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January 20th, 2010

Local Government Energy Program
Energy Audit Report

For

Secaucus Housing Authority

The Elms
777 5th Street
Secaucus, NJ 07094

Project Number: LGEA20

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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 Secaucus Housing Authority buildings. For this audit, the PMK Group, an approved subcontractor under the LGEA, performed the assessment of the large mechanical and electrical systems including HVAC equipment. The audit included a review of The Elms, Kroll Heights and R. Impreveduto Towers. The buildings are located in Secaucus, NJ. A separate energy audit report is issued for each of the referenced buildings.

This report addresses The Elms building located at 777 5th Street, Secaucus, 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 Elms was built in 1975 and consists of six stories and a total floor area of 75,000 square feet including 100 apartment units. The building is operated 24 hours per day since it is a residential building.

The goal of this Local Government Energy Audit (LGEA) is to provide sufficient information to Secaucus Housing Authority 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, Housing Authorities, 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 conditions.
- Section 3 provides a detail inventory of major electrical and mechanical systems in the building.
- Sections 4 through 7 provide a description of our recommendations.
- Appendices include further details and information supporting our recommendations.

EXECUTIVE SUMMARY

The energy audit performed by Steven Winter Associates (SWA) encompasses The Elms building located at 777 5th Street, Secaucus, NJ. The building is a six-story residential building with a total floor area of 75,000 square feet. The building was built in 1975 and contains 100 apartment units for senior housing. The original structure has not undergone any major renovations or additions.

Based on the field visits performed by the SWA staff on September 9th and 10th, 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 January 2008 through January 2009, the period of analysis for this audit, the building consumed 1,429,600 kWh or $195,341 worth of electricity at an approximate rate of $0.137/kWh and is charged $119 annually for a natural gas account. The joint energy consumption for the building, including both electricity and fossil fuel, was 4,878 MMBtus of energy that cost a total of $195,460.

SWA has entered energy information about The Elms building in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The building was benchmarked as a Multifamily Housing building. The building was not able to receive an Energy Star performance rating since the building is classified as a Multifamily Housing building, which is currently ineligible for a performance score through the Benchmarking tool. SWA encourages the Secaucus Housing Authority to continue entering utility data in *Energy Star Portfolio Manager* in order to track weather normalized source energy use over time. The current Site Energy Use Intensity is 64.6 kBtu/ft^{2}yr.

Recommendations

Implementing this report's recommendations will reduce use by approximately 11.7 kBtu/ft^{2}yr, which would decrease the building's energy use intensity to 52.9 kBtu/ft^{2}yr.

SWA recommends a package of measures that address both common areas and tenant spaces. The Elms building was built in 1975, when all-electric buildings were pursued in order to avoid escalating oil and natural gas prices. SWA recommends that Secaucus Housing Authority consider bringing natural gas usage to the building in order to decrease the high cost of electricity. Specifically, SWA recommends that the 12 and 16-ton condensers and corresponding air handlers are replaced with newer, more efficient gas-fired units. Also, in an effort to reduce electricity usage as well as carbon emissions, SWA recommends a 91.8 kW PV solar array to offset a portion of the buildings electric use.

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

- Upgrade windows

Category II Recommendations: Operations and Maintenance

- Maintain roofs
- 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 **4** Energy Conservation Measures (ECMs) for the Elms building that is summarized in the following Table 1. The total investment cost for these ECMs with incentives is **$107,393**. SWA estimates a first year savings of **$36,322** with a simple payback of **2.9 years**. SWA also recommends **3** ECMs with a 5-10 year payback that is summarized in Table 2 and **4** End of Life Cycle ECMs.

The implementation of all the recommended ECMs would reduce the building electric usage by 496,648 kWh annually, or 35% of the building's current electric consumption. SWA estimates that implementing these ECMs will reduce the carbon footprint of the Elms building by **798,761 lbs of CO_2**, which is equivalent to removing approximately 60 cars from the roads each year or avoiding the need of 1,925 trees to absorb the annual CO_2 produced.

There are various incentives that Secaucus Housing Authority could apply for that could also help lower the cost of installing the ECMs. SWA recommends Secaucus Housing Authority to apply for the Pay-for-Performance (P4P) program through the New Jersey Office of Clean Energy. The P4P program is aimed at buildings that show potential for saving 15% or greater of annual energy consumption. This comprehensive energy efficiency program provides incentives towards whole-building energy improvements, including incentives for an Energy Reduction Plan, installation of energy saving measures and Post-Construction benchmarking. The program was originally intended for buildings with an average annual peak demand of over 200kW; however the program currently allows local government buildings not receiving Energy Efficiency and Conservation Block Grants to participate. The 2009 deadline for local governments to enter into the program is 12/31/2009. More P4P program opportunities may be available in 2010; however funding has not yet been approved.

Alternatively, SWA recommends that the Secaucus Housing Authority apply for the NJ SmartStart program through the New Jersey Office of Clean Energy. This incentive can help provide technical assistance for the building in the implementation phase of any energy conservation project. A new NJ Clean Power program, Direct Install, to be rolled out soon, could also assist to cover 80% of the capital investment. Our incentives estimates are based on this alternative.

Renewable ECMs require application approval and negotiations with the utility and proof of performance. There is also a utility-sponsored loan program through PSE&G that would allow the building to pay for the installation of the PV system through a loan issued by PSE&G.

The following three 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 energy 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 120 new CFL lamps	RS Means, lit search	6,853	0	6,853	21,490	4.5	0	1.0	2,021	4,965	5	22,610	1.4	229.9	46.0	66.8	15,886	38,478
2	Gas-Fired Make-up Air-handler	Contractor	60,000	400	59,600	256,624	0.0	-8,209	0.7	0	22,434	15	263,977	2.7	342.9	22.9	37.3	208,210	368,997
3	Install 7 new occupancy sensors	RS Means, lit search	1,540	140	1,400	2,688	0.6	0	0.1	0	368	15	4,428	3.8	216.3	14.4	25.4	2,996	4,813
4	Programmable Thermostats for baseboard heaters	RS Means, lit search	39,000	0	39,000	62,447	0.0	0	2.8	0	8,555	15	100,670	4.6	158.1	10.5	20.6	63,132	111,811
	TOTALS	-	**107,393**	**540**	**106,853**	**343,249**	**5.1**	**-8,209**	**4.7**	**2,021**	**36,322**	-	**391,684**	**2.9**	-	-	-	**290,224**	**524,100**

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 energy 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
5	Install 4 new T8 fluorescent fixtures	RS Means, lit search	861	120	741	298	0.0	0	0.0	105	146	15	1,716	5.1	131.6	8.8	18.0	1,000	534
6	Install 91.8 kW PV system	Similar Projects	596,700	0	596,700	92,371	91.0	0	4.2	0	67,855	25	1,155,661	8.8	93.7	3.7	8.3	282,634	165,390
7	Install 10 new pulse start metal halide fixtures	RS Means, lit search	8,053	250	7,803	4,643	1.0	0	0.2	221	857	15	10,085	9.1	29.3	2.0	-17.1	2,429	8,313
	TOTALS	-	**605,614**	**370**	**605,244**	**97,312**	**92.0**	**0**	**4.4**	**326**	**68,858**	-	**1,167,462**	**23.0**	-	-	-	**286,063**	**174,237**

Table 3 - Recommended End of Life Cycle 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 energy 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
8	Replace 16-ton Condenser and AHU	RS Means, lit search	18,510	0	18,510	11,627	2.4	0	0.5	0	1,593	15	18,744	11.6	1.3	0.1	3.4	506	20,818
9	Replace 12-ton Condenser and AHU	RS Means, lit search	16,525	0	16,525	8,720	1.8	0	0.4	0	1,195	15	14,057	13.8	-14.9	-1.0	1.0	-2,263	15,613
10	Install 100 Energy Star refrigerators	RS Means, lit search	118,000	0	118,000	30,800	6.4	0	1.4	0	4,220	15	49,652	28.0	-57.9	-3.9	-6.9	-67,627	55,147
11	Replace bathroom Infrared Heating Lamps	Vendors	30,000	0	30,000	4,940	1.0	0	0.2	0	677	15	7,964	44.3	-73.5	-4.9	-11.2	-21,921	8,845
	TOTALS	-	**183,035**	**0**	**183,035**	**56,087**	**11.6**	**0**	**2.6**	**0**	**7,684**	-	**90,417**	**23.8**	-	-	-	**-91,305**	**100,424**

Note: For more details on End of Life Cycle ECMs and associated incremental cost for high efficiency equipment and performance see Section 4.

1. HISTORIC ENERGY CONSUMPTION

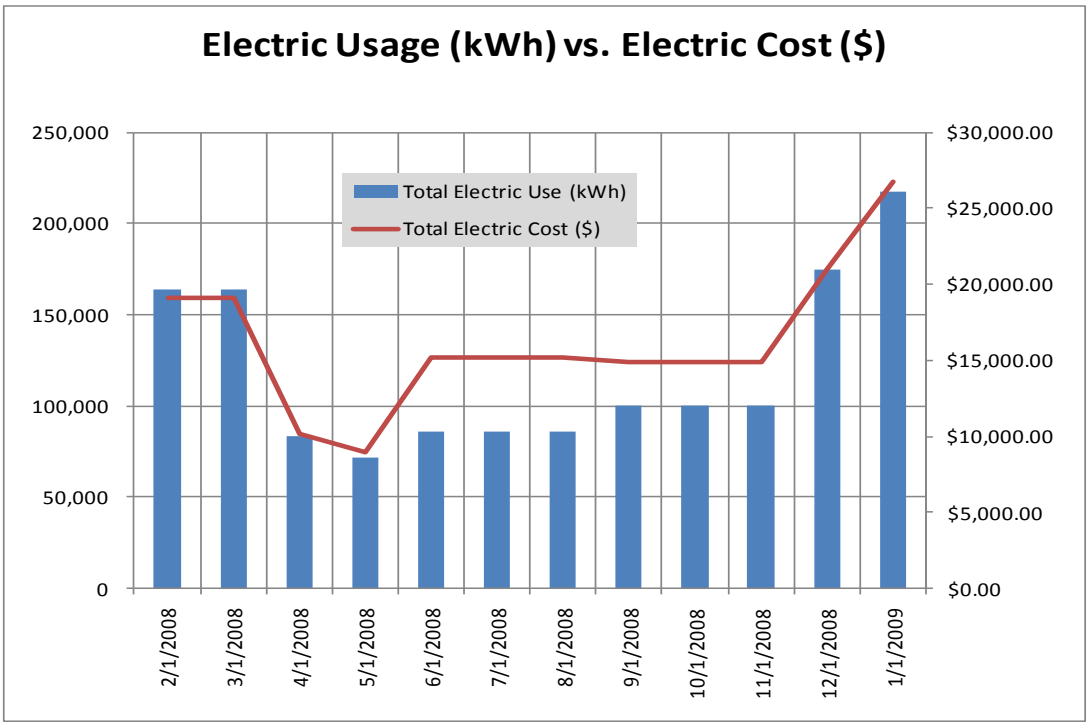
1.1. Energy usage, load profiles and cost analysis

SWA analyzed utility bills from **January 2008 through January 2009** (period of analysis) that were received from the utility companies supplying The Elms building with electric and natural gas. The Elms building is master-metered for electricity (including common areas and all tenant spaces) and contains one gas meter that is not used. All billing analysis is based on the central meters that serve the building.

Electricity - The Elms building currently buys electricity from PSE&G at **an average rate of $0.137/kWh** based on 12 months of utility bills from January 2008 to January 2009. The Elms building purchased **approximately 1,429,600 kWh or $195,341 worth of electricity** in the previous year. The Elms building is currently charged separately for demand (kW) which has been factored into each monthly bill. Based on the same time period, the building also has **an average monthly demand of 336.0 kW and a monthly peak demand of 476.0 kW.**

Natural gas - The Elms building currently has one gas meter set up for service through PSE&G. This meter is currently not used but is required by the utility company. Clients typically pay a minimal meter charge per meter to the utility company. In the previous year, The Elms paid $119 for natural gas with 0 therms usage.

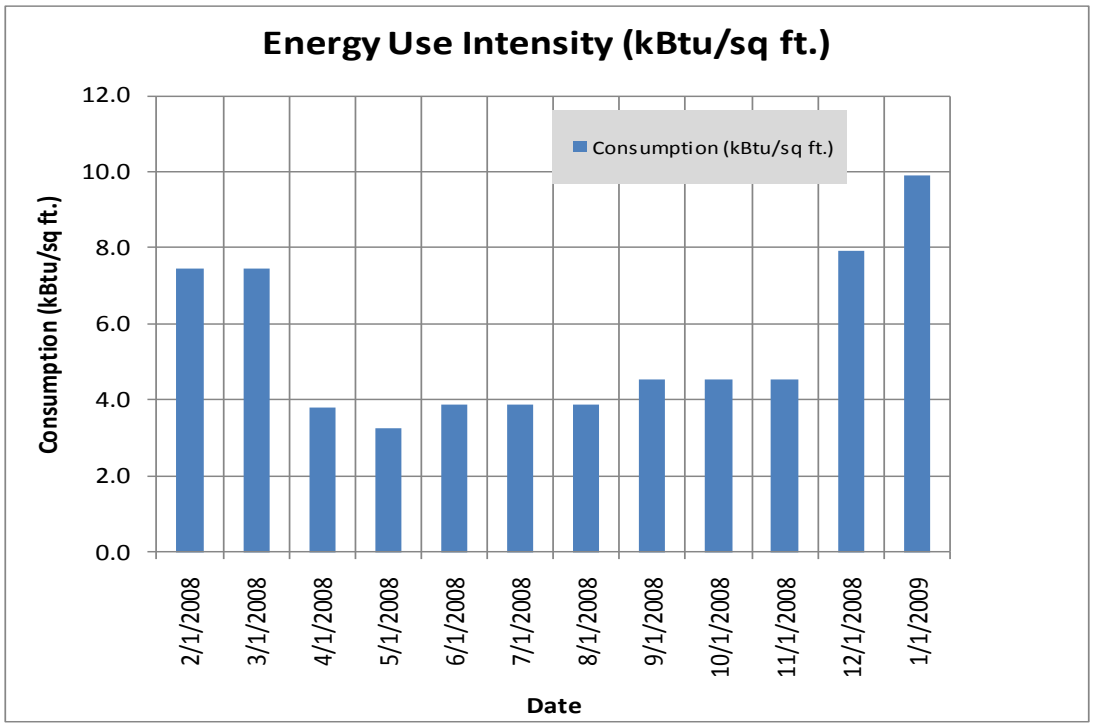
The following chart shows electricity use versus cost for The Elms building based on utility bills for the 12 month period of January 2008 to January 2009.



During the period from 6/2008 through 11/2008, the electricity cost appears to rise in comparison to electricity usage. During this six month period, there were two meter readings and four estimated bills. SWA recommends that Secaucus Housing Authority monitor how many electric bills are estimated and contact the utility company as soon as they receive an estimated bill. Each monthly utility bill will have notation that states whether the meter was "actual" or "estimated". If the utility company estimates a bill, the utility company will adjust a future bill to make up the difference once the meter has been read again. Making sure the utility bills are always read avoids having to adjust future bills, which can cause billing confusion.

A chart has not been generated for Natural gas usage since usage was 0.

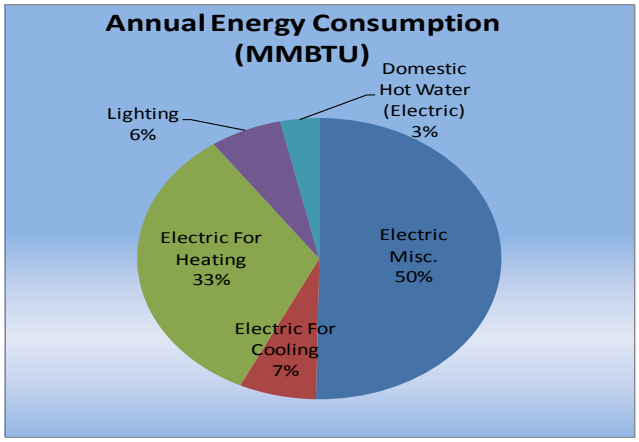
The following chart shows combined natural gas and electric consumption in Btu/sq ft for The Elms building based on utility bills for the 12 month period of January 2008 to January 2009.

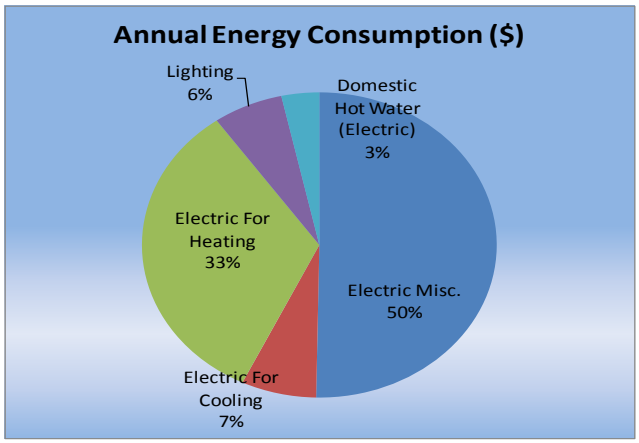


The following table and chart pies show energy use for The Elms building based on utility bills for the 12 month period of January 2008 to January 2009. Note electrical cost at $40.0/MMBtu of energy.

2008 Annual Energy Consumption / Costs					
	MMBtu	% MMBtu	$	% $	$/MMBtu
Electric Miscellaneous	2453	50%	$98,120	50%	$40.00
Electric For Cooling	334	7%	$13,360	7%	$40.00
Electric For Heating	1612	33%	$64,480	33%	$40.00
Lighting	311	6%	$12,440	6%	$40.00
Domestic Hot Water (Electric)	168	3%	$6,720	3%	$40.00
Gas Space Heating	0	0%	$0	0%	-
Totals	4,878	100%	$195,341	100%	-
Total Electric Usage	4,878	100%	$195,341	99.9%	$40.00
Total Gas Usage	0	0%	$119	0.1%	-
Totals	4,878	100%	$195,460	100%	-

Note: Only hardwired light fixtures were audited in tenant spaces. Plug-in lamps were observed in almost every apartment and these factor into the above calculations as "Electric Miscellaneous"

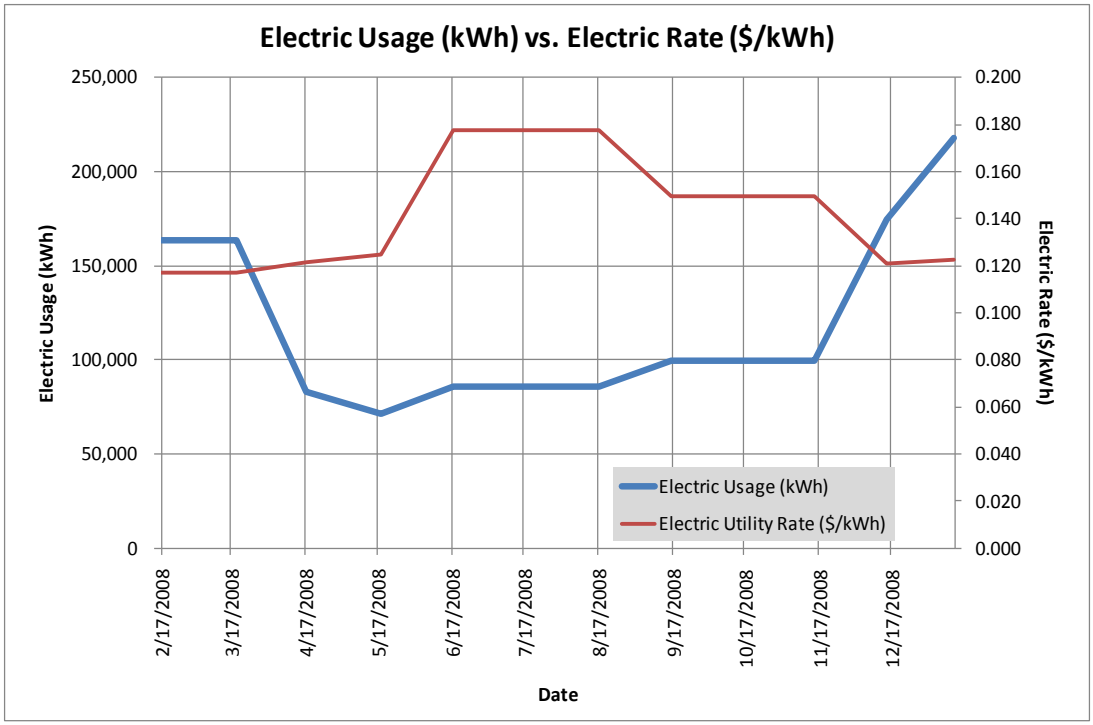




1.2. Utility rate analysis

The Elms building 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 Elms building currently pays an average rate of approximately $0.137/kWh based on the 12 months of utility bills of January 2008 to January 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 and therefore appears to be the appropriate rate for the building.



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

1.3. Energy benchmarking

SWA has entered energy information about The Elms building in the U.S. Environmental Protection Agency's (EPA) *Energy Star Portfolio Manager* Energy benchmarking system. The building was benchmarked as Multifamily Housing building. The building was not able to receive an Energy Star performance rating since the building is classified as a Multifamily Housing building, which is currently ineligible for a performance score through the Benchmarking tool. SWA encourages Secaucus Housing Authority to continue entering utility data in *Energy Star Portfolio Manager* in order to track weather normalized source energy use over time. The current Site Energy Use Intensity is 64.6 kBtu/ft^{2}yr. Implementing this report's highly recommended Energy Conservations Measures (ECMs) will reduce use by approximately 4.7 kBtu/sqft yr, with an additional 4.4 kBtu/sq ft yr from the recommended ECMs and 2.6 kBtu/sq ft yr from the recommended End of Life Cycle ECMs.

Per the LGEA program requirements, SWA has assisted Secaucus Housing Authority to create an *Energy Star Portfolio Manager* account and has shared The Elms 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:

Username: SecaucusHousing
Password: SECAUCUS

Also, below is a performance rating that is generated based on historical energy consumption from the Portfolio Manager Benchmarking tool.

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
SHA - Elms

Building ID: 1923227
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: November 04, 2009

Facility
SHA - Elms
777 5th Street
Secaucus, NJ 07094

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1975
Gross Floor Area (ft^2): 75,000

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

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	4,844,521
Natural Gas (kBtu)[4]	0
Total Energy (kBtu)	4,844,521

Energy Intensity[5]	
Site ($kBtu/ft^2/yr$)	65
Source ($kBtu/ft^2/yr$)	216

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	738

Electric Distribution Utility
PSE&G - Public Service Elec & Gas Co

National Average Comparison	
National Average Site EUI	
National Average Source EUI	
% Difference from National Average Source EUI	
Building Type	Multifamily Housing

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.

EPA Form 5900-16

2. FACILITY AND SYSTEMS DESCRIPTION

2.1. Building Characteristics

The Elms building was originally built in 1975 with various renovations and updates including roof and window replacement, appliance and lighting upgrades, and new electric baseboards throughout the tenant spaces. The Elms consists of a total floor area of 75,000 square feet, it has six stories and contains 100 apartment units (75 one bedroom and 25 studios), administrative offices, a community room, library, and common spaces.

2.2. Building occupancy profiles

The building is operated 24 hours per day, 7 days per week. The peak occupancy for the building is approximately 175 tenants and 5 staff and maintenance personnel.

2.3. Building envelope

2.3.1.Exterior Walls

The exterior walls consist of 12" concrete block with gypsum board set on steel studs spaced 16" on center. Sections of the building that contain residential units contain an EIFS system that includes 2" of rigid insulation on the exterior surface. The EIFS insulation system was most likely added after the original construction of the exterior walls. Areas that do not contain residential units consist of concrete blocks with a split rib face. Due to warm temperature conditions at the time of the field visits, insulation levels could not be verified with the help of infrared technology.

Overall, exterior and interior wall finishes of the envelope were found to be in age-appropriate, good condition with no major signs of unusual water, air leakage or other energy compromising damage.

Typical Building Elevation showing various materials used

2.3.2.Roof

The roof areas of the building are flat and constructed of dark-colored EPDM finish without a gravel layer. The roof membrane appeared to be in good condition. At the time of the field audit, SWA was told a sub-contractor performs regular maintenance on the roof. No current leaks were mentioned to the auditors at the time of the field visit and no signs of water leakage were detected.

In an effort to get the maximum life expectancy out of the roofing material installed, SWA recommends following the installer's or manufacturer's recommended maintenance and inspection schedule.

2.3.3.Base

The building's base is 4-6" concrete slab-on-grade with a perimeter footing. There were not any reported problems with water penetration or moisture. The slab edge or perimeter insulation could not be verified. There were no reported problems with water penetration or moisture. The building code in effect at the time of construction may not have required insulation either at the perimeter of the foundation walls or under the slab.

2.3.4.Windows

At the time of the field audit, SWA was informed that the windows were replaced approximately 13 years ago. Drawings received by SWA were original to the building; therefore, the window schedule and selection could not be confirmed.

The windows in the tenant spaces are a mixture of double-glazed, double-hung or fixed aluminum framed type. Some of these windows show signs of moisture build-up, which indicates that a seal somewhere around the window has been compromised. SWA recommends routine maintenance to prevent deterioration around the glass pane of the window as well as the window frame itself. The windows throughout the rest of the building were a mixture of fixed and casement windows, double-pane with aluminum framing. All appeared to be in fine condition.

Tenant window showing moisture

As a best practice, SWA recommends that all windows be inspected at least once a year. Any gaps, cracks, or damage to weather-stripping or caulking should be repaired or replaced, as needed, to minimize energy loss around those openings. Building staff should also verify that windows open and close properly and repair, as needed.

2.3.5.Exterior doors

The exterior doors are a mix of un-insulated metal doors and glass doors. The un-insulated metal exterior doors were observed to be in good condition except for missing or worn weather-stripping. SWA recommends that the exterior doors of the building are weather-stripped in order to decrease the

amount of conditioned air that is lost to the outside. 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.

Worn weather-stripping at side door

2.3.6. Building air tightness

Based on a visual inspection, there are various tenant and common spaces that could benefit from additional maintenance (caulking and air-sealing) in order to improve the building envelope. Windows should be routinely maintained to ensure tight seals. Window air conditioner units should either be caulked or have tight fitting gaskets and if possible removed during the heating season. Duct tape around the perimeter of air conditioner units does not serve as a sufficient air barrier. If removing air condition units is not possible, SWA recommends a tight fitting cover, such as Chill Stop-R. The exhaust for the stand alone air conditioners found in most bedrooms should also be well-sealed with caulk. As a best practice, weather-stripping on doors and windows should be checked every 6 months for deficiencies and replaced as they fail.

Stand alone air conditioner ducted through an apartment window

2.4. HVAC Systems

The Elms building is an all electric building with electric baseboard heating units serving all areas. During the field audit, SWA was informed that all of the electric baseboards were replaced 4 years ago.

2.4.1.Heating

The heating system consists of a combination of all-electric air handling units as well as electric baseboards. Electric baseboard heating exists throughout apartments as well as some corridors. Electric baseboard heating consists of Cadet Baseboard units at 208 volts with a line voltage thermostat. Air handling units provide electric heat only to common spaces such as first floor common areas as well as corridors.

Typical Baseboard heater

Typical thermostat for electric baseboard

Individual bathrooms located in each apartment are equipped with Nutone infrared ceiling-mounted heaters that are operated on a 15 minute dial timer. Based on a survey of both maintenance staff as well as tenants, it was determined that these heaters are used on an occasional basis, primarily when taking a shower and drying off in the bathroom.

Typical bathroom heating

At the time of the audit, there were no specific complaints by tenants regarding apartment heating. However, higher accuracy in temperature controls would provide potential for energy savings. Conversion to natural gas heat would be cost prohibitive and disruptive to the building occupants and is not recommended.

2.4.2. Cooling

Cooling is provided to common areas on the first floor as well as all tenant spaces. The Community room is served by a 10 ton, 4,000 CFM Carrier Split AC system. Common areas on each floor such as elevator waiting areas and corridors are not cooled but rely on fresh air to be delivered from the rooftop unit. Individual apartment cooling is provided by one sleeved through-wall air conditioner unit located in the living room area. The majority of rooms surveyed featured a Kenmore model AC unit rated at 11,700 Btus with an EER rating of 9.4. Four apartments surveyed contained Royal Sovereign portable cooling units rated at 9,000 Btus with an EER of 11.0. The portable cooling units are standalone units that are vented directly through the bedroom windows.

2.4.3. Ventilation

As mentioned above, common spaces in the building are provided fresh air via either a rooftop unit or an air handling unit. Individual apartment bathrooms have fixed exhaust grills located within the shower compartments and are designed for 40 CFM that are ducted to exhaust risers that run vertically to the roof curb-mounted Acme Centri Master Exhaust fans. These exhaust fans help

induce fresh air into the apartments, by exhausting stale air and creating a slightly negative pressure on the inside of each apartment.

2.4.4.Domestic Hot Water

There are two commercial electric water heaters located in the first floor mechanical room. The first unit is a Rheem/Ruud unit with a capacity of 27 kW and 119 gallon storage capacity operating on 207V. The second unit is an A.O. Smith electric heater that operates on 208V with (6) 4.5 kW elements. These units are responsible for providing hot water to the common areas such as the Community room sinks and laundry located on the first floor. When laundry equipment reaches the end of its lifetime, it may be cost-effective to consider converting to natural gas.

Each apartment contains one electric hot water heater located underneath the kitchen sink. Each hot water heater was replaced within the last 3 years. These units provide hot water to each apartment kitchen and bathroom. These units were observed to be in good operating condition and there were no tenant complaints.

2.5. Electrical systems

2.5.1.Lighting

Interior Lighting – The Elms building contains mostly efficient T8 fluorescent fixtures with electronic ballasts for general areas and common spaces such as hallways. Tenant space consists of a mix of screw-in CFLs, pin-type CFLs and incandescent bulbs. Out of 25 studio apartments and 75 one bedroom apartments, SWA sampled 3 studio apartments and 8 one bedroom apartments. Apartment lighting was found to be consistent for each type of apartment and therefore data was extrapolated from a sample of over 10% of each apartment type to expand to all 100 apartments. There were approximately 100 incandescent bulbs located in apartments that SWA recommends to upgrade to CFLs. Please note that only hard-wired fixtures are considered as part of the lighting audit, since hardwired fixtures are installed by the building and are common throughout each tenant space. Plug-in lamps have not been counted but were observed in most apartments. Electric use from plug-in lamps will be shown throughout the report in charts as a plug-load or miscellaneous electric usage.

Common area lighting consists of mostly T8 fluorescent fixtures with electronic ballasts. Some common areas such as the Community room on the first floor, the trash compactor room and the front desk area contained a few lights that should be upgraded as well. There were 4 remaining T12 fluorescent fixtures with magnetic ballasts in common areas that should be upgraded to T8 fluorescent fixtures with electronic ballasts. There were also 20 either halogen, multi vapor and incandescent lights that should be upgraded to CFLs. SWA also identified 7 areas within the building that could benefit from installing occupancy sensors. Occupancy sensors will benefit common area rooms such as the Ceramic room and Laundry room that see sporadic use throughout the day. The Common Area bathrooms located on the first floor were observed to be hardwired to remain on 24 hours per day and are not able to be shut off. SWA recommends installing an occupancy sensor in these bathrooms in order to reduce the amount of runtime per each light fixture. A complete lighting inventory has been included in Appendix A of this report.

Exit Lights – All of the exit signs were found to be efficient LED exit signs. See attached existing and proposed lighting schedule in Appendix A.

Exterior Lighting - The exterior lighting surveyed consist of six 150W metal halide lamps and four 400W metal halides. SWA recommends replacing these metal halide fixtures with newer technology pulse start metal halides. See attached existing and proposed lighting schedule in Appendix A.

2.5.2. Appliances

SWA performed a basic survey of appliances installed at The Elms building. 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/year. Refrigerators surveyed during the field audit used as much as 709 kWh/year. According to building staff, approximately half of the refrigerators were replaced 5-6 years ago. These new refrigerators do not appear to be Energy Star rated and use 537 kWh/year according to their product specifications. SWA recommends upgrading each tenant refrigerator to a new Energy Star rated refrigerator. When compared to the average electrical consumption of older equipment, Energy Star equipment results in a large energy as well as cost savings. Look for the Energy Star label when replacing appliances and equipment including; window air conditioners, refrigerators, printers, computers, copy machines, etc. More information can be found in the "Products" section of the Energy Star website at: http://www.energystar.gov

2.5.3. Elevators

The Elms building contains one hydraulic elevator. There are currently no efficient upgrades for the elevator at this time

2.5.4. Process and others electrical systems

There are no other electrical systems present within the building.

3. EQUIPMENT LIST

Inventory

Building System	Description	Physical Location	Make/Model	Fuel	Space served	Estimated Remaining useful life %
Heating	Room heat is provided by new Electric Baseboard 208 Volt with a line voltage thermostat.	Apartments, Offices, Corridors, Common Spaces (Building)	Cadet/8F2500, 6F1500	Electric	Building	97%
Make up air / Heating	This unit is a 5000 cfm heat only 100 % make up unit with a 120 Kw reheat coil for tempering the make up air during the shoulder and winter months. The 5000 cfm supply meets current ASHRAE 62.1-2007 standards. On the date of our survey this unit was not running.	Rooftop	Governair/AH10-15	Electric	Corridors	0%
Heating	Space heater, 3 units	Greenhouse	Marley-MUH-108- 10 Kw	Electric	Greenhouse	75%
Heating	Space heater (Original equipment)	Mechanical Room	Federal Pacific	Electric	Generator Room	50%
Heating	Ceiling mounted heaters that are operated on a 15 minute dial timer. (22) units are (1385 Kw) and 78 units are (1265 Kw)	Apartment Bathrooms	Nu-Tone #9294 (1265 watts) #9276 (1385 watts)	Electric	Apartment Bathrooms	20%
Cooling	Through the wall a/c units, 11,700 Btu's. with an EER rating of 9.4	Apartment Living Rooms	Kenmore #580.751305	Electric	Apartments	20%
Cooling	Portable units 9,000 Btu unit venting through the window with an EER of 11.0	Some Apartment bedrooms	Royal Sovereign #ARP-900m	Electric	Apartment Bedrooms	35%
Cooling	8.5Ton Condenser-11.3 Kw	Behind Building	Carrier #38ADO12410	Electric	Community Room	5%
	4000 cfm Carrier split system Air Handler w/ Hw Reheat Original -1975	Utility Closet off of Community Room	Carrier/ 40RR01230	Electric	Community Room	5%
Cooling	12 Ton Carrier Condenser-14.9kw	Behind Building	Carrier #38ADO16410	Electric	Lobby, Offices, Ceramics Room	5%
	4000 cfm air handler w/Electric reheat Original -1975	Ceiling in Generator Room	Carrier #40RR016410	Electric	Lobby, Offices, Ceramics Room	5%
Ventilation	40 Cfm -Bathroom Exhaust is provided by 17 roof top exhaust fans.	Rooftop	Centri Master by Acme # PRN100 115/1/60/ODP W/TOL W/PLUG	Electric	Apartment Bathrooms	50%
Ventilation	50 Cfm Kitchen Exhaust is provided by 17 roof tope exhaust fans.	Rooftop	Centri Master by Acme/ PRN100 115/1/60/ODP W/TOL W/PLUG	Electric	Apartment Kitchens	50%
Circulation	water booster pump on demand, 5hp	Mechanical Room	Aurora Pump/5A 182TTDR7902DRL	Electric	Building	50%
DHW	commercial electric water heater, 119 Gallon 208v 27 Kw	Mechanical Room	Rheem/Ruud/ ES-120-27-G	Electric	Building	50%
DHW	commercial electric water heater, 120 Gallon 208 volts with (6) 4.5 kw	Mechanical Room	A.O. Smith/ DRE 120	Electric	Building	50%
DHW	100 heaters, one per apartment, 30 gallon electric hot water heaters located underneath each kitchen apartment sink, no nameplate info available, all installed within the last 3 years	Underneath each kitchen sink	NA, 30 gallons	Electric	Apartment bathrooms and kitchens	80%

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

4. ENERGY CONSERVATION MEASURES

Based on the assessment of the Elms building, 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

- Upgrade windows – Replace current windows with new double-paned, argon-filled windows with a low-e coating and thermal break. This is not cost-effective at this time but is strongly recommended provided the current conditions of the windows.

Category II Recommendations: Operations and Maintenance

- Maintain roofs - SWA recommends regular maintenance to verify water is draining correctly.

- Provide weather stripping / air sealing – SWA observed that some windows and doors had deteriorating weather stripping and sealing. 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 (0.5 gpm on bathroom sinks) and low-flow shower heads (1.2 gpm) 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 – Always select Energy Star appliances.

Category III Recommendations: Energy Conservation Measures

Summary table

ECM#	Description of Highly Recommended 0-5 Year Payback ECMs
1	Install 120 new CFL lamps
2	Gas-Fired Make-up Air-handler
3	Install 7 new occupancy sensors
4	Programmable Thermostats for baseboard heaters
	Description of Recommended 5-10 Year Payback ECMs
5	Install 4 new T8 fluorescent fixtures
6	Install 91.8 kW PV system
7	Install 10 new Pulse Start Metal Halides
	Description of Recommended End of Life Cycle ECMs
8	Replace 16-ton Condenser and AHU
9	Replace 12-ton Condenser and AHU
10	Install 100 Energy Star refrigerators
11	Replace bathroom infrared Heating Lamps

ECM#1: *Install 120 new CFL lamps*

Description:

The Elms building contains 100 apartments; 25 studios and 75 one bedrooms. Each apartment contains one fixture in the bathroom that contains 3 incandescent bulbs. SWA recommends replacing each incandescent bulb with an equivalent CFL. In addition to apartments, the Elms building contains 20 incandescent, multi vapor and halogen bulbs that should also be upgraded to new CFL lamps.

Installation cost:

Estimated installed cost: $6,853
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 energy 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 120 new CFL lamps	RSMeans	6,853	0	6,853	21,490	4.5	0	1.0	2,021	4,965	5	22,610	1.4	229.9	46.0	66.8	15,886	38,478

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 currently no incentives for this measure at this time.

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

ECM#2: *Gas-Fired Make-up Air-Handler*

Description:

The current make-up air handler, which provides 120 kW (409,440 BTUH) of heating, has surpassed its useful life and due to the fact that it is fueled by electricity, is much more expensive to operate than a unit that is gas-fired. Contacting PSEE&G about converting to a gas-fired AHU would provide significant savings.

Due to its age and condition, the coefficient of performance (COP) of the current air-handler can be estimated to be 75% of its original COP. Since the COP of electric heat is 1, the new COP is estimated to be 0.75. The efficiency of the proposed gas-fired air-handler is 80%. The heating capacity of the current unit is 409,440 BTUH, and it is assumed that the new unit will be about the same. Very few therms of energy will be saved by this measure, but due to the difference in price – electricity is almost 3 times more expensive than gas ($0.137/kWh for electricity, as opposed to $1.55 per therm for gas) – the cost savings will be substantial. Using the values of 5,034 annual heating degree-days and a 99.6% dry-bulb temperature for nearby Newark, NJ provided by ASHRAE, it was calculated that the current unit consumes 8,756 therms of electricity, while a gas unit would consume 8,209 therms. This would yield $22,434 in annual savings and a simple payback of 2.7 years.

Installation cost:

Estimated installed cost: $59,600
Source of cost estimate: Contractor (Struble Mechanical Services, Fairfield, NJ)

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 energy 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	Gas-Fired Make-up Air-handler	Contractor	60,000	400	59,600	256,624	0.0	-8,209	0.7	0	22,434	15	263,977	2.7	342.9	22.9	37.3	208,210	368,997

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 – Gas furnaces ($300-$400 per unit).

Maximum incentive amount is $400.

Options for funding ECM:

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

ECM#3: *Install 7 new occupancy sensors*

Description:

Based on field observations, there are 7 areas within the Elms building that would benefit from occupancy sensors. SWA recommends that these 7 areas are upgraded to occupancy sensors in order to reduce the amount of runtime based on occupancy schedules. See Appendix A for complete lighting schedule and analysis.

Installation cost:

Estimated installed cost: $1,400
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 energy 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 7 new occupancy sensors	RS Means	1,540	140	1,400	2,688	0.6	0	0.1	0	368	15	4,428	3.8	216.3	14.4	25.4	2,996	4,813

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

Rebates / financial incentives:
NJ Clean Energy Prescriptive Lighting Controls – Wall-mounted occupancy sensors ($20 per control)
Maximum incentive amount is $140.

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

ECM#4: *Programmable Thermostats for baseboard heaters*

Description:

Currently, the electric baseboard heaters in the living rooms, bedrooms and common hallways are controlled by line-voltage thermostats. It would be beneficial to install 200 7-day programmable set back thermostats to replace the existing thermostats. These thermostats would automatically turn down the heating and cooling (for the common area only) at times when the areas are unoccupied, saving energy costs.

Installation cost:

Estimated installed cost: $39,000 ($195 for each thermostat)
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 energy 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	Programmable Thermostats for baseboard heaters	RS Means	39,000	0	39,000	62,447	0.0	0	2.8	0	8,555	15	100,670	4.6	158.1	10.5	20.6	63,132	111,811

Assumptions: SWA calculated the savings for this measure using measurements taken the days of the field visits and using the billing analysis. Calculations were performed automatically by Honeywell's Programmable Thermostat calculator. It was assumed that the heating would be turned down to 65ºF at night, but cooling would not. It was calculated that the thermostats would save 62,477 kWh per year with a simple payback of 4.6 years.

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

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

ECM#5: *Install 4 new T8 fluorescent fixtures*

Description:

The Elms building currently contains 4 inefficient T12 fluorescent fixtures with magnetic ballasts. SWA recommends replacing each one of these T12 fixtures with equivalent T8 fluorescent fixtures with electronic ballasts. Typically, T8 fluorescent fixtures with electronic ballasts use 30% less energy than equivalent T12 fixtures with magnetic ballasts. In addition, there will be operating cost savings associated with each bulb since CFLs have a longer rated lifetime than incandescent bulbs. See Appendix A for complete lighting schedule and analysis.

Installation cost:

Estimated installed cost: $741
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 energy 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
5	Install 4 new T8 fluorescent fixtures	RSMeans	861	120	741	298	0.0	0	0.0	105	146	15	1,716	5.1	131.6	8.8	18.0	1,000	534

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 – T-5 and T8 lamps with electronic ballast in existing facilities ($10-30 per fixture, depending on quantity of lamps)
Maximum incentive amount is $120.

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

ECM#6: *Install 91.8 kW PV system*

Description:

As a result of the Photovoltaic study, three areas of the site have been identified as conducive for the application of a Photovoltaic (PV) system. If Secaucus Housing Authority is interested in moving forward, a structural analysis of the roofs must be performed to confirm they will support the addition of PV modules.

Currently, The Elms building does not use any renewable energy systems. As a result of a preliminary Photovoltaic study, three areas of the site have been identified as conducive for the application of a Photovoltaic (PV) system. The three areas identified consist of the roof and both parking lots. 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 Secaucus Housing Authority further review installing a 91.8 kW 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 Elms building is not eligible for a 30% federal tax credit. Instead, Secaucus Housing Authority 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.

There are a few locations for a 91.8 kW PV installation on the building roofs, parking lots and away from shade. The proposed PV system would include 40 flat, crystalline PV modules installed on the roof and 419 flat, crystalline PV modules installed on canopies over the parking lots. The system is based on commonly used 200 Watt PV modules, and one (1) inverter for conversion to AC power. The total annual generating capacity of the system is 92,371 kWh as estimated by the PV WATTS calculator provided by the Department of Energy (DOE), National Renewable Energy Laboratory (NREL).

Installation cost:

Estimated installed cost: $504,900
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 energy 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
6	Install 91.8 kW PV System	Similar Projects	596,700	0	596,700	92,371	91.0	0	4.2	0	67,855	25	1,155,661	8.8	93.7	3.7	8.3	282,634	165,390

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).

Rebates/financial incentives:
NJ Clean Energy - Solar Renewable Energy Certificate Program. Each time a solar electric system generates 1000kWh (1MWh) of electricity, a SREC is issued which can then be sold or traded separately from the power. The buildings must also become net-metered in order to earn SRECs as well as sell power back to the electric grid. $55,200 has been incorporated in the above costs; however it requires proof of performance, application approval and negotiations with the utility.

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

ECM#7: *Install 10 new pulse start metal halide fixtures*

Description:

The Elms building currently contains 10 exterior probe start metal halide fixtures that are older and consume an unnecessary amount of power. SWA recommends upgrading each probe-start metal halide to pulse-start metal halides. A complete lighting schedule has been attached in Appendix A of this report.

Installation cost:

Estimated installed cost: $7,803
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 energy 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
7	Install 10 new pulse start metal halide fixtures	RSMeans	8.053	250	7,803	4,643	1.0	0	0.2	221	857	15	10,085	9.1	29.3	2.0	-17.1	2,429	8,313

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 w/pulse start ($25 per fixture)
Maximum incentive amount is $250.

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

ECM#8: *Replace 16-ton Condenser and AHU*

Description:

A 16-ton Carrier condenser with Model #40RR01230 is reaching its useful life and is in poor condition. It is recommended that it be replaced with a more efficient unit. As of the beginning of 2010, air-conditioning units that use R-22 refrigerant, like the two current models, will no longer be sold, as they are being replaced with units that use Puron refrigerant. These units have Seasonal Energy Efficiency Ratios (SEERs) but new air-handlers must also be purchased to accommodate the new refrigerant. Units with SEER values of 12.8 are available.

Installation cost:

Estimated installed cost: $18,510
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 energy 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
8	Replace 16-ton Condenser and AHU	RSMeans	18,510	0	18,510	11,627	2.4	0	0.5	0	1,593	15	18,744	11.6	1.3	0.1	3.4	506	20,818

Assumptions: Using the facility's electric billing and usage data, the cost of electricity was determined to be $0.137 per kWh. Due to the unit's age and condition, the current SEER 7.7 was estimated to be 70% of the original SEER, which were approximately 11. The number of annual degree days and the 0.4% cooling dry-bulb temperature, provided by ASHRAE, were 864 degree days and 91ºF, respectively.

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

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

ECM#9: *Replace 12-ton Condenser and AHU*

Description:

A 12-ton Carrier condenser, with Model #38AD016410 is nearing its useful life and is in poor condition. It is recommended that it be replaced with a more efficient unit. As of the beginning of 2010, air-conditioning units that use R-22 refrigerant, like the two current models, will not longer be sold, as they are being replaced with units that use Puron refrigerant. These units have higher Season Energy Efficiency Ratios (SEERs) but new air-handlers must also be purchased to accommodate the new refrigerant. Units with SEER values of 12.8 are available.

Installation cost:

Estimated installed cost: $16,525
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 energy 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
9	Replace 12-ton Condenser and AHU	RSMeans	16,525	0	16,525	8,720	1.8	0	0.4	0	1,195	15	14,057	13.8	-14.9	-1.0	1.0	-2,263	15,613

Assumptions: Using the facility's electric billing and usage data, the cost of electricity was determined to be $0.137 per kWh. Due to the unit's age and condition, the current SEER 7.7 was estimated to be 70% of the original SEER, which were approximately 11. The number of annual degree days and the 0.4% cooling dry-bulb temperature, provided by ASHRAE, were 864 degree days and 91ºF, respectively.

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

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

ECM#10: *Install 100 Energy Star refrigerators*

Description:

SWA performed a basic survey of appliances installed at the Elms building. A minimum of 10 apartments were visited or 10% of the total number of apartments. According to building staff, some refrigerators have already been replaced in the building approximately 5-6 years ago. The older refrigerators were observed to use as much as 709 kWh/year, while the newer refrigerators use as much as 537 kWh/year. It does not appear that the newer refrigerators are Energy Star and thus could benefit from being upgraded. SWA recommends that Secaucus Housing Authority install 100 Energy Star refrigerators throughout The Elms building.

Installation cost:

Estimated installed cost: $118,000
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 energy 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
10	Install 100 Energy Star refrigerators	RSMeans	118,000	0	118,000	30,800	6.4	0	1.4	0	4,220	15	49,652	28.0	-57.9	-3.9	-6.9	-67,627	55,147

Assumptions: SWA estimates that approximately 50% of the refrigerators were replaced 5-6 years ago. Based on field observations, refrigerators used either 709 kWh/year or 537 kWh/year. Savings calculations are assuming that 50 units use 709 kWh/year and 50 units use 537 kWh/year.

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

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

ECM#11: *Bathroom Infrared Heating Lamps*

Description:

Currently, each apartment bathroom contains radiant heating coils to provide heat while the residents are showering and drying off in the bathroom. These infrared heating coils were observed to be nearing the end of their lifetime. Dirt and dust have built-up on each coil, potentially causing safety problems as well as reducing the efficiency of each coil. SWA recommends replacing each coil with a newer, efficient model heat lamp.

Installation cost:

Estimated installed cost: $30,000 ($300 for each heat lamp)
Source of cost estimate: Vendor

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 energy 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
11	Replace bathroom infrared heating lamps	RSMeans	30,000	0	30,000	4,940	1.0	0	0.2	0	677	15	7,964	44.3	-73.5	-4.9	-11.2	-21,921	8,845

Assumptions: The current units are Nutone heaters, 78 of which have model #9294 and 22 of which have model #9276. Model #9294 units are rated at 1.265 kW and Model #9276 units are rated at 1.385 kW. The recommended replacement heaters, for all 100 units, are Qmark Model #B674W infrared heating lamps. These are rated at 0.75 kW. Estimated use of each unit is 91.25 hours per year, or 15 minutes per day. The total annual electric consumption of all units is estimated to be 11,784 and the proposed electric consumption is estimated to be 6,844 kWh with an annual savings of $677.

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

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

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

5. RENEWABLE AND DISTRIBUTED ENERGY MEASURES

5.1. Existing systems

There are not currently any existing renewable energy systems.

5.2. 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.

5.3. Solar Photovoltaic

Pleases see the above recommended ECM#6.

5.4. Solar Thermal Collectors

Solar thermal collectors are not recommended for this project because they would require modification to the existing individual unit domestic hot water systems and/or heat distribution system, which would not be cost effective.

5.5. Combined Heat and Power

CHP is not applicable for this building because of the existing HVAC and Domestic Hot Water system configuration.

5.6. Geothermal

Geothermal is not applicable for this building because it would require significant modifications to the existing HVAC system, which would not be cost effective. Additionally, the land area available is not suitable for vertical closed loop or large enough to install the necessary underground infrastructure for a geothermal system.

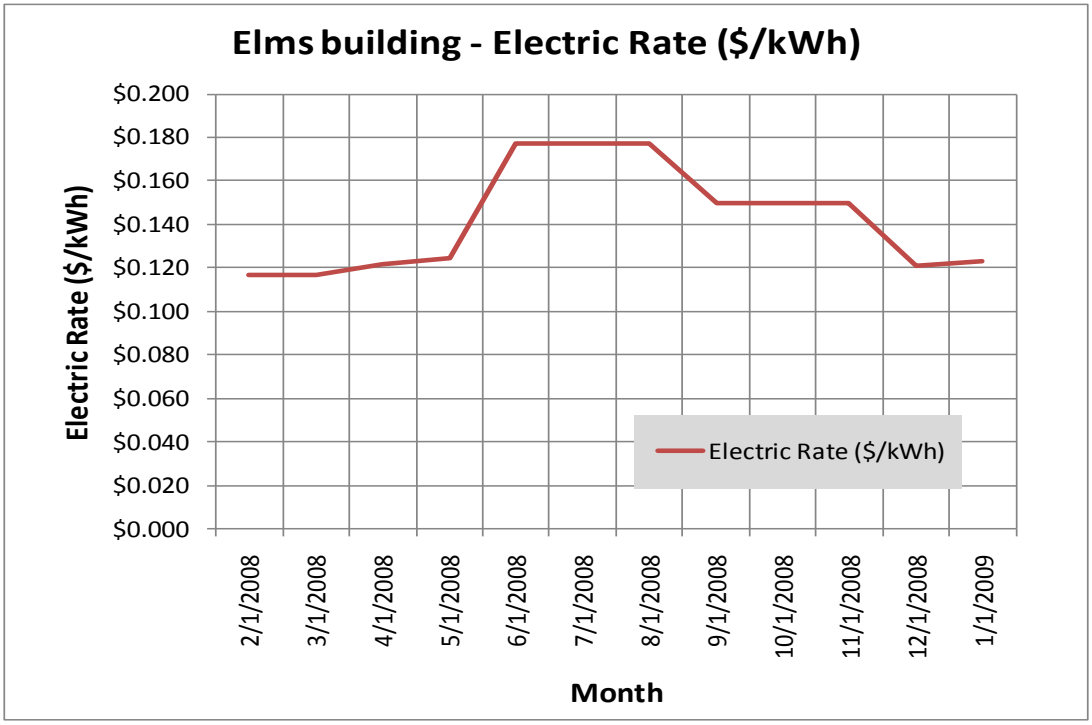
6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

6.1. Energy Purchasing

The Elms building receives natural gas via one incoming meter, however there is currently no gas use since the building is all electric. Electricity is purchased via one incoming master-meter directly for the building from PSE&G without an ESCO. The electric meter serves both common areas as well as all tenant apartments. SWA analyzed the utility rate for electricity supply over an extended period. Electric bill analysis shows fluctuations of 34% over the most recent 12 month period. Some of these fluctuations may have been caused by adjustments between estimated and actual meter readings, others may be due to unusual high and escalating energy costs in 2008.

Currently, New Jersey commercial buildings of similar type pay $0.150/kWh for electricity and $1.55/therm for natural gas. Currently, the electricity rate for the Elms building is $.137/kWh, which means that the building is charged less than the average electric rate for commercial buildings in New Jersey. SWA does not recommend contacting a third-party energy supplier unless there is an opportunity

to reduce the electric rate even further, or if the building decides to add natural gas service. Appendix B contains a complete list of third party energy suppliers for the Secaucus Housing Authority service area. Secaucus Housing Authority 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 Elms building 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	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	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	Community Room	Parabolic	E	4'T8	9	2	32	S	8.0	365	6	582	1,840	C	Parabolic	4'T8	E	OS	9	2	32	6.0	365	6	582	1380	0	460	460
2	1	Community Room	Exit Sign	N	LED	2	1	5	N	24.0	365	1	11	105	N/A	Exit Sign	LED	N	N	2	1	5	24.0	365	1	11	105	0	0	0
3	1	Community Room	HID	N	Hal	7	1	65	S	8.0	365	16	471	1,656	CFL	Screw-in	CFL	N	OS	7	1	20	4.0	365	0	140	204	1247	204	1451
4	1	Community Room	Recessed	N	MV	3	1	100	S	8.0	365	25	325	1,095	CFL	Recessed	CFL	N	OS	3	1	35	4.0	365	0	105	153	788	153	942
5	1	Community Room	Pin	N	CFL	16	1	9	S	8.0	365	0	144	420	N/A	Pin	CFL	N	S	16	1	9	4.0	365	0	144	210	0	210	210
6	1	Community Room - Kitchen	Parabolic	E	4'T8	1	2	32	S	8.0	365	6	70	204	N/A	Parabolic	4'T8	E	S	1	2	32	4.0	365	6	70	102	0	102	102
7	1	Community Room - Kitchen	Pin	N	CFL	1	1	9	S	8.0	365	0	9	26	N/A	Pin	CFL	N	S	1	1	9	4.0	365	0	9	13	0	13	13
8	1	Lobby	Parabolic	E	4'T8	9	2	32	S	24.0	365	6	582	5,519	N/A	Parabolic	4'T8	E	S	9	2	32	24.0	365	6	582	5519	0	0	0
9	1	Elevator	Recessed	E	4'T8	2	2	32	N	24.0	365	6	134	1,226	N/A	Recessed	4'T8	E	N	2	2	32	24.0	365	6	134	1226	0	0	0
10	6	Studio Kitchens (25)	Pin	N	CFL	25	3	9	S	4.0	365	0	675	986	N/A	Pin	CFL	N	S	25	3	9	4.0	365	0	675	986	0	0	0
11	6	Studio Entranceway (25)	Pin	N	CFL	25	2	9	S	12.0	365	0	450	1,971	N/A	Pin	CFL	N	S	25	2	9	12.0	365	0	450	1971	0	0	0
12	6	Studio - Outside Bathroom (25)	Pin	N	CFL	25	2	9	S	4.0	365	0	450	657	N/A	Pin	CFL	N	S	25	2	9	4.0	365	0	450	657	0	0	0
13	6	Studio Bathroom (25)	Screw-in	N	Inc	25	3	60	S	4.0	365	0	4,500	6,570	CFL	Screw-in	CFL	N	S	25	3	20	4.0	365	0	1500	2190	4380	0	4380
14	5	One BR - Kitchen (75)	Pin	N	CFL	75	3	9	S	4.0	365	0	2,025	2,957	N/A	Pin	CFL	N	S	75	3	9	4.0	365	0	2025	2957	0	0	0
15	5	One BR - Bedroom (75)	Pin	N	CFL	75	2	9	S	4.0	365	0	1,350	1,971	N/A	Pin	CFL	N	S	75	2	9	4.0	365	0	1350	1971	0	0	0
16	5	One BR - Bathroom (75)	Screw-in	N	Inc	75	3	40	S	4.0	365	0	9,000	13,140	CFL	Screw-in	CFL	N	S	75	3	15	4.0	365	0	3375	4928	8213	0	8213
17	5	One BR - Entranceway (75)	Pin	N	CFL	75	2	9	S	12.0	365	0	1,350	5,913	N/A	Pin	CFL	N	S	75	2	9	12.0	365	0	1350	5913	0	0	0
18	1	Common Area - Ladies Room	Parabolic	E	4'T8	1	2	32	S	24.0	365	6	70	613	N/A	Parabolic	4'T8	E	S	1	2	32	6.0	365	6	70	153	0	460	460
19	1	Common Area - Ladies Room	Parabolic	E	2'T8	1	2	17	S	24.0	365	3	37	324	N/A	Parabolic	2'T8	E	S	1	2	17	6.0	365	3	37	81	0	243	243
20	1	Common Area - Mens Room	Parabolic	E	4'T8	1	2	32	S	24.0	365	6	70	613	N/A	Parabolic	4'T8	E	S	1	2	32	6.0	365	6	70	153	0	460	460
21	1	Common Area - Mens Room	Parabolic	E	2'T8	1	2	17	S	24.0	365	3	37	324	N/A	Parabolic	2'T8	E	S	1	2	17	6.0	365	3	37	81	0	243	243
22	1	Ceramic room	Parabolic	E	4'T8	6	2	32	S	24.0	365	6	390	3,679	C	Parabolic	4'T8	E	OS	6	2	32	18.0	365	6	390	2759	0	920	920
23	1	Ceramic room	HID	N	Hal	6	1	65	S	24.0	365	16	406	4,257	CFL	Screw-in	CFL	N	OS	6	1	20	18.0	365	0	120	788	3206	263	3469
24	1	Ceramic room	Recessed	N	MV	3	1	150	S	24.0	365	38	488	4,941	CFL	Recessed	CFL	N	OS	3	1	50	18.0	365	0	150	986	3627	329	3955
25	1	Laundry Room	2'U-Shape	E	2'T8	4	2	18	S	24.0	365	5	149	1,437	C	2'U-shape	2'T8	E	OS	4	2	18	18.0	365	5	149	1077	0	359	359

26	1	Hallway	2'U-Shape	E	2'T8	12	2	18	S	24.0	365	5	437	4,310	N/A	2'U-shape	2'T8	E	S	12	2	18	24.0	365	5	437	4310	0	0	0
27	1	Hallway	Exit Sign	N	LED	1	1	5	S	24.0	365	1	6	53	N/A	Exit Sign	LED	N	S	1	1	5	24.0	365	1	6	53	0	0	0
28	1	Generator Room	Parabolic	E	4'T8	11	2	32	S	2.0	365	6	710	562	N/A	Parabolic	4'T8	E	S	11	2	32	2.0	365	6	710	562	0	0	0
29	1	Small Generator Room	2'U-Shape	E	2'T8	2	2	18	S	2.0	365	5	77	60	N/A	2'U-shape	2'T8	E	S	2	2	18	2.0	365	5	77	60	0	0	0
30	1	Hallway	2'U-Shape	E	2'T8	1	2	18	S	24.0	365	5	41	359	N/A	2'U-shape	2'T8	E	S	1	2	18	24.0	365	5	41	359	0	0	0
31	1	Storage Room	2'U-Shape	E	2'T8	4	2	18	S	2.0	365	5	149	120	N/A	2'U-shape	2'T8	E	S	4	2	18	2.0	365	5	149	120	0	0	0
32	1	Maintenance Office	2'U-Shape	E	2'T8	4	2	18	S	8.0	365	5	149	479	N/A	2'U-shape	2'T8	E	S	4	2	18	6.0	365	5	149	359	0	120	120
33	1	Front Desk	2'U-Shape	E	2'T8	6	2	18	S	8.0	365	5	221	718	N/A	2'U-shape	2'T8	E	S	6	2	18	8.0	365	5	221	718	0	0	0
34	1	Front Desk	Parabolic	M	4'T12	4	1	40	S	12.0	365	12	172	911	T8	Parabolic	4'T8	E	S	4	1	32	12.0	365	3	131	613	298	0	298
35	1	Copy Room	2'U-Shape	E	2'T8	4	2	18	S	8.0	365	5	149	479	N/A	2'U-shape	2'T8	E	S	4	2	18	8.0	365	5	149	479	0	0	0
36	1	Hallway	2'U-Shape	E	2'T8	1	2	18	S	24.0	365	5	41	359	N/A	2'U-shape	2'T8	E	S	1	2	18	24.0	365	5	41	359	0	0	0
37	1	Trash Compactor	Pin	N	CFL	1	2	9	S	2.0	365	0	18	13	N/A	Pin	CFL	N	S	1	2	9	2.0	365	0	18	13	0	0	0
38	1	Hallway	Parabolic	E	4'T8	3	2	32	S	24.0	365	6	198	1,840	N/A	Parabolic	4'T8	E	S	3	2	32	24.0	365	6	198	1840	0	0	0
39	1	Entrance	Screw-in	N	CFL	5	1	25	S	24.0	365	0	125	1,095	N/A	Screw-in	CFL	N	S	5	1	25	24.0	365	0	125	1095	0	0	0
40	Ext	Parking	Exterior	N	MH	6	1	150	T	12.0	365	38	938	4,941	PSMH	Exterior	PSMH	N	T	6	1	100	12.0	365	22	622	3206	1734	0	1734
41	Ext	Walkway	Exterior	N	CFL	6	1	42	T	12.0	365	0	252	1,104	N/A	Exterior	CFL	N	T	6	1	42	12.0	365	0	252	1104	0	0	0
42	Ext	Parking	Exterior	N	MH	4	1	400	T	12.0	365	100	1,700	8,760	PSMH	Exterior	PSMH	N	T	4	1	275	12.0	365	59	1159	5852	2908	0	2908
43	6	Stairwell	2'U-Shape	E	2'T8	2	2	18	S	8.0	365	5	77	239	N/A	2'U-shape	2'T8	E	S	2	2	18	8.0	365	5	77	239	0	0	0
44	6	Hallway	Exit Sign	N	LED	2	1	5	S	24.0	365	1	11	105	N/A	Exit Sign	LED	N	S	2	1	5	24.0	365	1	11	105	0	0	0
45	6	Hallway	2'U-Shape	E	2'T8	2	2	18	S	24.0	365	5	77	718	N/A	2'U-shape	2'T8	E	S	2	2	18	24.0	365	5	77	718	0	0	0
46	6	Dwelling Unit	Pin	N	CFL	4	2	9	S	4.0	365	0	72	105	N/A	Pin	CFL	N	S	4	2	9	4.0	365	0	72	105	0	0	0
47	6	Hallway	Exit Sign	N	LED	3	1	5	S	24.0	365	1	16	158	N/A	Exit Sign	LED	N	S	3	1	5	24.0	365	1	16	158	0	0	0
48	6	Trash Compactor	Screw-in	N	Inc	1	1	60	S	2.0	365	0	60	44	CFL	Screw-in	CFL	N	S	1	1	20	2.0	365	0	20	15	29	0	29
49	3	Library	Parabolic	E	4'T8	3	2	32	S	8.0	365	6	198	613	N/A	Parabolic	4'T8	E	S	3	2	32	8.0	365	6	198	613	0	0	0
50	5	Hallway	Exit Sign	N	LED	3	1	5	S	24.0	365	1	16	158	N/A	Exit Sign	LED	N	S	3	1	5	24.0	365	1	16	158	0	0	0
51	4	Hallway	Exit Sign	N	LED	3	1	5	S	24.0	365	1	16	158	N/A	Exit Sign	LED	N	S	3	1	5	24.0	365	1	16	158	0	0	0
52	3	Hallway	Exit Sign	N	LED	3	1	5	S	24.0	365	1	16	158	N/A	Exit Sign	LED	N	S	3	1	5	24.0	365	1	16	158	0	0	0
53	2	Hallway	Exit Sign	N	LED	3	1	5	S	24.0	365	1	16	158	N/A	Exit Sign	LED	N	S	3	1	5	24.0	365	1	16	158	0	0	0
Totals:						**577**	**90**	**1,879**				**374**	**29,733**	**91,219**						**577**	**90**	**1,336**				**18,995**	**60,250**	**26,430**	**4,539**	**30,970**
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

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