ENERGY AUDIT – FINAL REPORT

WINSLOW TOWNSHIP – SENIOR CENTER

33 COOPERS FOLLY ROAD
ATCO, NJ 08004
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Township Administrator

CEG PROJECT NO. 9C09009

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I. EXECUTIVE SUMMARY

This report presents the findings of an energy audit conducted for:

Winslow Township
Senior Citizens Center
33 Coopers Folly Road
Atco, NJ 08004

Municipal Contact Person: Robert J. Castagna, Purchasing Agent

This audit was performed in connection with the New Jersey Clean Energy Local Government Energy Audit Program. These energy audits are conducted to promote the office of Clean Energy's mission, which is to use innovation and technology to solve energy and environmental problems in a way that improves the State's economy. This can be achieved through the wiser and more efficient use of energy.

The annual energy costs at this facility are as follows:

Electricity	$ 9,834
Natural Gas	$ 2,455
Total	$ 12,289

The potential annual energy cost savings are shown below in Table 1. Be aware that the measures are not additive because of the interrelation of several of the measures. The cost of each measure for this level of auditing is ± 20% until detailed engineering, specifications, and hard proposals are obtained.

Table 1
Energy Conservation Measures (ECM's)

ECM NO.	DESCRIPTION	COST	ANNUAL SAVINGS	SIMPLE PAYBACK (YEARS)	SIMPLE RETURN ON INVESTMENT
1*	Lighting Upgrade – Fluorescent Lighting	*$4,134	$555	7.5	38.3 %
2*	Lighting Upgrade – CFL Lighting	*$131	$22	6.0	49.4 %
3*	Lighting Upgrade – Lighting Controls	*$275	$109	2.5	41.7 %
4*	Replace Heating Hot Water Boiler	*$14,200	$1,336	10.6	9.4 %
5	AC Upgrade – Social Hall	$15,750	$1,934	8.1	11 %
6	AC Upgrade – Lobby, Vestibule, Office	$4,625	$551	8.4	10.5 %
7	Domestic Hot Water Heater Replacement	$2,350	$828	2.8	37.2 %
8	Retro-Commissioning	$1,080	$644	1.7	62 %
9	36.8 KW PV Solar Panel System	$331,200	$29,863	11.1	8.2 %

* ECM cost includes 1st year maintenance savings.

The estimated demand and energy savings are shown below in Table 2. The information in this table corresponds to the ECM's in Table 1.

Table 2
Estimated Energy Savings

ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECT DEMAND (KW)	ELECT CONSUMPTION (KWH)	NAT GAS (THERMS)
1	Lighting Upgrade – Fluorescent Lighting	3.29	3,269	-
2	Lighting Upgrade – CFL Lighting	0.16	128	-
3	Lighting Upgrade – Lighting Controls	-	644	-
4	Replace Heating Hot Water Boiler	-	-	820
5	AC Upgrade – Social Hall	-	11,376	-
6	AC Upgrade – Lobby, Vestibule, Office	-	3,240	-
7	Domestic Hot Water Heater Replacement	6	6,240	(143)
8	Retro-Commissioning	-	2,890	267
9	36.8 KW PV Solar Panel System	36.8	57,428	-

Recommendations:

Concord Engineering Group recommends the implementation of all ECM's that provide a calculated simple payback at or under seven (7) years. The potential energy and cost savings from these ECM's are economically justifiable. The following Energy Conservation Measures are recommended for the Winslow Township, Senior Citizens Center:

- **ECM #1:** Interior T-8 Fluorescent Lighting Upgrades
- **ECM #2:** Install Compact Fluorescent Lamps
- **ECM #3:** Interior Lighting Controls – Occupancy Sensors
- **ECM #7:** Domestic Hot Water Heater Replacement
- **ECM #8:** Retro-Commissioning

II. INTRODUCTION

This comprehensive energy audit covers the 7,200 square foot Senior Citizens Center that includes; social hall, administrative offices, kitchen, restrooms, mechanical room and storage.

The first task was to collect and review one year's worth of utility energy data for electricity and natural gas. This information was used to analyze operational characteristics, calculate energy benchmarks for comparison to industry averages, estimate savings potential, and establish a baseline to monitor the effectiveness of implemented measures. A computer spreadsheet was used to enter, sum, and calculate benchmarks and to graph utility information (see Appendix A).

The Energy Use Intensity (EUI) is expressed in British Thermal Units/square foot/year (BTU/ft^2/yr) and can be used to compare energy consumption to similar building types or to track consumption from year to year in the same building. The EUI is calculated by converting annual consumption of all fuels to BTU's then dividing by the area (gross square footage) of the building. EUI is a good indicator of the relative potential for energy savings. A comparatively low EUI indicates less potential for large energy savings. Blueprints (where available) were obtained from the municipality and were utilized to calculate/verify the gross area of the facility.

After gathering the utility data and calculating the EUI, the next step in the audit process is obtaining Architectural and Engineering drawings (where available). By reviewing the Architectural and Engineering drawings, questions regarding the building envelope, lighting systems/controls, HVAC equipment and controls are noted. These questions are then compared to the energy usage profiles developed during the utility data gathering step. Furthermore, through the review of the architectural and engineering drawings a building profile can be defined that documents building age, type, usage, major energy consuming equipment or systems, etc. After this information is gathered the next step in the process is the site visit.

The site visit was spent inspecting the actual systems and answering specific questions from the preliminary review. The building manager provided occupancy schedules, O & M practices, the building energy management program, and other information that has an impact on energy consumption.

The post-site work includes evaluation of the information gathered during the site visit, researching possible conservation opportunities, organizing the audit into a comprehensive report, and making recommendations on mechanical, lighting and building envelope improvements.

III. METHOD OF ANALYSIS

CEG completed the preliminary audit tasks noted in Section II preparing for the site survey. The site survey is a critical input in deciphering where energy opportunities exist within a facility. The auditor walks the entire site to inventory the building envelope (roof, windows, etc.), the heating, ventilation, and air conditioning equipment (HVAC), the lighting equipment, other facility-specific equipment, and to gain an understanding of how each facility is used.

The collected data is then processed using energy engineering calculations to calculate the anticipated energy usage for the proposed energy conservation measures (ECM's). The actual energy usage is entered directly from the utility bills provided by the Owner. The anticipated energy usage is compared to the actual usage to determine energy savings for the proposed ECM's.

It is pertinent to note, that the savings noted in this report are not duplicative. The savings for each recommendation may actually be higher if the individual recommendations were installed instead of the entire project. For example, the lighting module calculates the change in wattage and multiplies it by the new operating hours instead of the existing operating hours (if there was a change in the hours at all). The lighting controls module calculates the change in hours and multiplies it by the new system wattage instead of the existing wattage. Therefore, if you chose to install the recommended lighting system but not the lighting controls, the savings achieved with the new lighting system would actually be higher because there would have been no reduction in the hours of use.

The same principal follows for heating, cooling, and temperature recommendations – even with fuel switching. If there are recommendations to change the temperature settings to reduce fuel use, then the savings for the heating/cooling equipment recommendations are reduced, as well.

Our thermal module calculates the savings for temperature reductions utilizing automated engineering calculations within Microsoft Excel™ spreadsheets. The savings are calculated in "output" values – meaning energy, not fuel savings. To show fuel savings we multiply the energy values times the fuel conversion factor (these factors are different for electricity, natural gas, fuel oil, etc.) and also take into account the heating/cooling equipment efficiency. The temperature recommendation savings are lower when the heating/cooling equipment is more efficient or is using a cheaper fuel.

Thermal recommendations (insulation, windows, etc.) are evaluated by taking the difference in the thermal load due to reduced heat transfer. Again, the "thermal load" is the thermal load after the other recommendations have been accounted for.

Lastly, installation costs, refer to Appendix B, are then applied to each recommendation and simple paybacks are calculated. Costs are derived from Means Cost Data, other industry publications, and local contractors and suppliers. The NJ SmartStart Building® program incentives (refer to Appendix C) are calculated for the appropriate ECM's and subtracted from the installed cost prior to calculation of the simple payback. In addition, where applicable, maintenance cost savings are estimated and applied to the net savings. Simple return on

investment is calculated using the standard formula of the difference of gains minus investments, divided by the investments. Included within the gains are the annual energy savings, utility incentives and maintenance savings as a total sum. The calculation is completed assuming the project is 100% direct purchased by the Owner with an energy cost escalation of 2.4% for natural gas and 2.2% for electricity.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

Table 3 and Figure 1 represent the electrical usage for the surveyed facility from April-08 to March-09. Atlantic City Electric provides electricity to the facility under the MGS / Monthly General Service Rate Schedule. This electric rate has a component for consumption that is measured in kilowatt-hours (kWh). It is calculated by multiplying the wattage of the equipment times the hours that it operates. For example, a 1,000 Watt lamp operating for 5 hours would measure 5,000 Watt-hours. Since one kilowatt is equal to 1,000 Watts, the measured consumption would be 5 kWh. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the most current rate structure available.

Table 4 and Figure 2 show the natural gas energy usage for the surveyed Annex Building from April-08 to March-09. Woodruff Energy supplies the natural gas and South Jersey Gas delivers the fuel to the burner at the facility under the GSG / General Service, firm transportation rate. Below is the average unit cost for the utilities at this facility.

Description	Average
Electricity	17¢/kWh
Natural Gas	$1.63/Therm

Table 3
Electricity Billing Data

Senior Center Monthly General Service

Provider	Month	Start Date	End Date	Account	Utility Type	Billing Days	Peak Demand	Units	Load Factor (%)	Total Consumption	Units	Supply Charge	Delivery Charge	Total $
Atlantic City Electric	April	3/17/2008	4/16/2008	1037 0669 9990	Electric	30	18.95	kw	36.00%	4912	kwh	$ 481.01	$ 289.32	$ 770.33
Atlantic City Electric	May	4/16/2008	5/15/2008	1037 0669 9990	Electric	29	18.99	kw	29.58%	3909	kwh	$ 391.95	$ 242.78	$ 634.73
Atlantic City Electric	June	5/15/2008	6/16/2008	1037 0669 9990	Electric	32	22	kw	31.45%	5313	kwh	$ 646.54	$ 294.99	$ 941.53
Atlantic City Electric	July	6/16/2008	7/16/2008	1037 0669 9990	Electric	30	23.68	kw	39.41%	6719	kwh	$ 948.32	$ 308.56	$ 1,256.88
Atlantic City Electric	August	7/16/2008	8/14/2008	1037 0669 9990	Electric	29	24.3	kw	37.09%	6273	kwh	$ 889.81	$ 294.38	$ 1,184.19
Atlantic City Electric	September	8/14/2008	9/15/2008	1037 0669 9990	Electric	32	24.73	kw	26.20%	4977	kwh	$ 648.63	$ 273.45	$ 922.08
Atlantic City Electric	October	9/15/2008	10/16/2008	1037 0669 9990	Electric	31	18.05	kw	25.71%	3452	kwh	$ 402.05	$ 190.86	$ 592.91
Atlantic City Electric	November	10/16/2008	11/13/2008	1037 0669 9990	Electric	28	14.68	kw	40.58%	4003	kwh	$ 448.42	$ 163.66	$ 612.08
Atlantic City Electric	December	11/13/2008	12/15/2008	1037 0669 9990	Electric	32	18.44	kw	30.96%	4384	kwh	$ 505.09	$ 197.59	$ 702.68
Atlantic City Electric	January	12/15/2008	1/15/2009	1037 0669 9990	Electric	31	20.46	kw	32.51%	4948	kwh	$ 570.19	$ 219.17	$ 789.36
Atlantic City Electric	February	1/15/2009	2/13/2009	1037 0669 9990	Electric	29	20.27	kw	31.82%	4489	kwh	$ 519.85	$ 200.40	$ 720.25
Atlantic City Electric	March	2/13/2009	3/17/2009	1037 0669 9990	Electric	32	17.84	kw	32.34%	4431	kwh	$ 510.80	$ 196.45	$ 707.25
						Max Peak:	24.73	kw	Total:	57,810	kwh		Total:	$ 9,834.27
													Avg. Cost per kwh:	$ 0.17

Figure 1
Electricity Usage Profile

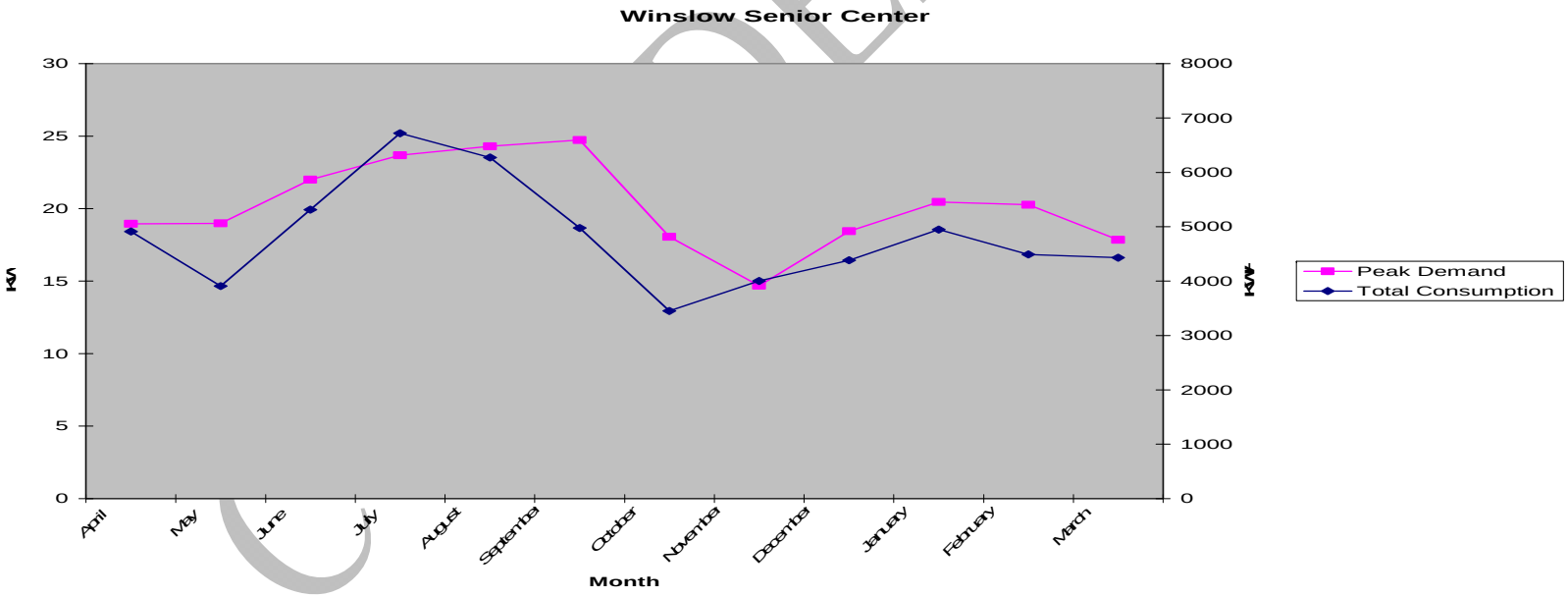
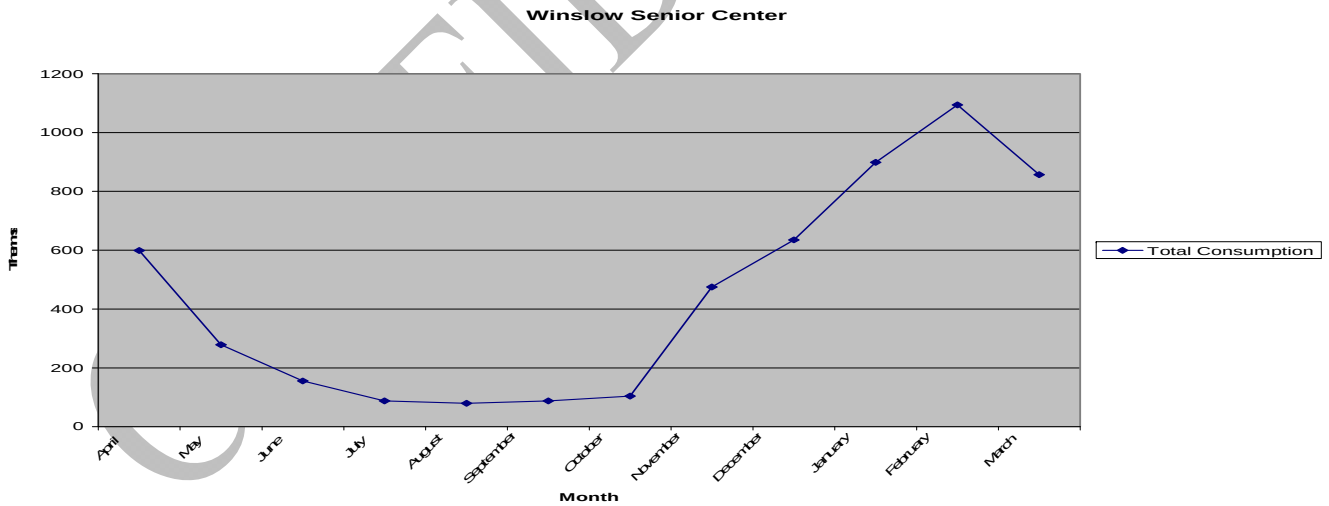


Table 4
Natural Gas Billing Data

Senior Center

Provider	Month	Start Date	End Date	Account	Utility Type	Billing Days	Consumption	Units	Total $
South Jersey Gas	April	3/17/2008	4/16/2008	2 1 9 03 4857 0 0	Gas	30	599.01	therms	$ 949.10
South Jersey Gas	May	4/16/2008	5/14/2008	2 1 9 03 4857 0 0	Gas	28	278.37	therms	$ 449.42
South Jersey Gas	June	5/14/2008	6/13/2008	2 1 9 03 4857 0 0	Gas	30	154.96	therms	$ 317.85
South Jersey Gas	July	6/13/2008	7/15/2008	2 1 9 03 4857 0 0	Gas	32	87.11	therms	$ 199.29
South Jersey Gas	August	7/15/2008	8/13/2008	2 1 9 03 4857 0 0	Gas	29	79.46	therms	$ 147.31
South Jersey Gas	September	8/13/2008	9/12/2008	2 1 9 03 4857 0 0	Gas	30	87.38	therms	$ 153.10
South Jersey Gas	October	9/12/2008	10/15/2008	2 1 9 03 4857 0 0	Gas	33	103.6	therms	$ 170.33
South Jersey Gas	November	10/15/2008	11/13/2008	2 1 9 03 4857 0 0	Gas	29	474.72	therms	$ 651.65
South Jersey Gas	December	11/13/2008	12/12/2008	2 1 9 03 4857 0 0	Gas	29	635.07	therms	$ 1,033.11
South Jersey Gas	January	12/12/2008	1/14/2009	2 1 9 03 4857 0 0	Gas	33	898.91	therms	$ 1,465.70
South Jersey Gas	February	1/14/2009	2/12/2009	2 1 9 03 4857 0 0	Gas	29	1094.02	therms	$ 1,788.64
South Jersey Gas	March	2/12/2009	3/16/2009	2 1 9 03 4857 0 0	Gas	32	856.56	therms	$ 1,406.76
						12 Month Total:	5,349.17	therms	$ 8,732.26
						Average Cost per therm:	$ 1.63		

Figure 2
Natural Gas Usage Profile



B. Energy Use Intensity (EUI)

Energy Use Intensity (EUI) is a measure of a building's energy utilization per square foot of building. This calculation is completed by converting all utility usage (gas, electric, oil) consumed by a building over a specified time period, typically one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance among buildings of similar type. The EUI for this facility is calculated as follows:

$$\text{Building EUI} = \frac{\text{(Electric Usage in kBtu/h + Gas Usage in kBtu/h)}}{\text{Building Square Footage}}$$

Electric = ((57,810 kWh) * (1000 W/kW) * (3.414 Btu/h / 1 W))/ (1000 Btu/h / 1 kBtu/h)
= 197,363 kBtu/h

Gas = ((5,349.17 therms) * (100,000 Btu/h / 1 W)) / (1000 Btu/h / 1 kBtu/h) = 534,917 kBtu/h

$$\text{Building EUI} = \frac{\text{(197,363 kBTU / h + 534,917 kBtu / h)}}{\text{7,200 SF}} = \frac{\text{732,280 kBtu / h}}{\text{7,200 SF}} = \text{101.7 kBtu/SF}$$

Senior Citizens Center EUI = 101.7 kBtu/SF

C. EPA Energy Benchmarking System

The United States Environmental Protection Agency (EPA) in an effort to promote energy management has created a system for benchmarking energy use amongst various end users. The benchmarking tool utilized for this analysis is entitled Portfolio Manager. The Portfolio Manager tool allows you to track and assess energy consumption via the template forms located on the ENERGY STAR website (www.energystar.gov). The importance of benchmarking for local government municipalities is becoming more important as utility costs continue to increase and more emphasis is being placed throughout multiple arenas on carbon reduction, greenhouse gas emissions and other environmental impacts.

Based on information gathered from the ENERGY STAR website, Government agencies spend more than $10 billion a year on energy to provide public services and meet constituent needs. Furthermore, energy use in commercial buildings and industrial facilities is responsible for more than 50 percent of U.S. carbon dioxide emissions. Therefore, it is vital that local government municipalities assess their energy usage, benchmark this usage utilizing Portfolio Manager, set priorities and goals to lessen their energy usage and move forward with these priorites and goals. Saving energy will in-turn save the environment.

In accordance with the Local Government Energy Audit Program, CEG has created an Energy Star account for the municipality in order to allow access to monitor their yearly energy usage as it compares to facilities of similar type. The following is the user name and password for this account:

User Name:	winslowtownship
Password:	rcastagna

Utilizing the utility bills and other information gathered during the energy audit process, CEG entered the respective data into Portfolio Manager and the following is a summary of the results:

Table 5
ENERGY STAR Performance Rating

FACILITY DESCRIPTION	ENERGY PERFORMANCE RATING	NATIONAL AVERAGE
Senior Center	N/A	N/A

Specific building types are detailed on the ENERGY STAR website. Non-typical buildings are covered by an “Other” category. The Senior Citizens Center falls under this “Other” category. The “Other” category is used if your building type or a section of the building is not represented by one of the specific categories. An Energy Performance Rating cannot be calculated if more

then 10% of a building is classified as "Other." In addition, office buildings with less than 5000 S.F. cannot generate an Energy Performance Rating. Refer to Appendix G for detailed energy benchmarking report entitled "STATEMENT OF ENERGY PERFORMANCE."

The majority of the Senior Citizens Center would be classified as "Other" and therefore cannot be given an Energy Performance Rating. Despite this, the Portfolio Manager also calculates the building Energy Use Intensity (EUI).

The EUI is also an important tool that can be used to track the energy efficiency of the building. Baselines for improvement can be set that the municipality can strive to meet. CEG recommends that the Winslow Township keep their Portfolio Manager account up to date to monitor the performance of the building.

The EUI calculated in the previous section and in the Energy Star Portfolio Manager is a good indicator of the energy performance in the absence of the Energy Star Performance Rating. The lower the EUI the less energy the facility uses per square foot. A low EUI indicates a more efficient building. There maybe some opportunity for improvement making the facility more energy efficient and saving more on the utility costs.

V. FACILITY DESCRIPTION

Facility Description

The Winslow Township Senior Citizen's Building is located at 33 Coopers Folly Road in Winslow Township, New Jersey. The building was constructed in 1992 and is a single story structure with textured concrete block exterior. Wood truss framing forms a shed roof with textured asphalt shingles. All windows are double-pane, insulating type with anodized aluminum mullions and framing. The building's foundation is slab-on-grade. Operating hours for the building are somewhat random with the exception of Mondays (open 10AM – 12PM), Tuesdays and Thursdays (open 8AM – 3PM), and the building is closed on Fridays.

Heating System

Heat for the building is generated by a natural gas-fired hot water boiler. The boiler is a Weil-McLain model PFG-7-PI Series 3 having 390,000 BTW/H input. Its combustion efficiency when new was 80%.

Heating hot water is circulated via a Bell & Gossett Series 90 Inline Pump with ¾ horsepower motor to hot water coils at three (3) different air handlers in the building. Two (2) of the air handlers are dedicated to serve the Social Hall. One (1) air handler provides conditioned air to the north side of the room and the other air handler delivering air to the south side of the room. The third air handler serves common areas and an office near the entry of the building. All air handlers distribute conditioned air via sheet metal ductwork

The heating coils at each air handler are duct-mounted above the air handler and are piped with thermostatically controlled, 3-way control valves. Heating hot water, which flows continuously during the heating season at a constant flow rate, either flows through the heating coil or is diverted around it depending on the space temperature.

The office is equipped with a through-wall unit that has a hot water heating coil. This unit provides an individual zone of control of heating and cooling for the office. The unit is a McQuay model 16-07 packaged terminal air conditioner.

The public restrooms each have a ceiling recessed cabinet unit heater to address heating requirements in the restrooms.

Domestic Hot Water

Two (2) electric, storage type hot water heaters exist in the building. One (1) water heater is located in the Janitor Closet near the entry of the building. This water heater is a RUUD model PEP20-1 with 20 gallons storage, 5,000 watts, and 208 volts, single-phase power supply. This water heater provides hot water for the lavatories in the public restrooms and the mop sink in the Janitor's Closet.

The other water heater is located in the boiler room and supplies hot water to the kitchen. This water heater is a RUUD model EGLS 50 6 with 50 gallons storage and 6,000 watts at 208 volts, single-phase power. Both water heaters were installed in 1992 when the building was constructed.

Cooling System

The three (3) aforementioned air handlers described in the Heating System section each possess a refrigerant coil which works with an associated, air-cooled condensing unit to produce air conditioning for the building.

Both air handlers that serve the Social Hall are Snyder General model B080D3 with a 2 HP fan motor.

The remote condensing unit that serves the north side of the Social Hall is a McQuay 7 ½ ton unit model C080G0 and was installed at the time of the building construction in 1992. The condensing unit that serves the south side unit of the Social Hall was installed in 2004. The unit is a Rheem model RAWD 090 CAZ and has 7 ½ tons of refrigeration capacity.

The air handling unit serving the common areas near the building entry is a McQuay model BYME 036-0420 and has a ½ horsepower fan motor. The associated condensing is the original unit and is of unknown make and model, however has a 3 ton capacity.

Exhaust

Each toilet room and the Janitor Closet are equipped with a 12" x 24" cabinet type exhaust fan that has its discharge ducted to an exterior wall grille located under the exterior soffit.

All exhaust fans run continuously.

An exterior wall mounted exhaust fan serves a range hood in the kitchen. This fan is manually controlled on an as-needed basis.

Lighting System

The Main Lobby, vestibule, office & social hall are lit via 2-foot by 4-foot lay-in fixtures containing T12 lamps and magnetic ballasts. Standard switching is utilized and there are no other types of lighting controls present.

The coat closet & storage closet are lit via 1-foot by 4-foot surface mounted fixtures containing T12 lamps and magnetic ballasts. Standard switching is utilized and there are no other types of lighting controls present.

The men's & women's toilet rooms are lit via 1-foot by 4-foot lay-in fixtures and vanity wall mounted fixtures containing T12 lamps and magnetic ballasts. Standard switching is utilized and there are no other types of lighting controls present.

The janitor's closet, kitchen closet & AHU closets 1 & 2 are lit via incandescent fixtures. Standard switching is utilized and there are no other types of lighting controls present.

The mechanical room is lit via 1-foot by 4-foot in pendant fixtures containing T12 lamps and magnetic ballast. Standard switching is utilized and there are no other types of lighting controls present.

Exit signs throughout the building contain incandescent lamps and consume an estimated 5 watts of electricity per sign.

The under canopy lighting and exterior lighting mounted to the building are lit via wall packs containing metal halide lamps.

VI. MAJOR EQUIPMENT LIST

Following the completion of the field survey a detailed equipment list was created. The equipment within this list is considered major energy consuming equipment whose replacement could yield substantial savings. In addition, the list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment if a manufacturers date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Equipment denoted by an asterisk indicates an estimate of the equipment ratings due to equipment inaccessibility, worn nameplates, lack of nameplates, etc.

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

VII. ENERGY CONSERVATION MEASURES

ECM #1: Lighting Upgrade - Upgrade the Fluorescent Lighting

Description:

Improved fluorescent lamps and ballasts are available as direct replacements for the existing lamps and ballasts. A simple retrofit of the existing fixture can provide substantial savings. A conventional drop-ceiling lay in fixture with three, 4-foot lamps has a total wattage of 115 Watts per fixture. By using the improved lamps and ballasts, the total wattage would be reduced to 72 Watts. The light levels would increase by about 15% and the light quality would increase by 35%.

CEG recommends replacement of the existing T12 lamps and ballasts with the latest technology T8 lamps and high efficiency electronic ballasts. The new energy efficient, T8 lamps will provide adequate lighting and will save the Owner on electrical costs due to the better performance of the electronic ballasts. In addition to functional cost savings, the fixture replacement will also provide operational cost savings. The operational cost savings will be realized through the lesser number of lamps that will be required to be replaced per year. The expected lamp life of the latest high efficiency T8 lamps is approximately 30,000 burn-hours, requiring fewer lamps to replace per year. Based on the operating hours of this portion of the facility, approximately 1000 hours per year, the Owner will be changing approximately 33% less lamps per year.

In addition, a single electronic ballast can operate one, two, three, or four lamps in a fixture. The existing magnetic ballasts can only operate up to two lamps. The electronic ballasts could reduce the amount of ballasts in the facility by half. This can be taken advantage of with "tandem wiring" of ballasts. Instead of using one electronic ballast for every one fixture it is sometimes feasible to use one electronic ballast for every two or more fixtures. The electrician wires a single ballast to operate the lamps in adjacent light fixtures which further reduces the amount of ballasts needed.

Energy Savings Calculations:

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

Maintenance Savings are calculated as follows:

Maintenance Savings = (*# of lamps* x % *reduction* x $ *per lamp*) + *Installation Labor*

Maintenance Savings = (215 x 33% *reduction* x $2.00) + ($20 x 71) = $1,562

Total ECM Lifetime Energy Savings = 25 Years (Est.) x $555 / yr. = $13,875

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$6,456**
NJ Smart Start Equipment Incentive ($):	**($760)**
Maintenance Savings ($):	**($1,562)**
Net Installation Cost ($):	**$4,134**
Total Energy Savings ($ / yr):	**$555**
Estimated ECM Lifetime (yrs):	**25**
Simple Lifetime Energy Savings ($):	**$13,875**
Simple Payback (yrs):	**7.5**
Simple Return on Investment:	**38.3 %**

ECM #2: Lighting Upgrade – Install Compact Fluorescent Lighting

Description:

Compact fluorescent lamps (CFL's) were created to be direct replacements for the standard incandescent lamps which are common to table lamps, spot lights, hi-hats, bathroom vanity lighting, etc. The light output of the CFL has been designed to resemble the incandescent lamp.

The color rendering index (CRI) of the CFL is much higher than standard fluorescent lighting, and therefore provides a much "truer" light.

The CFL is available in a myriad of shapes and sizes depending on the specific application. Typical replacements are: a 13-Watt CFL for a 60-Watt incandescent lamp, an 18-Watt CFL for a 75-Watt incandescent lamp, and a 25-Watt CFL for a 100-Watt incandescent lamp.

The CFL is also available for a number of "brightness colors" that is indicated by the Kelvin rating. A 2700K CFL is the "warmest" color available and is closest in color to the incandescent lamp. CFL's are also available in 3000K, 3500K, and 4100K. The 4100K would be the "brightest" or "coolest" output.

A CFL can be chosen to screw right into existing fixtures, or hardwired into existing fixtures.

Energy Savings Calculations:

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

Maintenance Savings are calculated as follows:

Maintenance Savings = (*# of lamps* x % *reduction* x $ *per lamp*) + *Installation Labor*

Maintenance Savings = (5 x 75% *reduction* x $5) + ($15 x 4) = $79

Total ECM Lifetime Energy Savings = 25 Years (Est.) x $22 / yr. = $550

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$210**
NJ Smart Start Equipment Incentive ($):	**$0**
Annual Maintenance Savings ($):	**($79)**
Net Installation Cost ($) After 1 Year:	**$131**
Total Energy Savings ($ / yr):	**$22**
Estimated ECM Lifetime (yrs):	**25**
Simple Lifetime Energy Savings ($):	**$550**
Simple Payback (yrs):	**6**
Simple Return on Investment:	**49.4 %**

ECM #3: Lighting Upgrade – Install Lighting Controls

Description:

In some areas the lighting is left on unnecessarily. There has been a belief that it is better to keep the lights on rather than to continuously switch them on and off. The on/off dilemma was studied and it was determined that the best option is to turn the lights off whenever possible. Although this practice reduces the lamp life, the energy savings far outweigh the lamp replacement costs.

Lighting controls are available in many forms. Lighting controls can be as simplistic as an additional switch. Time-clocks are often used which allows the user to set an on/off schedule. Time-clocks range from a dial clock with on/off indicators to a small box the size of a thermostat with user programs for on/off schedule in a digital format. Occupancy sensors detect motion and will switch the lights on when the room is occupied. They can either be mounted in place of the current wall switch, or they can be mounted on the ceiling to cover large areas. Lastly, photocells are a lighting control that sense light levels and will turn the lights off when there is adequate daylight. These are mostly used outside, but they are becoming much more popular in energy-efficient office designs as well.

To determine an estimated savings for lighting controls, we used ASHRAE 90.1-2004 (NJ Energy Code). Appendix G states that occupancy sensors have a 10% power adjustment factor for daytime occupancies for buildings over 5,000 SF. CEG recommends the installation of dual technology occupancy sensors in all private offices, conference rooms, mechanical rooms, storage rooms, file rooms, etc.

CEG would recommend wall switches for individual rooms, ceiling mount sensors for large office areas or restrooms, and fixture mount box sensors for some applications as manufactured by Sensorswitch, Watt Stopper, etc.

Energy Savings Calculations:

From Appendix E of this report, we calculated the lighting power density (Watts/ft^2) of the existing facility to be 1.32 Watts/SF. Ten percent of this value is the resultant energy savings due to installation of occupancy sensors:

Savings = 10% x 1.32 Watts/SF x 4,875 SF x 1,000 hrs/yr.

= 644 kWh/yr. x $0.17/kWh

Annual Savings = $109 / yr

Installation cost per dual-technology sensor is $75/unit.

The SmartStart Buildings® incentive is $20 per control which equates to an installed cost of $55/unit. Total number of rooms to be retrofitted is 5 (4,875 SF).

Total cost to install sensors is $55 x 5 units = $275.

Total ECM Lifetime Energy Savings = 15 Years (Est.) x $109 / yr. = $1,635

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$375**
NJ Smart Start Equipment Incentive ($):	**($100)**
Maintenance Savings ($):	**$0**
Net Installation Cost ($):	**$275**
Total Energy Savings ($ / yr):	**$109**
Estimated ECM Lifetime (yrs):	**15**
Simple Lifetime Energy Savings ($):	**$1,635**
Simple Payback (yrs):	**2.5**
Simple Return on Investment:	**41.7 %**

ECM #4: Replace Heating Hot Water Boiler

Description:

The Senior Center is heated by a Weil McLain natural gas fired hot water boiler with 390 MBH input and presently is about 79% efficient. The unit was installed in about 1992. The estimated service life for the furnace is 25 years as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook. In this energy conservation measure we are suggesting replacing the existing boiler with a new Lochinvar Knight XL boiler rated at 399 MBH input and 93.3% efficient.

Existing Heating Hot Water Boiler:

Rated Capacity = 390 MBH Input (Natural Gas)
Thermal Efficiency = 79%

Replacement Boiler:

High Efficiency Lochinvar or Equal (with Sequencing Control & O/A HW Reset)
Rated Capacity = 399 MBH Input (Natural Gas)
Thermal Efficiency = 93.3%

Operating Data:
Heating Season Fuel Consumption = 5349 Therms
(Based on gas billing data)
Average Cost of Natural Gas = $1.63/Therm

Energy Savings Calculations:

$$AnnualEnergySavings = YearlyConsumption \times \frac{NewBoilerEff. - OldBoilerEff.}{NewBoilerEff.}$$

$$AnnualEnergySavings = 5349 Therms \times \frac{93.3 - 79}{93.3} = 819.8 Therms$$

Cost Savings = Annual Energy Savings x $/Therm

Cost Savings = 819.9 Therms x $1.63/Therm = $1336.30 / yr.

Total ECM Lifetime Energy Savings = 25 Years (Est.) x $1336.30 / yr. = $33,407.50

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$15,000**
NJ Smart Start Equipment Incentive ($):	**($700)**
Maintenance Savings ($):	**($100)**
Net Installation Cost ($):	**$14,200**
Total Energy Savings ($ / yr):	**$1,336**
Estimated ECM Lifetime (yrs):	**25**
Simple Lifetime Energy Savings ($):	**$33,407**
Simple Payback (yrs):	**10.6**
Simple Return on Investment:	**9.4 %**

ECM #5: Air Conditioning Upgrade – Social Hall

Description:

Air-conditioning is provided within the Social Hall by two 7 ton split systems units totaling 14 tons of cooling. The indoor fan coil units have hydronic heating coils which provide heating during the winter months. The heating coils are fed from the main heating boiler loop. Each indoor unit's cooling coil is coupled with a 7 ton outdoor condensing unit which provides cooling. The estimated seasonal energy efficiency ratio (SEER) of CU-1 is about 8.0. CU-2 appears to have been replaced approximately 10 years ago with a 10 SEER Rheem unit. The NJ State Energy Code (ASHRAE 90.1-2008) mandates a minimum energy efficiency of 13.0 SEER for units of this type. The remaining service life of the fan coils units is approximately 3 years as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook. CU-1 is well beyond it's useful life and CU-2 has 10 years of remaining service life.

This energy conservation measure would replace the (2) indoor fan coil units and their associated outdoor condensing units. The existing units will be replaced with high energy efficient, split system air-conditioning units with cooling capacities typical of the existing units. The average SEER of the new equipment will be upwards of 15 SEER.

Energy Savings Calculations:

$$EnergySavings = \frac{[CoolingTons \times 12{,}000\,Btu/ton \div 1000W/kW]}{[(EER_{NEW} - EER_{OLD})]} \times Avg.\ Load\ Factor \times Hrs.\ of\ Cooling \times \#\ of\ Units$$

Existing Air Conditioning Units

Rated Capacity = 7 Tons (CU-1)
Rated Capacity = 7 Tons (CU-2)
Condenser Unit Efficiency = 8.0 EER (CU-1)

Condenser Unit Efficiency = 10.0 EER (CU-2)
Cooling Season Hrs. of Operation = 1,800 hrs/yr. per unit
Average Cost of Electricity - $0.17/kWh

Proposed High-Efficiency Air Conditioning Unit

Rated Capacity = 14 Tons (2 Units)
New Condenser Unit Efficiency = 16 EER

$$EnergySavings = \frac{[CoolingTons \times 12{,}000\,Btu/ton \div 1000W/kW]}{[(EER_{NEW} - EER_{OLD})]} \times Avg.LoadFactor \times Hrs.ofCooling$$

$$EnergySavings = \frac{[7Tons \times 12{,}000\,Btu/ton \div 1000W/kW]}{[(16EER_{NEW} - 8EER_{OLD})]} \times 0.8 \times 1800 = 6840kWh/yr. \text{ (CU-1)}$$

$$EnergySavings = \frac{[7Tons \times 12{,}000\,Btu/ton \div 1000W/kW]}{[(16EER_{NEW} - 10EER_{OLD})]} \times 0.8 \times 1800 = 4536kWh/yr. \text{ (CU-2)}$$

Total Cost Savings = (6840 kWh + 4536 kWh) * $0.17/kWh = $1933.92 / Yr.

Total ECM Lifetime Energy Savings = 15 Years (Est.) x $1933.92 / yr. = $29,009

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$16,800**
NJ Smart Start Equipment Incentive ($):	**($1050)**
Maintenance Savings ($):	**($0)**
Net Installation Cost ($):	**$15,750**
Total Energy Savings ($ / yr):	**$ 1,934**
Estimated ECM Lifetime (yrs):	**15**
Simple Lifetime Energy Savings ($):	**$29,009**
Simple Payback (yrs):	**8.1**
Simple Return on Investment:	**11 %**

ECM #6: Air Conditioning Upgrade – Lobby, Vestibule & Office

Description:

Air-conditioning is provided within the Lobby, Vestibule and Office by one 3 ton split system. The indoor fan coil unit has a hydronic heating coil which provides heating during the winter months. The heating coil is fed from the main heating boiler loop. The indoor unit's cooling coil is coupled with a 3 ton outdoor condensing unit which provides cooling. The estimated seasonal energy efficiency ratio (SEER) of CU-3 is about 8.0. The NJ State Energy Code (ASHRAE 90.1-2008) mandates a minimum energy efficiency of 13.0 SEER for units of this type. The remaining service life of the fan coils units is approximately 3 years as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook. CU-3 is well beyond its useful life.

This energy conservation measure would replace the indoor fan coil unit and its associated outdoor condensing unit. The existing unit will be replaced with high energy efficient, split system air-conditioning units with cooling capacities typical of the existing units. The average SEER of the new equipment will be upwards of 15 SEER.

Energy Savings Calculations:

$$EnergySavings = \frac{[CoolingTons \times 12{,}000\,Btu/ton \div 1000W/kW]}{[(EER_{NEW} - EER_{OLD})]} \times Avg.\,Load\ Factor \times Hrs.\,of\ Cooling \times \#\,of\ Units$$

Existing Air Conditioning Units

Rated Capacity = 3 Tons (CU-3)
Condenser Unit Efficiency = 8.0 EER (CU-3)
Cooling Season Hrs. of Operation = 1,800 hrs/yr. per unit
Average Cost of Electricity - $0.17/kWh

Proposed High-Efficiency Air Conditioning Unit

Rated Capacity = 3 Tons
New Condenser Unit Efficiency = 16 EER

$$EnergySavings = \frac{[CoolingTons \times 12{,}000\,Btu/ton \div 1000W/kW]}{[(EER_{NEW} - EER_{OLD})]} \times Avg.LoadFactor \times Hrs.ofCooling$$

$$EnergySavings = \frac{[3Tons \times 12{,}000\,Btu/ton \div 1000W/kW]}{[(16EER_{NEW} - 8EER_{OLD})]} \times 0.8 \times 1800 = 3240kWh/yr.$$ (CU-3)

Total Cost Savings = 3240 kWh * $0.17/kWh = $550.80 / Yr.

Total ECM Lifetime Energy Savings = 15 Years (Est.) x $550.80 / yr. = $8,262

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$4,850**
NJ Smart Start Equipment Incentive ($):	**($225)**
Maintenance Savings ($):	**($0)**
Net Installation Cost ($):	**$4,625**
Total Energy Savings ($ / yr):	**$ 551**
Estimated ECM Lifetime (yrs):	**15**
Simple Lifetime Energy Savings ($):	**$8,262**
Simple Payback (yrs):	**8.4**
Simple Return on Investment:	**10.5 %**

ECM #7: Domestic Hot Water Heater Replacement

Description:

The electric domestic hot water heater for the building appears to only have about 2 years remaining of useful life. This energy conservation measure will replace the existing electric, 6000 Watt, 60-gallon capacity domestic hot water heater with a gas-fired, tankless water heater. Tankless water heaters heat water directly without the use of a storage tank. Therefore, they avoid the standby heat losses associated with storage water heaters. In a gas-fired tankless water heater, a gas burner heats the water and provides a constant supply of hot water. Therefore, you do not need to wait for the storage tank to fill up with enough hot water as is typical with storage-type hot water heaters.

Energy Savings Calculations:

Existing Electric DHW Heater

Rated Capacity = 6000 Watts Energy Factor (EF) = 0.90
60 gallons storage

Proposed High-Efficiency Gas-Fired Tankless Water Heater

Rated Capacity = 5 gallons per minute Natural Gas-Fired EF= 0.65

Operating Data for Existing Electric DHW Heater:

Average cost of electricity = 17 ¢/kWh
Electric DHW Heater Operating Hrs/Yr. = 1,040 Hrs.

Electric usage = (1,040 Hrs x 6000 Watts) ÷ 1,000 Watts/kW = 6240 kWh

Cost = 17 ¢/kWh x 6240 kWh = $1061

Operating Data for new tankless gas-fired DHW heater:

Average cost of natural gas = $1.63/Therm

Annual gas usage for 5 GPM tankless gas-fired units = 143 Therms

Cost = 143 Therms x $ 1.63 /Therm = $233

Energy Savings = $1061 - $233 = $828

Total ECM Lifetime Energy Savings = 18 Years (Est.) x $828 / yr. = $14,904

NJ Smart Start® Program Incentives are calculated as follows:

From Appendix C, a natural gas-fired domestic hot water heater less than 50 gallons warrants the following incentive:

$$\text{Smart Start®}\ Incentive = (Quantity \times\ \$50\ per\ DHW\ Heater) = (1 \times \$50) = \$50$$

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$2,400**
NJ Smart Start Equipment Incentive ($):	**($50)**
Maintenance Savings ($):	**($0)**
Net Installation Cost ($):	**$2,350**
Total Energy Savings ($ / yr):	**$828**
Estimated ECM Lifetime (yrs):	**18**
Simple Lifetime Energy Savings ($):	**$14,904**
Simple Payback (yrs):	**2.8**
Simple Return on Investment:	**37.2 %**

ECM #8: Retro-Commissioning

Description:

Retro-commissioning is a quality-oriented process for verifying and documenting that HVAC systems perform as closely as possible to defined performance criteria. The benefits include documenting accurately the existing system's function and performance; Verifying that system performance meets the facility's requirements; benchmarking the performance of existing systems for future changes; and identifying problems in the system.

The cost of retro-commissioning of the public works facility is between $0.15 and $0.30 per Square Foot (Source: Thorne & Nadel "Retro-Commissioning: Program Strategies To Capture Energy Savings in Existing Buildings (2003)" – average Retro-Commissioning costs of $0.22 in TX, TN, CO, MA, AZ, OR, CA).

The energy savings from retro-commissioning critical systems such as HVAC and power systems is approximately 5% of the total energy used (Source: E. Mills et al, "Cost-effectiveness of Commissioning 224 Buildings across 21 states – 2004").

Energy Savings Calculations:

Estimated Cost of Retro-Commissioning = $0.15 x 7200 SF = $1080

Estimated Energy Savings = 5% x $12,876 = $643.80

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	**$1,080**
NJ Smart Start Equipment Incentive ($):	**($0)**
Maintenance Savings ($):	**($0)**
Net Installation Cost ($):	**$1,080**
Total Energy Savings ($ / yr):	**$644**
Estimated ECM Lifetime (yrs):	**N/A**
Simple Lifetime Energy Savings ($):	**N/A**
Simple Payback (yrs):	**1.7**
Simple Return on Investment:	**62 %**

*N/A Not Applicable

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES (ECM # 9)

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy technologies for the Winslow Township Annex Building, and concluded that there is potential for solar energy generation.

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which will be mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof would be necessary before the installation of PV panels is considered). The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around $350, this value was used in our financial calculations. This equates to $0.35 per kWh generated.

CEG has reviewed the existing roof area of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. A roof area of 2760 S.F. can be utilized for a PV system on the Senior Citizens Center roof. A depiction of the area utilized is shown in Appendix F following the financial calculations. Using this square footage it was determined that a system size of 36.8 kilowatts could be installed. The required square footage for a system of this size is 2,353 S.F. and has an estimated kilowatt hour production of 57,428 KWh annually, reducing the overall electric consumption by approximately 100%. Presently the BPU and net-zero metering laws of New Jersey limit the KWh production to the maximum KWh used at each facility through the individual building meter. A detailed financial analysis can be found in Appendix F. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

CEG has reviewed financing options for the owner. Two options were studied and they are as follows: Self-financed and direct purchase without finance. Self-finance was calculated with 95% of the total project cost financed at a 7% interest rate over 25 years. Direct purchase involves the local government paying for 100% of the total project cost upfront. Both of these calculations include a utility inflation rate as well as the degradation of the solar panels over time. Based on our calculations the following are the payback periods for the respective method of payment:

PAYMENT TYPE	SIMPLE PAYBACK	INTERNAL RATE OF RETURN
Self-Finance	11.09 Years	14.1 %
Direct Purchase	11.09 Years	8.2%

The above information is concluded as ECM #9 showing installation costs, energy savings and other pertinent summarized information in Section I of this report.

Wind energy production is another option available through the Renewable Energy Incentive Program. Small wind turbines can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. CEG has reviewed the applicability of wind energy for Winslow Township and has determined it is not a viable option. Low average wind speeds for the area are not adequate for wind turbine generation. Typical wind turbines start producing energy at 8 mph wind speeds. Winslow Township averages 4 mph wind speeds making this application impractical.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

Load Profile analysis was performed to determine the seasonal energy usage of the facility. Irregularities in the load profile will indicate potential problems within the facility. Consequently based on the profile a recommendation will be made to remedy the irregularity in energy usage. For this report, the facility's energy consumption data was gathered in table format and plotted in graph form to create the load profile. Refer to Section IV, Figures 1 and 2 included within this report to reference the respective electricity and natural gas usage load profile for April 2008 through May 2009. .

Electricity:

Section IV, Figure 1 demonstrates a typical cooling profile, (April –October), complimenting the heating load (November – March). It is evident that there is a reduction in the consumption from October to December 2008 but the load profile represents a steady usage. The Summer-time load profile is typical for an air conditioning load with some expected increased consumption June-August. The Base-load shaping is important because a flat consumption profile will yield more competitive energy procurement pricing. The demand for electricity is increased during the summer season (air conditioning), and this facility utilizes a centralized cooling system.

Natural Gas:

Section IV, Figure 2 demonstrates a typical heating load (November –March), and a very complimentary cooling load (April –October). Consequently there is a clear separation between summer and winter loads consistent with energy commodity prices traded on the New York Mercantile Exchange. Heating loads carry a much higher average cost because of the higher demand for natural gas during the winter heating period. The demand for natural gas is increased during the heating season. This facility utilizes a natural gas fired hot air system for heating.

Tariff Analysis:

Electricity:

The Senior Center receives electrical service from Atlantic City Electric on a MGS (Monthly General Service) and (BGS) Basic General Service rate.

MGS:

Available at any point of Company's system where facilities of adequate character and capacity exist for the entire electric service requirements of any customer delivered at one point and metered on at or compensated to the voltage of delivery. This schedule is not available to residential customers. This service has the following charges: Delivery Service Charge, Customer Charge, Single Phase Charge, Three Phase Charge, Distribution Demand Charge,

Reactive Demand Charge, Distribution Rates, Non-Utility Generation Charge, Societal Benefits Charge, Regulatory Assets Charge, Transition Bond Charge, Market Transition Charge Tax, System Control Charge, CIEP Standby Charge, Transition Enhancement Charge, Basic Generation Service Charge and Regional Greenhouse Gas Initiative Recovery Charge.

BGS:

Since the passage and implementation of the Electric Discount and Competition Act (EDECA) in 1999, there have been many changes brought about by deregulation of the electric energy industry in New Jersey. Since that time, customers in New Jersey have been able to choose their electric supplier. Customers who do not choose to switch to a Third Party Supplier (TPS), or who leave a TPS to return to their Electric Delivery Company are supplied with Basic Generation Service (BGS). BGS is the default electric supply service provided by Atlantic City Electric. The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS).

While may be on a typical rate structure with the local utility some variations in price do cause some concern, and are worth investigating further. The average delivered price for this rate is above market based rates and the June – September pricing seems to be much above current market rates. Winslow should consider aggregating this electric load with its other accounts for optimum costs.

Natural Gas:

The Senior Center receives natural gas service through South Jersey Gas Company (SJG) on a BGSS (Basic Gas Supply Service) rate class, when not receiving commodity by a Third Party Supplier. This tariff is designed to cover SJG's cost of gas applicable to customers who purchased gas from SJG. The company earns no profit from BGSS. BGSS consists of two (2) pricing mechanisms:

1. Periodic BGSS pricing is applicable to residential customers and commercial customers who consume less than 5000 therms annually.

2. Monthly BGSS pricing is applicable to commercial and industrial customers who consume at least 5000 therms annually.

The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS). It is pertinent to note, should the TPS not deliver, and the customer will receive replacement service from the utility which carries an extremely high penalty cost of service.

Imbalances can occur when Third Party Suppliers are used to supply natural gas, full-delivery is not made, and when a new supplier is contracted or the customer returns to the utility. It is important when utilizing a Third Party Supplier, that an experienced regional supplier is used. Otherwise, under delivery can occur, jeopardizing economics and scheduling.

From review of the information provided, this facility is utilizing the services of a Third Party Supplier (TPS), Woodruff Energy. Comparing Winslow's contracted natural gas costs to average market based costs. CEG believes that Winslow can improve its natural gas costs by almost 50%. CEG recommends the use of an energy advisor.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within the Township. CEG's primary observation is seen in the electricity costs. The "Price to Compare" (comparing the utility price) per kWh (kWh) for all buildings is $12.71 / kWh, (kWh, kilowatt hour is the common unit of electric measure). Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. The Township could see significant savings if it were to take advantage of these current market prices quickly, before energy increases. Based on last year's historical consumption (April – March 2009) and current electric rates, savings of over $27,000 per year could be realized (Note: Savings were calculated using Winslow's Average Annual Consumption of 855,185 kWh and a variance of $.0321//kWh utilizing a fixed one-year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG also recommends advisement for alternative sourcing and supply of energy on a "managed approach".

CEG's secondary recommendation coincides with the natural gas costs. CEG recognized the natural gas cost could be improved as compared to current market prices. Based on the current market Winslow is paying approximately $4.12 / dth (per unit of measure) above market in the South Jersey Gas service territory or over $13,000 / year in savings. CEG recommends further advisement on these prices. Winslow should also consider procuring energy (natural gas) on its own. CEG recommends alternative sourcing strategies.

CEG also recommends that Winslow Township schedule a meeting with their current utility providers to review their utility charges and current tariff structures for electricity and natural gas. This meeting would provide insight regarding alternative procurement options that are currently available. Through its meeting with the Local Distribution Company (LDC), the Township will learn more about the competitive supply process and can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu. They should also consider using a billing-auditing service to further analyze the utility invoices, manage the data and use the data to manage ongoing demand-side management projects. Furthermore, CEG recommends special attention to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with their utility representative. In addition, Winslow should also ask the utility representative about alternative billing options. Some utilities allow for consolidated billing options when utilizing the service of a Third Party Supplier.

Finally, if the Winslow Township frequently changes its supplier for energy (natural gas), it needs to closely monitor balancing, particularly when the contract is close to termination.

X. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the Owner to utilize in subsidizing the costs for installing the energy conservation measures noted within this report. Below are a few alternative funding methods:

i. *Energy Savings Improvement Program (ESIP)* – Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and par for the costs using the value of energy savings that result from the improvements. The "Energy Savings Improvement Program (ESIP)" law provides a flexible approach that can allow all government agencies in New Jersey to improve and reduce energy usage with minimal expenditure of new financial resources.

ii. *Municipal Bonds* – Municipal bonds are a bond issued by a city or other local government, or their agencies. Potential issuers of municipal bonds include cities, counties, redevelopment agencies, school districts, publicly owned airports and seaports, and any other governmental entity (or group of governments) below the state level. Municipal bonds may be general obligations of the issuer or secured by specified revenues. Interest income received by holders of municipal bonds is often exempt from the federal income tax and from the income tax of the state in which they are issued, although municipal bonds issued for certain purposes may not be tax exempt.

iii. *Power Purchase Agreement* – Public Law 2008, Chapter 3 authorizes contractor of up to fifteen (15) years for contracts commonly known as "power purchase agreements." These are programs where the contracting unit (Owner) procures a contract for, in most cases, a third party to install, maintain, and own a renewable energy system. These renewable energy systems are typically solar panels, windmills or other systems that create renewable energy. In exchange for the third party's work of installing, maintaining and owning the renewable energy system, the contracting unit (Owner) agrees to purchase the power generated by the renewable energy system from the third party at agreed upon energy rates.

CEG recommends the Owner review the use of the above-listed funding options in addition to utilizing their standard method of financing for facilities upgrades in order to fund the proposed energy conservation measures.

XI. ADDITIONAL RECOMMENDATIONS

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

A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.

B. Maintain all weather stripping on windows and doors.

C. Use cog-belts instead of v-belts on all belt-driven fans, etc. These can reduce electrical consumption of the motor by 2-5%.

D. Reduce lighting in specified areas where the foot candle levels are above 70 in private offices and above 30 in corridor, lobbies, etc.

E. Provide more frequent air filter changes to decrease overall fan horsepower requirements and maintain better IAQ.

F. Recalibrate existing sensors serving the office spaces

G. Install a Vending Miser system to turn off the vending machines in the lunch room when not in use.

H. Clean all light fixtures to maximize light output.

I. Confirm that outside air economizers on the rooftop units that serve the Office Areas are functioning properly to take advantage of free cooling.

APPENDIX

Electric Cost Summary

Winslow Township
Senior Citizens Center
ATLANTIC CITY
ELECTRIC
Acct.No:1037 0669 9990

Appendix A

Month	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Total
Last Meter Read Date	3/17/2008	4/16/2008	5/15/2008	6/16/2008	7/16/2008	8/14/2008	9/15/2008	10/16/2008	11/13/2008	12/15/2008	1/15/2009	2/13/2009	3/17/2008
Current Meter Read Date	4/16/2008	5/15/2008	6/16/2008	7/16/2008	8/14/2008	9/15/2008	10/16/2008	11/13/2008	12/15/2008	1/15/2009	2/13/2009	3/17/2009	3/17/2009
Billing Days	30	29	32	30	29	32	31	28	32	31	29	32	365
KWH	4,912	3,909	5,313	6,719	6,273	4,977	3,452	4,003	4,384	4,948	4,489	4,431	57,810
KW	19	19	22	24	24	25	18	15	18	20	20	18	25
Monthly Load Factor	36%	30%	31%	39%	37%	26%	26%	41%	31%	33%	32%	32%	33%
Electric Delivery, $	$289	$243	$295	$309	$294	$273	$191	$164	$198	$219	$200	$196	$2,872
Delivery $/kwh	$0.059	$0.062	$0.056	$0.046	$0.047	$0.055	$0.055	$0.041	$0.045	$0.044	$0.045	$0.044	$0.050
Electric Supply, $	$481	$392	$647	$948	$890	$649	$402	$448	$505	$570	$520	$511	$6,963
Supply $/kwh	$0.098	$0.100	$0.122	$0.141	$0.142	$0.130	$0.116	$0.112	$0.115	$0.115	$0.116	$0.115	$0.119
Total Cost, $	$770	$635	$942	$1,257	$1,184	$922	$593	$612	$703	$789	$720	$707	$9,834
$/KWH	$0.1568	$0.1624	$0.1772	$0.1871	$0.1888	$0.1853	$0.1718	$0.1529	$0.1603	$0.1595	$0.1604	$0.1596	$0.1701

Natural Gas Cost Summary

Winslow Township
Senior Citizens Center
SOUTH JERSEY GAS
Acct. No. 219 03 4857 00

Month	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Total
Billing Days	30	28	30	32	29	30	33	29	29	33	29	32	364
Last Meter Read Date	3/17/2008	4/16/2008	5/14/2008	6/13/2008	7/15/2008	8/13/2008	9/12/2008	10/15/2008	11/13/2008	12/12/2008	1/14/2009	2/12/2009	3/17/2008
Current Meter Read Date	4/16/2008	5/14/2008	6/13/2008	7/15/2008	8/13/2008	9/12/2008	10/15/2008	11/13/2008	12/12/2008	1/14/2009	2/12/2009	3/16/2009	3/13/2009
Gas Used per 100 cu ft	581	270	149	84	77	85	100	460	613	866	1,056	830	5,171
BTU Factor	1.03	1.03	1.04	1.04	1.03	1.03	1.04	1.03	1.04	1.04	1.04	1.03	1.03
Therms (Burner Tip)	599	278	155	87	79	87	104	475	635	899	1,094	857	5,349
Total Distribution Cost	$261	$130	$81	$55	$50	$54	$62	$211	$278	$397	$488	$388	$2,455
Cost per Therm	$0.435	$0.467	$0.525	$0.633	$0.632	$0.618	$0.603	$0.445	$0.438	$0.441	$0.446	$0.452	$0.511
Total Commodity Cost	$688	$319	$237	$144	$97	$99	$108	$440	$755	$1,069	$1,301	$1,019	$6,278
Cost per Therm	$1.15	$1.15	$1.53	$1.65	$1.22	$1.13	$1.04	$0.93	$1.19	$1.19	$1.19	$1.19	$1.21
Total Cost	$949	$449	$318	$199	$147	$153	$170	$652	$1,033	$1,466	$1,789	$1,407	$8,732
Cost per Therm	$1.58	$1.61	$2.05	$2.29	$1.85	$1.75	$1.64	$1.37	$1.63	$1.63	$1.63	$1.64	$1.63

SENIOR CENTER

CONSTRUCTION COST AND REBATES					
ECM # 1 - UPGRADE FLUORESCENT LIGHTING	Qty	Unit Cost $	Material $	Labor $	Total $
New T-8 Linear Fluorescent Lamps & Ballasts	1	$1,896	$1,896	$4,560	$6,456
Total Cost					$6,456
Utility Incentive					-$760
Total Net Cost					**$5,696**
ECM # 2 - INSTALL CFL LIGHTING	Qty	Unit Cost $	Material $	Labor $	Total $
Compact Fluorescent	1	$23	$23	$188	$210
Total Cost					$210
Total Net Cost					**$210**
ECM # 3 - INSTALL LIGHTING CONTROLS	Qty	Unit Cost $	Material $	Labor $	Total $
Occupancy Sensors	5	$75	$375	$0	$375
Total Cost					$375
Utility Incentive					-$100
Total Net Cost					**$275**
ECM # 4 - BOILER REPLACEMENT	Qty	Unit Cost $	Material $	Labor $	Total $
Demo boiler					$1,000
Boiler	1	$6,500	$6,500	$6,500	$13,000
Pump	1	$500	$500	$500	$1,000
Total Cost					$15,000
Utility Incentive					-$700
Total Net Cost					**$14,300**
ECM # 5 - AIR CONDITIONING UPGRADE - SOCIAL HALL	Qty	Unit Cost $	Material $	Labor $	Total $
FCU-1	1	$2,100	$2,100	$2,100	$4,200
CU-1	1	$2,100	$2,100	$2,100	$4,200
FCU-2	1	$2,100	$2,100	$2,100	$4,200
CU-2	1	$2,100	$2,100	$2,100	$4,200
Total Cost					$16,800
Utility Incentive					-$1,050
Total Net Cost					**$15,750**

SENIOR CENTER

ECM # 5 - AIR CONDITIONING UPGRADE - LOBBY, VEST., OFFICE	Qty	Unit Cost $	Material $	Labor $	Total $
FCU-3	1	$1,500	$1,500	$1,500	$3,000
CU-3	1	$850	$850	$1,000	$1,850
Total Cost					$4,850
Utility Incentive					-$225
Total Net Cost					**$4,625**
ECM # 7 - VARIABLE SPEED HOT WATER CIRCULATOR	Qty	Unit Cost $	Material $	Labor $	Total $
3/4 HP Pump	1	$1,500	$1,500	$1,500	$3,000
2-way Valves	3	$500	$1,500	$2,000	$3,500
VFD & Controls	1	$2,000	$2,000	$2,000	$4,000
Total Cost					$10,500
Utility Incentive					-$100
Total Net Cost					**$10,400**
ECM #8 - DOMESTIC HOT WATER HEATER REPLACEMENT	Qty	Unit Cost $	Material $	Labor $	Total $
Domestic HWH	1	$1,200	$1,200	$1,200	$2,400
Total Cost					$2,400
Utility Incentive					-$50
Total Net Cost					**$2,350**
ECM #9 - RETRO-COMMISSIONING	Qty	Unit Cost $	Material $	Labor $	Total $
Retro-Commissioning	1	$1,080	$1,080	-	$1,080
Total Net Cost					**$1,080**
ECM # 10 - PV SOLAR	Qty	Unit Cost $	Material $	Labor $	Total $
PV Solar	96	$2,070	$198,720	Included	$198,720
Total					**$198,720**

* Construction Costs do not include maintenance savings as shown in Executive Summary Table 1

Concord Engineering Group, Inc.

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

SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of January, 2009:

Electric Chillers

Water-Cooled Chillers	$12 - $170 per ton
Air-Cooled Chillers	$8 - $52 per ton

Gas Cooling

Gas Absorption Chillers	$185 - $400 per ton
Gas Engine-Driven Chillers	Calculated through custom measure path)

Desiccant Systems

	$1.00 per cfm – gas or electric

Electric Unitary HVAC

Unitary AC and Split Systems	$73 - $93 per ton
Air-to-Air Heat Pumps	$73 - $92 per ton
Water-Source Heat Pumps	$81 per ton
Packaged Terminal AC & HP	$65 per ton
Central DX AC Systems	$40- $72 per ton
Dual Enthalpy Economizer Controls	$250

Ground Source Heat Pumps

Closed Loop & Open Loop	$370 per ton

Gas Heating

Gas Fired Boilers < 300 MBH	$300 per unit
Gas Fired Boilers ≥ 300 - 1500 MBH	$1.75 per MBH
Gas Fired Boilers ≥1500 - ≤ 4000 MBH	$1.00 per MBH
Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	$300 - $400 per unit

Variable Frequency Drives

Variable Air Volume	$65 - $155 per hp
Chilled-Water Pumps	$60 per hp
Compressors	$5,250 to $12,500 per drive

Natural Gas Water Heating

Gas Water Heaters ≤ 50 gallons	$50 per unit
Gas-Fired Water Heaters >50 gallons	$1.00 - $2.00 per MBH
Gas-Fired Booster Water Heaters	$17 - $35 per MBH

Premium Motors

Three-Phase Motors	$45 - $700 per motor

Prescriptive Lighting

T-5 and T-8 Lamps w/Electronic Ballast in Existing Facilities	$10 - $30 per fixture, (depending on quantity)
Hard-Wired Compact Fluorescent	$25 - $30 per fixture
Metal Halide w/Pulse Start	$25 per fixture
LED Exit Signs	$10 - $20 per fixture
T-5 and T-8 High Bay Fixtures	$16 - $284 per fixture

Lighting Controls – Occupancy Sensors

Wall Mounted	$20 per control
Remote Mounted	$35 per control
Daylight Dimmers	$25 per fixture
Occupancy Controlled hi-low Fluorescent Controls	$25 per fixture controlled

Lighting Controls – HID or Fluorescent Hi-Bay Controls

Occupancy hi-low	$75 per fixture controlled
Daylight Dimming	$75 per fixture controlled

Other Equipment Incentives

Performance Lighting	$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2004 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive

Senior Citizens Center

TAG	MAKE	MODEL	TYPE	CAPACITY	EFFICIENCY	SERVES	LOCATION	REMAINING USEFUL LIFE	NOTES
B-1	WEIL MCLAIN	PFG-7-PI	HOT WATER BOILER	390 MBH INPUT, 308 MBH OUTPUT	79%	ENTIRE BUILDING	MECHANICAL ROOM #14	8 YEARS	NATURAL GAS FIRED, FIRE TUBE HOT WATER BOILER - SERIES 3
P-1	B & G	J60-SERIES 90	INLINE PUMP	3/4 HP, 34T MOTOR	UNKNOWN	ENTIRE BUILDING	MECHANICAL ROOM #14	1 YEAR	INLINE CIRCULATING PUMP
HWH-1	RUDD	PEP20-1	ELECTRIC HOT WATER HEATER	5 KW, 20 GALLON, 208/60/1	100%	RESTROOMS	JANITOR UTILITY CLOSET #6	2 YEARS	HOT WATER HEATER WITH STORAGE
HWH-2	RUDD	EGLS50-6	ELECTRIC HOT WATER HEATER	6 KW, 50 GALLON	100%	KITCHEN	MECHANICAL ROOM #14	2 YEARS	HOT WATER HEATER WITH STORAGE
AHU-1	SNYDER GENERAL	B080-D3	DX FAN COIL - COOLING	7 TON, 2 HP, 208/230/60/3	UNKNOWN	SOCIAL HALL	SOUTHEAST CORNER UTILITY CLOSET #11	3 YEARS	DUCT MOUNTED HEATING COIL
AHU-2	SNYDER GENERAL	B080-D3	FAN COIL W/ DX - COOLING	7 TON, 2 HP, 208/230/60/3	UNKNOWN	SOCIAL HALL	NORTHEAST CORNER UTILITY CLOSET #10	3 YEARS	DUCT MOUNTED HEATING COIL
AHU-3	MCQUAY	BYME-036-042	FAN COIL W/ DX - COOLING	3 TON, 1/2 HP, 208/60/1	UNKNOWN	WEST SIDE LOBBY, VESTIBULE, OFFICE	JANITOR UTILITY CLOSET #6	3 YEARS	DUCT MOUNTED HEATING COIL
CU-I	MCQUAY	C080GO	SPLIT SYSTEM CONDENSING UNIT	7 TONS	8 SEER	AHU-2	PAD MOUNTED NORTHEAST CORNER	0	ORIGINAL UNIT - SN# R910700026 - RECOMMEND REPLACEMENT
CU-2	RHEEM	RAWD090CAZ-200	SPLIT SYSTEM CONDENSING UNIT	7 1/2 TONS	10 SEER	AHU-1	PAD MOUNTED NORTHEAST CORNER	10 YEARS	REPLACED ORIGINAL UNIT
CU-3	UNKNOWN	UNKNOWN	SPLIT SYSTEM CONDENSING UNIT	3 TONS	8 SEER	AHU-3	PAD MOUNTED SOUTHEAST CORNER	0	RECOMMEND REPLACEMENT
CUH-1	NELSON AIRE AAF	LSBESRFFXR-340212	ELECTRIC CABINET HEATER	UNKNOWN	100%	MEN'S ROOM	MEN'S ROOM	5 YEARS	HORIZONTAL CEILING MOUNTED
CUH-2	NELSON AIRE AAF	LSBESRFFXR-340212	ELECTRIC CABINET HEATER	UNKNOWN	100%	WOMEN'S ROOM	WOMEN'S ROOM	5YEARS	HORIZONTAL CEILING MOUNTED
PTAC-1	MCQUAY	16-07	THRU WALL	7.000 BTU COOLING	UNKNOWN	OFFICE	OFFICE	7 YEARS	

INVESTMENT GRADE LIGHTING AUDIT

CONCORD ENERGY SERVICES

CEG Project #: BS09-011
Project Name : WINSLOW TOWNSHIP SENIOR CITIZENS CENTER
Address: 33 COOPERS FOLLY ROAD
City, State: ATCO, N.J.
Building SF: 7200

kWh Cost: 0.17

	Existing Fixtures								Proposed Fixtures											Fixtures Retrofitted			Unit Installation Cost							
Existing Lighting Fixture Type	Room Number	Room Name	Lighting Fixture Description	Lamps per Fixture	Voltage	Watts	Qty of Fixtures	Total Watts	New Lighting Fixture Type	Existing/Replace	Description	Lamps per Fixture	Watts	Qty of Fixtures	Total Watts	Wattage Reduction	Average Burn Hours	Ave $/kwh	Energy Savings, kWh	Energy Savings, $	Qty	Material Each	Labor Each	Total Each	Total Materials	Total Labor	Total All	Rebate Estimate	Simple Payback
First Floor																														
A	1	Lobby	3L-T12 40w 2'x4' Recessed Troffer	3	120	115	4	460	NA	Relamp, Reballast	32w-T8 energy saver w/ electronic T8 High Efficiency ballast	3	72	4	288	172	1000	$0.17	172	$29.24	4	25.38	60	$85.38	$101.52	$240.00	$341.52	$40.00	10.3
A	1a	Vestibule	3L-T12 40w 2'x4' Recessed Troffer	3	120	115	1	115	NA	Relamp, Reballast	32w-T8 energy saver w/ electronic T8 High Efficiency ballast	3	72	1	72	43	1000	$0.17	43	$7.31	1	25.38	60	$85.38	$25.38	$60.00	$85.38	$10.00	10.3
A	2	Office	3L-T12 40w 2'x4' Recessed Troffer	3	120	115	2	230	NA	Relamp, Reballast	32w-T8 energy saver w/ electronic T8 High Efficiency ballast	3	72	2	144	86	1000	$0.17	86	$14.62	2	25.38	60	$85.38	$50.76	$120.00	$170.76	$20.00	10.3
B	3	Coat Closet	2L-T12 40w 1'x4' Surface Fixture	2	120	77	1	77	NB	Relamp, Reballast	32w-T8 energy saver w/ electronic T8 High Efficiency ballast	2	48	1	48	29	750	$0.17	22	$3.70	1	22.88	60	$82.88	$22.88	$60.00	$82.88	$10.00	19.7
B	4	Storage Closet	2L-T12 40w 1'x4' Surface Fixture	2	120	87	1	87	NB	Relamp, Reballast	32w-T8 energy saver w/ electronic T8 High Efficiency ballast	2	48	1	48	39	1000	$0.17	39	$6.63	1	22.88	60	$82.88	$22.88	$60.00	$82.88	$10.00	11.0
C	5	Womens Toilet Rm.	2L-T12 40w Vanity Wall Light (48")	2	120	87	1	87	NC	Relamp, Reballast	32w-T8 energy saver w/ electronic T8 High Efficiency ballast	2	48	1	48	39	1000	$0.17	39	$6.63	1	22.88	60	$82.88	$22.88	$60.00	$82.88	$10.00	11.0
B	5	Womens Toilet Rm.	2L-T12 40w 1'x4' Surface Fixture	2	120	87	4	348	NB	Relamp, Reballast	32w-T8 energy saver w/ electronic T8 High Efficiency ballast	2	48	4	192	156	1000	$0.17	156	$26.52	4	22.88	60	$82.88	$91.52	$240.00	$331.52	$40.00	11.0
D	6	Janitor's Closet	1L-60w A-Lamp Fixture	1	120	60	2	120	ND	Relamp	1L-CFL-26w Medium base	1	28	2	56	64	750	$0.17	48	$8.16	2	4.55	37.5	$42.05	$9.10	$75.00	$84.10	$0.00	10.3
C	7	Mens Toilet Rm.	2L-T12 40w Vanity Wall Light (48")	2	120	87	1	87	NC	Relamp, Reballast	32w-T8 energy saver w/ electronic T8 High Efficiency ballast	2	48	1	48	39	1000	$0.17	39	$6.63	1	22.88	60	$82.88	$22.88	$60.00	$82.88	$10.00	11.0
B	7	Mens Toilet Rm.	2L-T12 40w 1'x4' Surface Fixture	2	120	87	3	261	NB	Relamp, Reballast	32w-T8 energy saver w/ electronic T8 High Efficiency ballas	2	48	3	144	117	1000	$0.17	117	$19.89	3	22.88	60	$82.88	$68.64	$180.00	$248.64	$30.00	11.0
A	8	Social Hall	3L-T12 40w 2'x4' Recessed Troffer	3	120	117	52	6084	NA	Relamp, Reballast	32w-T8 energy saver w/ electronic T8 High Efficiency ballast	3	72	52	3744	2340	1000	$0.17	2,340	$397.80	52	25.38	60	$85.38	$1,319.76	$3,120.00	$4,439.76	$520.00	9.9
D	10	AHU Closet #2	1L-60w A-Lamp Fixture	1	120	60	1	60	ND	Relamp	1L-CFL-26w Medium base	1	28	1	28	32	750	$0.17	24	$4.08	1	4.55	37.5	$42.05	$4.55	$37.50	$42.05	$0.00	10.3
D	11	AHU Closet #1	1L-60w A-Lamp Fixture	1	120	60	1	60	ND	Relamp	1L-CFL-26w Medium base	1	28	1	28	32	750	$0.17	24	$4.08	1	4.55	37.5	$42.05	$4.55	$37.50	$42.05	$0.00	10.3
E	12	Kitchen	3L-T12 40w 2'x4' Surface Fixture	3	120	115	4	460	NE	Relamp, Reballast	32w-T8 energy saver w/ electronic T8 High Efficiency ballast	3	72	4	288	172	1000	$0.17	172	$29.24	4	25.38	60	$85.38	$101.52	$240.00	$341.52	$40.00	10.3
D	13	Kitchen Storage Rm	1L-60w A-Lamp Fixture	1	120	60	1	60	ND	Relamp	1L-CFL-26w Medium base	1	28	1	28	32	1000	$0.17	32	$5.44	1	4.55	37.5	$42.05	$4.55	$37.50	$42.05	$0.00	7.7
F	14	Mechanical Room	2L-T12 40w 1'x4' Industrial Fixture (Chain Hung)	2	120	77	2	154	NF	Relamp, Reballast	32w-T8 energy saver w/ electronic T8 High Efficiency ballast	2	48	2	96	58	750	$0.17	44	$7.40	2	22.88	60	$82.88	$45.76	$120.00	$165.76	$20.00	19.7
G	N/A	Exterior Lighting	1L-70w MH Surface Mtd. Fixture	1	120	70	5	350	NG	Existing to Remain	Existing to Remain	1	70	5	350	0	0	$0.17	0	$0.00	0	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	
H	N/A	Exterior Lighting	1L-70w MH Wall Pack	1	120	70	6	420	NH	Existing to Remain	Existing to Remain	1	70	6	420	0	0	$0.17	0	$0.00	0	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	
Total First Floor							**92**	**9520**						**92**	**6070**	**3450**			**3,396**	**$577.36**	**81**				**$1,919**	**$4,748**	**$6,667**	**$760**	**10.2**

Project Name: Winslow Township Senior Citizens Center
Location: Atco, NJ
Description: Photovoltaic System 95% Financing - 20 year

Simple Payback Analysis

	Photovoltaic System 95% Financing - 20 year
Total Construction Cost	$331,200
Annual kWh Production	57,428
Annual Energy Cost Reduction	$9,763
Annual SREC Revenue	$20,100
First Cost Premium	**$331,200**
Simple Payback:	**11.09** Years

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	95%
Financing Term (mths):	240	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.170**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	7.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Interest Expense	Loan Principal	Net Cash Flow	Cumulative Cash Flow
0	$16,560	0	0	0	$0	0	0	(16,560)	0
1	$0	57,428	$9,763	$0	$20,100	$21,788	$7,485	$590	($15,970)
2	$0	57,141	$10,056	$0	$19,999	$21,247	$8,026	$782	($15,188)
3	$0	56,855	$10,357	$0	$19,899	$20,666	$8,606	$984	($14,204)
4	$0	56,571	$10,668	$0	$19,800	$20,044	$9,229	$1,195	($13,009)
5	$0	56,288	$10,988	$580	$19,701	$19,377	$9,896	$836	($12,173)
6	$0	56,007	$11,318	$577	$19,602	$18,662	$10,611	$1,070	($11,102)
7	$0	55,727	$11,657	$574	$19,504	$17,895	$11,378	$1,315	($9,788)
8	$0	55,448	$12,007	$571	$19,407	$17,072	$12,201	$1,570	($8,218)
9	$0	55,171	$12,367	$568	$19,310	$16,190	$13,083	$1,836	($6,382)
10	$0	54,895	$12,738	$565	$19,213	$15,244	$14,028	$2,113	($4,269)
11	$0	54,620	$13,120	$563	$19,117	$14,230	$15,043	$2,402	($1,866)
12	$0	54,347	$13,514	$560	$19,022	$13,143	$16,130	$2,703	$837
13	$0	54,076	$13,919	$557	$18,926	$11,977	$17,296	$3,016	$3,853
14	$0	53,805	$14,337	$554	$18,832	$10,726	$18,546	$3,342	$7,194
15	$0	53,536	$14,767	$551	$18,738	$9,386	$19,887	$3,681	$10,875
16	$0	53,269	$15,210	$549	$18,644	$7,948	$21,325	$4,033	$14,907
17	$0	53,002	$15,666	$546	$18,551	$6,407	$22,866	$4,398	$19,306
18	$0	52,737	$16,136	$543	$18,458	$4,754	$24,519	$4,778	$24,084
19	$0	52,473	$16,620	$540	$18,366	$2,981	$26,292	$5,173	$29,257
20	$0	52,211	$17,119	$538	$18,274	$1,080	$28,192	$5,582	$34,840
21	$0	51,950	$17,633	$535	$18,183	$916	$25,918	$8,447	$43,286
22	$0	51,690	$18,162	$532	$18,092	$627	$21,328	$13,766	$57,052
23	$0	51,432	$18,706	$530	$18,001	$0	$0	$36,178	$93,230
24	$0	51,175	$19,268	$527	$17,911	$0	$0	$36,652	$129,882
25	$0	50,919	$19,846	$524	$17,822	$0	$0	$37,143	$167,025
	Totals:	1,095,608	$262,329	$8,936	$383,463	$270,816	$314,640	$361,885	$523,460
				Net Present Value (NPV)			**$27,642**		
				Internal Rate of Return (IRR)			**14.1%**		

Project Name: **Winslow Township Senior Citizens Center**
Location: **Atco, NJ**
Description: **Photovoltaic System - Direct Purchase**

Simple Payback Analysis

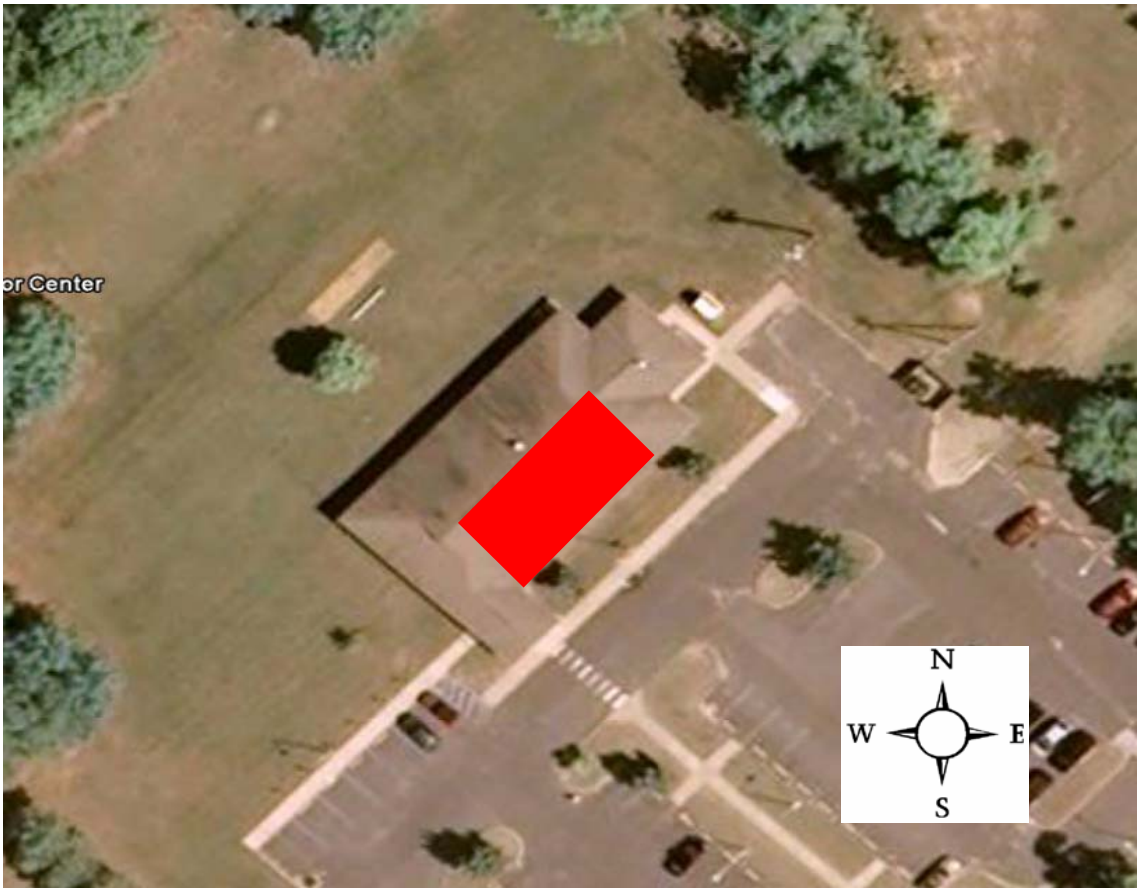
	Photovoltaic System - Direct Purchase
Total Construction Cost	$331,200
Annual kWh Production	57,428
Annual Energy Cost Reduction	$9,763
Annual SREC Revenue	$20,100
First Cost Premium	**$331,200**
Simple Payback:	**11.09** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.170**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	$331,200	0	0	0	$0	(331,200)	0
1	$0	57,428	$9,763	$0	$20,100	$29,863	($301,337)
2	$0	57,141	$10,056	$0	$19,999	$30,055	($271,282)
3	$0	56,855	$10,357	$0	$19,899	$30,257	($241,026)
4	$0	56,571	$10,668	$0	$19,800	$30,468	($210,558)
5	$0	56,288	$10,988	$580	$19,701	$30,109	($180,449)
6	$0	56,007	$11,318	$577	$19,602	$30,343	($150,105)
7	$0	55,727	$11,657	$574	$19,504	$30,588	($119,518)
8	$0	55,448	$12,007	$571	$19,407	$30,843	($88,675)
9	$0	55,171	$12,367	$568	$19,310	$31,109	($57,567)
10	$0	54,895	$12,738	$565	$19,213	$31,386	($26,180)
11	$0	54,620	$13,120	$563	$19,117	$31,675	$5,494
12	$0	54,347	$13,514	$560	$19,022	$31,976	$37,470
13	$0	54,076	$13,919	$557	$18,926	$32,289	$69,759
14	$0	53,805	$14,337	$554	$18,832	$32,615	$102,374
15	$0	53,536	$14,767	$551	$18,738	$32,953	$135,327
16	$0	53,269	$15,210	$549	$18,644	$33,305	$168,632
17	$0	53,002	$15,666	$546	$18,551	$33,671	$202,304
18	$0	52,737	$16,136	$543	$18,458	$34,051	$236,355
19	$0	52,473	$16,620	$540	$18,366	$34,446	$270,801
20	$0	52,211	$17,119	$538	$18,274	$34,855	$305,656
21	$1	51,950	$17,633	$535	$18,183	$35,280	$340,936
22	$2	51,690	$18,162	$532	$18,092	$35,721	$376,657
23	$3	51,432	$18,706	$530	$18,001	$36,178	$412,835
24	$4	51,175	$19,268	$527	$17,911	$36,652	$449,486
25	$5	50,919	$19,846	$524	$17,822	$37,143	$486,629
	Totals:	1,095,608	$262,329	$8,936	$383,463	$817,829	$636,856
				Net Present Value (NPV)		**$486,654**	
				Internal Rate of Return (IRR)		**8.2%**	

Building	Usable Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Senior Citizens Center	2760	Sunpower SPR230	160	14.7	2,353	36.80	57,428	5,280	15.64



.= Proposed PV Layout

Notes:

1. Estimated kWH based on 4.68 hours full output per day per 365 day year. Actual kWH will vary day to day.

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Senior Citizens Center

Building ID: 1785330
For 12-month Period Ending: February 28, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: July 01, 2009

Facility
Senior Citizens Center
33 Coopers Folly Road
Atco, NJ 08004

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1992
Gross Floor Area (ft²): 7,200

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

Site Energy Use Summary[3]

Electricity (kBtu)	188,609
Natural Gas (kBtu)[4]	485,971
Total Energy (kBtu)	674,580

Energy Intensity[5]

Site (kBtu/ft²/yr)	98
Source (kBtu/ft²/yr)	165

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	55

Electric Distribution Utility
Atlantic City Electric Co

National Average Comparison

National Average Site EUI	52
National Average Source EUI	102
% Difference from National Average Source EUI	62%
Building Type	Social/Meeting

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.

ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.
NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Senior Citizens Center	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Social/Meeting	Is this an accurate description of the space in question?		☐
Location	33 Coopers Folly Road, Atco, NJ 08004	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Senior Citizens Center (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	7,200 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	1 (Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	35 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	5 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Atlantic City Electric Co

Fuel Type: Electricity		
Meter: Electric (kWh) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (kWh)**
01/17/2009	02/16/2009	4,489.00
12/17/2008	01/16/2009	4,948.00
11/17/2008	12/16/2008	4,384.00
10/17/2008	11/16/2008	4,003.00
09/17/2008	10/16/2008	3,452.00
08/17/2008	09/16/2008	4,977.00
07/17/2008	08/16/2008	6,273.00
06/17/2008	07/16/2008	6,719.00
05/17/2008	06/16/2008	5,313.00
04/17/2008	05/16/2008	3,909.00
03/17/2008	04/16/2008	4,912.00
Electric Consumption (kWh)		**53,379.00**
Electric Consumption (kBtu)		**182,129.15**
Total Electricity Consumption (kBtu)		**182,129.15**
Is this the total Electricity consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas		
Meter: Gas (therms) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (therms)**
01/17/2009	02/16/2009	1,094.02
12/17/2008	01/16/2009	898.91
11/17/2008	12/16/2008	635.07
10/17/2008	11/16/2008	474.72
09/17/2008	10/16/2008	103.60
08/17/2008	09/16/2008	87.38
07/17/2008	08/16/2008	79.46
06/17/2008	07/16/2008	87.11
05/17/2008	06/16/2008	154.96
04/17/2008	05/16/2008	278.37

03/17/2008	04/16/2008	599.01
Gas Consumption (therms)		**4,492.61**
Gas Consumption (kBtu)		**449,261.00**
Total Natural Gas Consumption (kBtu)		**449,261.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

Additional Fuels	
Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	☐

Certifying Professional

(When applying for the ENERGY STAR, this must be the same PE that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

Facility
Senior Citizens Center
33 Coopers Folly Road
Atco, NJ 08004

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Senior Citizens Center	
Gross Floor Area Excluding Parking: (ft^2)	7,200
Year Built	1992
For 12-month Evaluation Period Ending Date:	February 28, 2009

Facility Space Use Summary

Senior Citizens Center	
Space Type	Other - Social/Meeting
Gross Floor Area(ft^2)	7,200
Number of PCs[o]	1
Weekly operating hours[o]	35
Workers on Main Shift[o]	5

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 02/28/2009)	**Baseline** (Ending Date 02/28/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft^2)	98	98	0	N/A	52
Source (kBtu/ft^2)	165	165	0	N/A	102
Energy Cost					
$/year	$ 17,358.52	$ 17,358.52	N/A	N/A	$ 9,211.58
$/$ft^2$/year	$ 2.41	$ 2.41	N/A	N/A	$ 1.28
Greenhouse Gas Emissions					
$MtCO_2e$/year	55	55	0	N/A	29
$kgCO_2e/ft^2$/year	8	8	0	N/A	4

More than 50% of your building is defined as Social/Meeting. This building is currently ineligible for a rating. Please note the National Average column represents the CBECS national average data for Social/Meeting. This building uses X% less energy per square foot than the CBECS national average for Social/Meeting.

Notes:
o - This attribute is optional.
d - A default value has been supplied by Portfolio Manager.