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January 19th, 2010

Local Government Energy Program
Energy Audit Report

For

Secaucus Housing Authority

R. Impreveduto Towers
600 County Ave
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 R. Impreveduto Towers building located at 600 County Ave., 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.

R. Impreveduto Towers was built in 1986 and consists of twelve stories and a total floor area of 95,000 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 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 R. Impreveduto Towers building located at 600 County Ave., Secaucus, NJ. The building is a twelve-story residential building with a total floor area of 95,000 square feet. The building was built in 1986 and contains 100 apartment units for senior housing. The original structure has undergone various renovations such as roof and window replacements, appliance and lighting upgrades, and an exterior EIFS insulation system.

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 March 2008 through March 2009, the period of analysis for this audit, the building consumed 998,469 kWh or $156,929 worth of electricity at an approximate rate of $0.157/kWh and 9,471 therms or $13,174 worth of natural gas at an approximate rate of $1.39/therm. The joint energy consumption for the building, including both electricity and fossil fuel, was 4,354 MMBtus of energy that cost a total of $170,103.

SWA has entered energy information about the R. Impreveduto Towers 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 45.2 kBtu/ft^{2}yr.

Recommendations

Implementing this report's recommendations will reduce use by approximately 12.5 kBtu/ft^{2}yr, which would decrease the building's energy use intensity to 32.7 kBtu/ft^{2}yr.

SWA recommends a package of measures that address both common areas and tenant spaces. R. Impreveduto Towers, built in 1986, has been maintained well and much of the original structure is in good shape and much of the mechanical equipment is still operating as expected.

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
- Install Energy Star roof with increased rigid insulation

Category II Recommendations: Operations and Maintenance

- Install wrap insulation around DHW heater
- 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 **3** Energy Conservation Measures (ECMs) for the R. Impreveduto Towers building that is summarized in the following Table 1. The total investment cost for these ECMs with incentives is **$52,352**. SWA estimates a first year savings of **$21,115** with a simple payback of **2.5 years**. SWA also recommends **1** ECM with a 5-10 year payback that is summarized in Table 2 and **3** End of Life Cycle ECMs.

The implementation of all the recommended ECMs would reduce the building electric usage by 177,984 kWh annually, or 18% of the building's current electric consumption. The recommended ECMs would also reduce the building natural gas usage by 5,774 therms or 61% of the building's current electric consumption. SWA estimates that implementing these ECMs will reduce the carbon footprint of the R. Impreveduto Towers building by **382,309 lbs of CO_2**, which is equivalent to removing approximately 29 cars from the roads each year or avoiding the need of 920 trees to absorb the annual CO_2 produced. SWA also recommends that Secaucus Housing Authority 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 $0.007/kWh, which would have equated to $1,997 for the past 12 months.

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.

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 programmable thermostat for split-system unit	RS Means, lit search	195	0	195	5,493	0.0	0	0.2	0	862	15	10,148	0.2	5104.1	340.3	442.2	10,100	9,835
2	Install 566 new CFL lamps	RS Means, lit search	49,077	0	49,077	103,542	21.6	0	3.7	3,351	19,607	5	89,284	2.5	81.9	16.4	28.6	40,718	185,392
3	Install 14 occupancy sensors	RS Means, lit search	3,080	280	2,800	2,248	0.5	0	0.1	293	646	15	7,601	4.3	171.5	11.4	21.9	4,911	4,025
	TOTALS	**-**	**52,352**	**280**	**52,072**	**111,283**	**22.1**	**0**	**4.0**	**3,644**	**21,115**	**-**	**107,033**	**2.5**	**-**	**-**	**-**	**55,729**	**199,252**

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
4	Replace 20 ton air-cooled condenser and associated AHU	RSMeans	85,000	1,840	83,160	11,703	2.4	5,774	6.5	0	9,863	15	116,061	8.4	39.6	2.6	8.2	34,587	84,601
	TOTALS	**-**	**85,000**	**1,840**	**83,160**	**11,703**	**2.4**	**5,774**	**6.5**	**0**	**9,863**	**-**	**116,061**	**8.4**	**-**	**-**	**-**	**34,587**	**84,601**

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
5	Install 162 new T8 fixtures	RS Means, lit search	34,882	4,860	30,022	6,338	1.3	0	0.2	1,036	2,031	15	23,900	14.8	-20.4	-1.4	0.2	-5,775	11,348
6	Install 1 new Pulse Start Metal Halide fixture	RS Means, lit search	805	25	780	145	0.0	0	0.0	22	45	15	527	17.4	-32.5	-2.2	-1.8	-246	260
7	Replace 75 ton chiller	Contractor	175,000	3,900	171,100	48,505	10.1	0	1.7	0	7,615	25	129,699	22.5	-24.2	-1.0	0.8	-38,494	86,848
	TOTALS	-	**210,687**	**8,785**	**201,902**	**54,988**	**11.4**	**0**	**2.0**	**1,058**	**9,691**	-	**154,125**	**20.8**	-	-	-	**-44,515**	**98,456**

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

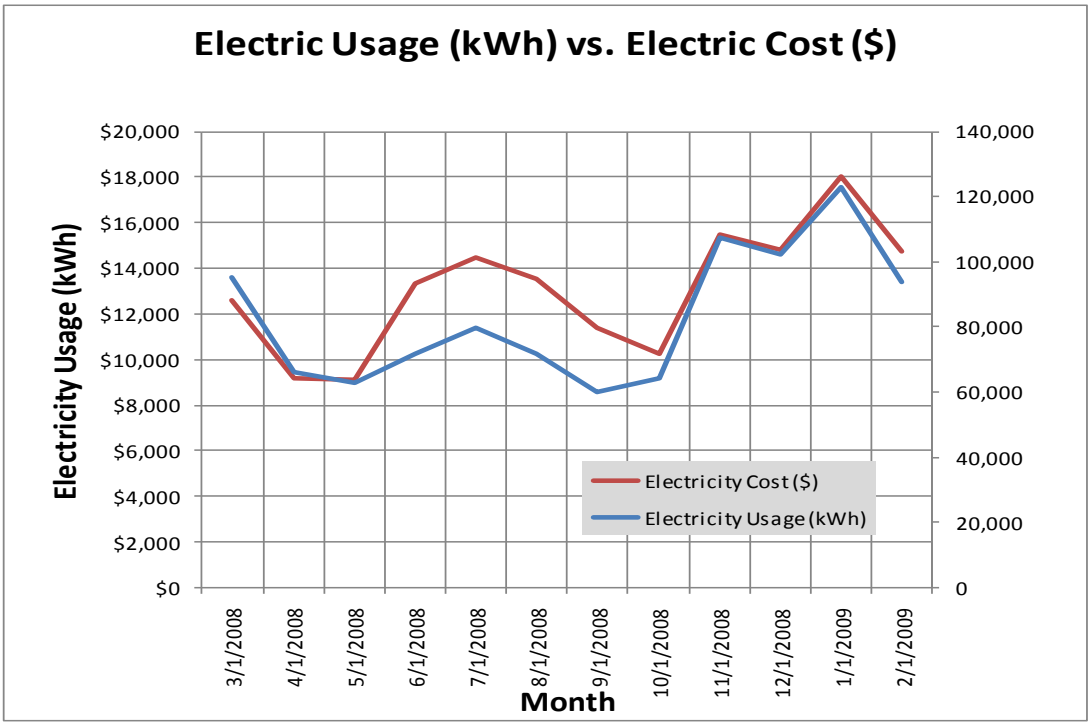
1.1. Energy usage, load profiles and cost analysis

SWA analyzed utility bills from **March 2008 through March 2009** (period of analysis) that were received from the utility companies supplying the R. Impreveduto Towers building with electricity and natural gas. R. Impreveduto Towers is currently master-metered for gas since the building uses gas to heat the common areas. The common areas as well as each apartment are all metered separately for electricity. SWA based billing analysis on common area meters as well as extrapolating data for each apartment based on 10% of each apartment type.

Electricity – R. Impreveduto currently buys electricity from PSE&G at **an average rate of $0.157/kWh** based on 12 months of utility bills from March 2008 to March 2009. R. Impreveduto Towers purchased **approximately 998,469 kWh or $156,929 worth of electricity** in the previous year. The common area and tenant meters are each charged separately for demand (kW) which has been factored into each monthly bill. Based on the same time period, the common area meter also has **an average monthly demand of 113.0 kW and a monthly peak demand of 136.0 kW.**

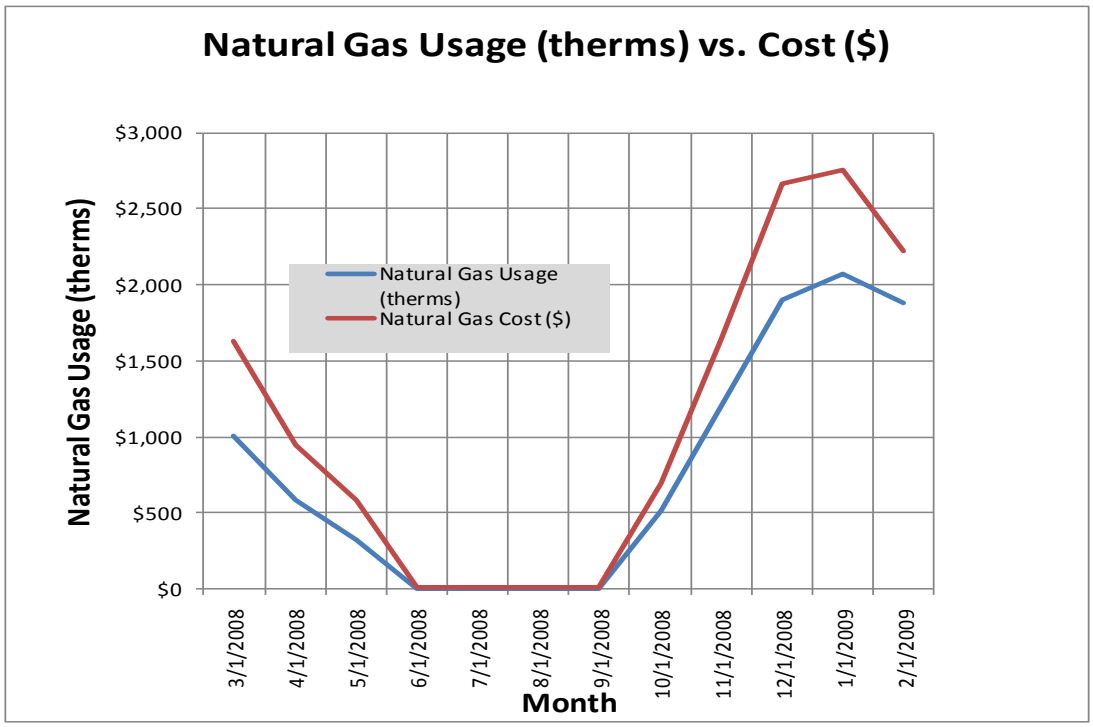
Natural gas – R. Impreveduto Towers is currently served by one meter for natural gas. The building currently buys natural gas from PSE&G at **an average rate of $1.39/therm** based on 12 months of utility bills from March 2008 to March 2009. The building purchased **approximately 9,471 therms or $13,174 worth of natural gas** in the previous year.

The following chart shows electricity use versus cost for R. Impreveduto Towers based on utility bills for the 12 month period of March 2008 to March 2009.

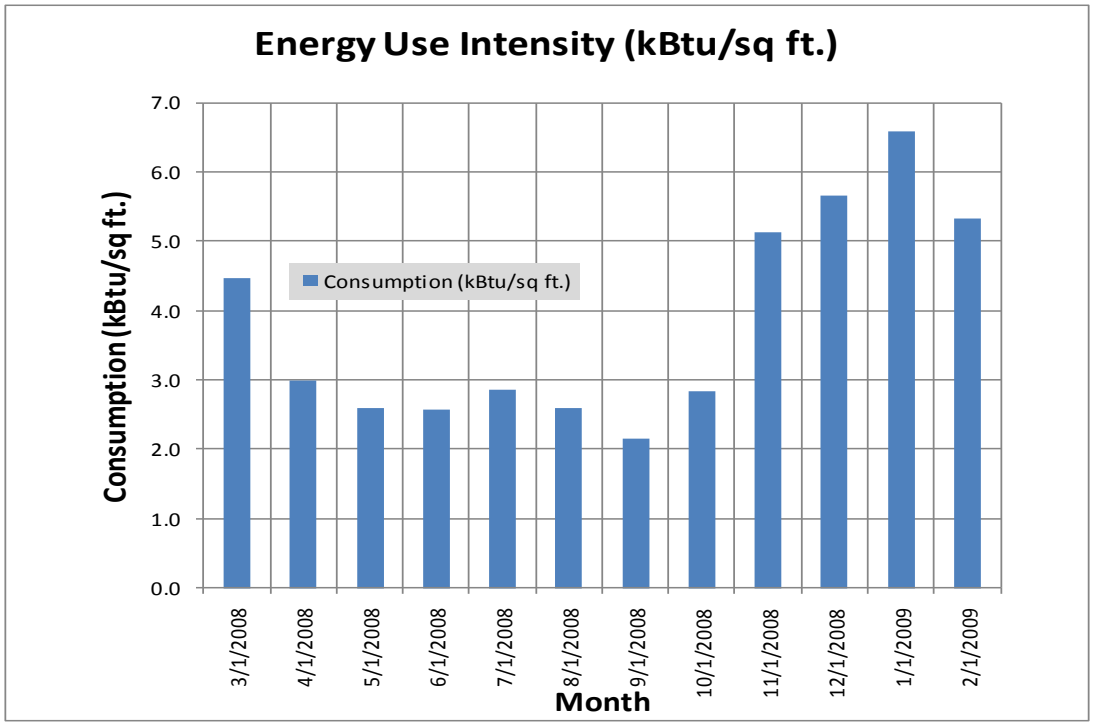


Electricity cost follows the same trend line of electricity usage. During summer months, electricity costs rises slightly in comparison to electricity usage as a result in increased demand charges during the cooling months.

The following chart shows natural gas use versus cost for R. Impreveduto Towers based on utility bills for the 12 month period of March 2008 to March 2009.



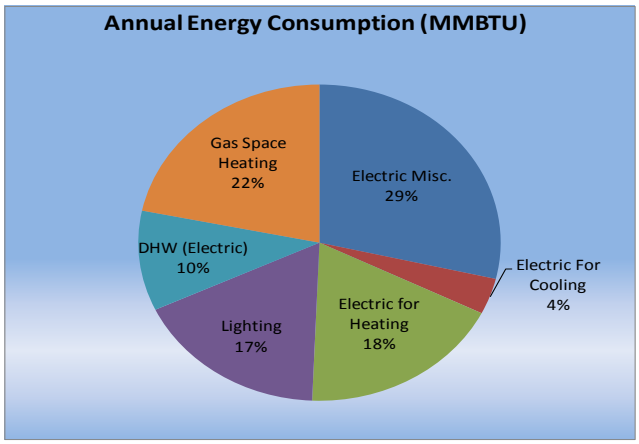
The following chart shows combined natural gas and electric consumption in Btu/sq ft for the R. Impreveduto Towers building based on utility bills for the 12 month period of March 2008 to March 2009.

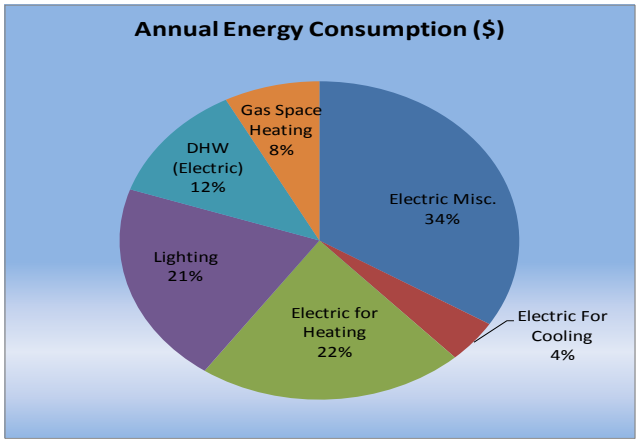


As expected, total building energy intensity gradually increases during the winter months, peaking in January.

The following table and chart pies show energy use for the R. Impreveduto Towers building based on utility bills for the 12 month period of March 2008 to March 2009. Note electrical cost at $46.1/MMBtu of energy is more than 3 times the cost of natural gas at $13.9/MMBtu.

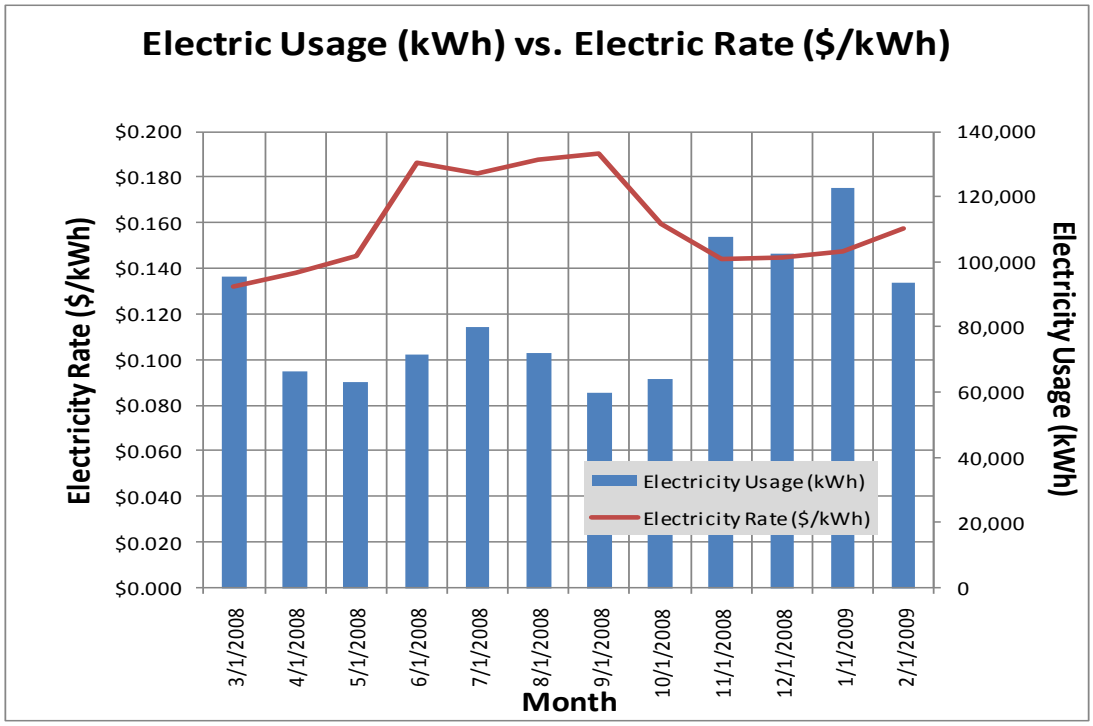
2008 Annual Energy Consumption / Costs					
	MMBtu	% MMBtu	$	% $	$/MMBtu
Electric Miscellaneous	1249	29%	$57,579	34%	46.1
Electric For Cooling	160	4%	$7,376	4%	46.1
Electric For Heating	796	18%	$36,696	22%	46.1
Lighting	757	17%	$34,898	21%	46.1
Domestic Hot Water (Electric)	445	10%	$20,515	12%	46.1
Gas Space Heating	947	22%	$13,163	8%	13.9
Totals	4,354	100%	$170,226	100%	-
Total Electric Usage	3,407	100%	$156,929	92.3%	46.1
Total Gas Usage	947	100%	$13,174	7.7%	13.9
Totals	4,354	100%	$170,103	100%	-





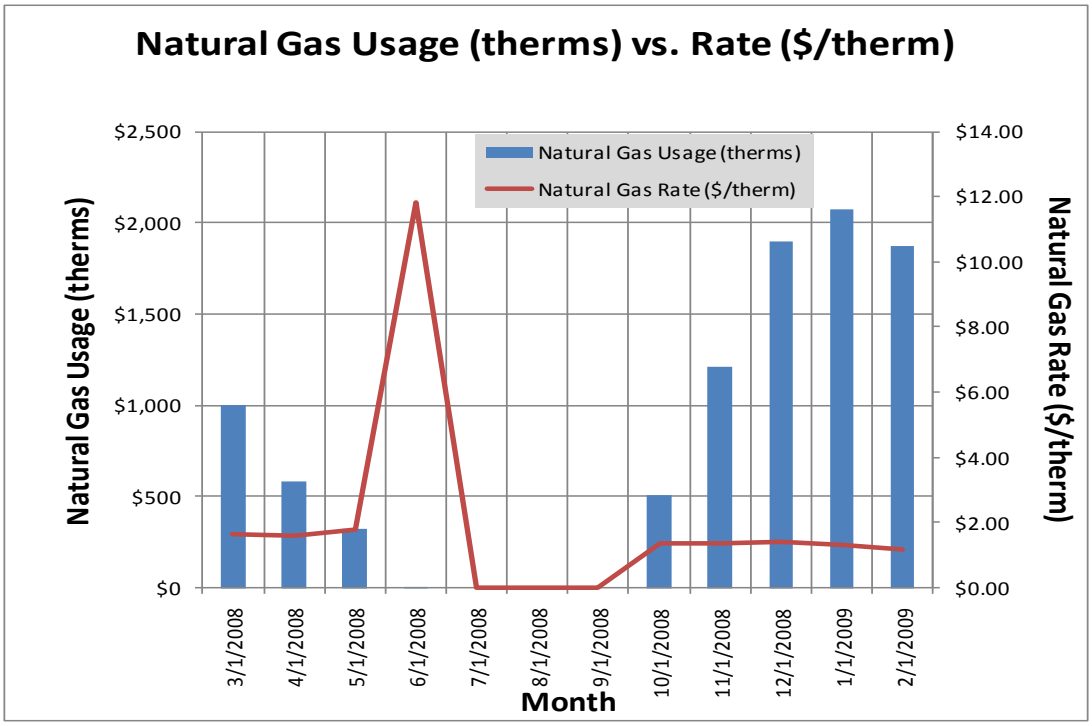
1.2. Utility rate analysis

The R. Impreveduto 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. R. Impreveduto currently pays an average rate of approximately $0.157/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 and therefore appears to be the appropriate rate for the building.



The electricity rate fluctuates inversely proportional to usage, as expected. Typically, the more units of electricity that are used by the building, the cheaper electricity becomes per unit.

The R. Impreveduto Towers building currently purchases natural gas from PSE&G at a general service market rate for natural gas use (therms). The building currently pays an average rate of approximately $1.39/therm based on the 12 months of utility bills of March 2008 to March 2009. The natural gas rate does not show large fluctuations throughout the year and therefore appears to be the appropriate rate for the building.



The natural gas rate fluctuates inversely proportional to usage, as expected. Typically, the more units of natural gas that are used by the building, the cheaper natural gas becomes per unit. In summer periods, when a minimal amount of gas is used, the natural gas rate ($/therm) increases sharply. Each month, the utility customer pays service and delivery charges to the utility company regardless of use. When minimal amounts of gas are used, the rate appears to sky rocket since service and delivery charges are the same amount as during high use months but represent a larger percentage of the total bill.

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 R. Impreveduto Towers 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 45.2 kBtu/ft^{2}yr.

Implementing this report's highly recommended Energy Conservations Measures (ECMs) will reduce use by approximately 3.5 kBtu/sqft yr, with an additional 1.4 kBtu/sq ft yr from the recommended ECMs and 14.6 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 R. Impreveduto Towers 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 - R. Impreveduto Towers

Building ID: 1926374
For 12-month Period Ending: January 31, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: December 14, 2009

Facility
SHA - R. Impreveduto Towers
600 County Avenue
Secaucus, NJ 07094

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1986
Gross Floor Area (ft²): 95,000

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

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	3,328,000
Natural Gas (kBtu)[4]	961,666
Total Energy (kBtu)	4,289,666

Energy Intensity[5]	
Site (kBtu/ft²/yr)	45
Source (kBtu/ft²/yr)	128

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	558

Electric Distribution Utility
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.

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

R. Impreveduto Towers was built in 1986 with various renovations and updates including roof and window replacement, appliance and lighting upgrades, and exterior EIFS insulation system. The building contains 100 apartment units (all one bedroom units), administrative offices, a community room, laundry room and other common spaces. The building consists of 12 stories with a total area of 95,000 square feet.

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 15 staff and maintenance personnel.

2.3. Building envelope

2.3.1.Exterior Walls

The exterior walls consist of 8" concrete block with a 2" exterior EIFS façade. The interior surface of the walls consist of gypsum board set on steel studs spaced 16" on center. According to building drawings, the interior side of the exterior walls consists of a 3 1/2" layer of fiberglass batt insulation. 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 the exception of some minor damage to EIFS façade system. The EIFS system showed some punctures at the ground level, where they were most likely damaged when walls were accessed with ladders, etc. SWA recommends that building staff ensure that each puncture area is repaired and sealed properly to avoid moisture damage. When an EIFS system is punctured, it allows water to penetrate the surface and could cause further damage to the system.

Areas showing damage to EIFS façade; leading to moisture in walls

2.3.2.Roof

The roof areas of the building are flat and constructed of dark-colored EPDM finish with gravel ballast. There is a small section of roof used as a patio that contains light-colored concrete stones over the gravel ballast. The roof membrane appeared to be in good condition with sufficiently sealed

seams and proper flashing. 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.

Typical roof surface

The roof contains 3" of rigid insulation, tapered towards each roof drain. 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 and specified slab edge insulation. 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.

2.3.4. Windows

At the time of the field audit, SWA was informed that the windows were replaced approximately 8 years ago. These windows are aluminum-framed, double-paned windows with no low-e coating. Although these windows are relatively new, there are signs of water damage in the frame of many of the windows. Specifically, the windows appear not to form a tight seal in the corners allowing moisture and air to penetrate through the window. SWA recommends that maintenance staff conduct a visual inspection of each window at least once every 6 months. If a window does not form a tight seal, weather-stripping or sealant can be added to prevent further moisture damage. Windows located in tenant spaces are hard to close all the way. Tenants should be informed on how to make sure the windows shut properly and to alert maintenance if a seal appears to be compromised.

Common Area window (left), Tenant window (right)

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. Some areas had proper weather-stripping but chipped paint and rust prevented the weather-stripping from forming a proper seal. 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. In cases where weather-stripping is intact but rust or chipped paint provide the weather-stripping from forming a seal, SWA recommends that a portion of the door is sanded smooth and repainted to allow the seal to work. 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.

Exterior door rust build-up preventing proper seal

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. 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

R. Impreveduto Towers contains a central cooling plant to provide chilled water cooling to all common areas as well as tenant spaces. Natural gas-fired rooftop units provide heating to common areas, while electric fan coil units provide electric resistance heating to tenant spaces.

2.4.1. Heating

Each tenant space is provided space heating by one (1) Whalen (Model W402ET3) fan coil unit. The unit contains a face and bypass damper that directs re-circulated air between a 3 kW electric heating coil and a chilled water coil. Each unit is equipped with a High and Low speed fan and is controlled through a non-programmable thermostat located in the living room area. Maintenances staff noted that a few units contain programmable thermostats because they tried implementing them throughout the building but faced much resistance from tenants. Air flow readings were taken in 4 of the 10 units visited and each unit was found to be delivering 30% above 400 CFM design conditions. This may occur because of the close nature of the supply registers fed from the fan coil plenum. Return air readings were found to be within 10% of design.

Make-up air is provided by a Snyder General Roofpak unit (Model #RFS020 BA Air Handler) equipped with a 1,050 kBTU natural gas-fired heating coil. This rooftop unit uses 100% outdoor air. Air distribution to the floors below is via a vertical shaft with supply registers located on each floor providing 650 CFM per floor and 1,050 CFM to the 2nd floor providing additional supply for the Laundry area. The Ground level receives 320 CFM. Our balancing report indicates that this unit is producing 8,430 CFM within 10% of the 8,520 CFM design with exception of noted blocked registers.

2.4.2. Cooling

Cooling is provided to tenant spaces via the same Whalen (Model W402ET3) 400 CFM single fan coil unit for living room and bedroom areas. Chilled water is provided by a Model 30GB-075080 75 ton Carrier chiller via a 2 pipe system that utilizes three 101 GPM/3 HP circulating pumps running 2 at a time with a manual lead/lag selector switch.

Carrier Chiller

The Community Room located on the 12th floor is cooled by a Trane DX rooftop unit model SPCC-C106-A with multiple stages of electric heat 13.5-54 kW. The audit indicated a total flow of 1,210 CFM for this space which is well outside of the 3,758 design flow.

The Exercise Room located on the Penthouse floor is cooled by a 6 ton Trane DX rooftop unit model WSC072A3RGA with (2) stages of electric heat 13.5/18 kW. This unit has been replaced recently and appears to be in good working order, delivering approximately 1,280 CFM to the space. No earlier design criterion was available for this system.

The Entry Lobby temperature is maintained by one Mitsubishi split system model PKH18EK that delivers 650 CFM at 1.5 tons and 18,600 BTUH of electric heat. Additional heat is provided by a wall-mounted 2,000W unit heater. This area was in good working order and no improvements are needed.

2.4.3. Ventilation

Individual bathrooms have wall switch activated exhaust fans that are ducted to exhaust risers that run vertically to the roof curb-mounted exhaust fans (originally designed for 30 CFM each). Balancing report indicated that the fans tested were moving an average of 30 CFM at the time of testing.

Individual kitchen exhaust is provided through a switched 160 CFM Broan model #40 exhaust hood that is ducted to a common exhaust riser that runs vertically to a curb-mounted exhaust fan located at various roof levels (originally designed for 60 CFM). The audit indicated that these fans were exhausting approximately 72 CFM, which is slightly above 10% tolerance.

Kitchen exhaust hood

2.4.4. Domestic Hot Water

Domestic water pressure is maintained by a SACO water boosting system at 42 PSI via three 5HP 34 GPM booster pumps. The system appears to be well-maintained and operating effectively.

Each of the individual apartment units contains one 30 gallon/2,000W water heater. The units surveyed appear to be relatively new and working properly.

The Community Room also has a dedicated AO Smith 20 Gal/2,500W water heater Model ELJF-20 and hot water circulating pump.

2.5. Electrical systems

2.5.1. Lighting

Interior Lighting – The R. Impreveduto Towers building contains mostly of inefficient T12 fluorescent fixtures with magnetic ballasts for general areas and common spaces such as hallways, stairwells and first and twelfth floor common areas. There are approximately 62 inefficient fluorescent fixtures in common areas that should be upgraded to T8 fluorescent fixtures with electronic ballasts. There were also approximately 266 incandescent or other bulbs located in common areas that should be upgraded to CFLs. Tenant spaces consist of a mix of T12 fluorescent fixtures, screw-in CFLs, pin-type CFLs and incandescent bulbs. Out of 100 one bedroom apartments, SWA sampled 12 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 T12 fluorescent fixtures as well as 300 incandescent bulbs that could benefit from upgrading to more efficient CFLs within the tenant spaces. Within the building, SWA also observed 14 areas that could benefit from installing occupancy sensors; which include office areas as well as waiting areas outside of elevators on each floor.

Exit Lights – All of the exit signs were found to be efficient LED exit signs. LED exit signs are always a cost-effective option since they use such little power and operate 24 hours a day, 365 days a year. See attached existing and proposed lighting schedule in Appendix A.

Exterior Lighting - The exterior lighting surveyed revealed that there were 2 exterior fixtures that contained multi vapor lamps and 1 fixture that contains a probe-start metal halide lamp. SWA recommends upgrading the probe-start metal halide fixtures with a new pulse-start metal halide fixture.

2.5.2. Appliances

SWA performed a basic survey of appliances installed at the R. Impreveduto Towers building. Appliances, such as refrigerators, that are over 10 years of age should be replaced with newer efficient models with the Energy Star label. It is unclear when the current refrigerators were installed but according to model specifications, these units use approximately 459 kWh/year. Based on their model plate information and energy usage, these refrigerators appear to be around 10 years old and would not be cost effective to replace at this time. Newer Energy Star labeled refrigerators of similar size use as little as 315 kWh/year and should be considered when it is time to upgrade the existing refrigerators. 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; laundry equipment, 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 R. Impreveduto Towers building contains two elevators. These elevators were observed to be in good operating condition and would not be cost-effective to upgrade at this point in 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/Cooling	single Fan coil unit with 3kw electric heating coil with Hi, and Low speed fan (Original Equipment)	All Apartments	Whalen W420ET3	Electric	Apartment	10%
Heating/Cooling	Dx rooftop unit, multi stage electric heat 13.5 – 54 Kw	Rooftop	Trane SPCC-C106-A	Electric	Community room	7%
Heating/Cooling	a 6 ton Trane Dx rooftop unit with (2) stages of electric heat 13.5 / 18 Kw	Rooftop	Trane WSCO72ARGA 04'	Electric	Exercise Room	75%
Heating/Cooling	20 ton Snyder General-Air Cooled compressor	Rooftop	Snyder General # RCS020BY	Electric	Common spaces, corridors	7%
	Make up air is provided by a SnyderGeneral Roofpak -100 % outside air Air Handler equipped with a 1,050 MBH natural gas fired heating coil		Snyder McQuay RFS0209A	Natural Gas		
Heating	Space Heater- (3) @ 2 kw	Walls	Original	Electric	Corridors 4th - 12th	50%
Heating	Space Heater- (2) @ 1.25 kw	Walls	Original	Electric	Corridors 2nd-3rd	50%
Heating	Space Heater- (1) @ 1.5 kw	Walls	Original	Electric	Corridors 2nd-3rd	50%
Heating	Space Heater- (1) @ 1.25 kw	Walls	Original	Electric	Corridors 1st floor	50%
Heating	Space Heater- (1) @ 2 kw	Walls	Original	Electric	Lobby 1st floor	50%
Heating	Space Heater- (2) @ 2 kw	Walls	Original	Electric	Ground floor	50%
Heating	Space Heater- (1) @ 3 kw	Server room		Electric	Server Room	50%
Heating	Space Heater- (1) @ 3 kw	Elevator Room		Electric	Elevator Room	50%
Cooling	20 Ton air cooled chiller	Rooftop	Snyder McQuay RCS020BY	Electric	Common spaces, corridors	5%
Cooling	Through the wall unit	Server room	Kenmore #580	Electric	Server Room	75%
Cooling	one Mitsubishi split system model 1 ½ tons and 18,600 Btuh of electric heat	Lobby and outside lobby	Mitsubishi MR SLIM PKH18EK	Electric	Lobby	50%
Chilled Water	75 Ton Carrier chiller via a 2 pipe system that utilizes three 101 gpm - 3hp circulating pumps running 2 at a time with a manual lead / lag selector switch	Behind Building	Carrier 30GB075080	Electric	Building	5%

Ventilation	Elevator room exhaust damper actuator	Elevator Room	Honeywell/ML4 115A1009	Electric	Elevator Room	75%
Ventilation	Kitchen Exhaust Fans, oven range hood, 120V, 60Hz, 2 Amps, 160cfm	Apartment Kitchens	Broan-Nu-Tone #40.000-H	Electric	Apartment Kitchens	50%
Exhaust	Roof top Exhaust Fan EF-G 1500 cfm- (Original fan)	High Rooftop	Penn Ventilation #CB18	Electric	Kitchen Exhaust riser	10%
Exhaust	Roof top Exhaust Fan EF-H 930 cfm- (Original fan)	High Rooftop	Penn Ventilation #CB45	Electric	Bathroom Exhaust Riser	10%
Exhaust	Roof top Exhaust Fan EF-E 750 cfm- (Original fan)	Rooftop Under stairs	Penn Ventilation BB45	Electric	Bathroom Exhaust Riser	10%
Exhaust	Roof top Exhaust Fan EF-F 1500 cfm- (Original fan)	Rooftop Under stairs	Penn Ventilation #CB18	Electric	Kitchen Exhaust riser	10%
Exhaust	Roof top Exhaust Fan EF-A 750 cfm- (Replacement fan)	Rooftop Adjacent to opening	GreenHeck #GB-120-4X-QD	Electric	Bathroom Exhaust Riser	75%
Exhaust	Roof top Exhaust Fan EF-B 1500 cfm- (Replacement fan)	Rooftop Adjacent to opening	GreenHeck #GB-200-5-X	Electric	Kitchen Exhaust riser	75%
Exhaust	Roof top Exhaust Fan EF-C 1500 cfm- (Replacement fan)	Rooftop adjacent to parapet	GreenHeck #GB-200-3-X	Electric	Kitchen Exhaust riser	75%
Exhaust	Roof top Exhaust Fan EF-D 750 cfm- (Replacement fan)	Rooftop adjacent to parapet	GreenHeck #GB-120-4X	Electric	Bathroom Exhaust Riser	75%
Exhaust	Wall Mtd. Pressurization fans 3000 cfm @ 1 Hp	Stair ways	Penn Ventilator # FB 244	Electric	Stair tower Pressurization	90%
DHW	20 gal / 2500 watt water heater	Community Room	AO Smith #ELJF - 20	Electric	Community Room	50%
DHW	Individual apartment units contains (1) 30 gal / 2000 watt water heater	Apartments	AO Smith/	Electric	Apartments	20%
Circulation	Hot water circulation pump	Community Room	Dayton/5GD80	Electric	Community room	75%
Circulation	Chilled water circulation pump, 2730 RPM	Pump Room	Marathon Electric/RVH182 TTD7026DF L	Electric	Building	30%
Circulation	Water booster pumps. 2 units, 5 HP, 84.5% efficiency, 3480 RPM	Compactor Room	Grundfos #85900713	Electric	Building	30%
Circulation	Water booster pumps- 3450RPM	Compactor Room	Baldor #64Z0013	Electric	Building	30%

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 R. Impreveduto Towers 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 – Re-seal current windows with proper caulk and weather-stripping. It is recommended that each window is completely re-sealed to provide a proper seal between the window frame and exterior wall and also between the window and window frame.

- Install Energy Star roof with increased rigid insulation – SWA recommends to increase the amount of rigid insulation on the roof to 6 inches if any major roof renovations are undertaken. In addition, the building could benefit from installing a light-colored, reflective roof surface to prevent solar radiation from penetrating the building and increasing the load on air-conditioners during winter.

Category II Recommendations: Operations and Maintenance

- Install wrap insulation around DHW heater – SWA observed that the AO Smith domestic hot water tank could benefit from wrapping with blanket insulation. Installing insulation to the DHW heater will help prevent standby losses.

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

- Provide weather stripping / air sealing – SWA observed that all windows and doors had proper weather-stripping and air sealing due to their age. 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) 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 programmable thermostat for split-system unit
2	Install 566 new CFL lamps
3	Install 14 occupancy sensors
	Description of Recommended 5-10 Year Payback ECMs
4	Replace 20 ton air-cooled condenser and associate AHU
	Description of Recommended End of Life Cycle ECMs
5	Install 162 new T8 fixtures
6	Install 1 new Pulse Start Metal Halide
7	Replace 75 ton chiller

ECM#1: Install programmable thermostat for split-system unit

Description:

Currently, the Mr. Slim split system provides cooling and heating for the lobby and is controlled by a non-setback thermostat. It would be beneficial to install a 7-day programmable set back thermostat to replace this unit. This thermostat would automatically provide a set back for the cooling and heating during off hours providing energy savings.

Installation cost:

Estimated installed cost: $195
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 programmable thermostat for split-system unit	RS Means	195	0	195	5,493	0.0	0	0.2	0	862	15	10,148	0.2	5104.1	340.3	442.2	10,100	9,835

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 cooling would not be used at night, when the lobby was unoccupied.

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: *Install 566 new CFL lamps*

Description:

The R. Impreveduto Towers building contains 100 apartments that each contains 3 incandescent bulbs that can be upgraded to CFL. In addition, there were 266 other lamps throughout the building that could reduce energy by being upgraded to energy efficient CFLs. SWA recommends replacing each incandescent bulb with an equivalent CFL. See Appendix A for complete lighting schedule and analysis.

Installation cost:

Estimated installed cost: $49,077
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
2	Install 566 new CFL lamps	RSMeans	49,077	0	49,077	103,542	21.6	0	3.7	3,351	19,607	5	89,284	2.5	81.9	16.4	28.6	40,718	185,392

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#3: *Install 14 occupancy sensors*

Description:

Based on field observations, there are 14 areas within the R. Impreveduto Towers building that would benefit from the installation of occupancy sensors. SWA recommends that these 14 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: $2,800
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 14 occupancy sensors	RS Means	3,080	280	2,800	2,248	0.5	0	0.1	293	646	15	7,601	4.3	171.5	11.4	21.9	4,911	4,025

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 $280.

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: *Replace 20 ton air-cooled condenser and associated AHU*

Description:

A 20 ton Snyder General split system model #RCS020BY, 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 no longer be sold, as they are being replaced with units that use Puron refrigerant. These units have higher Seasonal Energy Efficiency Ratios (SEERs), but new air handlers must also be purchased to accommodate the new refrigerant. Units with SEERs of 12 are available. The associated air handler also provides 360 MBH of heating.

Installation cost:

Estimated installed cost: $83,160
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	Replace 20 ton air-cooled condenser and associate AHU	RSMeans	85,000	1,840	83,160	11,703	2.4	5,774	6.5	0	9,863	15	116,061	8.4	39.6	2.6	8.2	34,587	84,601

Assumptions: Using the facility's electric billing and usage data, the cost of electricity was determined to be $0.157 per kWh. Due to the unit's age and condition, the current SEER was estimated to be about 8. The number of annual degree-days and the 0.4% cooling dry-bulb temperature, provided by ASHRAE, were 864 degree days and 91ºF, respectively. ASHRAE also listed the 99.6% heating dry bulb temperature to be 10ºF, and the number of heating degree days to be 5,034.

Rebates / financial incentives:
NJ Clean Energy – Electric Unitary HVAC – Unitary AC and split systems ($73-$92 per ton)

Maximum incentive amount is $1,840.

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 162 new T8 fluorescent fixtures*

Description:

The R. Impreveduto Towers building currently contains 162 inefficient T12 fluorescent fixtures with magnetic ballasts. Each apartment unit in the building contains one T12 fluorescent fixture with magnetic ballast in the kitchen area. Also, some T12 lighting still exists throughout the common areas. 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: $30,022
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 162 new T8 fluorescent fixtures	RSMeans	34,882	4,860	30,022	6,338	1.3	0	0.2	1,036	2,031	15	23,900	14.8	-20.4	-1.4	0.2	-5,775	11,348

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 $4,860.

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 1 new Pulse Start Metal Halide fixtures*

Description:

The R. Impreveduto Towers building currently contains 1 exterior probe start metal halide fixture that is older and consumes an unnecessary amount of power. SWA recommends upgrading the probe-start metal halide to a pulse-start metal halide. A complete lighting schedule has been attached in Appendix A of this report.

Installation cost:

Estimated installed cost: $780
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
6	Install 1 new pulse start metal halide fixture	RSMeans	805	25	780	145	0.0	0	0.0	22	45	15	527	17.4	-32.5	-2.2	-1.8	-246	260

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 $25.

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: *Replace 75 ton chiller*

Description:

A 75-ton Carrier chiller, with model #30GB075080, is nearing its useful life and is in poor condition. It is recommended that the chiller be replaced with a more efficient unit that uses Puron refrigerant. Units with EERs of 10.5 (about 12 SEER) are available.

Installation cost:

Estimated installed cost: $173,050
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
7	Replace 75 ton chiller	Contractor	175,000	3,900	173,050	48,505	10.1	0	1.7	0	7,615	25	129,699	22.5	-24.2	-1.0	0.8	-38,494	86,848

Assumptions: Using the facility's electric billing and usage data, the cost of electricity was determined to be $0.157 per kWh. Due to the unit's age and condition, the current SEER 8, was estimated to be 80% of the original SEER, which was about 10. The number of annual degree-days and the 0.4% cooling dry-bulb temperature, provided by ASHRAE, were 864 degree days and 91ºF, respectively. ASHRAE also listed the 99.6% heating dry bulb temperature to be 10ºF, and the number of heating degree days to be 5,034.

Rebates / financial incentives:
NJ Clean Energy Electric Chillers – Air-cooled chillers ($8-$52 per ton)
Maximum incentive amount is $3,900.

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

Photovoltaic (PV) technology would not be feasible or cost beneficial to this project since there is virtually no roof space and very little unobstructed southern exposure on the site.

5.4. Solar Thermal Collectors

Solar thermal collectors are not recommended for this project because they would require modification to the existing domestic hot water system 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 electric metering and individual electric DHW makers configuration.

5.6. Geothermal

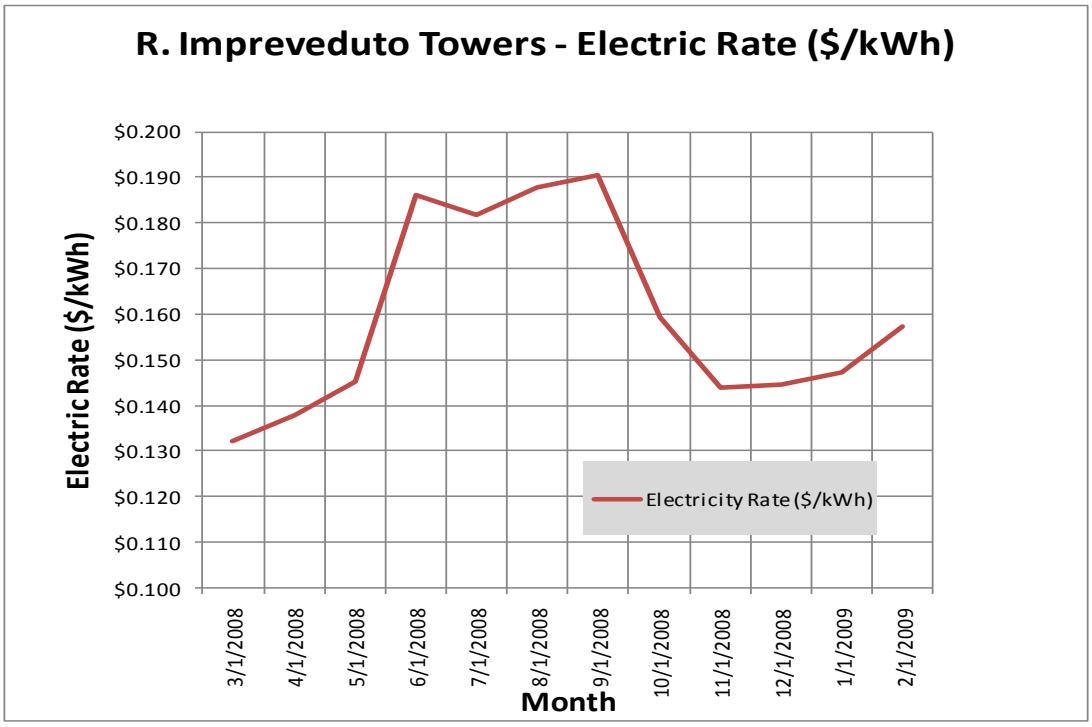
Geothermal is not applicable for this building because it would require significant modifications to the existing HVAC system, which would not be cost effective. Additionally, the land area available is not suitable for vertical closed loop or large enough to install the necessary underground infrastructure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

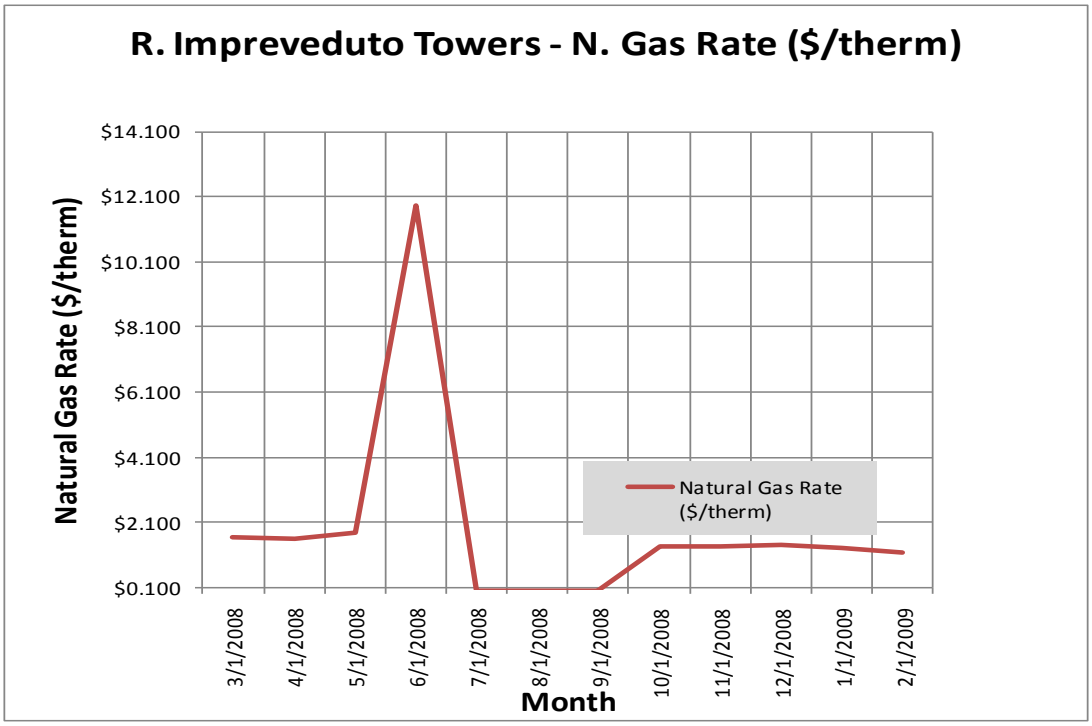
6. ENERGY PURCHASING AND PROCUREMENT STRATEGIES

6.1. Energy Purchasing

The R. Impreveduto Towers building 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 common areas and individual meters for each tenant space 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 31% over the most recent 12 month period. Natural gas bill analysis shows fluctuations up to 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 R. Impreveduto Towers is $.157/kWh, which means there is a potential cost savings of $1,997 per year. The current natural gas rate for the R. Impreveduto Towers building is $1.39/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 Secaucus Housing Authority 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 R. Impreveduto Towers building. 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 R. Impreveduto Towers 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	Identification / Room	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	2	Laundry Room	Recessed	M	4'T12	4	2	40	S	8.0	365	15	335	1,110	T8	Recessed	4'T8	E	OS	4	2	32	6.0	365	6	262	613	292	204	496
2	1	Storage Room	Screw-in	N	Inc	2	1	60	S	2.0	365	0	120	88	CFL	Screw-in	CFL	N	S	2	1	20	2.0	365	0	40	29	58	0	58
3	2	Storage Room	Screw-in	N	Inc	2	1	60	S	2.0	365	0	120	88	CFL	Screw-in	CFL	N	S	2	1	20	2.0	365	0	40	29	58	0	58
4	3	Storage Room	Screw-in	N	Inc	2	1	60	S	2.0	365	0	120	88	CFL	Screw-in	CFL	N	S	2	1	20	2.0	365	0	40	29	58	0	58
5	4	Storage Room	Screw-in	N	Inc	2	1	60	S	2.0	365	0	120	88	CFL	Screw-in	CFL	N	S	2	1	20	2.0	365	0	40	29	58	0	58
6	5	Storage Room	Screw-in	N	Inc	2	1	60	S	2.0	365	0	120	88	CFL	Screw-in	CFL	N	S	2	1	20	2.0	365	0	40	29	58	0	58
7	6	Storage Room	Screw-in	N	Inc	2	1	60	S	2.0	365	0	120	88	CFL	Screw-in	CFL	N	S	2	1	20	2.0	365	0	40	29	58	0	58
8	7	Storage Room	Screw-in	N	Inc	2	1	60	S	2.0	365	0	120	88	CFL	Screw-in	CFL	N	S	2	1	20	2.0	365	0	40	29	58	0	58
9	8	Storage Room	Screw-in	N	Inc	2	1	60	S	2.0	365	0	120	88	CFL	Screw-in	CFL	N	S	2	1	20	2.0	365	0	40	29	58	0	58
10	9	Storage Room	Screw-in	N	Inc	2	1	60	S	2.0	365	0	120	88	CFL	Screw-in	CFL	N	S	2	1	20	2.0	365	0	40	29	58	0	58
11	10	Storage Room	Screw-in	N	Inc	2	1	60	S	2.0	365	0	120	88	CFL	Screw-in	CFL	N	S	2	1	20	2.0	365	0	40	29	58	0	58
12	11	Storage Room	Screw-in	N	Inc	2	1	60	S	2.0	365	0	120	88	CFL	Screw-in	CFL	N	S	2	1	20	2.0	365	0	40	29	58	0	58
13	12	Storage Room	Screw-in	N	Inc	2	1	60	S	2.0	365	0	120	88	CFL	Screw-in	CFL	N	S	2	1	20	2.0	365	0	40	29	58	0	58
14	1	Hallway	Parabolic	M	4'T12	1	3	40	S	8.0	365	20	140	409	T8	Parabolic	4'T8	E	S	1	3	32	8.0	365	10	106	310	99	0	99
15	2	Hallway	Parabolic	M	4'T12	1	3	40	S	8.0	365	20	140	409	T8	Parabolic	4'T8	E	S	1	3	32	8.0	365	10	106	310	99	0	99
16	3	Hallway	Parabolic	M	4'T12	1	3	40	S	8.0	365	20	140	409	T8	Parabolic	4'T8	E	S	1	3	32	8.0	365	10	106	310	99	0	99
17	4	Hallway	Parabolic	M	4'T12	1	3	40	S	8.0	365	20	140	409	T8	Parabolic	4'T8	E	S	1	3	32	8.0	365	10	106	310	99	0	99
18	5	Hallway	Parabolic	M	4'T12	1	3	40	S	8.0	365	20	140	409	T8	Parabolic	4'T8	E	S	1	3	32	8.0	365	10	106	310	99	0	99
19	6	Hallway	Parabolic	M	4'T12	1	3	40	S	8.0	365	20	140	409	T8	Parabolic	4'T8	E	S	1	3	32	8.0	365	10	106	310	99	0	99
20	7	Hallway	Parabolic	M	4'T12	1	3	40	S	8.0	365	20	140	409	T8	Parabolic	4'T8	E	S	1	3	32	8.0	365	10	106	310	99	0	99
21	8	Hallway	Parabolic	M	4'T12	1	3	40	S	8.0	365	20	140	409	T8	Parabolic	4'T8	E	S	1	3	32	8.0	365	10	106	310	99	0	99
22	9	Hallway	Parabolic	M	4'T12	1	3	40	S	8.0	365	20	140	409	T8	Parabolic	4'T8	E	S	1	3	32	8.0	365	10	106	310	99	0	99
23	10	Hallway	Parabolic	M	4'T12	1	3	40	S	8.0	365	20	140	409	T8	Parabolic	4'T8	E	S	1	3	32	8.0	365	10	106	310	99	0	99
24	11	Hallway	Parabolic	M	4'T12	1	3	40	S	8.0	365	20	140	409	T8	Parabolic	4'T8	E	S	1	3	32	8.0	365	10	106	310	99	0	99
25	12	Hallway	Parabolic	M	4'T12	1	3	40	S	8.0	365	20	140	409	T8	Parabolic	4'T8	E	S	1	3	32	8.0	365	10	106	310	99	0	99
26	1	Outside of Storage Room	Screw-in	N	Inc	1	1	60	S	24.0	365	0	60	526	CFL	Screw-in	CFL	N	S	1	1	20	24.0	365	0	20	175	350	0	350

27	2	Outside of Storage Room	Screw-in	N	Inc	1	1	60	S	24.0	365	0	60	526	CFL	Screw-in	CFL	N	S	1	1	20	24.0	365	0	20	175	350	0	350
28	3	Outside of Storage Room	Screw-in	N	Inc	1	1	60	S	24.0	365	0	60	526	CFL	Screw-in	CFL	N	S	1	1	20	24.0	365	0	20	175	350	0	350
29	4	Outside of Storage Room	Screw-in	N	Inc	1	1	60	S	24.0	365	0	60	526	CFL	Screw-in	CFL	N	S	1	1	20	24.0	365	0	20	175	350	0	350
30	5	Outside of Storage Room	Screw-in	N	Inc	1	1	60	S	24.0	365	0	60	526	CFL	Screw-in	CFL	N	S	1	1	20	24.0	365	0	20	175	350	0	350
31	6	Outside of Storage Room	Screw-in	N	Inc	1	1	60	S	24.0	365	0	60	526	CFL	Screw-in	CFL	N	S	1	1	20	24.0	365	0	20	175	350	0	350
32	7	Outside of Storage Room	Screw-in	N	Inc	1	1	60	S	24.0	365	0	60	526	CFL	Screw-in	CFL	N	S	1	1	20	24.0	365	0	20	175	350	0	350
33	8	Outside of Storage Room	Screw-in	N	Inc	1	1	60	S	24.0	365	0	60	526	CFL	Screw-in	CFL	N	S	1	1	20	24.0	365	0	20	175	350	0	350
34	9	Outside of Storage Room	Screw-in	N	Inc	1	1	60	S	24.0	365	0	60	526	CFL	Screw-in	CFL	N	S	1	1	20	24.0	365	0	20	175	350	0	350
35	10	Outside of Storage Room	Screw-in	N	Inc	1	1	60	S	24.0	365	0	60	526	CFL	Screw-in	CFL	N	S	1	1	20	24.0	365	0	20	175	350	0	350
36	11	Outside of Storage Room	Screw-in	N	Inc	1	1	60	S	24.0	365	0	60	526	CFL	Screw-in	CFL	N	S	1	1	20	24.0	365	0	20	175	350	0	350
37	12	Outside of Storage Room	Screw-in	N	Inc	1	1	60	S	24.0	365	0	60	526	CFL	Screw-in	CFL	N	S	1	1	20	24.0	365	0	20	175	350	0	350
38	1	Outside of Elevators	Recessed	M	4'T12	3	2	40	S	8.0	365	15	255	832	T8	Recessed	4'T8	E	OS	3	2	32	6.0	365	6	198	460	219	153	372
39	2	Outside of Elevators	Recessed	M	4'T12	3	2	40	S	8.0	365	15	255	832	T8	Recessed	4'T8	E	OS	3	2	32	6.0	365	6	198	460	219	153	372
40	3	Outside of Elevators	Recessed	M	4'T12	3	2	40	S	8.0	365	15	255	832	T8	Recessed	4'T8	E	OS	3	2	32	6.0	365	6	198	460	219	153	372
41	4	Outside of Elevators	Recessed	M	4'T12	3	2	40	S	8.0	365	15	255	832	T8	Recessed	4'T8	E	OS	3	2	32	6.0	365	6	198	460	219	153	372
42	5	Outside of Elevators	Recessed	M	4'T12	3	2	40	S	8.0	365	15	255	832	T8	Recessed	4'T8	E	OS	3	2	32	6.0	365	6	198	460	219	153	372
43	6	Outside of Elevators	Recessed	M	4'T12	3	2	40	S	8.0	365	15	255	832	T8	Recessed	4'T8	E	OS	3	2	32	6.0	365	6	198	460	219	153	372
44	7	Outside of Elevators	Recessed	M	4'T12	3	2	40	S	8.0	365	15	255	832	T8	Recessed	4'T8	E	OS	3	2	32	6.0	365	6	198	460	219	153	372
45	8	Outside of Elevators	Recessed	M	4'T12	3	2	40	S	8.0	365	15	255	832	T8	Recessed	4'T8	E	OS	3	2	32	6.0	365	6	198	460	219	153	372
46	9	Outside of Elevators	Recessed	M	4'T12	3	2	40	S	8.0	365	15	255	832	T8	Recessed	4'T8	E	OS	3	2	32	6.0	365	6	198	460	219	153	372
47	10	Outside of Elevators	Recessed	M	4'T12	3	2	40	S	8.0	365	15	255	832	T8	Recessed	4'T8	E	OS	3	2	32	6.0	365	6	198	460	219	153	372
48	11	Outside of Elevators	Recessed	M	4'T12	3	2	40	S	8.0	365	15	255	832	T8	Recessed	4'T8	E	OS	3	2	32	6.0	365	6	198	460	219	153	372
49	12	Outside of Elevators	Recessed	M	4'T12	3	2	40	S	8.0	365	15	255	832	T8	Recessed	4'T8	E	OS	3	2	32	6.0	365	6	198	460	219	153	372
50	1	Outside of Stairwells	Screw-in	N	Inc	2	1	60	S	24.0	365	0	120	1,051	CFL	Screw-in	CFL	N	S	2	1	20	24.0	365	0	40	350	701	0	701
51	2	Outside of Stairwells	Screw-in	N	Inc	2	1	60	S	24.0	365	0	120	1,051	CFL	Screw-in	CFL	N	S	2	1	20	24.0	365	0	40	350	701	0	701
52	3	Outside of Stairwells	Screw-in	N	Inc	2	1	60	S	24.0	365	0	120	1,051	CFL	Screw-in	CFL	N	S	2	1	20	24.0	365	0	40	350	701	0	701
53	4	Outside of Stairwells	Screw-in	N	Inc	2	1	60	S	24.0	365	0	120	1,051	CFL	Screw-in	CFL	N	S	2	1	20	24.0	365	0	40	350	701	0	701
54	5	Outside of Stairwells	Screw-in	N	Inc	2	1	60	S	24.0	365	0	120	1,051	CFL	Screw-in	CFL	N	S	2	1	20	24.0	365	0	40	350	701	0	701
55	6	Outside of Stairwells	Screw-in	N	Inc	2	1	60	S	24.0	365	0	120	1,051	CFL	Screw-in	CFL	N	S	2	1	20	24.0	365	0	40	350	701	0	701
56	7	Outside of Stairwells	Screw-in	N	Inc	2	1	60	S	24.0	365	0	120	1,051	CFL	Screw-in	CFL	N	S	2	1	20	24.0	365	0	40	350	701	0	701
57	8	Outside of Stairwells	Screw-in	N	Inc	2	1	60	S	24.0	365	0	120	1,051	CFL	Screw-in	CFL	N	S	2	1	20	24.0	365	0	40	350	701	0	701
58	9	Outside of Stairwells	Screw-in	N	Inc	2	1	60	S	24.0	365	0	120	1,051	CFL	Screw-in	CFL	N	S	2	1	20	24.0	365	0	40	350	701	0	701
59	10	Outside of Stairwells	Screw-in	N	Inc	2	1	60	S	24.0	365	0	120	1,051	CFL	Screw-in	CFL	N	S	2	1	20	24.0	365	0	40	350	701	0	701
60	11	Outside of Stairwells	Screw-in	N	Inc	2	1	60	S	24.0	365	0	120	1,051	CFL	Screw-in	CFL	N	S	2	1	20	24.0	365	0	40	350	701	0	701
61	12	Outside of Stairwells	Screw-in	N	Inc	2	1	60	S	24.0	365	0	120	1,051	CFL	Screw-in	CFL	N	S	2	1	20	24.0	365	0	40	350	701	0	701
62	1	Hallway	Screw-in	N	Inc	9	1	40	S	24.0	365	0	360	3,154	CFL	Screw-in	CFL	N	S	9	1	15	24.0	365	0	135	1183	1971	0	1971
63	2	Hallway	Screw-in	N	Inc	9	1	40	S	24.0	365	0	360	3,154	CFL	Screw-in	CFL	N	S	9	1	15	24.0	365	0	135	1183	1971	0	1971
64	3	Hallway	Screw-in	N	Inc	9	1	40	S	24.0	365	0	360	3,154	CFL	Screw-in	CFL	N	S	9	1	15	24.0	365	0	135	1183	1971	0	1971
65	4	Hallway	Screw-in	N	Inc	9	1	40	S	24.0	365	0	360	3,154	CFL	Screw-in	CFL	N	S	9	1	15	24.0	365	0	135	1183	1971	0	1971
66	5	Hallway	Screw-in	N	Inc	9	1	40	S	24.0	365	0	360	3,154	CFL	Screw-in	CFL	N	S	9	1	15	24.0	365	0	135	1183	1971	0	1971
67	6	Hallway	Screw-in	N	Inc	9	1	40	S	24.0	365	0	360	3,154	CFL	Screw-in	CFL	N	S	9	1	15	24.0	365	0	135	1183	1971	0	1971
68	7	Hallway	Screw-in	N	Inc	9	1	40	S	24.0	365	0	360	3,154	CFL	Screw-in	CFL	N	S	9	1	15	24.0	365	0	135	1183	1971	0	1971
69	8	Hallway	Screw-in	N	Inc	9	1	40	S	24.0	365	0	360	3,154	CFL	Screw-in	CFL	N	S	9	1	15	24.0	365	0	135	1183	1971	0	1971
70	9	Hallway	Screw-in	N	Inc	9	1	40	S	24.0	365	0	360	3,154	CFL	Screw-in	CFL	N	S	9	1	15	24.0	365	0	135	1183	1971	0	1971
71	10	Hallway	Screw-in	N	Inc	9	1	40	S	24.0	365	0	360	3,154	CFL	Screw-in	CFL	N	S	9	1	15	24.0	365	0	135	1183	1971	0	1971
72	11	Hallway	Screw-in	N	Inc	9	1	40	S	24.0	365	0	360	3,154	CFL	Screw-in	CFL	N	S	9	1	15	24.0	365	0	135	1183	1971	0	1971
73	12	Hallway	Screw-in	N	Inc	9	1	40	S	24.0	365	0	360	3,154	CFL	Screw-in	CFL	N	S	9	1	15	24.0	365	0	135	1183	1971	0	1971
74	1	Hallway	Screw-in	N	Inc	8	1	30	S	24.0	365	0	240	2,102	CFL	Screw-in	CFL	N	S	8	1	10	24.0	365	0	80	701	1402	0	1402
75	2	Hallway	Screw-in	N	Inc	8	1	30	S	24.0	365	0	240	2,102	CFL	Screw-in	CFL	N	S	8	1	10	24.0	365	0	80	701	1402	0	1402
76	3	Hallway	Screw-in	N	Inc	8	1	30	S	24.0	365	0	240	2,102	CFL	Screw-in	CFL	N	S	8	1	10	24.0	365	0	80	701	1402	0	1402
77	4	Hallway	Screw-in	N	Inc	8	1	30	S	24.0	365	0	240	2,102	CFL	Screw-in	CFL	N	S	8	1	10	24.0	365	0	80	701	1402	0	1402
78	5	Hallway	Screw-in	N	Inc	8	1	30	S	24.0	365	0	240	2,102	CFL	Screw-in	CFL	N	S	8	1	10	24.0	365	0	80	701	1402	0	1402
79	6	Hallway	Screw-in	N	Inc	8	1	30	S	24.0	365	0	240	2,102	CFL	Screw-in	CFL	N	S	8	1	10	24.0	365	0	80	701	1402	0	1402
80	7	Hallway	Screw-in	N	Inc	8	1	30	S	24.0	365	0	240	2,102	CFL	Screw-in	CFL	N	S	8	1	10	24.0	365	0	80	701	1402	0	1402

81	8	Hallway	Screw-in	N	Inc	8	1	30	S	24.0	365	0	240	2,102	CFL	Screw-in	CFL	N	S	8	1	10	24.0	365	0	80	701	1402	0	1402
82	9	Hallway	Screw-in	N	Inc	8	1	30	S	24.0	365	0	240	2,102	CFL	Screw-in	CFL	N	S	8	1	10	24.0	365	0	80	701	1402	0	1402
83	10	Hallway	Screw-in	N	Inc	8	1	30	S	24.0	365	0	240	2,102	CFL	Screw-in	CFL	N	S	8	1	10	24.0	365	0	80	701	1402	0	1402
84	11	Hallway	Screw-in	N	Inc	8	1	30	S	24.0	365	0	240	2,102	CFL	Screw-in	CFL	N	S	8	1	10	24.0	365	0	80	701	1402	0	1402
85	12	Hallway	Screw-in	N	Inc	8	1	30	S	24.0	365	0	240	2,102	CFL	Screw-in	CFL	N	S	8	1	10	24.0	365	0	80	701	1402	0	1402
86	1	Hallway	Exit Sign	N	LED	1	1	5	N	24.0	365	1	6	53	N/A	Exit Sign	LED	N	N	1	1	5	24.0	365	1	6	53	0	0	0
87	2	Hallway	Exit Sign	N	LED	1	1	5	N	24.0	365	1	6	53	N/A	Exit Sign	LED	N	N	1	1	5	24.0	365	1	6	53	0	0	0
88	3	Hallway	Exit Sign	N	LED	1	1	5	N	24.0	365	1	6	53	N/A	Exit Sign	LED	N	N	1	1	5	24.0	365	1	6	53	0	0	0
89	4	Hallway	Exit Sign	N	LED	1	1	5	N	24.0	365	1	6	53	N/A	Exit Sign	LED	N	N	1	1	5	24.0	365	1	6	53	0	0	0
90	5	Hallway	Exit Sign	N	LED	1	1	5	N	24.0	365	1	6	53	N/A	Exit Sign	LED	N	N	1	1	5	24.0	365	1	6	53	0	0	0
91	6	Hallway	Exit Sign	N	LED	1	1	5	N	24.0	365	1	6	53	N/A	Exit Sign	LED	N	N	1	1	5	24.0	365	1	6	53	0	0	0
92	7	Hallway	Exit Sign	N	LED	1	1	5	N	24.0	365	1	6	53	N/A	Exit Sign	LED	N	N	1	1	5	24.0	365	1	6	53	0	0	0
93	8	Hallway	Exit Sign	N	LED	1	1	5	N	24.0	365	1	6	53	N/A	Exit Sign	LED	N	N	1	1	5	24.0	365	1	6	53	0	0	0
94	9	Hallway	Exit Sign	N	LED	1	1	5	N	24.0	365	1	6	53	N/A	Exit Sign	LED	N	N	1	1	5	24.0	365	1	6	53	0	0	0
95	10	Hallway	Exit Sign	N	LED	1	1	5	N	24.0	365	1	6	53	N/A	Exit Sign	LED	N	N	1	1	5	24.0	365	1	6	53	0	0	0
96	11	Hallway	Exit Sign	N	LED	1	1	5	N	24.0	365	1	6	53	N/A	Exit Sign	LED	N	N	1	1	5	24.0	365	1	6	53	0	0	0
97	12	Hallway	Exit Sign	N	LED	1	1	5	N	24.0	365	1	6	53	N/A	Exit Sign	LED	N	N	1	1	5	24.0	365	1	6	53	0	0	0
98	1	Elevator Lobby	Screw-in	N	CFL	6	1	60	N	24.0	365	0	360	3,154	N/A	Screw-in	CFL	N	N	6	1	60	24.0	365	0	360	3154	0	0	0
99	1	Office	Recessed	M	4'T12	4	2	40	S	8.0	365	15	335	1,110	T8	Recessed	4'T8	E	OS	4	2	32	6.0	365	6	262	613	292	204	496
100	1	Generator Room	Recessed	M	4'T12	6	2	40	S	2.0	365	15	495	416	T8	Recessed	4'T8	E	S	6	2	32	2.0	365	6	390	307	110	0	110
101	1	Elevator	Screw-in	N	CFL	1	1	19	N	24.0	365	0	19	166	N/A	Screw-in	CFL	N	N	1	1	19	24.0	365	0	19	166	0	0	0
102	WB	Typ. Dwelling Unit Kitchen	Parabolic	M	4'T12	100	2	40	S	2.0	365	15	8,015	6,935	T8	Parabolic	4'T8	E	S	100	2	32	2.0	365	6	6406	5110	1825	0	1825
103	WB	Typ. Dwelling Unit Living Room	Screw-in	N	Inc	100	1	100	S	10.0	365	0	10,000	36,500	CFL	Screw-in	CFL	N	S	100	1	35	10.0	365	0	3500	12775	23725	0	23725
104	WB	Typ. Dwelling Unit Bathroom Hallway	Screw-in	N	Inc	100	1	100	S	3.0	365	0	10,000	10,950	CFL	Screw-in	CFL	N	S	100	1	35	3.0	365	0	3500	3833	7118	0	7118
105	WB	Typ. Dwelling Unit Bathroom	Screw-in	N	Inc	100	4	60	S	3.0	365	0	24,000	26,280	CFL	Screw-in	CFL	N	S	100	4	20	3.0	365	0	8000	8760	17520	0	17520
106	WB	Typ. Dwelling Unit Bathroom	Screw-in	N	Infrared	100	1	250	S	3.0	365	63	25,063	34,274	N/A	Screw-in	nfrare	N	S	100	1	250	3.0	365	63	25063	34274	0	0	0
107	Ext	Exterior	Exterior	N	MH	1	1	70	PC	12.0	365	18	88	385	PSMH	Exterior	PSMH	N	PC	1	1	45	12.0	365	10	55	241	145	0	145
108	Ext	Exterior	Exterior	N	MV	2	1	175	PC	12.0	365	44	394	1,918	CFL	Exterior	CFL	N	PC	2	1	60	12.0	365	0	120	526	1393	0	1393
Totals:						**848**	**151**	**5,014**				**617**	**94,716**	**221,765**						**848**	**151**	**2,500**				**55,437**	**109,493**	**110,024**	**2,248**	**112,273**
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 Thomall 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