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May 5, 2010

Local Government Energy Program
Energy Audit Report

Mount Laurel Township

Senior Meeting Center
100 Mount Laurel Road
Mount Laurel, NJ 08054

Project Number: LGEA22

TABLE OF CONTENTS

INTRODUCTION

As an approved energy consulting firm under the Local Government Energy Audit Program (LGEA), Steven Winter Associates, Inc. (SWA) was selected to perform an energy audit and assessment for the Mount Laurel Township buildings. The audit included a review of the Mount Laurel EMS building (201 Masonville Road), EMS building (1051 S. Church Street), Library, Administrative building, Paws Farm, Paws Farm (Farmhouse) and the Senior Meeting Center. The buildings are located in Mount Laurel, NJ. A separate energy audit report is issued for each of the referenced buildings.

This report addresses the Senior Meeting Center building located at 100 Mount Laurel Road, Mount Laurel, NJ. The current conditions and energy-related information were collected in order to analyze and suggest the implementation of building improvements and energy conservation measures.

The Senior Meeting Complex, located was constructed in 2003 and has not undergone any major renovations. The two-story building consists of approximately 21,218 square feet of conditioned space with occupancy of approximately 2 employees and 10-20 community members at any given time. The building is operated 40 hours per week with occasional usage in the evening for meetings.

The goal of this Local Government Energy Audit (LGEA) is to provide sufficient information to Mount Laurel Township to make decisions regarding the implementation of the most appropriate and most cost effective energy conservation measures for the building.

Launched in 2008, the 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 will subsidize 75% of the cost of the audit. If the net cost of the installed measures recommended by the audit, after applying eligible NJ SmartStart Buildings incentives, exceeds the remaining cost of the audit, then that additional 25% will also be paid by the program. The Board of Public Utilities (BPU's) Office of Clean Energy has assigned TRC Energy Services to administer the Program.

- Section 1 and section 2 of the report cover a description and analysis of the building existing condition.
- Section 3 provides a detailed inventory of major electrical and mechanical systems in the building.
- Sections 4 through 5 provide a description of our recommendations.
- Appendices include further details and information supporting SWA's recommendations.

EXECUTIVE SUMMARY

The energy audit performed by Steven Winter Associates (SWA) encompasses the Senior Meeting Center located at 100 Mount Laurel Road, Mount Laurel, NJ. The two-story building has a total floor area of 21,218 square feet. The Senior Meeting Center was constructed in 2003 and there have been no major additions or renovations to the building.

Based on the field visit performed by the SWA staff on September 30th and October 1st, 2009 and the results of a comprehensive energy analysis, this report describes the site's current conditions and recommendations for improvements. Suggestions for measures related to energy conservation and improved comfort are provided in the scope of work. Energy and resource savings are estimated for each measure that results in a reduction of heating, cooling, and electric usage.

Existing conditions

From March 2008 through March 2009, the period of analysis for this audit, the building consumed 321,120 kWh or $50,674 worth of electricity at an approximate rate of $0.158/kWh and 15,060 therms or $21,623 worth of natural gas at an approximate rate of $1.436 per therm. The joint energy consumption for the building including both electricity and fossil fuel was 2,602 MMBtus of energy that cost a total of $72,297.

SWA has entered energy information about the Senior Meeting Center in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. Currently, the building is not eligible for a performance rating since Senior Centers are currently not defined within the Benchmark Tool. SWA encourages Mount Laurel Township to continue entering utility data in *Energy Star Portfolio Manager* in order to track weather normalized source energy use over time.

The Site Energy Use Intensity is 116.0 kBtu/sq ft yr compared to the national average of 104.0 kBtu/ft^{2}yr.

Recommendations

Implementing this report's recommendations will reduce use by approximately 17.6 kBtu/ft^{2}yr, which would decrease the building's energy use intensity to 98.4 kBtu/ft^{2}yr, which is below the national average of 104.0 kBtu/ft^{2}yr.

The Senior Meeting Center is approximately 7 years old and all of the existing equipment is well within the useful lifetime. Due to the new age of the building, the existing equipment will not be cost-effective to replace at this time. SWA recommends a package of measures that address mostly the lighting system but also introduces renewable energy in the form of a Solar Photovoltaic system. The condition of the building and central location within the Mount Laurel Township, make this building a prime candidate for energy efficiency education. SWA recommends installing a 82.6kW canopy-mounted Solar Photovoltaic system that will offset a large portion of the buildings energy usage as well as provide a semi-covered parking shelter. This system will be visible from the road as residents drive by the Municipal Complex that contains the Senior Meeting Center, Municipal Building, Police Station and Library. The Solar Photovoltaic system will become an educational tool for the community and showcase the Town's willingness to participate in energy efficiency, energy offsets and renewable energy.

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

Category I Recommendations: Capital Improvement Measures

- Install a BMS system with local controls

Category II Recommendations: Operations and Maintenance

- Adjust temperature at anti-scald device
- Bi-annual inspections of exterior wall areas
- Bi-annual inspections of roof surfaces
- Adjust timer for exterior lights
- Perform routine maintenance inspections of windows and doors
- Provide weather stripping / air sealing
- Provide water efficient fixtures and controls
- Use Energy Star labeled appliances

Category III Recommendations: Energy Conservation Measures

At this time, SWA highly recommends a total of **2** Energy Conservation Measure (ECM) for the Senior Meeting Center that is summarized in the following Table 1. The total investment cost for these highly recommended ECMs with incentives is **$4,238**. SWA estimates a first year savings of **$1,537** with a simple payback of **2.8 years**. SWA also recommends **2** ECMs with a 5-10 year payback that is summarized in Table 2 and no End of Life Cycle ECMs.

The implementation of all the recommended ECMs would reduce or offset the building electric usage by 109,611 kWh annually or 34% of the building's current electric consumption and would not decrease the building's natural gas consumption. SWA estimates that implementing these ECMs will reduce the carbon footprint of the Senior Meeting Center by **47,458 lbs of CO_2**, which is equivalent to removing approximately 12 cars from the roads each year or avoiding the need of 210 trees to absorb the annual CO_2 produced. SWA also recommends that Mount Laurel Township contacts third party energy suppliers in order to negotiate a lower electricity rate. Comparing the current electric rate to average utility rates of similar type buildings in New Jersey, it may be possible to save up to $0.008/kWh, which would have equated to $2,569 for the past 12 months.

There are various incentives that Mount Laurel Township could apply for that could also help lower the cost of installing the ECMs. SWA recommends that Mount Laurel Township apply for either the NJ SmartStart program or the NJ Clean Power Direct Install program. The NJ SmartStart program provides incentives for prescriptive measures in order to offset the cost of implementation, incentive levels vary by equipment type. The NJ Clean Energy Direct Install program is a new program that provides incentives that could cover up to 80% of the capital investment for prescriptive measures. More information about both programs and how to apply can be found in Appendix D or at the New Jersey Office of Clean Energy's website: http://www.njcleanenergy.com/commercial-industrial/home/home

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

Table 1 - Highly Recommended 0-5 Year Payback ECMs																			
ECM #	ECM description	Source	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 cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
1	Install 43 new CFL fixtures	RS Means	2,238	0	2,238	6,321	1.3	0	1.0	126	1,125	5	5,122	2.0	129	26	41	2,913	11,318
2	Install 10 new Occupancy Sensors	RS Means	2,200	200	2,000	2,609	0.5	0	0.4	0	412	15	4,851	4.9	143	10	19	2,921	4,671
	TOTALS		**4,438**	**200**	**4,238**	**8,930**	**1.8**	**0**	**1.4**	**126**	**1,537**	**-**	**9,972**	**2.8**	**-**	**-**	**-**	**5,834**	**15,989**

Assumptions: Discount Rate: 3.2% per DOE FEMP; Energy Price Escalation Rate: 0% per DOE FEMP Guidelines
Note: A 0.0 electrical demand reduction / month indicates that it is very low / negligible

Table 2 - Recommended 5-10 Year Payback ECMs																			
ECM #	ECM description	Source	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 cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
3	Install an 82.6 kW Solar Photovoltaic system	Similar Projects	660,800	0	660,800	97,501	82.6	0	15.7	0	73,905	25	1,258,706	8.9	90	4	8	305,821	174,576
4	Install 11 new Pulse Start Metal Halide fixtures	RS Means	7,758	275	7,483	3,180	0.7	0	0.5	267	769	15	9,054	9.7	21	1	6	1,703	5,694
	TOTALS		**668,558**	**275**	**668,283**	**100,681**	**83.3**	**0**	**16.2**	**267**	**74,675**	**-**	**1,267,761**	**8.9**	**-**	**-**	**-**	**307,524**	**180,269**

1. HISTORIC ENERGY CONSUMPTION

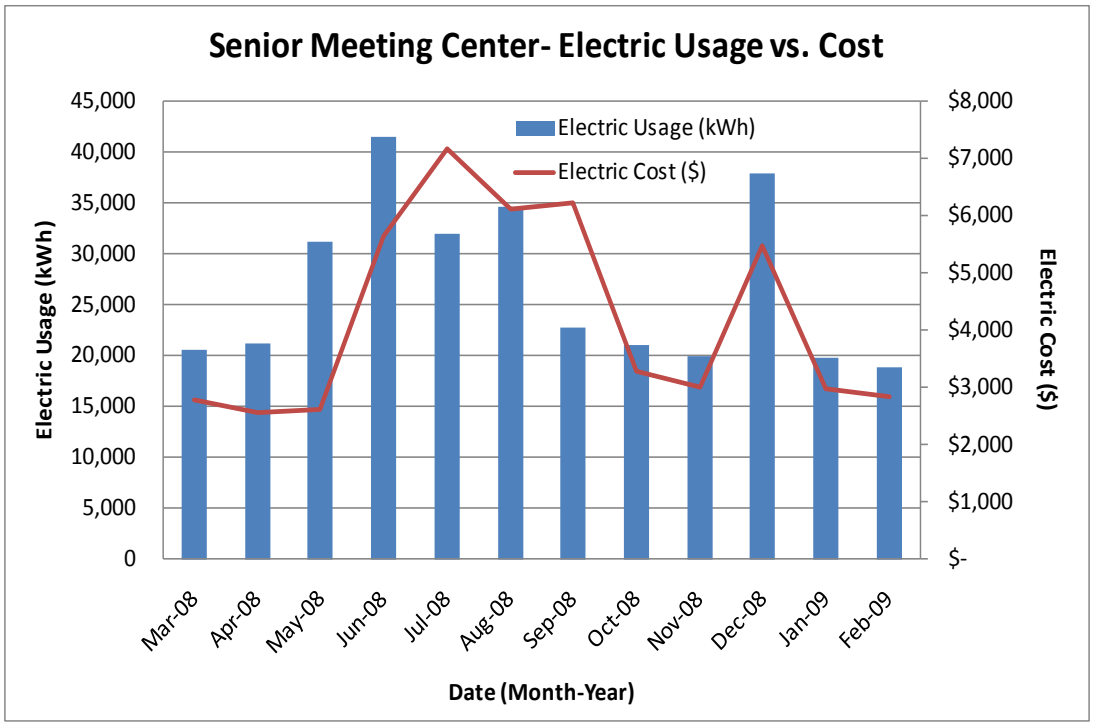
1.1. Energy usage, load profiles and cost analysis

SWA analyzed utility bills from **March 2008 through March 2009** (period of analysis) that were received from the utility companies supplying the Senior Meeting Center with electric and natural gas.

Electricity - The Senior Meeting Center buys electricity from PSE&G at **an average rate of $0.158/kWh** based on 12 months of utility bills from March 2008 to March 2009. The building purchased **approximately 321,120 kWh or $50,674 worth of electricity** in the previous year. The building is currently charged for demand (kW) which has been factored into each monthly bill. The building has an average monthly demand of **57.3 kW and a peak demand of 81.6.**

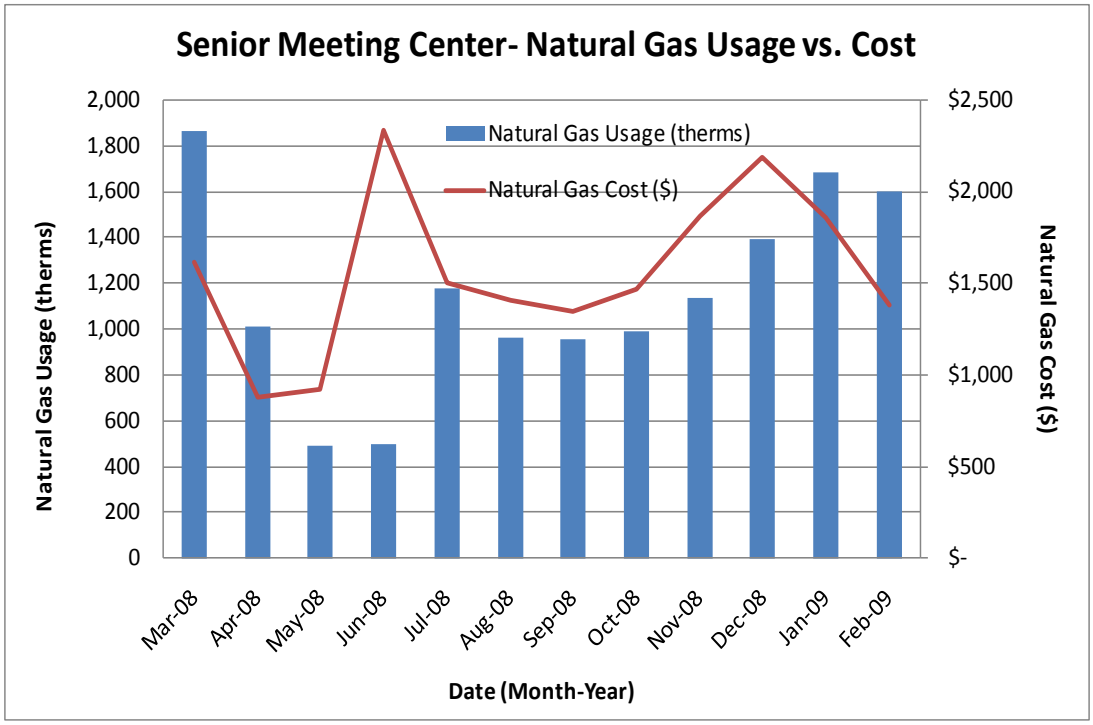
Natural gas - The Senior Meeting Center is currently served by one meter for natural gas. The building currently buys natural gas from PSE&G at **an average aggregated rate of $1.436/therm** based on 12 months of utility bills for March 2008 to March 2009. The building purchased **approximately 15,060 therms or $21,623 worth of natural gas** in the previous year.

The following chart shows electricity use versus cost for the Senior Meeting Center based on utility bills for the 12 month period of March 2008 to March 2009.



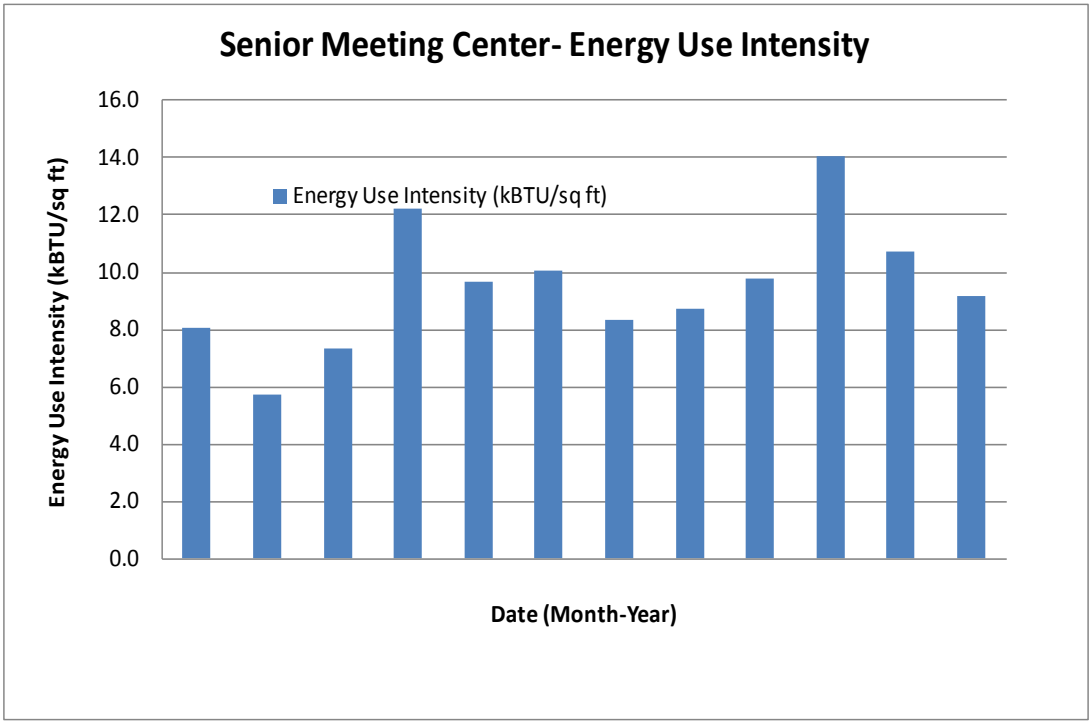
Electricity use follows the expected trend; peaking during the summer months when the electric chiller is being used the most and decreases during the winter. There is an unusual peak during January that shows that electricity is being used in some form for heating. The cost of electricity fluctuates as expected with usage; however there is a secondary peak around January because of the use of electricity for space heating.

The following is a chart of the natural gas annual load profile for the building versus natural gas costs, peaking in the coldest months of the year.



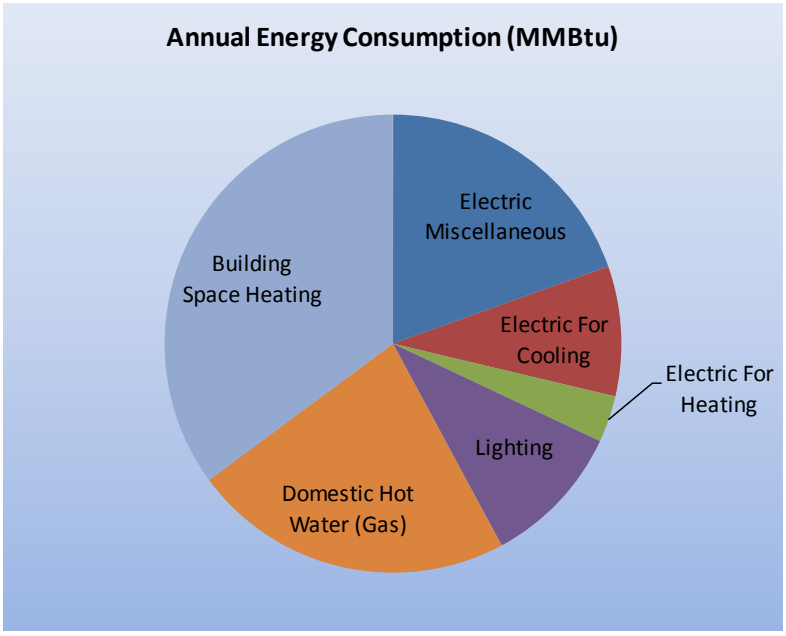
In the above chart, the natural gas use peaks during the winter months when natural gas is consumed by the heating plant. March 2008 shows an unusually high peak as well as July 2008. These fluctuations are most likely the result of metering reading issues, when Mount Laurel was under-billed in a previous month so the bill was reconciled in a later month. The above chart shows that there is unusually high natural gas usage during the summer. This is most likely caused by gas reheat in the VAV boxes.

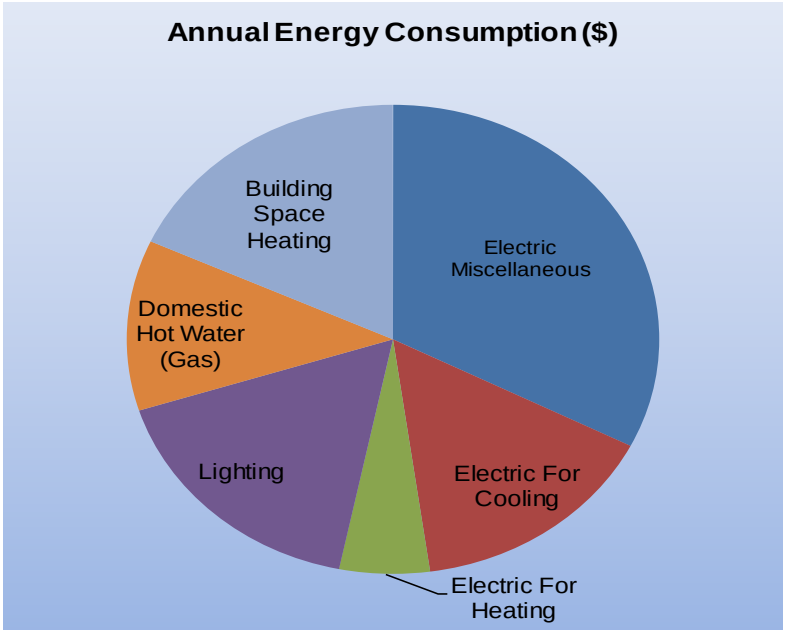
The following chart shows combined natural gas and electric consumption in kBtu/sq ft for the Senior Meeting Center based on utility bills for the 12 month period of March 2008 to March 2009.



The following table and chart pies show energy use for the Senior Meeting Center based on utility bills for the 12 month period of March 2008 to March 2009. Note electrical cost at $46/MMBtu of energy is more than 3 times as expensive to use as natural gas at $14/MMBtu.

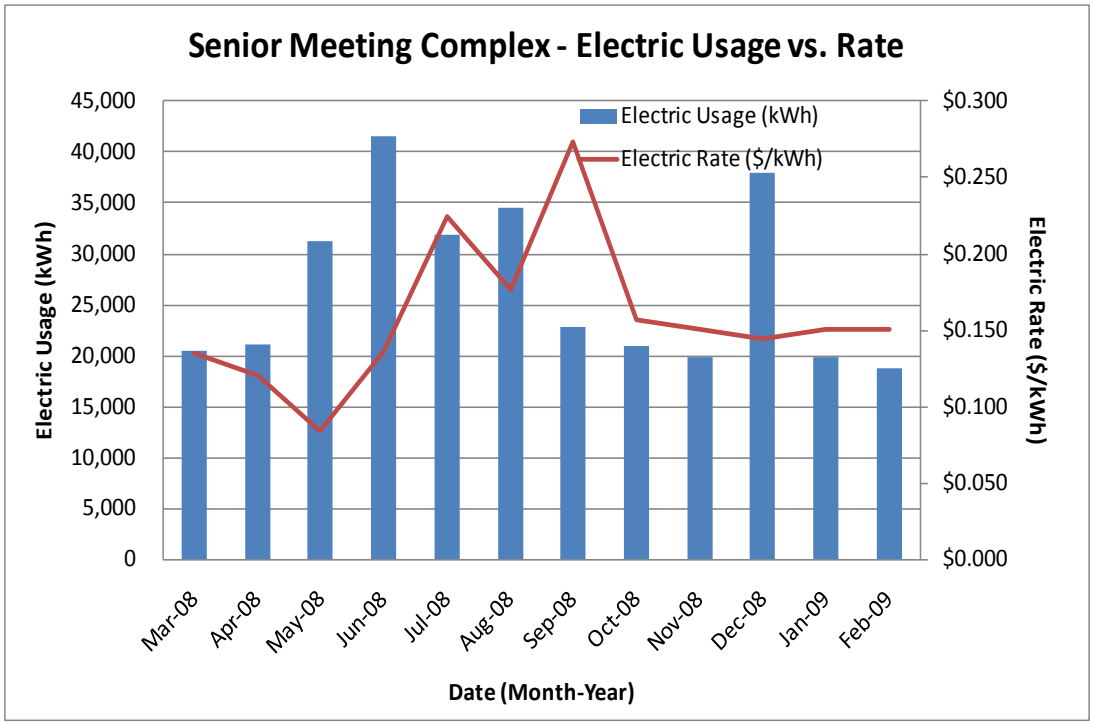
2008 Annual Energy Consumption / Costs					
	MMBtu	% MMBtu	$	% $	$/MMBtu
Electric Miscellaneous	508	20%	$23,493	33%	46
Electric For Cooling	239	9%	$11,040	15%	46
Electric For Heating	86	3%	$3,958	5%	46
Lighting	263	10%	$12,163	17%	46
Domestic Hot Water (Gas)	592	23%	$8,500	12%	14
Building Space Heating	914	35%	$13,123	18%	14
Totals	2,601	100%	$72,276	100%	
Total Electric Usage	1,096	42%	$50,674	70%	46
Total Gas Usage	1,506	58%	$21,623	30%	14
Totals	2,602	100%	$72,297	100%	





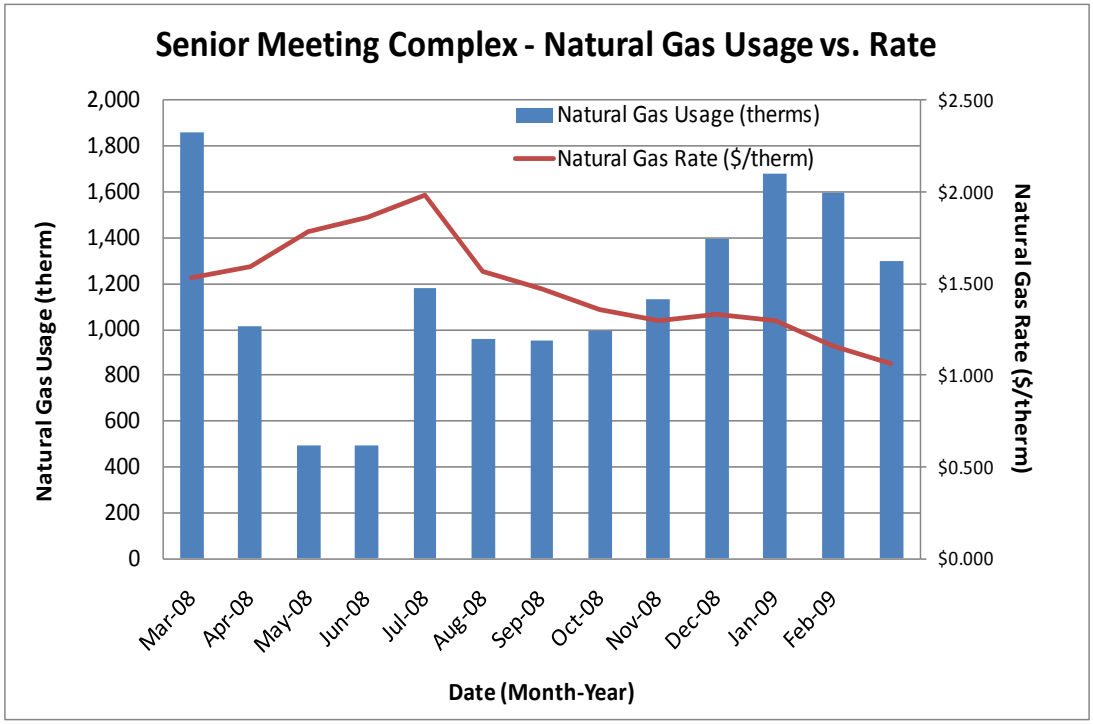
1.2. Utility rate analysis

The Senior Meeting Center currently purchases electricity from PSE&G at a general service market rate for electricity use (kWh) including a separate (kW) demand charge that is factored into each monthly bill. The Senior Meeting Center currently pays an average rate of approximately $0.158/kWh based on the 12 months of utility bills of March 2008 to March 2009. Demand prices are reflected in the utility bills and can be verified by observing the price fluctuations throughout the year. The electric rate does not show large fluctuations throughout the year except for the anticipated rate increase during the summer months, and therefore appears to be the appropriate rate for the building.



The Senior Meeting Center currently purchases natural gas supply from the PSE&G at a general service market rate for natural gas (therms). There is one gas meter that provides natural gas service to the building currently. The average aggregated rate (supply and transport) for the meter is approximately $1.436/therm based on 12 months of utility bills for March 2008 to March 2009. The suppliers' general service rate for natural gas charges a market-rate price based on use and the building utility billing does not breakdown demand costs for all periods. Demand prices are reflected in the utility bills and can be verified by observing the price fluctuations throughout the year. Typically, the natural gas prices increase during the summer months when natural gas is used the least. Also contributing to the high gas price per therm fluctuations in the summer may be the low use caps for the non-heating months. Thus the building pays for fixed costs such as meter reading charges during the summer months.

Some of the minor unusual utility fluctuations that showed up for a couple of months on the utility bills may be due to adjustments between estimated and actual meter readings. December 2008 shows an increase in electrical consumption which may be due to the increased use of the building for holiday events or if they used Christmas lights.



Natural gas rates fluctuate with the amount of gas purchased per therm. In the above chart, it is clear that when consumption is lower, natural gas rates (per unit) increase sharply. Every utility bill has a minimum delivery charge as well as taxes, etc factored into the cost, when consumption is low, these charges remain the same therefore increasing the rate (per unit) sharply when usage declines.

1.3. Energy benchmarking

From March 2008 through March 2009, the period of analysis for this audit, the building consumed 321,120 kWh or $50,674 worth of electricity at an approximate rate of $0.158/kWh and 15,060 therms or $21,623 worth of natural gas at an approximate rate of $1.436 per therm. The joint energy consumption for the building, including both electricity and fossil fuel, was 2,602 MMBtus of energy that cost a total of $72,297.

SWA has entered energy information about the Senior Meeting Center in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. Currently, the building is not eligible to receive a performance rating since Senior Centers categorized separately in the Benchmark tool. SWA encourages the Mount Laurel Township to continue entering utility data in *Energy Star Portfolio Manager* in order to track weather normalized source energy use over time.

The Site Energy Use Intensity is 116.0 kBtu/sq ft yr compared to the national average of 104.0 kBtu/sq ft yr. Implementing this report's highly recommended Energy Conservations Measures (ECMs) will reduce use by approximately 1.4 kBtu/sqft yr, with an additional 16.2 kBtu/sq ft yr from the recommended ECMs with a 5-10 year payback. The entire package of measures will reduce the Site Energy Use Intensity from 116.0 kBtu/sq ft yr to 98.4 kBtu/sq ft yr, which is below the national average.

Per the LGEA program requirements, SWA has assisted Mount Laurel Township to create an *Energy Star Portfolio Manager* account and has shared the building facility information to allow future data to be

added and tracked using the benchmarking tool. SWA is sharing this Portfolio Manager Site information with TRC Energy Services. As per requirements, the account information is provided below:

[redacted]

Also, below is a statement of energy performance generated based on historical energy consumption from the Portfolio Manager tool.

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Mount Laurel Township - Senior Meeting Center

Building ID: 1923949
For 12-month Period Ending: February 28, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: February 11, 2010

Facility	**Facility Owner**	**Primary Contact for this Facility**
Mount Laurel Township - Senior Meeting Center 100 Mount Laurel Road Mount Laurel, NJ 08054	N/A	N/A

Year Built: 2003
Gross Floor Area (ft²): 21,218

Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	1,052,390
Natural Gas (kBtu)[4]	1,415,667
Total Energy (kBtu)	2,468,057
Energy Intensity[5]	
Site (kBtu/ft²/yr)	116
Source (kBtu/ft²/yr)	236
Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	236
Electric Distribution Utility	
Public Service Elec & Gas Co	
National Average Comparison	
National Average Site EUI	104
National Average Source EUI	213
% Difference from National Average Source EUI	11%
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.

Certifying Professional
N/A

Meets Industry Standards[6] **for Indoor Environmental Conditions:**	
Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**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

2. FACILITY AND SYSTEMS DESCRIPTION

2.1. Building Characteristics

The two-story Senior Meeting Center was built in 2003 and has not undergone any major renovations. The building has a total area of 21,218 square feet and houses various meeting rooms, a craft room, a kitchen and administrative offices. Currently, only the first floor used for meetings, the Second floor is not furnished and is only used for storage.

2.2. Building occupancy profiles

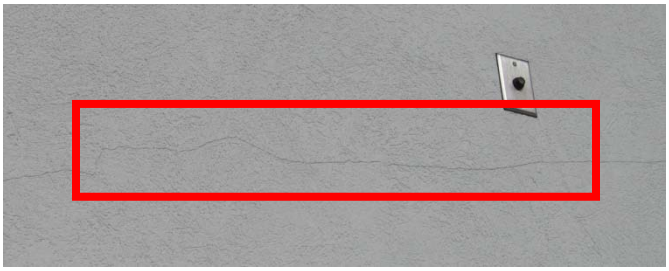
The building is occupied by up 2 employees for 40 hours a week. Approximately 10-20 community members are in the building at any given time. The building is operated 40 hours per week with occasional use in the evening for community meetings.

2.3. Building envelope

2.3.1.Exterior Walls

The exterior envelope consists of 8" and 12" insulate CMU blocks with a textured stucco façade. The exterior walls are well-insulated and appeared to be in good condition with a few minor exceptions. Wasps' nests have formed in some areas under ledges and there are minor cracks in the stucco.

Wasps nest forming under stucco ledge



Crack in stucco facade

Overall, exterior and interior wall finishes of the envelope were found to be in age-appropriate, good condition. SWA recommends biannual maintenance inspections to inspect the exterior walls with a focus on cracks and locating sources of water and air leakage.

2.3.2.Roof

The building has dark grey colored asphalt shingled roof that is original to the building. The roof is wood truss-framed 24" on-center with R-19 batts of foil-faced insulation installed directly above the top floor ceiling. There were no reported problems with roof leaks or maintenance issues reported at the time of field audit. SWA recommends general maintenance to prevent any damage leading to roof leaks.

Asphalt shingle roof

2.3.3.Base

The building's base is 4" concrete slab-on-grade over crushed stone with concrete footers and a vapor barrier. There were not any reported problems with water penetration or moisture.

2.3.4.Windows

The building contains a mixture of double-hung and fixed windows that are wood-framed, insulated windows with double glazing. SWA recommends exterior and interior inspections of all windows as part of the building's routine maintenance schedule to ensure air and water tight performance year round. Any gaps, cracks, or damage to weather-stripping or caulking should be repaired or replaced as needed, to minimize energy loss around those openings. All of the windows appear to be in good age-appropriate condition.

Typical window installation

2.3.5.Exterior doors

The exterior doors at the Senior Meeting Complex consist of either wooden or insulated steel doors. The exterior doors are in good condition with some typical wearing of the weather-stripping. If not properly maintained, exterior doors can become major sources of heat loss and infiltration. As a best

practice, SWA recommends checking the weather-stripping of each door on a regular basis and replacing any broken seals immediately. This will help optimize comfort and energy performance.

2.3.6. Building air tightness

Based on a visual inspection and communication with the building staff, the building was observed to be relatively air tight with some minor areas of air infiltration such as worn weather-stripping on exterior doors. As a best practice, weather-stripping on doors and windows should be checked every 6 months for deficiencies and replaced as they fail.

2.4. HVAC Systems

The Senior Meeting Center is heated and cooled in all areas. In general, the systems are approximately 7 years old and consist of newer, efficient equipment. All of the systems were observed to operating correctly, with no major maintenance or operational problems.

2.4.1. Heating

The heating system consists of one main heating plant located in the mechanical room located on the first floor. This heating plant consists of two Weil-McLain cast iron sectional boilers. These forced draft, natural gas-fired boilers are identical; each with an output capacity of 538 MBH and thermal efficiency of 81%. Newer, more efficient boilers of equivalent type are available with thermal efficiencies of over 85% however; due to the age of these boilers, replacing them would not be cost-effective.

The heating hot water distribution system for the building differs by floor. The heating plant delivers hot water via coils to the air handler located on the second floor. This air handler provides heated air to VAV boxes located on the first floor. The second floor is primarily heated by six unit heaters that each contains a hot water coil. Both the first and second floors contain fin-tube radiation baseboards along the perimeter on walls that also have windows. There were no observed problems with the heating system.

The heating system is controlled by a central control system within the building. This control system contains a simple node that does not have graphical display. Mount Laurel Township uses a third-party controls contractor (Peterson Controls) to maintain set points on a seasonal basis. SWA recommends installing a new BMS system that has a graphical display and more localized controls. At this point in time, installing a new BMS system will not be cost-effective but should be considered as part of a capital improvement plant. There are two main issues with the current control system. The current control system needs to be adjusted seasonally for temperature set points. There is currently no temperature cut-off that prevent the system from firing during the “winter mode” if there is an unseasonably warm day. The second issue is that there are no controls to prevent from using too much gas reheat at the VAV boxes during the summer. Based on billing analysis, there is high natural gas usage during the summer. This high usage is due to gas reheat at the VAV boxes. Typically, the air handler takes a mixture of fresh air and return air and cools it to a specified temperature before delivering the conditioned air to the open space on the second floor and VAV boxes on the first floor. This temperature set point is not being controlled correctly, allowing for air to be over-cooled and sent to the VAV boxes on the first floor. When air that is too cold reaches the VAV boxes; the heating coil within the boxes calls for heat via hot water from the boiler to reheat this air to the desired temperature. In essence, the building is cooling and heating at the same time. Installing a BMS system can help control all of the settings of the system.

The stairwells of the building contain a total of two electric unit heaters to prevent keep the stairwells at a minimum heat level. It would not be cost-effective to upgrade these electric unit heaters to gas since they are not located near the hot water loop and are used minimally.

2.4.2. Cooling

The building contains one central cooling plant to provide chilled water to all areas of the building. The cooling plant consists of a McQuay air cooled reciprocating electric chiller with a capacity of 70 tons. This chiller provides chilled water an air handler that provides conditioned air directly to the open area on the second floor and to VAV boxes located on the ceiling of the first floor. The 70 ton chiller has an Energy Efficient Ratio (EER) of 9.5. Newer, more efficient air cooled reciprocating electric chillers are available with EERs of over 14.0, however; due to the age of this chiller, replacing it would not be cost-effective.

2.4.3. Ventilation

As mentioned above, the building contains a large McQuay air handling unit that provides most of the ventilation for the building. The air handling unit uses two 15HP motors, controlled by variable frequency drives (VFDs) to control the amount of supply and exhaust air in the building. This unit mixes ducted return air with fresh incoming air to provide ventilation directly to the second floor and to the first floor via VAV boxes. The air handling unit was observed to be appropriately sized and in good working condition. There are no upgrades recommended at this point in time.

In addition to the air handling unit, exhaust fans help to remove the stale air from the building and also helps induce fresh air into the building.

2.4.4. Domestic Hot Water

The Senior Meeting Center contains one Bradford White, atmospheric, gas-fired domestic hot water heater. This unit stores domestic hot water at 140ºF. When there is a call for domestic hot water (DHW), the water leaves the unit at 140ºF and is run directly through a Leonard anti-scald device. The Leonard anti-scald device acts as a mixing valve that mixes cold city water with domestic hot water to send water to the faucets in the building at a temperature that is safe and will not scald or burn occupants. SWA observed that this anti-scald device is set to deliver water at 90ºF. Domestic hot water becomes a hazard for developing Legionella at temperatures lower than 120ºF. SWA recommends, as a health and safety measure, that the Leonard anti-scald device is adjusted to mix water and deliver it at a temperature of 120ºF.

2.5. Electrical systems

2.5.1. Lighting

Interior Lighting – The Senior Meeting Center general lighting consists of efficient T8 fluorescent fixtures with electronic ballasts. There are some areas that contain incandescent lighting such as bathrooms that should be replaced with screw-in CFLs.

Incandescent lighting in Women's Restroom

All of the interior lights in the Senior Meeting Center are controlled via wall switches. SWA recommends installing occupancy sensors in areas such as bathrooms, storage rooms and mechanical rooms since they are used infrequently. See attached lighting schedule in Appendix A for a complete lighting inventory and estimated power consumption.

Exit Lights - Exit signs were found to be LED types which are the most efficient exit signs available at this time. See attached lighting schedule in Appendix A for a complete lighting inventory throughout the building and estimated power consumption.

Exterior Lighting – Exterior lighting consisted of approximately 7 Probe Start Metal Halide fixtures that should be upgraded to Pulse Start Metal Halide fixtures. SWA recommends upgrading these fixtures to Pulse Start Metal Halides that provide a better quality light and can be installed at lower wattages. The exterior light fixtures are controlled by a Tork lighting control timer located in the first floor mechanical room. Tork timers are set by inserting small pins in a mechanical dial that tell the lights when to turn on and off. SWA observed that these pins were missing from the timer, not allowing the lights to shut off. See attached lighting schedule in Appendix A for a complete lighting inventory throughout the building and estimated power consumption.

2.5.2. Appliances

SWA performed a basic survey of appliances installed at the Senior Meeting Center. Appliances, such as refrigerators, that are over 10 years of age should be replaced with newer efficient models with the Energy Star label. For example, Energy Star refrigerators use as little as 315 kWh / yr. When compared to the average electrical consumption of older equipment, Energy Star equipment results in a large savings. Building management should select Energy Star label appliances and equipment when replacing: refrigerators, printers, computers, copy machines, etc. More information can be found in the "Products" section of the Energy Star website at: http://www.energystar.gov.

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

2.5.3. Elevators

The Senior Meeting Center contains one hydraulic elevator. Building staff noted that this elevator is disabled for public use since all activities are held on the first floor and the second floor is used for Town storage.

2.5.4. Process and others electrical systems

There are not currently any other electrical or process systems located in the building.

3. EQUIPMENT LIST

Building System	Description	Physical Location	Make/ Model	Fuel	Space served	Date Installed	Estimated Remaining useful life %
Heating	B-1; Weil-McLain cast iron sectional boiler with Honeywell burner controls, forced draft, Boiler HP 19.2, 538 MBH output, 81% thermal efficiency	Mechanical Room, First Floor	Weil-McLain, Series 78, Model #BG-678, Serial #23064, NJ Registration #2003-23064-H	Natural Gas	All Areas	2003	72%
Heating	B-2; Weil-McLain cast iron sectional boiler with Honeywell burner controls, forced draft, Boiler HP 19.2, 538 MBH output, 81% thermal efficiency	Mechanical Room, First Floor	Weil-McLain, Series 78, Model #BG-678, Serial #23065, NJ Registration #2003-23065-H	Natural Gas	All Areas	2003	72%
Heating	Hot Water expansion tank, Bell & Gossett, 130 gallon capacity, well insulated	Mechanical Room, First Floor	Bell & Gossett, Model #B-400, Serial #NA	Hot Water	All Areas	2003	30%
Heating	P-3; hot water circulation pump motor, 5 HP, 1750 RPM, 3 PH, high efficiency, nameplate information taken from drawings	Mechanical Room, First Floor	Bell and Gossett, Inline Series 80, Model #NA, Serial #NA	Electricity	All Areas	2003	30%
Heating	P-4; hot water circulation pump motor, 5 HP, 1750 RPM, 3 PH, high efficiency, nameplate information taken from drawings	Mechanical Room, First Floor	Bell and Gossett, Inline Series 80, Model #NA, Serial #NA	Electricity	All Areas	2003	30%
Heating	P-5; Bell and Gossett, hot water curculation pump motor, 1/2 HP, 1725 RPM, 3 PH, high efficiency	Mechanical Room, First Floor	Bell and Gossett, Model #FVF 48T17D175B P, Serial #NA	Electricity	All Areas	2003	30%
Heating	P-6; Bell and Gossett, hot water curculation pump motor, 1/2 HP, 1725 RPM, 3 PH, high efficiency	Mechanical Room, First Floor	Bell and Gossett, Model #FVF 48T17D175B P, Serial #NA	Electricity	All Areas	2003	30%
Heating/ Cooling	AHU-1; McQuay, 14,725 CFM, Chilled water cooling capacity 781.8 MBH, Hot Water coil, Air handler fan motors are controlled by two 15HP motors with VFD controls	Mechanical Room, Second Floor	McQuay, Model #CAH030FDAC	Electricity/ Chilled Water loop/ Hot Water loop	All Areas	2003	53%
Heating	UH-1,2,3,4,5,6 - Six (6) Unit heaters, identical models, 2,400 CFM, nameplate information taken from drawings	Second Floor, hung from ceiling	Sterling, Model #HV-204, Serial #NA	Natural Gas	Second Floor	2003	53%
Heating	EUH 1,2; Two (2) electric unit heaters, identical models, 300 CFM, taken from drawings	Stairwells	Qmark, Model #MUH03-21, Serial #NA	Stairwells	Mechanical Rooms	2003	53%
Cooling	CH-1; McQuay air cooled global reciprocating compressor chiller, 70 tons, 9.5 EER, set to serve chilled water at 53F, designed for future expansion to municipal buildings, R-22	Behind building	McQuay, Model #AGR070AS12-ER10, Serial #STNU020 300220	Electricity	All Areas	2003	72%

Ventilation	EF-1; Greenheck exhaust fan, 525 CFM, 1/4 HP, in-line, nameplate info taken from drawings	Kitchen	Greenheck, Model #BS0-80-4, Serial #NA	Electricity	Kitchen	2003	40%
Ventilation	EF-2; Greenheck exhaust fan, 1565 CFM, 3/4 HP, in-line, nameplate info taken from drawings	Second Floor, open area	Greenheck, Model #BS0-120-7, Serial #NA	Electricity	Second Floor, open area	2003	40%
Controls	Johnson Thermostats, programmable, all observed to be set at 72F	Various	Johnson, Model #VMA-10, Serial #NA	Electricity	Various	2003	53%
Domestic Hot Water	Bradford White atmospheric, gas-fired hot water heater with 65 gallon storage capacity, 370 MBH input, 358.8 gal/hour recovery, set for 140F	Mechanical Room, Second Floor	Bradford White, Commercial Hydrojet, Model #D65 T3703NA, Serial #YC 1067820	Natural Gas	All Areas	2003	40%
Domestic Hot Water	Leonard anti-scald device, acts as a mixing valve and drops temperature of DHW down to 90F.	Mechanical Room, Second Floor	Leonard, Model #NA, Serial #NA	Electricity	All Areas	2003	40%
Elevator	Schindler Hydraulic elevator, 2500 lbs capacity, shut down and only operated when bringing items to and from storage on second floor	Elevator Room, First Floor	Schindler, Type EIB 187, GO #09209-01	Electricity	1st Floor/ 2nd Floor	2003	72%
Generator	Generac 2000 Series generator	Exterior, behind building	Generact, 2000 series, Item #M400600	Diesel Gas	All Areas	2003	72%
Lighting	See Appendix A	-	-	-	-	-	-

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

4. ENERGY CONSERVATION MEASURES

Based on the assessment of the Senior Meeting Center, SWA has separated the investment opportunities into three recommended categories:

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

Category I Recommendations: Capital Improvements

- Install a BMS system with local controls – Currently, the BMS system is operated by a third party controls contractor. The current BMS system consists of just a node that requires adjustment via a computer when a contractor is on site or remotely. According to building staff, the heating system is does not have an outside temperature cut off point. The system is manually switched to heating or cooling mode on a seasonal basis by the third-party controls company. Adding an upgraded BMS system will allow better control of the building by building staff and will ensure that the system is not heating or cooling during unnecessary times. In addition to better controlling the system during heating months, there is an opportunity for improvement with set points during cooling months. The building is currently over-cooling, allowing the gas boiler to fire during the summer and have to reheat air at the VAV boxes before it hits the first floor space. There were no reported problems with overheating or overcooling, however adding a BMS system will give Mount Laurel Township more control over the system.

Category II Recommendations: Operations and Maintenance

- Adjust temperature at anti-scald device – SWA recommends adjusting the outgoing domestic hot water temperature at the anti-scald device from 90ºF to 120ºF. The anti-scald device acts as a mixing device to ensure that water is not delivered in the temperature range of scalding or severe burns. SWA observed the unit is currently set at a temperature that is too low. Domestic hot water should never be delivered at temperatures less than 120ºF, since lower temperatures pose a threat for the development of Legionella.

- Bi-annual inspections of exterior wall areas – SWA recommends bi-annual inspections as part of a preventative maintenance plan to ensure the integrity of the exterior wall assembly. The focus should be on removing and preventing maintenance issues such as wasps' nests, cracks in the stucco façade and water/air leakage.

- Bi-annual inspections of roof surfaces – SWA recommends bi-annual inspections of all roof surfaces part of a preventative maintenance schedule. Building maintenance should repair any damaged or loose shingles immediately to prevent water damage.

- Adjust timer for exterior lights – Timers that control exterior lights should be adjusted twice per year to ensure that exterior lights are being shut off properly during daylight hours. On the day of the field visit, all of the exterior lights were observed to be on. SWA recommends that the installed controls are set correctly to ensure that exterior lights are shut off during the day. In addition, maintenance staff should reset these controls twice per year to account for daylight savings time.

- Perform routine maintenance inspections of windows and doors – SWA recommends that biannual inspections of each window and door are conducted as part of a preventative maintenance schedule.

- Provide weather stripping / air sealing – SWA observed that all windows and doors were in age-appropriate condition, with some exterior doors showing signs of compromised weather-stripping and air

sealing. One are of concern observed was the overhead doors located in the garage areas. As a best practice, SWA recommends that each window and door is inspected twice per year for deficiencies. Any time that a seal has been compromised, building maintenance staff should repair and replace the seal immediately to ensure that thermal barriers are not breached.

- Provide water efficient fixtures and controls - Adding controlled on / off timers on all lavatory faucets is a cost-effective way to reduce domestic hot water demand and save water. Building staff can also easily install faucet aerators and / or low-flow fixtures to reduce water consumption. There are many retrofit options, which can be installed now or incorporated as equipment is replaced. Routine maintenance practices that identify and quickly address water leaks are a low-cost way to save water and energy. Retrofitting with more efficient water-consumption fixtures / appliances will save both energy and money through reduced energy consumption for water heating, while also decreasing water / sewer bills.

- Use Energy Star labeled appliances - such as Energy Star refrigerators that should replace older energy inefficient equipment.

Category III Recommendations: Energy Conservation Measures

Summary table

ECM#	Description of Highly Recommended 0-5 Year Payback ECMs
1	Install 43 new CFL fixtures
2	Install 10 new Occupancy Sensors
	Description of Recommended 5-10 Year Payback ECMs
3	Install an 86.2 kW Solar Photovoltaic system
4	Install 11 new Pulse Start Metal Halide fixtures

ECM#1: *Install 43 new CFL lamps*

Description:
Currently, the Senior Meeting Center contains 43 incandescent lamps in fixtures located in bathroom areas that should be upgraded to Compact Fluorescent Lamps (CFLs). CFL bulbs should always be used since they provide a better quality light while using less energy than an incandescent bulb. For a detailed lighting schedule, please see Appendix A.

Installation cost:
Estimated installed cost: $2,238
Source of cost estimate: RS *Means; Published and established costs*

Economics:

ECM #	ECM description	Source	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 cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
1	Install 43 new CFL fixtures	RS Means	2,238	0	2,238	6,321	1.3	0	1.0	126	1,125	5	5,122	2.0	129	26	41	2,913	11,318

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA assumes operation cost savings based on avoided bulb replacement when upgrading to lighting that consists of longer rated burn hours.

Rebates / financial incentives:
There are no incentives for this measure at this time.

Options for funding ECM:
This project may benefit from enrolling in the NJ Direct Install or the NJ SmartStart program to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/home/home

ECM#2: *Install 10 new Occupancy Sensors*

Description:
Currently, the Senior Meeting Center could benefit from installing occupancy sensors in 10 separate areas. These 10 areas such as the Men's and Women's bathrooms, mechanical rooms and storage closets are not used consistently and can benefit from having the lights shut off automatically when no motion is detected for a set period of time. For a detailed lighting schedule, please see Appendix A.

Installation cost:
Estimated installed cost: $2,000
Source of cost estimate: RS *Means; Published and established costs*

Economics:

ECM #	ECM description	Source	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 cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
2	Install 10 new Occupancy Sensors	RS Means	2,200	200	2,000	2,609	0.5	0	0.4	0	412	15	4,851	4.9	143	10	19	2,921	4,671

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA assumes operational hours based on building staff interviews and field observations. .

Rebates / financial incentives:
NJ Clean Energy –Occupancy Sensors – Wall-mounted occupancy sensors ($20 per control)
Maximum incentive amount is $200.
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Options for funding ECM:
This project may benefit from enrolling in the NJ Direct Install or the NJ SmartStart program to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/home/home

ECM#3: *Install an 82.6kW Solar Photovoltaic system*

Description:
Currently, the Senior Meeting Center does not use any renewable energy systems. Renewable energy systems such as photovoltaic panels can be mounted on the building roofs and can offset a portion of the purchased electricity for the building. Power stations generally have two separate electrical charges: usage and demand. Usage is the amount of electricity in kilowatt-hours that a building uses from month to month. Demand is the amount of electrical power that a building uses at any given instance in a month period. During the summer periods, when electric demand at a power station is high due to the amount of air conditioners, lights, equipment, etc… being used within the region, demand charges go up to offset the utility's cost to provide enough electricity at that given time. Photovoltaic systems not only offset the amount of electricity use by a building, but also reduce the building's electrical demand, resulting in a higher cost savings as well. SWA presents below the economics, and recommends at this time that Mount Laurel Township further review installing an 82.6kW PV system to offset electrical demand and reduce the annual net electric consumption for the building, and review guaranteed incentives from NJ rebates to justify the investment. The Senior Meeting Center is not eligible for a 30% federal tax credit. Instead, Mount Laurel Township may consider applying for a grant and / or engage a PV generator / leaser who would install the PV system and then sell the power at a reduced rate. PSE&G provides the ability to buy SRECs at $600 / MWh or best market offer.

The primary location for an 82.6kW PV installation would be mounted on canopies in the parking lot South-West of the Senior Meeting Center. The Senior Meeting Center provides a good opportunity for offsetting electrical usage since the building has a consistent electrical baseload. The building uses a 70 ton electrical chiller as well as lights, motors, pumps, etc that provide a good opportunity to offset usage with Solar Photovoltaic panels. SWA recommends installing a canopy-mounted 82.6 kW Photovoltaic system directly over the parking spaces that lies South West of the building. In addition to generating electricity, this system will also be mounted on canopies over park spaces, providing a semi-sheltered parking structure for Mount Laurel Township employees and residents. The canopy structure would provide an overhead shelter in the side parking lot, while leaving the front view of the Senior Meeting Center unaltered. The proposed space is based on a measured area of 8,000 square feet (80 feet wide by 100 foot length). The total area of the photovoltaic panels would be approximately 7,185 square feet with an additional estimated area of 815 square feet of space required for infrastructure. Below is a bird's eye image of the facility with parking lots that includes an overlay of the proposed installation area.

A commercial multi-crystalline 123 watt panel (17.2 volts, 7.16 amps) has 10.7 square feet of surface area (11.51 watts per square foot). An 82.6 kW system needs approximately 672 panels which would take up 7,185 square feet. The installation of a renewable Solar Photovoltaic power generating system could serve as a good educational tool and exhibit for the community.

Installation cost:
Estimated installed cost: $660,800
Source of cost estimate: Similar Projects

Economics:

ECM #	ECM description	Source	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 cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
3	Install an 82.6 kW Solar Photovoltaic system	Similar Projects	660,800	0	660,800	97,501	82.6	0	15.7	0	73,905	25	1,258,706	8.9	90	4	8	305,821	174,576

Assumptions: SWA estimated the cost and savings of the system based on past PV projects. SWA projected physical dimensions based on a typical Polycrystalline Solar Panel (123 Watts, model #ND-123UJF). PV systems are sized based on Watts and physical dimensions for an array will differ with the efficiency of a given solar panel (W/sq ft).

Rebates / financial incentives:
NJ Clean Energy - Solar Renewable Energy Certificate Program. Each time a solar electric system generates 1,000kWh (1MWh) of electricity, a SREC is issued which can then be sold or traded separately from the power. The buildings must also become net-metered in order to earn SRECs as well as sell power back to the electric grid. $58,500 has been incorporated in the above costs for the duration limit of 15 years; however it requires proof of performance, application approval and negotiations with the utility.

Options for funding ECM:
This project may benefit from enrolling in the NJ Direct Install or the NJ SmartStart program to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/home/home

ECM#4: *Install 11 new Pulse Start Metal Halide fixtures*

Description:
Currently, the Senior Meeting Center uses 11 Probe Start metal halide fixtures for exterior lighting. All of these fixtures are controlled using a timer that does not correctly shut them off during the day. In addition to upgrading the fixtures, SWA recommends that the Tork timer responsible for shutting the lights off during daylight hours is re-adjusted. Probe Start metal halide fixtures have traditionally been used for exterior lighting; however the quality and amount of light that they give off reduces over time. Newer technology such as Pulse Start Metal halides can be installed and give off a better quality light and do not degrade overtime. Pulse Start metal halides save money by allowing customers to install lights at a lower wattage than Probe Start metal halides because degradation does not have to be taken into account. In addition, Probe Start metal halides turn on at full power and off at full power, it is not necessary for them to flicker and warm up like traditional Probe Start metal halides.

Installation cost:
Estimated installed cost: $7,483
Source of cost estimate: Similar Projects

Economics:

ECM #	ECM description	Source	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 cost savings, $	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, $	CO_2 reduced, lbs/yr
4	Install 11 new Pulse Start Metal Halide fixtures	RS Means	7,758	275	7,483	3,180	0.7	0	0.5	267	769	15	9,054	9.7	21	1	6	1,703	5,694

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. SWA assumes operation cost savings based on avoided bulb replacement when upgrading to lighting that consists of longer rated burn hours.

Rebates / financial incentives:
NJ Clean Energy – Prescriptive Lighting, Metal Halide with Pulse Start ($25 per fixture)
Maximum incentive is $275.

Options for funding ECM:
This project may benefit from enrolling in the NJ Direct Install or the NJ SmartStart program to offset a portion of the cost of implementation.
http://www.njcleanenergy.com/commercial-industrial/home/home

5. RENEWABLE AND DISTRIBUTED ENERGY MEASURES

Existing systems

There are not currently any existing renewable energy systems.

Wind

A Wind system is not applicable for this building because the area does not have winds of sufficient velocity to justify installing a wind turbine system.

Solar Photovoltaic

See ECM #3 above.

Solar Thermal Collectors

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

Combined Heat and Power

CHP is not applicable for this building because of the existing HVAC system and insufficient domestic hot water use.

Geothermal

Geothermal is not applicable for this building because of the current HVAC configuration and would not be cost-effective.

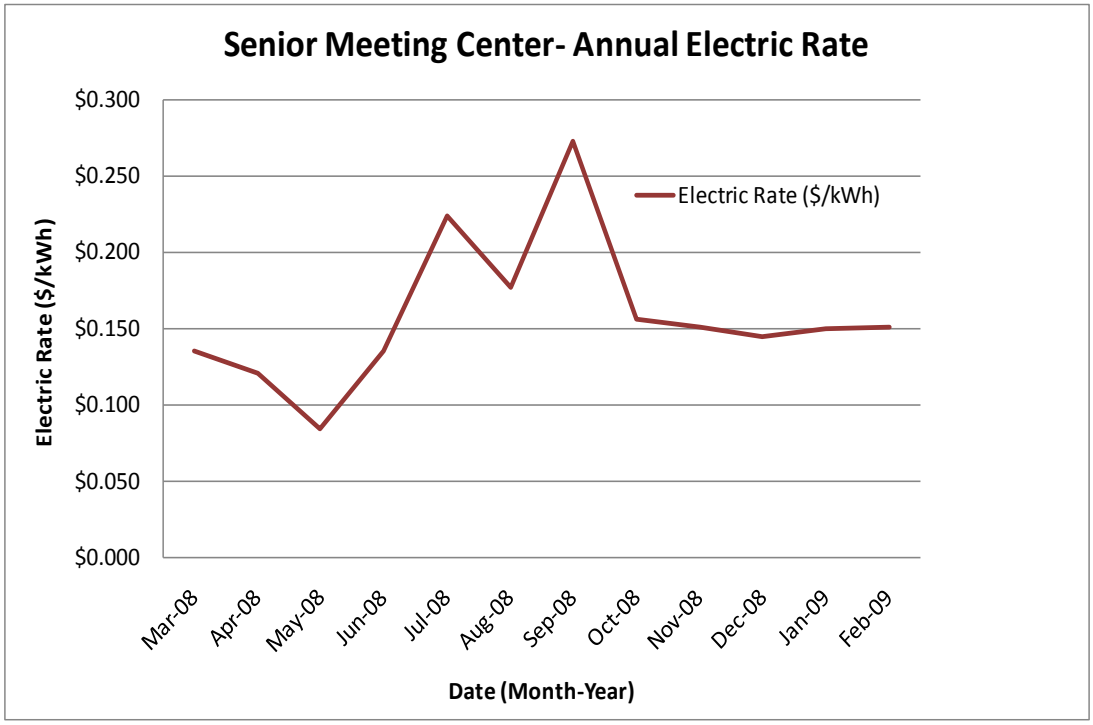
6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

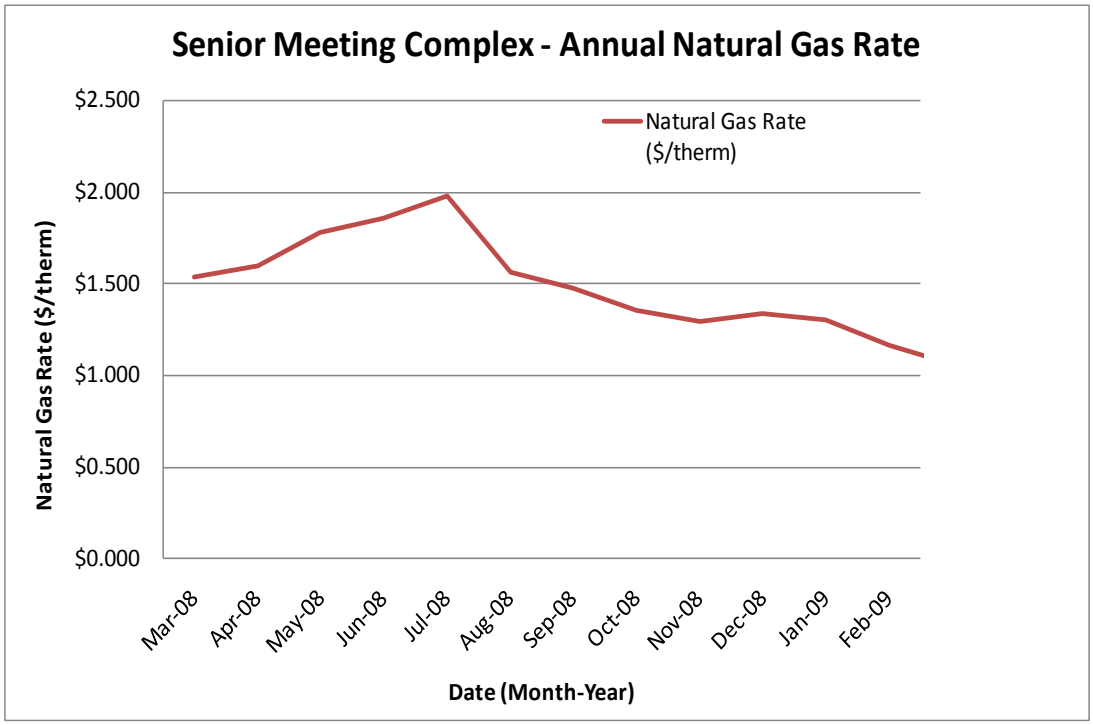
6.1. Energy Purchasing

The Senior Meeting Center receives natural gas via one incoming meter. PSE&G supplies gas to the building. There is not an ESCO engaged in the process. An Energy Services Company (ESCO) is a consultancy group that engages in a performance based contract with a client firm to implement measures which reduce energy consumption and costs in a technically and financially viable manner. Electricity is also purchased via one incoming meter directly for the building from PSE&G without an ESCO. SWA analyzed the utility rate for natural gas and electricity supply over an extended period. Electric bill analysis shows fluctuations of up to 69% over the 12 month period. Natural gas bill analysis shows fluctuations up to 46% over the 12 month period. Some of these fluctuations may be due to unusual high and escalating energy costs in 2008.

Currently, New Jersey commercial buildings of similar type pay $0.150/kWh for electricity and $1.550/therm for natural gas. Currently, the electricity rate for the Senior Meeting Center is $.158/kWh, which means there is a potential cost savings of $2,569 per year. The current natural gas rate for the Senior Meeting Center is $1.436/therm which is better than the average natural gas cost. A large cost savings potential for electricity exists, however this involves contacting third party suppliers and negotiating utility rates. SWA recommends that Mount Laurel Township further explore opportunities of purchasing electricity from third party energy suppliers in order to reduce rate fluctuation and ultimately

reduce the annual cost of energy for the Senior Meeting Center. Appendix B contains a complete list of third party energy suppliers for the Mount Laurel Township service area. Mount Laurel Township may want to consider partnering with other school districts, municipalities, townships and communities to aggregate a substantial electric and natural gas use for better leveraging in negotiations with ESCOs and of improving the pricing structures. This sort of activity is happening in many parts of the country and in New Jersey.





6.2. Energy Procurement strategies

Also, the Senior Meeting Center would not be eligible for enrollment in a Demand Response Program, because there isn't the capability at this time to shed a minimum of 150 kW electric demand when requested by the utility during peak demand periods, which is the typical threshold for considering this option.

7. METHOD OF ANALYSIS

7.1. Assumptions and tools

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

7.2. Disclaimer

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

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

Appendix A: Lighting Study

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**	**Screw-in**	**N**	**Inc**	**32**	**1**	**25**	**S**	**14**	**261**	**0**	**800**	**2,923**	**CFL**	**Screw-in**	**CFL**	**N**	**S**	**32**	**1**	**10**	**14**	**261**	**0**	**320**	**1,169**	**1,754**	**0**	**1,754**
2	1	Entrance	HID	N	HPS	9	1	70	S	14	261	18	648	2,894	HID	HID	HPS	N	S	9	1	70	14	261	18	648	2,894	0	0	0
3	1	Entrance	Parabolic	E	4'T8	3	3	32	S	14	261	10	298	1,162	N/A	Parabolic	4'T8	E	S	3	3	32	14	261	10	298	1,162	0	0	0
4	1	Entrance	Screw-in	N	CFL	5	2	13	S	14	261	0	130	475	N/A	Screw-in	CFL	N	S	5	2	13	14	261	0	130	475	0	0	0
5	1	Entrance	Exit Sign	N	LED	1	1	5	N	24	261	1	6	38	N/A	Exit Sign	LED	N	N	1	1	5	24	261	1	6	38	0	0	0
6	1	Office	Parabolic	E	4'T8	4	3	32	N	14	261	10	394	1,549	N/A	Parabolic	4'T8	E	N	4	3	32	14	261	10	394	1,549	0	0	0
7	1	Office	Parabolic	E	4'T8	2	2	32	N	14	261	6	134	512	N/A	Parabolic	4'T8	E	N	2	2	32	14	261	6	134	512	0	0	0
8	1	Office	Parabolic	E	4'T8	2	3	32	N	14	261	10	202	775	N/A	Parabolic	4'T8	E	N	2	3	32	14	261	10	202	775	0	0	0
9	**1**	**Entrance**	**Screw-in**	**N**	**Inc**	**1**	**1**	**75**	**N**	**14**	**261**	**0**	**75**	**274**	**CFL**	**Screw-in**	**CFL**	**N**	**N**	**1**	**1**	**25**	**14**	**261**	**0**	**25**	**91**	**183**	**0**	**183**
10	**1**	**Coat closet**	**Parabolic**	**E**	**4'T8**	**2**	**3**	**32**	**N**	**14**	**261**	**10**	**202**	**775**	**C**	**Parabolic**	**4'T8**	**E**	**OS**	**2**	**3**	**32**	**11**	**261**	**10**	**202**	**581**	**0**	**194**	**194**
11	1	Craft rm	Parabolic	E	4'T8	6	3	32	N	14	261	10	586	2,324	N/A	Parabolic	4'T8	E	N	6	3	32	14	261	10	586	2,324	0	0	0
12	1	Game rm	Parabolic	E	4'T8	12	3	32	N	14	261	10	1,162	4,648	N/A	Parabolic	4'T8	E	N	12	3	32	14	261	10	1,162	4,648	0	0	0
13	1	Music rm	Parabolic	E	4'T8	6	3	32	N	14	261	10	586	2,324	N/A	Parabolic	4'T8	E	N	6	3	32	14	261	10	586	2,324	0	0	0
14	**1**	**Storage Rm**	**Parabolic**	**E**	**4'T8**	**3**	**3**	**32**	**N**	**14**	**261**	**10**	**298**	**1,162**	**C**	**Parabolic**	**4'T8**	**E**	**OS**	**3**	**3**	**32**	**11**	**261**	**10**	**298**	**871**	**0**	**290**	**290**
15	1	Library	Parabolic	E	4'T8	6	3	32	N	14	261	10	586	2,324	N/A	Parabolic	4'T8	E	N	6	3	32	14	261	10	586	2,324	0	0	0
16	1	Meeting Rm	Parabolic	E	4'T8	24	3	32	N	14	261	10	2,314	9,296	N/A	Parabolic	4'T8	E	N	24	3	32	14	261	10	2,314	9,296	0	0	0
17	1	Meeting Rm	Exit Sign	E	LED	4	1	5	N	24	261	1	21	150	N/A	Exit Sign	LED	E	N	4	1	5	24	261	1	21	150	0	0	0
18	1	Meeting Rm	Screw-in	E	CFL	18	2	13	N	14	261	0	468	1,710	N/A	Screw-in	CFL	E	N	18	2	13	14	261	0	468	1,710	0	0	0
19	1	Meeting Rm	Parabolic	E	4'T8	24	3	32	N	14	261	10	2,314	9,296	N/A	Parabolic	4'T8	E	N	24	3	32	14	261	10	2,314	9,296	0	0	0
20	1	Meeting Rm	Exit Sign	E	LED	4	1	5	N	24	261	1	21	150	N/A	Exit Sign	LED	E	N	4	1	5	24	261	1	21	150	0	0	0
21	1	Meeting Rm	Screw-in	E	CFL	18	2	13	N	14	261	0	468	1,710	N/A	Screw-in	CFL	E	N	18	2	13	14	261	0	468	1,710	0	0	0
22	**1**	**Storage Rm**	**Parabolic**	**E**	**4'T8**	**3**	**3**	**32**	**S**	**14**	**261**	**10**	**298**	**1,162**	**C**	**Parabolic**	**4'T8**	**E**	**OS**	**3**	**3**	**32**	**11**	**261**	**10**	**298**	**871**	**0**	**290**	**290**
23	**1**	**Elevator rm**	**Parabolic**	**E**	**4'T8**	**1**	**2**	**32**	**S**	**14**	**261**	**6**	**70**	**256**	**C**	**Parabolic**	**4'T8**	**E**	**OS**	**1**	**2**	**32**	**11**	**261**	**6**	**70**	**192**	**0**	**64**	**64**
24	**1**	**Bathroom Women**	**Parabolic**	**E**	**4'T8**	**4**	**3**	**32**	**S**	**14**	**261**	**10**	**394**	**1,549**	**C**	**Parabolic**	**4'T8**	**E**	**OS**	**4**	**3**	**32**	**11**	**261**	**10**	**394**	**1,162**	**0**	**387**	**387**
25	**1**	**Bathroom Women**	**Screw-in**	**N**	**Inc**	**5**	**3**	**60**	**S**	**14**	**261**	**0**	**900**	**3,289**	**CFL**	**Screw-in**	**CFL**	**N**	**OS**	**5**	**3**	**20**	**11**	**261**	**0**	**300**	**822**	**2,192**	**274**	**2,466**
26	**1**	**Bathroom Men**	**Screw-in**	**N**	**Inc**	**5**	**3**	**60**	**S**	**14**	**261**	**0**	**900**	**3,289**	**CFL**	**Screw-in**	**CFL**	**N**	**OS**	**5**	**3**	**20**	**11**	**261**	**0**	**300**	**822**	**2,192**	**274**	**2,466**
27	**1**	**Bathroom Men**	**Parabolic**	**E**	**4'T8**	**4**	**3**	**32**	**S**	**14**	**261**	**10**	**394**	**1,549**	**C**	**Parabolic**	**4'T8**	**E**	**OS**	**4**	**3**	**32**	**11**	**261**	**10**	**394**	**1,162**	**0**	**387**	**387**
28	**1**	**Mechanical Rm**	**Parabolic**	**E**	**4'T8**	**6**	**2**	**32**	**S**	**14**	**261**	**6**	**390**	**1,535**	**C**	**Parabolic**	**4'T8**	**E**	**OS**	**6**	**2**	**32**	**11**	**261**	**6**	**390**	**1,151**	**0**	**384**	**384**
29	1	Kitchen	Parabolic	E	4'T8	7	2	32	S	14	261	6	454	1,790	N/A	Parabolic	4'T8	E	S	7	2	32	14	261	6	454	1,790	0	0	0
30	**1**	**Kitchen storage**	**Parabolic**	**E**	**4'T8**	**1**	**2**	**32**	**S**	**14**	**261**	**6**	**70**	**256**	**C**	**Parabolic**	**4'T8**	**E**	**OS**	**1**	**2**	**32**	**11**	**261**	**6**	**70**	**192**	**0**	**64**	**64**
31	1	Hallway	Parabolic	E	4'T8	15	3	32	S	14	261	10	1,450	5,810	N/A	Parabolic	4'T8	E	S	15	3	32	14	261	10	1,450	5,810	0	0	0
32	1	Hallway	Exit Sign	N	LED	4	1	5	N	24	261	1	21	150	C	Exit Sign	LED	N	S	4	1	5	24	261	1	21	150	0	0	0
33	2	Storage Rm	Parabolic	E	4'T8	26	2	32	S	2	261	6	1,670	950	N/A	Parabolic	4'T8	E	S	26	2	32	2	261	6	1,670	950	0	0	0
34	2	Storage Rm	Exit Sign	N	LED	2	1	5	N	24	261	1	11	75	N/A	Exit Sign	LED	N	N	2	1	5	24	261	1	11	75	0	0	0
35	**Ext**	**Exterior**	**Exterior**	**N**	**MH**	**6**	**1**	**150**	**PC**	**12**	**365**	**38**	**938**	**4,941**	**PSMH**	**Exterior**	**PSMH**	**N**	**PC**	**6**	**1**	**100**	**12**	**365**	**22**	**622**	**3,206**	**1,734**	**0**	**1,734**
36	**Ext**	**Exterior**	**Exterior**	**N**	**MH**	**5**	**1**	**150**	**PC**	**12**	**365**	**38**	**788**	**4,117**	**PSMH**	**Exterior**	**PSMH**	**N**	**PC**	**5**	**1**	**100**	**12**	**365**	**22**	**522**	**2,672**	**1,445**	**0**	**1,445**
Totals:						**280**	**79**	**1326**				**285**	**20,461**	**77,188**						**280**	**79**	**1,081**				**18,149**	**65,077**	**9,501**	**2,609**	**12,110**

Rows Highlighed Yellow Indicate an Energy Conservation Measure is recommended for that space

Appendix B: Third Party Energy Suppliers (ESCOs)

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

Third Party Electric Suppliers for PSEG Service Territory	Telephone & Web Site
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com
American Powernet Management, LP 437 North Grove St. Berlin, NJ 08009	(877) 977-2636 www.americanpowernet.com
BOC Energy Services, Inc. 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.boc.com
Commerce Energy, Inc. 4400 Route 9 South, Suite 100 Freehold, NJ 07728	(800) 556-8457 www.commerceenergy.com
ConEdison Solutions 535 State Highway 38 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(888) 635-0827 www.newenergy.com
Credit Suisse, (USA) Inc. 700 College Road East Princeton, NJ 08450	(212) 538-3124 www.creditsuisse.com
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com
FirstEnergy Solutions 300 Madison Avenue Morristown, NJ 07926	(800) 977-0500 www.fes.com
Glacial Energy of New Jersey, Inc. 207 LaRoche Avenue Harrington Park, NJ 07640	(877) 569-2841 www.glacialenergy.com
Metro Energy Group, LLC 14 Washington Place Hackensack, NJ 07601	(888) 536-3876 www.metroenergy.com
Integrys Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrysenergy.com
Liberty Power Delaware, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(866) 769-3799 www.libertypowercorp.com
Liberty Power Holdings, LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663	(800) 363-7499 www.libertypowercorp.com
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) 363-7499 www.pepco-services.com
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com
Sempra Energy Solutions 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.semprasolutions.com
South Jersey Energy Company One South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 756-3749 www.southjerseyenergy.com
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	(800) 225-1560 www.spragueenergy.com
Strategic Energy, LLC 55 Madison Avenue, Suite 400 Morristown, NJ 07960	(888) 925-9115 www.sel.com
Suez Energy Resources NA, Inc. 333 Thornall Street, 6th Floor Edison, NJ 08837	(888) 644-1014 www.suezenergyresources.com
UGI Energy Services, Inc. 704 East Main Street, Suite 1 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com

Third Party Gas Suppliers for PSEG Service Territory	Telephone & Web Site
Cooperative Industries	(800) 628-9427
412-420 Washington Avenue	www.cooperativenet.com
Belleville, NJ 07109	
Direct Energy Services, LLC	(866) 547-2722
120 Wood Avenue, Suite 611	www.directenergy.com
Iselin, NJ 08830	
Dominion Retail, Inc.	(866) 275-4240
395 Highway 170, Suite 125	www.retail.dom.com
Lakewood, NJ 08701	
Gateway Energy Services Corp.	(800) 805-8586
44 Whispering Pines Lane	www.gesc.com
Lakewood, NJ 08701	
UGI Energy Services, Inc.	(856) 273-9995
704 East Main Street, Suite 1	www.ugienergyservices.com
Moorestown, NJ 08057	
Great Eastern Energy	(888) 651-4121
116 Village Riva, Suite 200	www.greateastern.com
Princeton, NJ 08540	
Hess Corporation	(800) 437-7872
1 Hess Plaza	www.hess.com
Woodbridge, NJ 07095	
Hudson Energy Services, LLC	(877) 483-7669
545 Route 17 South	www.hudsonenergyservices.com
Ridgewood, NJ 07450	
Intelligent Energy	(800) 724-1880
2050 Center Avenue, Suite 500	www.intelligentenergy.org
Fort Lee, NJ 07024	
Keil & Sons	(877) 797-8786
1 Bergen Blvd.	www.systrumenergy.com
Fairview, NJ 07002	
Metro Energy Group, LLC	(888) 536-3876
14 Washington Place	www.metroenergy.com
Hackensack, NJ 07601	
MxEnergy, Inc.	(800) 375-1277
510 Thornall Street, Suite 270	www.mxenergy.com
Edison, NJ 08837	
NATGASCO (Mitchell Supreme)	(800) 840-4427
532 Freeman Street	www.natgasco.com
Orange, NJ 07050	
Pepco Energy Services, Inc.	(800) 363-7499
112 Main Street	www.pepco-services.com
Lebanon, NJ 08833	
PPL EnergyPlus, LLC	(800) 281-2000
811 Church Road	www.pplenergyplus.com
Cherry Hill, NJ 08002	
Sempra Energy Solutions	(877) 273-6772
581 Main Street, 8th Floor	www.semprasolutions.com
Woodbridge, NJ 07095	
South Jersey Energy Company	(800) 756-3749
One South Jersey Plaza, Route 54	www.southjerseyenergy.com
Folsom, NJ 08037	
Sprague Energy Corp.	(800) 225-1560
12 Ridge Road	www.spragueenergy.com
Chatham Township, NJ 07928	
Stuyvesant Energy LLC	(800) 646-6457
10 West Ivy Lane, Suite 4	www.stuyfuel.com
Englewood, NJ 07631	
Woodruff Energy	(800) 557-1121
73 Water Street	www.woodruffenergy.com
Bridgeton, NJ 08302	

Appendix C: Glossary and Method of Calculations

Glossary of ECM Terms

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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 measures (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 expresses 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.

Calculation References

ECM = Energy Conservation Measure
AOCS = Annual Operating Cost Savings
AECS = Annual Energy Cost Savings
LOCS = Lifetime Operating Cost Savings
LECS = Lifetime Energy Cost Savings
NPV = Net Present Value
IRR = Internal Rate of Return
DR = Discount Rate

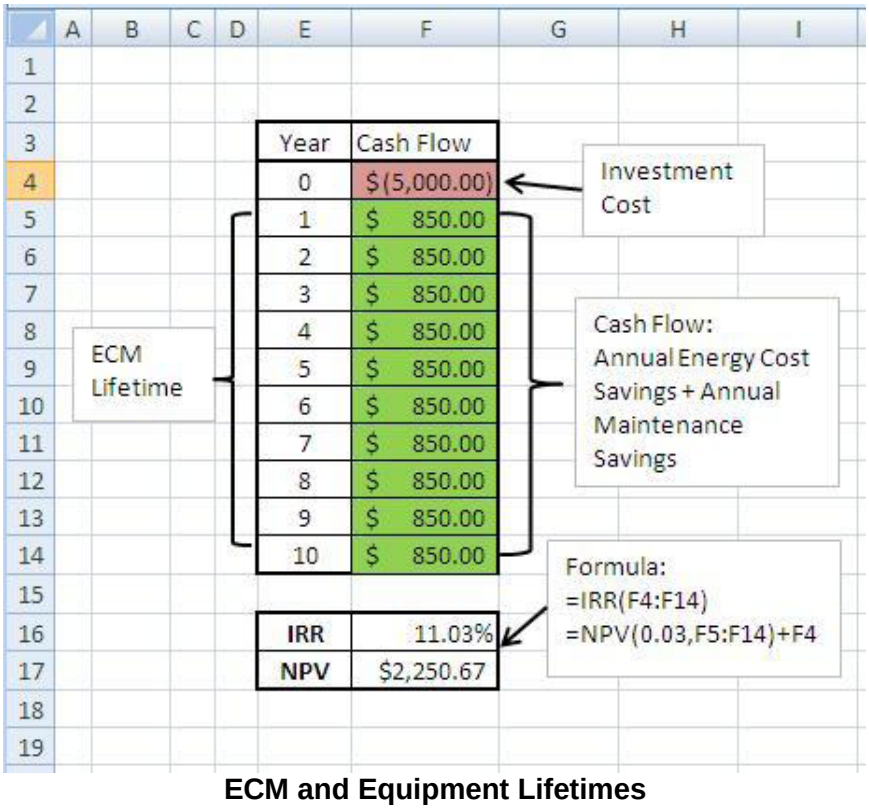
Net ECM Cost = Total ECM Cost – Incentive
LECS = AECS X ECM Lifetime
AOCS = LOCS / ECM Lifetime

Note: 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).

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
It is easiest to calculate the NPV and IRR using a spreadsheet program like Excel.

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:



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.

NJCEP C & I Lifetimes

Measure	Measure Life
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 D: 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. Theincentives 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.

Energy Efficiency and Conservation Block Grant Rebate Program

The Energy Efficiency and Conservation Block Grant (EECBG) Rebate Program provides supplemental funding up to $20,000 for eligible New Jersey local government entities to lower the cost of installing energy conservation measures. Funding for the EECBG Rebate Program is provided through the American Recovery and Reinvestment Act (ARRA).

For the most up to date information on how to participate in this program, go to: http://njcleanenergy.com/EECBG

Other 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/.