum of 15 years; added to annual energy cost savings for a period of 15 years. (Megawatt hour used is rounded to nearest 1,000 kWh)                                                |
| Assumptions:    | A Solar Pathfinder device is used to analyze site shading for the building and determine maximum amount of full load operation based on available sunlight. When the Solar Pathfinder device is not implemented, amount of full load operation based on available sunlight is assumed to be 1,180 hours in New Jersey. |

Total lifetime PV energy cost savings =  
kWh produced by panel \* [\$/kWh cost \* 25 years + \$600/Megawatt hour /1000 \* 15 years]

## ECM and Equipment Lifetimes

Determining a lifetime for equipment and ECM's can sometimes be difficult. The following table contains a list of lifetimes that the NJCEP uses in its commercial and industrial programs. Other valid sources are also used to determine lifetimes, such as the DOE, ASHRAE, or the manufacturer's warranty.

Lighting is typically the most difficult lifetime to calculate because the fixture, ballast, and bulb can all have different lifetimes. Essentially the ECM analysis will have different operating cost savings (avoided equipment replacement) depending on which lifetime is used.

When the bulb lifetime is used (rated burn hours / annual burn hours), the operating cost savings is just reflecting the theoretical cost of replacing the existing case bulb and ballast over the life of the recommended bulb. Dividing by the bulb lifetime will give an annual operating cost savings.

When a fixture lifetime is used (e.g. 15 years) the operating cost savings reflects the avoided bulb and ballast replacement cost of the existing case over 15 years minus the projected bulb and ballast replacement cost of the proposed case over 15 years. This will give the difference of the equipment replacement costs between the proposed and existing cases and when divided by 15 years will give the annual operating cost savings.

### New Jersey Clean Energy Program Commercial & Industrial Lifetimes

| Measure                                                       | Life Span |
|---------------------------------------------------------------|-----------|
| Commercial Lighting — New                                     | 15        |
| Commercial Lighting — Remodel/Replacement                     | 15        |
| Commercial Custom — New                                       | 18        |
| Commercial Chiller Optimization                               | 18        |
| Commercial Unitary HVAC — New - Tier 1                        | 15        |
| Commercial Unitary HVAC — Replacement - Tier 1                | 15        |
| Commercial Unitary HVAC — New - Tier 2                        | 15        |
| Commercial Unitary HVAC — Replacement Tier 2                  | 15        |
| Commercial Chillers — New                                     | 25        |
| Commercial Chillers — Replacement                             | 25        |
| Commercial Small Motors (1-10 HP) — New or Replacement        | 20        |
| Commercial Medium Motors (11-75 HP) — New or Replacement      | 20        |
| Commercial Large Motors (76-200 HP) — New or Replacement      | 20        |
| Commercial VSDs — New                                         | 15        |
| Commercial VSDs — Retrofit                                    | 15        |
| Commercial Comprehensive New Construction Design              | 18        |
| Commercial Custom — Replacement                               | 18        |
| Industrial Lighting — New                                     | 15        |
| Industrial Lighting — Remodel/Replacement                     | 15        |
| Industrial Unitary HVAC — New - Tier 1                        | 15        |
| Industrial Unitary HVAC — Replacement - Tier 1                | 15        |
| Industrial Unitary HVAC — New - Tier 2                        | 15        |
| Industrial Unitary HVAC — Replacement Tier 2                  | 15        |
| Industrial Chillers — New                                     | 25        |
| Industrial Chillers — Replacement                             | 25        |
| Industrial Small Motors (1-10 HP) — New or Replacement        | 20        |
| Industrial Medium Motors (11-75 HP) — New or Replacement      | 20        |
| Industrial Large Motors (76-200 HP) — New or Replacement      | 20        |
| Industrial VSDs — New                                         | 15        |
| Industrial VSDs — Retrofit                                    | 15        |
| Industrial Custom — Non-Process                               | 18        |
| Industrial Custom — Process                                   | 10        |
| Small Commercial Gas Furnace — New or Replacement             | 20        |
| Small Commercial Gas Boiler — New or Replacement              | 20        |
| Small Commercial Gas DHW — New or Replacement                 | 10        |
| C&I Gas Absorption Chiller — New or Replacement               | 25        |
| C&I Gas Custom — New or Replacement (Engine Driven Chiller)   | 25        |
| C&I Gas Custom — New or Replacement (Gas Efficiency Measures) | 18        |
| O&M savings                                                   | 3         |
| Compressed Air (GWh participant)                              | 8         |

# APPENDIX E: STATEMENT OF ENERGY PERFORMANCE FROM ENERGY STAR®

OMB No. 2060-0347

## STATEMENT OF ENERGY PERFORMANCE Borough of Park Ridge - Police Pistol Range

Building ID: 2253010  
For 12-month Period Ending: December 31, 2009<sup>1</sup>  
Date SEP becomes ineligible: N/A

Date SEP Generated: April 20, 2010

|                                                                                                          |                              |                                                 |
|----------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------|
| <b>Facility</b><br>Borough of Park Ridge - Police Pistol Range<br>53 Park Avenue<br>Park Ridge, NJ 07656 | <b>Facility Owner</b><br>N/A | <b>Primary Contact for this Facility</b><br>N/A |
|----------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------|

Year Built: 1960  
Gross Floor Area (ft<sup>2</sup>): 4,300

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

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

|                                   |         |
|-----------------------------------|---------|
| Electricity - Grid Purchase(kBtu) | 96,085  |
| Natural Gas (kBtu) <sup>4</sup>   | 37,950  |
| Total Energy (kBtu)               | 134,035 |

### Energy Intensity<sup>5</sup>

|                                   |    |
|-----------------------------------|----|
| Site (kBtu/ft <sup>2</sup> /yr)   | 31 |
| Source (kBtu/ft <sup>2</sup> /yr) | 84 |

### Emissions (based on site energy use)

|                                                     |    |
|-----------------------------------------------------|----|
| Greenhouse Gas Emissions (MtCO <sub>2</sub> e/year) | 17 |
|-----------------------------------------------------|----|

**Electric Distribution Utility**  
Borough of Park Ridge

### National Average Comparison

|                                               |       |
|-----------------------------------------------|-------|
| National Average Site EUI                     | 104   |
| National Average Source EUI                   | 213   |
| % Difference from National Average Source EUI | -61%  |
| Building Type                                 | Other |

|                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                        |
| 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>6</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 units of volume (e.g. 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 welcomes suggestions for reducing this level of effort. Send comments (referencing OMB control number) to the Director, Collection Strategies Division, U.S. EPA (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.

EPA Form 5900-16

## APPENDIX F: INCENTIVE PROGRAMS

### New Jersey Clean Energy Pay for Performance

The NJ Clean Energy Pay for Performance (P4P) Program relies on a network of Partners who provide technical services to clients. LGEA participating clients who are not receiving Direct Energy Efficiency and Conservation Block Grants are eligible for P4P. SWA is an eligible Partner and can develop an Energy Reduction Plan for each project with a whole-building traditional energy audit, a financial plan for funding the energy measures and an installation construction schedule.

The Energy Reduction Plan must define a comprehensive package of measures capable of reducing a building's energy consumption by 15+%. P4P incentives are awarded upon the satisfactory completion of three program milestones: submittal of an Energy Reduction Plan prepared by an approved Program Partner, installation of the recommended measures and completion of a Post-Construction Benchmarking Report. The incentives for electricity and natural gas savings will be paid based on actual savings, provided that the minimum 15% performance threshold savings has been achieved.

For further information, please see: <http://www.njcleanenergy.com/commercial-industrial/programs/pay-performance/existing-buildings> .

### Direct Install 2010 Program

Direct Install is a division of the New Jersey Clean Energy Programs' Smart Start Buildings. It is a turn-key program for small to mid-sized facilities to aid in upgrading equipment to more efficient types. It is designed to cut overall energy costs by upgrading lighting, HVAC and other equipment with energy efficient alternatives. The program pays **up to 80%** of the retrofit costs, including equipment cost and installation costs.

Eligibility:

- Existing small and mid-sized commercial and industrial facilities with peak electrical demand **below 200 kW** within 12 months of applying
- Must be located in New Jersey
- Must be served by one of the state's public, regulated or natural gas companies
  - Electric: Atlantic City Electric, Jersey Central Power & Light, Orange Rockland Electric, PSE&G
  - Natural Gas: Elizabethtown Gas, New Jersey Natural Gas, PSE&G, South Jersey Gas

For the most up to date information on contractors in New Jersey who participate in this program, go to: <http://www.njcleanenergy.com/commercial-industrial/programs/direct-install>

### Smart Start

New Jersey's SmartStart Building Program is administered by New Jersey's Office of Clean Energy. The program also offers design support for larger projects and technical assistance for smaller projects. If your project specifications do not fit into anything defined by the program, there are even incentives available for custom projects.

There are a number of improvement options for commercial, industrial, institutional, government, and agricultural projects throughout New Jersey. Alternatives are designed to enhance quality while building in energy efficiency to save money. Project categories included in this program are New Construction and Additions, Renovations, Remodeling and Equipment Replacement.

For the most up to date information on how to participate in this program, go to:  
<http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings>.

### **Renewable Energy Incentive Program**

The Renewable Energy Incentive Program (REIP) provides incentives that reduce the upfront cost of installing renewable energy systems, including solar, wind, and sustainable biomass. Incentives vary depending upon technology, system size, and building type. Current incentive levels, participation information, and application forms can be found at the website listed below.

Solar Renewable Energy Credits (SRECs) represent all the clean energy benefits of electricity generated from a solar energy system. SRECs can be sold or traded separately from the power, providing owners a source of revenue to help offset the cost of installation. All solar project owners in New Jersey with electric distribution grid-connected systems are eligible to generate SRECs. Each time a system generates 1,000 kWh of electricity an SREC is earned and placed in the customer's account on the web-based SREC tracking system.

For the most up to date information on how to participate in this program, go to:  
<http://www.njcleanenergy.com/renewable-energy/home/home>.

### **Utility Sponsored Programs**

Check with your local utility companies for further opportunities that may be available.

### **Federal and State Sponsored Programs**

Other federal and state sponsored funding opportunities may be available, including BLOCK and R&D grant funding. For more information, please check <http://www.dsireusa.org/>.

## APPENDIX G: ENERGY CONSERVATION MEASURES

|                                          | ECM # | ECM description                                                            | est. incentives, \$ | net est. ECM cost with incentives, \$ | kWh, 1st yr savings | kW, demand reduction/mo | therms, 1st yr savings | kBtu/sq ft, 1st yr savings | est. operating cost, 1st yr savings, \$ | total 1st yr savings, \$ | life of measure, yrs | est. lifetime cost savings, \$ | simple payback, yrs | lifetime return on investment, % | annual return on investment, % | internal rate of return, % | net present value, \$ | CO <sub>2</sub> reduced, lbs/yr |
|------------------------------------------|-------|----------------------------------------------------------------------------|---------------------|---------------------------------------|---------------------|-------------------------|------------------------|----------------------------|-----------------------------------------|--------------------------|----------------------|--------------------------------|---------------------|----------------------------------|--------------------------------|----------------------------|-----------------------|---------------------------------|
| <b>0-5 Year</b>                          | 1     | 16 New T5 fixtures to be installed with incentives                         | 256                 | 1,254                                 | 399                 | 0.1                     | 0                      | 0.3                        | 563                                     | 615                      | 15.0                 | 9,231                          | 2.0                 | 1309                             | 87                             | 49                         | 5,987                 | 715                             |
| <b>5-10</b>                              | 2     | 1 New motion sensors to be installed with incentives                       | 20                  | 200                                   | 210                 | 0.0                     | 0                      | 0.2                        | 0                                       | 28                       | 15.0                 | 416                            | 7.2                 | 108                              | 7                              | 9                          | 127                   | 376                             |
| <b>&lt;10 Year Payback (End of Life)</b> | 3     | 8 New CFL fixtures to be installed with incentives                         | none at this time   | 297                                   | 65                  | 0.0                     | 0                      | 0.1                        | 20                                      | 29                       | 5.0                  | 144                            | 10.3                | -17                              | -3                             | -20                        | -166                  | 116                             |
|                                          | 4     | Replace Ventilation System Fan Motors with High Eff., one 20 HP, two 10 HP | 325                 | 2,475                                 | 993                 | 0.3                     | 0                      | 0.8                        | 0                                       | 131                      | 20.0                 | 1,009                          | 18.9                | -59                              | -3                             | -6                         | -560                  | 1,778                           |
|                                          | 5     | 21 New T8 fixtures to be installed with incentives                         | 630                 | 1,986                                 | 265                 | 0.1                     | 0.0                    | 0.2                        | 32                                      | 67                       | 15.0                 | 2,622                          | 29.5                | 56                               | 4                              | -12                        | -822                  | 475                             |

**Assumptions:** Discount Rate: 3.2%; Energy Price Escalation Rate: 0%

**Note:** A 0.0 electrical demand reduction/month indicates that it is very low/negligible

## APPENDIX H: METHOD OF ANALYSIS

### 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

### 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 Pistol Range 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 Pistol Range(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.***