



ENERGY AUDIT – FINAL REPORT

WILDWOOD CREST BOROUGH HALL

6101 PACIFIC AVE.

WILDWOOD CREST, NJ 08260

ATTN: MR. KEVIN M. YECCO
Borough Clerk/Administrator

CEG PROJECT No. 9P09039

CONCORD ENGINEERING GROUP



520 SOUTH BURNT MILL ROAD

VOORHEES, NJ 08043

TELEPHONE: (856) 427-0200

FACSIMILE: (856) 427-6529

WWW.CEG-INC.NET

CONTACTS:

RAYMOND JOHNSON

Cell: (609) 760-4057

rjohnson@ceg-inc.net

Table of Contents

I. EXECUTIVE SUMMARY 3

II. INTRODUCTION..... 6

III. METHOD OF ANALYSIS..... 8

IV. HISTORIC ENERGY CONSUMPTION/COST 9

 A. Energy Usage / Tariffs 9

 B. Energy Use Intensity (EUI) 12

 C. EPA Energy Benchmarking System 14

V. FACILITY DESCRIPTION 16

VI. MAJOR EQUIPMENT LIST 17

VII. ENERGY CONSERVATION MEASURES 18

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES 25

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY 26

X. INSTALLATION FUNDING OPTIONS..... 29

XI. ADDITIONAL RECOMMENDATIONS..... 30

Appendix A – Detailed Cost Breakdown per ECM

Appendix B – New Jersey Smart Start[®] Program Incentives

Appendix C – Major Equipment List

Appendix D - Portfolio Manager “Statement of Energy Performance”

Appendix E – Investment Grade Lighting Audit

Appendix F – Building Aerial Photo

REPORT DISCLAIMER

The information contained within this report, including any attachment(s), is intended solely for use by the named addressee(s). If you are not the intended recipient, or a person designated as responsible for delivering such messages to the intended recipient, you are not authorized to disclose, copy, distribute or retain this report, in whole or in part, without written authorization from Concord Engineering Group, Inc., 520 S. Burnt Mill Road, Voorhees, NJ 08043.

This report may contain proprietary, confidential or privileged information. If you have received this report in error, please notify the sender immediately. Thank you for your anticipated cooperation.

I. EXECUTIVE SUMMARY

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

The Borough of Wildwood Crest
 Borough Hall
 6101 Pacific Avenue
 Wildwood Crest, NJ 08260

Municipal Contact: Mr. Kevin M. Yecco, Clerk / Administrator

Facility Contact: Mr. Michael Velardo, DPW

This audit was performed in connection with the New Jersey Clean Energy Local Government Energy Audit Program. The energy audit is conducted to promote the mission of the office of Clean Energy, 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	\$ 36,891
Natural Gas	\$ 10,323
Total	\$ 47,214

The potential annual energy cost savings for each energy conservation measure (ECM) are shown below in Table 1. Be aware that the ECM's are not additive because of the interrelation of some of the measures. This audit is consistent with an ASHRAE level 2 audit. The cost and savings for each measure is $\pm 20\%$. The evaluations are based on engineering estimations and industry standard calculation methods. More detailed analyses would require engineering simulation models, hard equipment specifications, and contractor bid pricing.

Table 1
Energy Conservation Measures (ECM's)

ECM NO.	DESCRIPTION	COST ^A	ANNUAL SAVINGS ^B	SIMPLE PAYBACK (YEARS)	SIMPLE ROI
1	Lighting Upgrade – General	\$3,350	\$589	5.7	18 %
2	Install Lighting Controls	\$1,155	\$304	3.8	26 %
3	Replace Split Systems	\$16,008	\$2392	9.8	8.0%
4	Programmable Thermostats	\$4000	\$2210	1.8	57.6%

Notes: A. Cost takes into consideration applicable NJ SmartStart™ incentives and maintenance savings.

B. Savings takes into consideration applicable 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 – General	1.5	3,567	-
2	Install Lighting Controls	-	1,844	-
3	Replace Split Systems	12.4	9904	-
4	Programmable Thermostats	-	70.3	1122

Recommendations:

Concord Engineering Group recommends the implementation of all ECM's that provide a calculated simple payback at or under Ten (10) years. The following Energy Conservation Measures are recommended for the Wildwood Crest Borough Hall:

- **ECM #1:** Upgrade the Lighting
- **ECM#2:** Install Lighting Controls
- **ECM#3:** Replace Split Systems
- **ECM #4:** Programmable Thermostats

In addition to the ECM's, there are maintenance and operational measures that can provide significant energy savings and provide immediate benefit. The ECM's listed above represent investments that can be made to the facility which are justified by the savings seen overtime. However, the maintenance items and small operational improvements below are typically achievable with on site staff or maintenance contractors and in turn have the potential to provide substantial operational savings compared to the costs associated. The following are recommendations which should be considered a priority in achieving an energy efficient building:

1. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
2. Maintain all weather stripping on entrance doors.
3. Clean all light fixtures to maximize light output.
4. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

II. INTRODUCTION

This comprehensive energy audit covers the **16,052** square foot Borough Hall building located at 6101 Pacific Avenue. The building is used for municipal offices and includes general administrative offices, tax, code, fire prevention, municipal court, and Police Department.

Note: The building square footage was verified after field survey and architectural drawing review. The square footage was incorrectly noted on Application “C” as **15,000** square feet.

Electrical and natural gas utility information is collected and analyzed for one full year’s energy use of the building. The utility information allows for analysis of the building’s operational characteristics; calculate energy benchmarks for comparison to industry averages, estimated savings potential, and baseline usage/cost to monitor the effectiveness of implemented measures. A computer spreadsheet is used to calculate benchmarks and to graph utility information (see the utility profiles below).

The Energy Use Intensity (EUI) is established for the building. Energy Use Intensity (EUI) is expressed in British Thermal Units/square foot/year (BTU/ft²/yr), which is 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 the annual consumption of all energy sources to BTU’s and dividing by the area (gross square footage) of the building. Blueprints (where available) are utilized to verify the gross area of the facility. The EUI is a good indicator of the relative potential for energy savings. A low EUI indicates less potential for energy savings, while a high EUI indicates poor building performance therefore a high potential for energy savings.

Existing building architectural and engineering drawings (where available) are utilized for additional background information. The building envelope, lighting systems, HVAC equipment, and controls information gathered from building drawings allow for a more accurate and detailed review of the building. The information is compared to the energy usage profiles developed from utility data. 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.

The preliminary audit information is gathered in preparation for the site survey. The site survey provides critical information in deciphering where energy is spent and opportunities exist within a facility. The entire site is surveyed to inventory the following to gain an understanding of how each facility operates:

- Building envelope (roof, windows, etc.)
- Heating, ventilation, and air conditioning equipment (HVAC)
- Lighting systems and controls
- Facility-specific equipment

The building site visit is performed to survey all major building components and systems. The site visit includes detailed inspection of energy consuming components. Summary of building occupancy schedules, operating and maintenance practices, and energy management programs provided by the building manager are collected along with the system and components to determine a more accurate impact on energy consumption.

III. METHOD OF ANALYSIS

Post site visit work includes evaluation of the information gathered, researching possible conservation opportunities, organizing the audit into a comprehensive report, and making recommendations on HVAC, lighting and building envelope improvements. Data collected is processed using energy engineering calculations to anticipate energy usage for each of the proposed energy conservation measures (ECM's). The actual building's energy usage is entered directly from the utility bills provided by the owner. The anticipated energy usage is compared to the historical data to determine energy savings for the proposed ECM's.

It is pertinent to note, that the savings noted in this report are not additive. The savings for each recommendation is calculated as standalone energy conservation measures. Implementation of more than one ECM may in some cases affect the savings of each ECM. The savings may in some cases be relatively higher if an individual ECM is implemented in lieu of multiple recommended ECM's. For example implementing reduced operating schedules for inefficient lighting will result in a greater relative savings. Implementing reduced operating schedules for newly installed efficient lighting will result in a lower relative savings, because there is less energy to be saved. If multiple ECM's are recommended to be implemented, the combined savings is calculated and identified appropriately.

ECM's are determined by identifying the building's unique properties and deciphering the most beneficial energy saving measures available that meet the specific needs of the facility. The building construction type, function, operational schedule, existing conditions, and foreseen future plans are critical in the evaluation and final recommendations. Energy savings are calculated base on industry standard methods and engineering estimations. Energy consumption is calculated based on manufacturer's cataloged information when new equipment is proposed.

Cost savings are calculated based on the actual historical energy costs for the facility. Installation costs include labor and equipment to estimate the full up-front investment required to implement a change. Costs are derived from Means Cost Data, industry publications, and local contractors and equipment suppliers. The NJ SmartStart Building® program incentives savings (where applicable) are included for the appropriate ECM's and subtracted from the installed cost. Maintenance savings are calculated where applicable and added to the energy savings for each ECM. The costs and savings are applied and a simple payback and simple return on investment (ROI) is calculated. The simple payback is based on the years that it takes for the savings to pay back the net installation cost (Net Installation divided by Net Savings.) A simple return on investment is calculated as the percentage of the net installation cost that is saved in one year (Net Savings divided by Net Installation.)

A simple life-time calculation is shown for each ECM. The life-time for each ECM is estimated based on the typical life of the equipment being replaced or altered. The energy savings is extrapolated throughout the life-time of the ECM. The total energy savings is calculated as the total life-time multiplied by the yearly savings.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

Electric

Table 3 and Figure 1 represent the electrical usage for the surveyed facility from September-08 to August-09. Atlantic City Electric Utility provides electricity to the facility under the MGS (Monthly General Service) rate. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. 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 historical data received for the facility.

Natural Gas

Table 4 and Figure 2 show the natural gas energy usage from August-08 to July-09. South Jersey Gas supplies the natural gas utilizing the GSG rate schedule and delivers the fuel to the burner under the firm transportation rate at the facility. The gas utility measures consumption in cubic feet x 100 (CCF), and converts the quantity into Therms of energy. One Therm is equivalent to 100,000 BTUs of energy. Below is the average unit cost for the utilities at this facility.

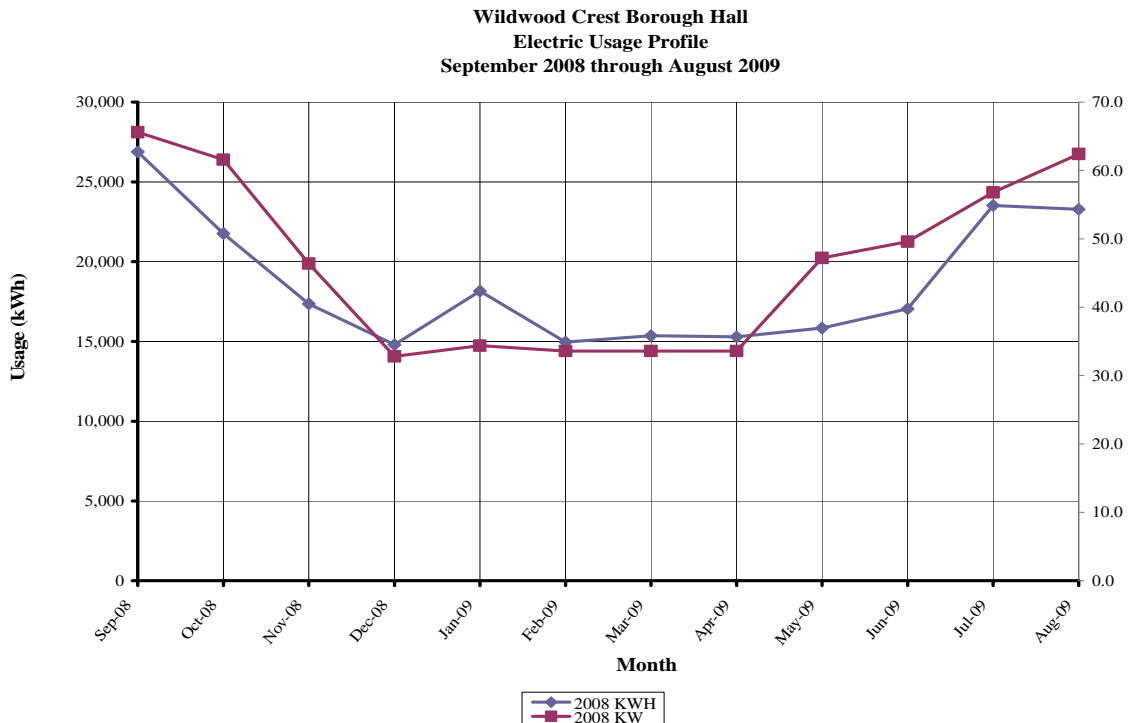
<u>Description</u>	<u>Average</u>
Electricity	16.5¢ / kWh (4.82¢ / kBtu)
*Natural Gas	\$1.59 / therm (1.59¢ / kBtu)

*Note: The Natural Gas cost per Therm includes customer service charges.

**Table 3
Electricity Billing Data**

Utility Provider: ACE, Monthly General Service (Acct. #0320545-9996-7)			
MONTH OF USE	CONSUMPTION KWH	DEMAND	TOTAL BILL
Sep-08	26,880	65.6	\$4,821
Oct-08	21,760	61.6	\$3,846
Nov-08	17,360	46.4	\$2,575
Dec-08	14,800	32.8	\$2,169
Jan-09	18,160	34.4	\$2,639
Feb-09	14,960	33.6	\$2,180
Mar-09	15,360	33.6	\$2,263
Apr-09	15,280	33.6	\$2,230
May-09	15,840	47.2	\$2,407
Jun-09	17,040	49.6	\$2,791
Jul-09	23,520	56.8	\$4,491
Aug-09	23,280	62.4	\$4,480
Totals	224,240	65.6 Max	\$36,891
AVERAGE DEMAND 46.5 KW average AVERAGE RATE \$0.165 \$/kWh			

**Figure 1
Electricity Usage Profile**

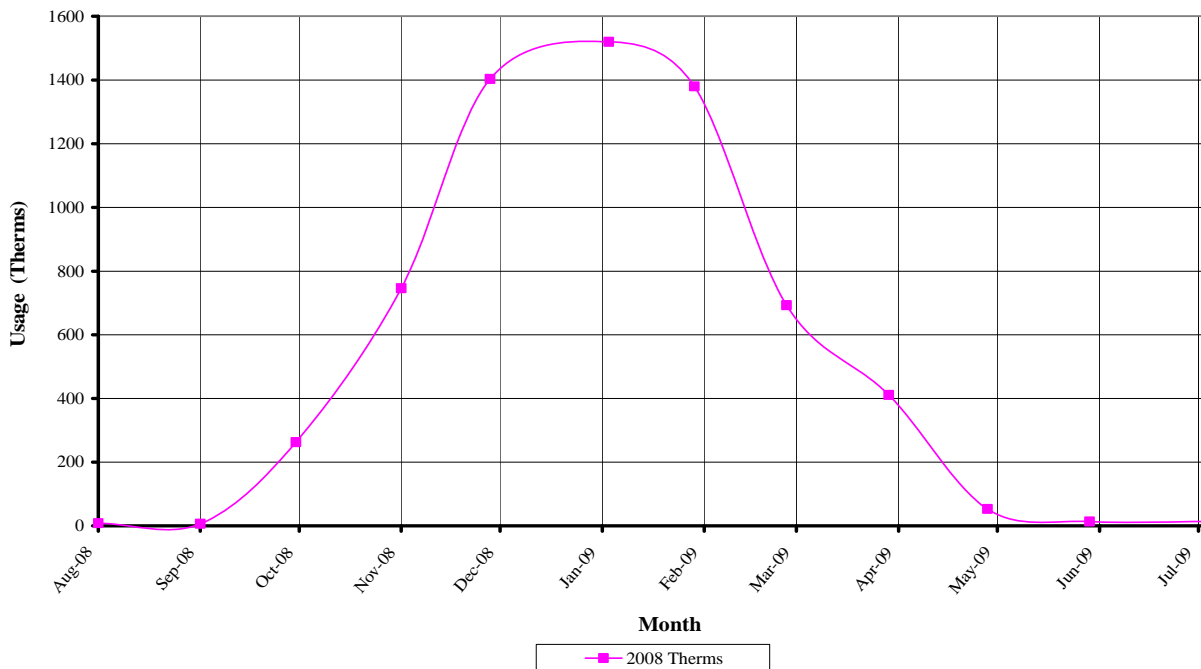


**Table 4
Natural Gas Billing Data**

Utility Provider: SJ Gas - Rate - GSG, (Meter #0517338)		
MONTH OF USE	CONSUMPTION (THERMS)	TOTAL BILL
Aug-08	8.22	\$31.46
Sep-08	6.22	\$26.69
Oct-08	263.16	\$354.44
Nov-08	745.92	\$898.37
Dec-08	1403.38	\$2,269.70
Jan-09	1519.81	\$2,478.00
Feb-09	1379.78	\$2,252.03
Mar-09	692.83	\$1,140.83
Apr-09	411.13	\$685.26
May-09	52.79	\$104.67
Jun-09	13.46	\$41.87
Jul-09	13.42	\$39.32
TOTALS	6510.12	\$10,322.64
AVERAGE RATE:	\$1.59	\$/THERM

**Figure 2
Natural Gas Usage Profile**

Wildwood Crest Borough Hall
Gas Usage Profile
August 2008 through July 2009



B. Energy Use Intensity (EUI)

Energy Use Intensity (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for 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 for similar building types. The Oak Ridge National Laboratory (ORNL) Buildings Technology Center under a contract with the U.S. Department of Energy maintains a Benchmarking Building Energy Performance Program. The ORNL website determines how a building's energy use compares with similar facilities throughout the U.S. and in a specific region or state.

Source use differs from site usage when comparing a building's energy consumption with the national average. Site energy use is the energy consumed by the building at the building site only. Source energy use includes the site energy use as well as all of the losses to create and distribute the energy to the building. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, which allows for a complete assessment of energy efficiency in a building. The type of utility purchased has a substantial impact on the source energy use of a building. The EPA has determined that source energy is the most comparable unit for evaluation purposes and overall global impact. Both the site and source EUI ratings for the building are provided to understand and compare the differences in energy use.

The site and source EUI for this facility is calculated as follows. (See Table 5 for details):

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

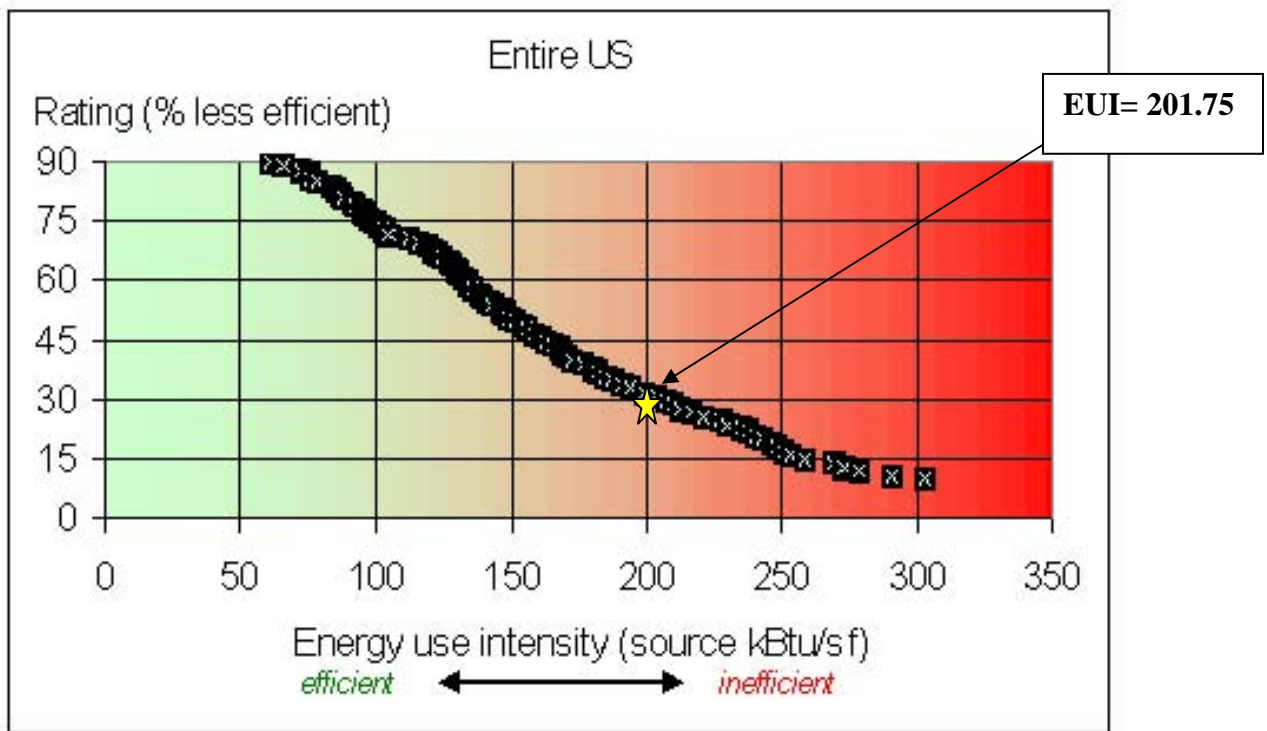
$$\text{Building Source EUI} = \frac{(\text{Electric Usage in kBtu} \times \text{SS Ratio} + \text{Gas Usage in kBtu} \times \text{SS Ratio})}{\text{Building Square Footage}}$$

Table 5
Borough Hall EUI Calculations

ENERGY TYPE	BUILDING USE			SITE ENERGY	SITE-SOURCE	SOURCE ENERGY
	kWh	Therms	Gallons	kBtu	RATIO	kBtu
ELECTRIC	224,240			765,555	3.340	2,556,955
NATURAL GAS		6,510.12		651,012	1.047	681,610
FUEL OIL			0.00	0	1.010	0
PROPANE			0.00	0	1.010	0
TOTAL				1,416,567		3,238,564
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA	16,052			SQUARE FEET		
BUILDING SITE EUI	88.25			kBtu/SF/YR		
BUILDING SOURCE EUI	201.75			kBtu/SF/YR		

Figure 3 below depicts a national EUI grading for the source use of office buildings.

Figure 3
Source Energy Use Intensity Distributions – Offices



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 priorities 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 login page for the account can be accessed at the following web address; the username and password are also listed below:

<https://www.energystar.gov/istar/pmpam/index.cfm?fuseaction=login.login>

User Name:	wildwoodcrestboro
Password:	lgeaceg09012
Security Question:	What is your birth city?
Security Answer:	“Wildwood Crest”

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 6
ENERGY STAR Performance Rating

FACILITY DESCRIPTION	ENERGY PERFORMANCE RATING	NATIONAL AVERAGE
Borough Hall	21	50

* N/A Due to building category, see below.

Specific building types are detailed on the ENERGY STAR website. Non-typical buildings are covered by an “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 Star Performance Rating cannot be calculated if more than 10% of a building is classified as “Other,” or if the building is an office with less than 5,000 square feet of floor space.

In addition to the Energy Star Performance Rating, the Portfolio Manager also calculates the Building Source Energy Use Intensity (EUI).

The Energy Use Intensity (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 Borough of Wildwood Crest 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 of the Borough Hall, in addition to the Energy Star Performance Rating.

The EUI distribution, Figure 3, is specific for Office Buildings throughout the country. The Borough Hall has a Building Source EUI of 201.75 rating for this type of facility. 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.

Refer to Appendix D for detailed energy benchmarking report entitled “STATEMENT OF ENERGY PERFORMANCE.”

V. FACILITY DESCRIPTION

The Borough Hall is the main municipal facility for Wildwood Crest. It houses the offices of the Tax Assessor, Borough Clerk, Commissioners, Courts, Fire Prevention & Code Enforcement, a Court Room, and the Police Station. The Police Station portion of the facility is a 24/7 operation. The building is a 2-story masonry building with brick exterior constructed in the 1930's. A major renovation was performed in 1996. The sloped portion of the roof structure is wood timbers with asphalt shingles. The flat section is wood joists with a membrane roof. A project to insulate the attic space was in progress at the time of our survey.

Heating and Cooling Systems

The Heating, Cooling and Ventilation systems for this facility consist of three(3) packaged gas-electric rooftop units and seven(7) DX split systems with hydronic heating coils. (38 tons total cooling capacity) Two of the three rooftop units are recent 2007 installed with good efficiency ratings, the third 2005 unit is a lower efficiency unit. All of the seven(7) split systems are over 15 years old and have low efficiencies by today's standards. The units are all single zone, thermostats, ducted supply and return with constant volume supply fans.

In addition, a hydronic heating system exists to account for perimeter envelope and ventilation air loads. An aged cast iron, atmospheric draft, Wiel McLain boiler and circulating pumps provide hot water to perimeter baseboard finned-tube units, and two split system heating coils. The finned tube units are equipped with zone thermostats and two-way control valves. The split system hydronic coils are equipped with 3-way valves. Many of the control valve are reportedly not functioning. This system is shut off in the summer months.

Each zone is provided with two thermostats, one for heating and the other for cooling. The thermostats are non-programmable manual type. The presence of separate heating and cooling thermostats has potential for simultaneous heating and cooling.

Domestic Hot Water

A 1992 vintage gas-fired Hot Water Heater, located in the boiler room is a minimum efficiency, Ruud brand GL-75, 75,500 Btuh input. It is beyond its expected useful lifetime.

Lighting System

Typical lighting throughout the building uses fluorescent tube fixtures with energy efficient T-8 lamps and electronic ballasts. Standard switching is utilized and there are no other types of lighting controls present. A limited number of fixtures use compact fluorescent lamps. The exterior lighting uses mainly high intensity discharge wall mounted fixtures and light poles in the parking areas.

Refer to Appendix E for a detailed Investment Grade Lighting Audit.

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 C for the Major Equipment List for this facility.

VII. ENERGY CONSERVATION MEASURES (ECM)

ECM #1: Lighting Upgrade – General

Description:

CEG recommends replacement of the existing 32 watt T8 lamps with 28 watt T8 lamps. Although the existing T8 lamps and electronic ballasts are relatively efficient, a simple lamp change will reduce the facilities annual electrical cost and offers a favorable payback period.

The energy efficiency of the existing lamp and ballast combinations were compared with the latest technology of light fixtures available. Long life, energy efficient LED fixtures were evaluated as replacements, but the current installed cost and extended payback period eliminated them from recommendation at this time.

Existing egress fixture lamp replacement shall be excluded from this ECM so that the current egress light levels are maintained.

Energy Savings Calculations:

The Investment Grade Lighting Audit appendix outlines the proposed retrofits, costs, savings, and payback periods.

NJ Smart Start[®] Program Incentives are calculated as follows:

From the Smart Start Incentive appendix, the replacement of a T-12 fixture to a T-5 or T-8 fixture warrants the following incentive: (1-2 lamp) = \$10 per fixture; (3-4 lamp) = \$20 per fixture.

Smart Start Incentive = (*# of 1-2 lamp fixtures x \$10*) + (*# of 3-4 lamp fixtures x \$20*)

Smart Start Incentive = (*(2)-2 lamp fixtures x \$10*) = \$20

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$3,370
NJ Smart Start Equipment Incentive (\$):	(\$20)
Net Installation Cost (\$):	\$3,350
Maintenance Savings (\$ / yr):	\$0
Energy Savings (\$ / yr):	\$589

Net Savings (\$ / yr):	\$589
Simple Payback (yrs):	5.7
Simple Return On Investment (%):	18 %
Simple Lifetime ROI (%):	2.7 %
Estimated ECM Lifetime (yr):	21.3
Simple Lifetime Savings (\$):	\$12,545

- ECM#1 Calculations DO NOT include lighting control changes implemented in ECM#2.
- If ECM#1 and #2 are implemented together the savings will be relatively lower than shown above.

ECM #2: Install Lighting Controls

Description:

Install Lighting Controls to Reduce the Lighting Use

In some areas the lighting is left on unnecessarily. In many cases the lights are left on because of the inconvenience to manually switch lights off when a room is left or on when a room is first occupied. This is common in storage rooms that are occupied for only short periods and only a few times per day. In some instances lights are left on due to the misconception that it is better to keep the lights on rather than to continuously switch lights on and off. Although increased switching reduces lamp life, the energy savings outweigh the lamp replacement costs. The payback timeframe for when to turn the lights off is approximately two minutes. If the lights are off for at least a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is adequate to provide reduced lighting levels when full light output is not needed. Occupancy sensors detect motion and will switch the lights on when the room is occupied. Occupancy sensors can either be mounted in place of a current wall switch, or on the ceiling to cover large areas. Photocell control senses light levels and turn off or reduce lights when there is adequate daylight. Photocells are mostly used outside, but are becoming more popular in energy-efficient interior lighting designs as well.

ASHRAE Standard 90.1-2004, Appendix G is a reference standard for modeling building efficiency. The standard estimates that lighting controls provide a 10% reduction in lighting power usage for daytime occupancies in buildings over 5,000 SF, and 15% reduction in buildings under 5,000 SF.

CEG would recommend the replacement of standard wall switches with sensor wall switches for individual rooms, ceiling mount sensors for large office areas or restrooms, and fixture mount box sensors for some applications. Sensors shall be manufactured by Sensorswitch, Watt Stopper or equivalent.

The “Investment Grade Lighting Audit” appendix of this report includes the summary of lighting controls implemented in this ECM and outlines the proposed controls, costs, savings, and payback periods. The calculations adjust the lighting power usage by 10% for all areas that include occupancy sensor lighting controls.

Energy Savings Calculations:

Energy Savings = Total kilowatt Hours per year (kWh/yr) of Occupancy Sensor Controlled Area x Average Electric Cost (\$/kWh) x 10% Energy Savings:

$$= 18,440 \text{ kWh/yr.} \times \$0.165/\text{kWh} \times 10\%$$

$$\text{Annual Savings} = \underline{\$304 / \text{yr}}$$

Installation cost per dual-technology sensor (Basis: Sensorswitch or equivalent) is \$75/unit including material and labor.

$$\text{Installation Cost} = \$75 \times 21 \text{ motion sensors} = \underline{\$1,575}$$

NJ Smart Start[®] Program Incentives are calculated as follows:

From the NJ Smart Start appendix, the installation of a lighting control device warrants an incentive of \$20 per occupancy sensor.

$$\text{Smart Start Incentive} = (\# \text{ of Occupancy Sensors} \times \$20)$$

$$\text{Smart Start Incentive} = (21 \times \$20) = \underline{\$420}$$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$1,575
NJ Smart Start Equipment Incentive (\$):	(\$420)
Net Installation Cost (\$):	\$1,155
Maintenance Savings (\$ / yr):	\$0
Energy Savings (\$ / yr):	\$304
Net Savings (\$ / yr):	\$304
Simple Payback (yrs):	3.8
Simple Return On Investment (%):	26 %
Simple Lifetime ROI (%):	2.9 %

Estimated ECM Lifetime (yr):	15
Simple Lifetime Savings (\$):	\$4,560

* ECM#2 Calculations DO NOT include lighting changes implemented in ECM#1. If ECM#1 and #2 are implemented together the savings will be relatively lower than shown above.

ECM #3: Split System Unit Replacement

Description:

The seven (7) split systems are aged and beyond their useful life. The size of these units range from 1-1/2 through 6 Tons for a total of 26 tons capacity. Regardless of energy savings, their replacement is needed. The units, made in 1992-94 by Rheem, had an efficiency rating of 10 EER when new. Due to the age and wear, the estimated efficiency is 9 EER today.

The three rooftop unit, made in 2005-2008, have an good efficiency ratings and 11 to 14 years life left. Thus, they are not part of this ECM.

This ECM includes replacing the split system condensing units with equivalent capacity but greater energy efficiency. As replacement proposed is of same manufacturer as existing, we assume that the existing indoor air handlers and DX coils can be re-used. We include cleaning and testing of these coils in the costs for this ECM. The ECM calculations are based on Rheem RASL-JEC condensing units with efficiencies of 14 EER cooling.

Heating Season Heating Degree Days = 4,888 HDD
 Cooling Season Full Load Cooling Hrs. = 800 hrs/yr.
 Average Cost of Electricity = \$0.165/kWh

Total Rated Cooling Capacity = 26 Tons
 Existing System Efficiency = 9 EER
 Proposed System Efficiency = 14 EER

Energy Savings Calculations:

Cooling Savings Calculation:

$$Energy Savings = \frac{Cooling(Tons) \times 12,000 \left(\frac{Btu}{Ton \cdot hr} \right)}{1000 \left(\frac{Wh}{kWh} \right)} \times \left(\frac{1}{EER_{OLD}} - \frac{1}{EER_{NEW}} \right) \times Full \ Load \ Hrs.$$

$$\text{Energy Savings} = \frac{26 (\text{Tons}) \times 12,000 \left(\frac{\text{Btu}}{\text{Ton hr}} \right)}{1000 \left(\frac{\text{Wh}}{\text{kWh}} \right)} \times \left(\frac{1}{9 \left(\frac{\text{Btu}}{\text{W}} \right)} - \frac{1}{14 \left(\frac{\text{Btu}}{\text{W}} \right)} \right) \times 800 \text{ hours}$$

$$= 9,905 \text{ kWh}$$

$$\text{Demand Savings} = \frac{\text{Energy Savings (kWh)}}{\text{Hrs of Cooling}}$$

$$\text{Demand Savings} = \frac{9,904 (\text{kWh})}{800 \text{ Hrs.}} = 12.4 \text{ KW}$$

$$\text{Cooling Cost Savings} = 9,904 (\text{kWh}) \times 0.165 \left(\frac{\$}{\text{kWh}} \right) = \$1,634$$

Installed cost for the seven (7) condensing units is estimated at \$18,400. Note that this estimate includes the demolition of the existing units.

From the NJ Smart Start[®] Program appendix, the rooftop unit replacement falls under the category “Unitary AC” and warrants an incentive based on efficiency (EER) at a certain cooling tonnage. The program incentives are calculated as follows:

$$\text{Smart Start}^{\text{®}} \text{ Incentive} = (\text{Cooling Tons} \times \$/\text{Ton Incentive})$$

$$= (26 \text{ Tons} \times \$92/\text{Ton}) = \$2392$$

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$18,400
NJ Smart Start Equipment Incentive (\$):	(\$2392)
Net Installation Cost (\$):	\$16,008
Maintenance Savings (\$ / yr):	-
Energy Savings (\$ / yr):	\$1,634
Total Energy Savings (\$ / yr):	\$1,634
Simple Payback (yrs):	9.8
Simple Return On Investment (%):	8%
Estimated ECM Lifetime (yr):	15

Simple Lifetime Savings (\$):	<i>\$10,460</i>
--------------------------------------	-----------------

ECM#4: Programmable Thermostats and Replace Valves

Description:

Twenty standard, manual wall thermostats for the HVAC units provide local control with adjustable settings. These thermostats are non-programmable also do not have unoccupied setback features. There are two thermostats for each zone, one heating, one cooling. This ECM proposes replacing each zones two thermostats with a single heating/cooling programmable type thermostat.

New programmable thermostats are available that utilize programming schedules for occupied and unoccupied times and can be set to vary space temperature at these respective times. In addition, the programmable thermostats can be used in conjunction with a motion sensor. When the space is not occupied the equipment can operate at the unoccupied set-point. Once the space becomes occupied the motion sensor sends a signal to the thermostat to raise the temperature of the space to the occupied set-point. This control system approach is ideal for facilities with intermittent occupancy.

This energy conservation measure would replace the various HVAC unit thermostats with programmable 7-day thermostats with night time setback control. The recommended thermostat set-points are as follows:

Occupied Heating =	70° F
Unoccupied Heating =	62° F
Occupied Cooling =	78° F
Unoccupied Cooling =	82° F

CEG recommends replacement of the existing remote thermostats with Honeywell RTH7500D 7-day programmable thermostat or equivalent.

Energy Savings Calculations:

The energy savings of a 7-day programmable thermostat was calculated by using Energy Star Life Cycle Cost Estimate software for qualified programmable thermostats. The referenced calculator can be found at www.energystar.gov. (see Appendix G for Borough Hall Calculation)

Calculated energy savings heating = \$1784 / yr.
 Calculated energy savings cooling = \$ 426 / yr.
 \$2210 / yr.

Energy may also be saved since it will not be possible to have heating and cooling operating simultaneously. We did not include this savings since it is not known how often this may occur, if at all.

Many of the hydronic baseboard control valves are not functioning. As part of this ECM we propose replacement of baseboard control valves (10).

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost (\$):	\$4000
NJ Smart Start Equipment Incentive (\$):	(\$0)
Net Installation Cost (\$):	\$4000
Maintenance Savings (\$ / yr):	(\$0)
Energy Savings (\$ / yr):	\$2,210
Net Savings (\$ / yr):	\$2,210
Estimated ECM Lifetime (yrs):	15
Simple Lifetime Energy Savings (\$):	\$29,150
Simple Payback (yrs):	1.8
Simple Return on Investment:	57.6 %

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

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 Wildwood Crest Borough Hall, to evaluate if there is any potential for solar or wind 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). Parking lots can also be utilized for the installation of a solar array. A truss system can be installed that is high enough to park a vehicle under the array, this way no parking lot area is lost. The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1,000 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. Due to the limited roof area facing south, chimney shading, rooftop equipment placement, and the pitch angle, it is our opinion that a roof mounted, PV Solar Panel system is not feasible for the Borough Hall building roof.

Refer to Appendix F for an aerial photo of the building.

In addition to the Solar Analysis, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. Based on CEG's review of the applicability of wind energy for the facility, it was determined that the average wind speed is not adequate, and the kilowatt demand for the building is below the threshold (200 kW) for purchase of a commercial wind turbine. Therefore, wind energy is not a viable option to implement.

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 the Electric and Natural Gas Usage Profiles included within this report to reference the respective electricity and natural gas usage load profiles.

Electricity:

The Electric Usage Profile demonstrates a typical electric load profile. There is increased consumption in the summer period (April -October), as is typical with air conditioning (cooling) load. Cooling in this facility is accomplished by (3), three packaged rooftop units and (7) seven DX split systems. The total cooling capacity is 38 tons. The late winter period (December – March) period has a very flat yet elevated usage profile. This is in part due to the fact that this facility houses the Police Station. This type of facility typically has a 24 hour, 7- day a week operation, thus adding to the elevated yet flat load profile. A flatter load profile of this type, will allow for more competitive energy prices when shopping for alternative suppliers.

Natural Gas:

The Natural Gas Usage Profile demonstrates a very typical natural gas (heat load) profile. The summer months (May – September) demonstrate extremely low consumption (complimenting the winter heating load). There is an increase in winter consumption (October – April). The increased winter load is caused by heating demand. In this facility the heat is supplied by the (3) three natural gas sourced rooftop units and (7) seven DX split systems with hydronic coils. In addition there is a hydronic heating system. This system is shut down in the summer months. A base-load shaping (flat) will secure more competitive energy prices when procuring energy through an alternative energy source.

Tariff Analysis:

Electricity:

This facility receives electrical Delivery Service from Atlantic City Electric on a MGS Secondary (Monthly General Service) utility rate. This rate is 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 at or compensated to the voltage of delivery. This schedule is not available to residential customers. This service includes the following charges: Delivery Service Charges, Distribution Demand Charges, Reactive Demand Charges, Non-Utility Generation Charges, Societal Benefits Charges, Regulatory Assets Recovery Charges, Transition Bond Charges, Market Transition Charge Tax,

Transmission Demand Charge, Regional Greenhouse Gas Initiative Recovery Charge, and Infrastructure Investment Surcharge.

This facility receives electrical supply service through Atlantic City Electric on a BGS (Basic Generation Service) rate. Since the passing and implementation of the Electricity Discount and Energy Competition Act (EDECA) in 1999, there have been many changes brought about by the deregulation of the electric industry in New Jersey. Since that time, customers in New Jersey have been able to choose their electrical 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. Beside the commodity itself, BGS also has the following charges: System Control Charge, CIEP Standby Fee, Transmission Enhancement Charge and Basic Generation Service Charge.

Natural Gas:

This facility is serviced by South Jersey Gas Company (SJG) on its Firm Delivery rate (GSG) General Service Gas from the utility and BGSS (Basic Generation Supply Service) when not being served by a Third Party Supplier (TPS). This Delivery Rate has the following charges: Customer Charge, Delivery Charge, BSC Volume Charge and Commodity Charge under this rate structure. The BGSS Supply rates are designed to recover SJG's cost of gas applicable to customers who purchase gas from SJG. The company earns no profit from BGSS. BGSS consists of (2) two pricing mechanisms: Residential and Commercial customers that use less than 5,000 therms annually and Commercial and Industrial customers that consume at least 5,000 therms annually.

Imbalances occur when Third Party Suppliers (TPS) are used to supply natural gas and full-delivery is not made, and when a new supplier is contracted or the customer returns to the utility.

Note: It is important when utilizing a Third Party Supplier, that an experienced regional supplier is used otherwise, imbalances can occur, jeopardizing economics and scheduling. If the supplier does not deliver they can be placed on a very costly rate. A customer can automatically be put on an alternative supply rate by the utility.

A "firm account" refers to the type of interstate pipeline service that the utility has subscribed for and delivered on behalf of the customer. Much like the telecom industry, the pipeline space (capacity) has been deregulated. The pipeline capacity is broken down into reliability of service. "Firm service" is the highest level of reliability and is the last, in pecking order, for interruption.

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within the Borough.. The primary area for potential improvement is seen in the electric costs. The average price per kWh (kilowatt hour) for all buildings based on 1-year historical average price is \$.1294/kWh (this is the average "price to compare" if the client intends to shop for energy). The average price per decatherm for natural gas is \$ 11.83 / dth (dth, is the common unit of measure). Energy commodities are among the most volatile of all commodities, however at this point and

time, energy is extremely competitive. The borough could see improvement in its energy costs if it were to take advantage of these current market prices quickly, before energy prices increase. Based on annual historical consumption (September 2008 through August 2009) and current electric rates, the borough could see an improvement in its electric costs of up to 26 % annually. (Note: Savings were calculated using Average Annual Consumption and a variance to a Fixed Average One-Year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG recommends advisement for alternative sourcing and supply of energy on a “managed approach”.

CEG’s secondary recommendation coincides with the townships’ natural gas costs. Based on the current market, Wildwood Crest could improve its natural gas costs by up to 26 %. Currently the township is utilizing the services of the utility. CEG recommends advisement on energy prices through an energy advisor. They should also consider procuring energy (natural gas) through an alternative supply source.

CEG also recommends scheduling a meeting with the 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 municipality can learn more about the competitive supply process. The township 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 information for ongoing demand-side management projects. Furthermore, special attention should be given to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with the utility representative. The township should ask the utility representative about alternative billing options, such as consolidated billing when utilizing the service of a Third Party Supplier. Finally, if the supplier for energy (natural gas) is changed, closely monitor balancing, particularly when the contract is close to termination. This could be performed with the aid of an “energy advisor”.

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 pay 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. Clean all light fixtures to maximize light output.
- D. Replace existing 31 watt “U-Tube” lamps in 2’x2’ fixture with 29 watt “U-Tube” lamps during normal maintenance in overlit areas.
- E. Provide more frequent air filter changes to decrease overall fan horsepower requirements and maintain better IAQ.
- F. Confirm that outside air economizers on the rooftop units that serve the Office Areas are functioning properly to take advantage of free cooling.

In addition to the recommendations above, implementing Retro-Commissioning would be beneficial for this facility. Retro-Commissioning is a means to verify your current equipment is operating at its designed efficiency, capacity, airflow, and overall performance. Retro-Commissioning provides valuable insight into systems or components not performing correctly or efficiently. The commissioning process defines the original system design parameters and recommends revisions to the current system operating characteristics.

APPENDIX

Wildwood Crest Borough Hall

CONSTRUCTION COST AND REBATES					
<u>ECM # 1 - UPGRADE THE LIGHTING</u>	<u>Qty</u>	<u>Unit Cost \$</u>	<u>Material \$</u>	<u>Labor \$</u>	<u>Total \$</u>
New T-8 & CFL Lamps & Ballasts	1	\$571	\$571	\$1,546	\$2,117
Total Cost					\$2,117
Utility Incentive					-\$580
Total Net Cost					\$1,537
<u>ECM # 2 - INSTALL LIGHTING CONTROLS</u>	<u>Qty</u>	<u>Unit Cost \$</u>	<u>Material \$</u>	<u>Labor \$</u>	<u>Total \$</u>
Occupancy Sensors	24	\$75	\$1,800	\$0	\$1,800
Total Cost					\$1,800
Utility Incentive					-\$480
Total Net Cost					\$1,320
<u>ECM # 3 - SPLIT SYSTEM UNIT REPLACEMENT</u>	<u>Qty</u>	<u>Unit Cost \$</u>	<u>Material \$</u>	<u>Labor \$</u>	<u>Total \$</u>
Demo Existing Condensing Units	6	\$200	\$0	\$1,200	\$1,000
New 1-1/2 ton Condensing Unit	2	\$1,000	\$2,000	\$2,000	\$4,000
New 4 ton Condensing Unit	2	\$1,500	\$3,000	\$3,000	\$6,000
New 5 ton Condensing Unit	1	\$1,700	\$1,700	\$1,700	\$3,400
New 6 ton Condensing Unit	1	\$2,000	\$2,000	\$2,000	\$4,000
Total Cost					\$18,400
Utility Incentive					-\$2,392
Total Net Cost					\$16,008
<u>ECM # 4 - PROGRAMMABLE THERMOSTAT & REPLACE VALVES</u>	<u>Qty</u>	<u>Unit Cost \$</u>	<u>Material \$</u>	<u>Labor \$</u>	<u>Total \$</u>
Remove Existing Thermoststs	20	\$25	\$0	\$500	\$500
Programmable Thermostat	10	\$100	\$1,000	\$500	\$1,500
Replace baseboard control valves	10	\$100	\$1,000	\$1,000	\$2,000
Total Cost					\$4,000
Utility Incentive					\$0
Total Net Cost					\$4,000

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

Wildwood Crest Borough Hall

EQUIPMENT LIST									
TAG	MAKE	MODEL	TYPE	CAPACITY	EFFICIENCY	SERVES	LOCATION	REMAINING USEFUL LIFE	NOTES
B-1	WIEL McLAIN, W/ POWERFLAME BURNER	BOILER: BL- 588-S-W, BURNER: GRI- G-10	CAST IRON, FORCED DRAFT, HOT WATER BOILER	817 MBH	80%	ENTIRE BUILDING	BOILER ROOM	4	1978, s#800214
HBB	SLANT-FIN	HYDRONIC BASEBOARD HEAT	FINNED-TUBE HOT WATER BASEBOARD EHEAT	APPROX 160 LF, 890 BTU PER FOOT	-	ENTIRE BUILDING	BUILDING PERIMETER	5	
CUH-1 (2)	GENERIC	-	CABINET UNIT HEATER	APPROX 1000 CFM	-	FRONT LOBBY / VESTIBULE	FRONT LOBBY / VESTIBULE	-	
-	DUNHAM-BUSH	-	HYDRONIC HORIZ UNIT HEATER	-	-	GARAGE	GARAGE	-	
AC-1 (#4)	RHEEM	RRKA-A048- CK10E	PACKAGED ROOFTOP, DX COOLING, GAS HEAT	4 TONS COOLING, 100 MBH HEAT	10 SEER	1ST FLOOR POLICE STATION	ROOF	11	MFG 9/2005
AC-2 (#10)	RHEEM	RRNA-B048- JK10E	PACKAGED ROOFTOP, DX COOLING, GAS HEAT	4 TONS COOLING, 100 MBH HEAT	13 SEER	1ST FLOOR TAX OFFICE	ROOF	13	MFG 6/2007
AC-3 (#1)	RHEEM	RRNA-B024- JK08E	PACKAGED ROOFTOP, DX COOLING, GAS HEAT	2 TONS COOLING, 80 MBH HEAT	13 SEER	1ST FLOOR CLERCKS OFFICE	ROOF	14	MFG 5/2008
CU-4 (#2)	RHEEM	CLASSIC X HIGH EFFICIENCY	CONDENSING UNIT	4 TONS	10 SEER	2ND FLOOR ZONING OFFICE	ROOF	0	MFG 1992
AH-4	RHEEM	RHOA2002A	AIR HANDLER W/ DX COIL, HW HEAT COIL	1600 CFM	-	2ND FLOOR ZONING OFFICE	ABOVE CEILING	0	
CU-7 (#3)	RHEEM	CLASSIC X HIGH EFFICIENCY	CONDENSING UNIT	4 TONS	10 SEER	1ST FLOOR JUDGES	ROOF	0	MFG 1992
AH-7	RHEEM	RHOA	AIR HANDLER W/ DX COIL, HW HEAT COIL	1600 CFM	-	1ST FLOOR JUDGES	ABOVE CEILING	0	
CU-6(#5)	RHEEM	RUAD-065- CAS	CONDENSING UNIT	6 TON	10 SEER	COURTROOM	ROOF	0	MFG 7/94
AH-6	RHEEM	RHOA1600A	AIR HANDLER W/ DX COIL, HW HEAT COIL	2400 CFM	-	COURTROOM	ABOVE CEILING	0	
CU-5(#6)	RHEEM	RAKA-060-CAS	CONDENSING UNIT	5 TON	10 SEER	CONFERENCE ROOM	ROOF	0	MFG 12/94
AH-5	RHEEM	RHOA	AIR HANDLER W/ DX COIL, HW HEAT COIL	2000 CFM	-	CONFERENCE ROOM	ABOVE CEILING	0	
CU-2(#7)	RHEEM	RAKA-018-JAZ	CONDENSING UNIT	1-1/2 TON	10 SEER	POLICE RECORDS	ROOF	0	
AH-2	RHEEM	RHOA	AIR HANDLER W/ DX COIL, HW HEAT COIL	800 CFM	-	POLICE RECORDS	ABOVE CEILING	0	
CU-1 (#8)	RHEEM	RAKA-018-JAZ	CONDENSING UNIT	1-1/2 TON	10 SEER	DETENTION ROOM	ROOF	0	
AH-1	RHEEM	RHOA	AIR HANDLER W/ DX COIL, HW HEAT COIL	600 CFM	-	DETENTION ROOM	ABOVE CEILING	0	
CU-3 (#9)	RHEEM	CLASSIC X HIGH EFFICIENCY	CONDENSING UNIT	4 TON	10 SEER	2ND FLOOR POLICE ADMIN	ROOF	0	MFG 1992
AH-3	RHEEM	RHOA	AIR HANDLER W/ DX COIL, HW HEAT COIL	1600 CFM	-	2ND FLOOR POLICE ADMIN	ABOVE CEILING	0	
-	SANYO	"MR. SLIM" KS1872 / CL1852	MINI SPLIT SYSTEM AC	560 CFM, 1-1/2 TON	APPROX 10 SEER	DISPATCH	DISPATCH / ROOF	9	MFG. 12/2003
-	SANYO	"INVERTER" C1872	CONDENSING UNIT	1-1/2 TON	APPROX 11 SEER	-	? / ROOF	13	MFG 5/2007
HWH	RUUD	GL-75-76C	DOMESTIC HOT WATER HEATER	75 GALLON, 75,500 BTUH INPUT	80%	ENTIRE BUILDING	BOILER ROOM	0	MFG 1992



STATEMENT OF ENERGY PERFORMANCE

Wildwood Crest Borough Hall

Building ID: 1854305

For 12-month Period Ending: August 31, 2009¹

Date SEP becomes ineligible: N/A

Date SEP Generated: September 24, 2009

Facility

Wildwood Crest Borough Hall
6101 Pacific Avenue
Wildwood Crest, NJ 08260

Facility Owner

N/A

Primary Contact for this Facility

N/A

Year Built: 1930

Gross Floor Area (ft²): 16,052

Energy Performance Rating² (1-100) 21

Site Energy Use Summary³

Electricity - Grid Purchase(kBtu)	763,222
Natural Gas (kBtu) ⁴	658,050
Total Energy (kBtu)	1,421,272

Energy Intensity⁵

Site (kBtu/ft ² /yr)	89
Source (kBtu/ft ² /yr)	202

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	151
---	-----

Electric Distribution Utility

Atlantic City Electric Co

National Average Comparison

National Average Site EUI	64
National Average Source EUI	147
% Difference from National Average Source EUI	38%
Building Type	Office

Meets Industry Standards⁶ for Indoor Environmental Conditions:

Ventilation for Acceptable Indoor Air Quality	N/A
Acceptable Thermal Environmental Conditions	N/A
Adequate Illumination	N/A

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

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	<input checked="" type="checkbox"/>
Building Name	Wildwood Crest Borough Hall	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		<input type="checkbox"/>
Type	Office	Is this an accurate description of the space in question?		<input type="checkbox"/>
Location	6101 Pacific Avenue, Wildwood Crest, NJ 08260	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		<input type="checkbox"/>
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		<input type="checkbox"/>
Wildwood Crest Borough Hall (Office)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
Gross Floor Area	16,052 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.		<input type="checkbox"/>
Weekly operating hours	33 Hours	Is this the total number of hours per week that the Office 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.		<input type="checkbox"/>
Workers on Main Shift	40	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. The normal worker density ranges between 0.3 and 10 workers per 1000 square feet (92.8 square meters)		<input type="checkbox"/>
Number of PCs	25	Is this the number of personal computers in the Office?		<input type="checkbox"/>
Percent Cooled	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		<input type="checkbox"/>
Percent Heated	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		<input type="checkbox"/>

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Atlantic City Electric Co

Fuel Type: Electricity		
Meter: Electricity (kWh (thousand Watt-hours)) Space(s): Entire Facility Generation Method: Grid Purchase		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
07/05/2009	08/04/2009	23,520.00
06/05/2009	07/04/2009	17,040.00
05/05/2009	06/04/2009	15,840.00
04/05/2009	05/04/2009	15,280.00
03/05/2009	04/04/2009	15,360.00
02/05/2009	03/04/2009	14,960.00
01/05/2009	02/04/2009	18,160.00
12/05/2008	01/04/2009	14,800.00
11/05/2008	12/04/2008	17,360.00
10/05/2008	11/04/2008	21,760.00
09/05/2008	10/04/2008	26,880.00
Electricity Consumption (kWh (thousand Watt-hours))		200,960.00
Electricity Consumption (kBtu (thousand Btu))		685,675.52
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		685,675.52
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		<input type="checkbox"/>
Fuel Type: Natural Gas		
Meter: Gas (therms) Space(s): Entire Facility		
Start Date	End Date	Energy Use (therms)
07/05/2009	08/04/2009	13.46
06/05/2009	07/04/2009	52.79
05/05/2009	06/04/2009	411.13
04/05/2009	05/04/2009	692.83
03/05/2009	04/04/2009	1,379.78
02/05/2009	03/04/2009	1,519.81
01/05/2009	02/04/2009	1,403.38
12/05/2008	01/04/2009	745.92
11/05/2008	12/04/2008	263.16
10/05/2008	11/04/2008	6.22
09/05/2008	10/04/2008	8.22

Gas Consumption (therms)	6,496.70
Gas Consumption (kBtu (thousand Btu))	649,670.00
Total Natural Gas Consumption (kBtu (thousand Btu))	649,670.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	<input type="checkbox"/>

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.	<input type="checkbox"/>

On-Site Solar and Wind Energy	
Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported.	<input type="checkbox"/>

Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same as the 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
Wildwood Crest Borough Hall
6101 Pacific Avenue
Wildwood Crest, NJ 08260

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Wildwood Crest Borough Hall	
Gross Floor Area Excluding Parking: (ft ²)	16,052
Year Built	1930
For 12-month Evaluation Period Ending Date:	August 31, 2009

Facility Space Use Summary

Wildwood Crest Borough Hall	
Space Type	Office
Gross Floor Area(ft ²)	16,052
Weekly operating hours	33
Workers on Main Shift	40
Number of PCs	25
Percent Cooled	50% or more
Percent Heated	50% or more

Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 08/31/2009)	Baseline (Ending Date 08/31/2009)	Rating of 75	Target	National Average
Energy Performance Rating	21	21	75	N/A	50
Energy Intensity					
Site (kBtu/ft ²)	89	89	48	N/A	64
Source (kBtu/ft ²)	202	202	108	N/A	147
Energy Cost					
\$/year	\$ 46,631.50	\$ 46,631.50	\$ 25,069.57	N/A	\$ 33,896.58
\$/ft ² /year	\$ 2.91	\$ 2.91	\$ 1.56	N/A	\$ 2.12
Greenhouse Gas Emissions					
MtCO ₂ e/year	151	151	81	N/A	110
kgCO ₂ e/ft ² /year	9	9	5	N/A	7

More than 50% of your building is defined as Office. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

Notes:

o - This attribute is optional.

d - A default value has been supplied by Portfolio Manager.

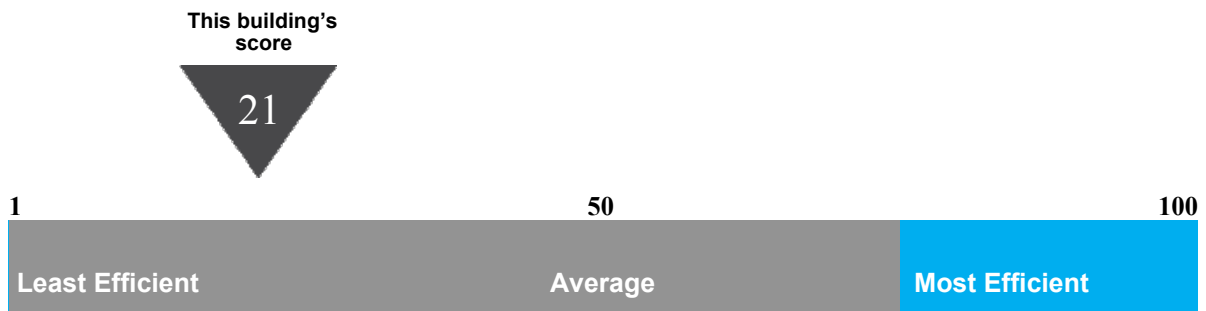
Statement of Energy Performance

2009

Wildwood Crest Borough Hall
6101 Pacific Avenue
Wildwood Crest, NJ 08260

Portfolio Manager Building ID: 1854305

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit energystar.gov/benchmark.



This building uses 202 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending August 2009

Buildings with a score of 75 or higher may qualify for EPA's ENERGY STAR.

I certify that the information contained within this statement is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification



ECM #1: Lighting Upgrade

Borough Hall

Appendix E

CEG Project #: BS09-012

Project Name : Wildwood Crest Borough Hall

Address: 6101 Pacific Avenue

City, State: Wildwood Crest, NJ 08260

Building SF: 16052

Page 1 of 2

Date 09/23/09

kWh Cost \$0.165

Fixture Location	Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost			Proposed Ltg Control Annual Savings				
	Usage, Hrs/Yr	Fixt Qty	Lighting Fixture Description	Total Watts - Location	Annual Energy Cost	Fixt Qty	Lighting Fixture Description	Total Watts - Location	Energy Savings, Watts	Energy Savings, kWh/Yr	Savings/Yr, \$	Simple Payback, Yrs	Unit Cost, Installed	Total Cost, Installed	Rebate Estimate	Ltg Control Description	*Energy Savings kWh/Yr	Savings/ Yr \$	**Unit Cost, Total	Simple Payback, Yrs
Municipal Bldg First Floor																				
Lobby	1690	1	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	55	\$15.34	1	Existing to Remain	55	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Corridor	1690	1	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	55	\$15.34	1	Existing to Remain	55	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
	1690	6	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	648	\$180.69	6	(4)Sylvania Lamps FO28 95 Watts	570	78	132	\$21.75	7.7	\$27.80	\$166.80	\$0.00					
Tax Assessor	1690	4	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	432	\$120.46	4	(4)Sylvania Lamps FO28 95 Watts	380	52	88	\$14.50	7.7	\$27.80	\$111.20	\$0.00					
	1690	1	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	55	\$15.34	1	Existing to Remain	55	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Clerk	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00					
Tax Collector	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00					
Tax Office	1690	4	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	432	\$120.46	4	(4)Sylvania Lamps FO28 95 Watts	380	52	88	\$14.50	7.7	\$27.80	\$111.20	\$0.00					
	1690	1	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	55	\$15.34	1	Existing to Remain	55	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Treasurer	1690	3	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	324	\$90.35	3	(4)Sylvania Lamps FO28 95 Watts	285	39	66	\$10.88	7.7	\$27.80	\$83.40	\$0.00					
Treasurer's Office	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00					
File Storage	300	1	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	108	\$5.35	1	(4)Sylvania Lamps FO28 95 Watts	95	13	4	\$0.64	43.2	\$27.80	\$27.80	\$0.00					
Men's Toilet Rm	1200	1	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	108	\$21.38	1	(4)Sylvania Lamps FO28 95 Watts	95	13	16	\$2.57	10.8	\$27.80	\$27.80	\$0.00					
	1200	6	(1)32w T8 Lamp. Surface Mount w/Elec. Ballast-28w	168	\$33.26	6	Existing to Remain	168	0	0	\$0.00				\$0.00					
Women's Toilet Rm	1200	1	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	108	\$21.38	1	(4)Sylvania Lamps FO28 95 Watts	95	13	16	\$2.57	10.8	\$27.80	\$27.80	\$0.00					
	1200	6	(1)32w T8 Lamp. Surface Mount w/Elec. Ballast-28w	168	\$33.26	6	Existing to Remain	168	0	0	\$0.00				\$0.00					
Court/Meeting Rm	1260	18	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	990	\$205.82	18	Existing to Remain	990	0	0	\$0.00		\$0.00	\$0.00	\$0.00	Dual Technology Occupancy Sensor	124.7	\$20.58	\$ 55.00	2.7
	1260	2	(1)28w Compact Fluor.	56	\$11.64	2	Existing to Remain	56	0	0	\$0.00		\$0.00	\$0.00	\$0.00		7.1	\$1.16		
Corridor #2	1690	3	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	165	\$46.01	3	Existing to Remain	165	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Public Defender's Office	1260	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$44.91	2	(4)Sylvania Lamps FO28 95 Watts	190	26	33	\$5.41	10.3	\$27.80	\$55.60	\$0.00					
Prosecutor's Office	1260	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$44.91	2	(4)Sylvania Lamps FO28 95 Watts	190	26	33	\$5.41	10.3	\$27.80	\$55.60	\$0.00					
County Clerk	1690	6	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	648	\$180.69	6	(4)Sylvania Lamps FO28 95 Watts	570	78	132	\$21.75	7.7	\$27.80	\$166.80	\$0.00					

Fixture Location	Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost			Proposed Ltg Control Annual Savings				
	Usage, Hrs/Yr	Fixt Qty	Lighting Fixture Description	Total Watts - Location	Annual Energy Cost	Fixt Qty	Lighting Fixture Description	Total Watts - Location	Energy Savings, Watts	Energy Savings, kWh/Yr	Savings/Yr, \$	Simple Payback, Yrs	Unit Cost, Installed	Total Cost, Installed	Rebate Estimate	Ltg Control Description	*Energy Savings kWh/Yr	Savings/Yr \$	**Unit Cost, Total	Simple Payback, Yrs
	1690	2	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	110	\$30.67	2	Existing to Remain	110	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Judge's Office	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00	Dual Technology Occupancy Sensor	36.5	\$6.02	\$ 55.00	9.1
Toilet Rm	1200	1	(1)13w Lamp-CFL-Scence	13	\$2.57	1	Existing to Remain	13	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Municipal Bldg First Floor Summary		80		5994	\$1,496	80		5500	494	782	\$129	8.2		\$1,056	\$0		168	\$28	\$110	4.0
Municipal Bldg Second Floor																				
Lobby	1690	4	(1)100w Metal Halide-115w	460	\$128.27	4	Existing to Remain	460	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Reception/Waiting	1690	4	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	220	\$61.35	4	Existing to Remain	220	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Commissioner Office #1	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00	Dual Technology Occupancy Sensor	36.5	\$6.02	\$ 55.00	9.1
Commissioner Office #2	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00	Dual Technology Occupancy Sensor	36.5	\$6.02	\$ 55.00	9.1
Corridor	1690	9	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	495	\$138.03	9	Existing to Remain	495	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Fire Prevention Office	1690	8	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	864	\$240.93	8	(4)Sylvania Lamps FO28 95 Watts	760	104	176	\$29.00	7.7	\$27.80	\$222.40	\$0.00					
Mayor's Office	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00	Dual Technology Occupancy Sensor	36.5	\$6.02	\$ 55.00	9.1
File Storage Rm	300	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$10.69	2	(4)Sylvania Lamps FO28 95 Watts	190	26	8	\$1.29	43.2	\$27.80	\$55.60	\$0.00					
Conference Rm	1260	6	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	648	\$134.72	6	(4)Sylvania Lamps FO28 95 Watts	570	78	98	\$16.22	10.3	\$27.80	\$166.80	\$0.00	Dual Technology Occupancy Sensor	81.6	\$13.47	\$ 55.00	4.1
Land Use Office	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00					
	1690	2	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	110	\$30.67	2	Existing to Remain	110	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Zoning Office	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00					
	1690	2	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	110	\$30.67	2	Existing to Remain	110	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Janitor's Closet	300	1	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	55	\$2.72	1	Existing to Remain	55	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Men's Toilet Rm	1200	1	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	55	\$10.89	1	Existing to Remain	55	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
	1200	3	(1)32w T8 Lamp. Surface Mount w/Elec. Ballast-28w	84	\$16.63	3	Existing to Remain	84	0	0	\$0.00				\$0.00					
Women's Toilet Rm	1200	1	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	55	\$10.89	1	Existing to Remain	55	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
	1200	3	(1)32w T8 Lamp. Surface Mount w/Elec. Ballast-28w	84	\$16.63	3	Existing to Remain	84	0	0	\$0.00				\$0.00					
Employee Lounge	1690	3	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	165	\$46.01	3	Existing to Remain	165	0	0	\$0.00		\$0.00	\$0.00	\$0.00	Dual Technology Occupancy Sensor	27.9	\$4.60	\$ 55.00	12.0
Storage Rm	300	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$10.69	2	(4)Sylvania Lamps FO28 95 Watts	190	26	8	\$1.29	43.2	\$27.80	\$55.60	\$0.00					
Municipal Bldg Second Floor Summary		61		4917	\$1,191	61		4553	364	509	\$84	9.3		\$778	\$0		219	\$36	\$275	7.6
Police Station First Floor																				

Fixture Location	Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost			Proposed Ltg Control Annual Savings				
	Usage, Hrs/Yr	Fixt Qty	Lighting Fixture Description	Total Watts - Location	Annual Energy Cost	Fixt Qty	Lighting Fixture Description	Total Watts - Location	Energy Savings, Watts	Energy Savings, kWh/Yr	Savings/Yr, \$	Simple Payback, Yrs	Unit Cost, Installed	Total Cost, Installed	Rebate Estimate	Ltg Control Description	*Energy Savings kWh/Yr	Savings/ Yr \$	**Unit Cost, Total	Simple Payback, Yrs
Detective's Office	1690	6	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	648	\$180.69	6	(4)Sylvania Lamps FO28 95 Watts	570	78	132	\$21.75	7.7	\$27.80	\$166.80	\$0.00	Dual Technology Occupancy Sensor	109.5	\$18.07	\$ 55.00	3.0
Corridor	8760	16	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	880	\$1,271.95	16	Existing to Remain	880	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Conference Rm	1690	1	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	108	\$30.12	1	(4)Sylvania Lamps FO28 95 Watts	95	13	22	\$3.63	7.7	\$27.80	\$27.80	\$0.00					
Domestic Violence Transition Rm	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00	Dual Technology Occupancy Sensor	36.5	\$6.02	\$ 55.00	9.1
Vestibule	8760	2	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	110	\$158.99	2	Existing to Remain	110	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Storage Rm	600	1	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	55	\$5.45	1	Existing to Remain	55	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Evidence Storage	600	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$21.38	2	(4)Sylvania Lamps FO28 95 Watts	190	26	16	\$2.57	21.6	\$27.80	\$55.60	\$0.00					
D.W.I. Rm	1690	3	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	324	\$90.35	3	(4)Sylvania Lamps FO28 95 Watts	285	39	66	\$10.88	7.7	\$27.80	\$83.40	\$0.00	Dual Technology Occupancy Sensor	54.8	\$9.03	\$ 55.00	6.1
Booking Area	8760	4	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	432	\$624.41	4	(4)Sylvania Lamps FO28 95 Watts	380	52	456	\$75.16	1.5	\$27.80	\$111.20	\$0.00	Dual Technology Occupancy Sensor	378.4	\$62.44	\$ 55.00	0.9
Adult Cell #1	8760	1	(3)32w T8 Lamps. 2'x4' w/Elec. Ballast-87w	87	\$125.75	1	(3)Sylvania Lamps FO28 72 Watts	72	15	131	\$21.68	1.1	\$23.35	\$23.35	\$0.00					
Adult Cell #1	8760	1	(3)32w T8 Lamps. 2'x4' w/Elec. Ballast-87w	87	\$125.75	1	(3)Sylvania Lamps FO28 72 Watts	72	15	131	\$21.68	1.1	\$23.35	\$23.35	\$0.00					
Ante Area #1	8760	1	(2)T12 Lamps. Surface Mount w/Mag. Ballast-77w	77	\$111.30	1	(2)Sylvania Lamps FO32 Sylvania Ballast QHE 48 Watts	48	29	254	\$41.92	1.6	\$79.05	\$79.05	\$10.00	Dual Technology Occupancy Sensor	67.5	\$11.13	\$ 55.00	4.9
Ante Area #2	8760	1	(2)T12 Lamps. Surface Mount w/Mag. Ballast-77w	77	\$111.30	1	(2)Sylvania Lamps FO32 Sylvania Ballast QHE 48 Watts	48	29	254	\$41.92	1.6	\$79.05	\$79.05	\$10.00	Dual Technology Occupancy Sensor	67.5	\$11.13	\$ 55.00	4.9
Lounge	1690	1	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	55	\$15.34	1	Existing to Remain	55	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Dispatch	8760	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$312.21	2	(4)Sylvania Lamps FO28 95 Watts	190	26	228	\$37.58	1.5	\$27.80	\$55.60	\$0.00					
	8760	2	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	110	\$158.99	2	Existing to Remain	110	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Toilet Rm #2	1200	1	(1)13w Lamp-CFL-Sconce	13	\$2.57	1	Existing to Remain	13	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Toilet Rm #3	1200	1	(1)13w Lamp-CFL-Sconce	13	\$2.57	1	Existing to Remain	13	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Police Lobby	8760	4	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	220	\$317.99	4	Existing to Remain	220	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Squad Rm	1690	6	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	648	\$180.69	6	(4)Sylvania Lamps FO28 95 Watts	570	78	132	\$21.75	7.7	\$27.80	\$166.80	\$0.00	Dual Technology Occupancy Sensor	109.5	\$18.07	\$ 55.00	3.0
Men's Locker Rm	6570	1	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	55	\$59.62	1	Existing to Remain	55	0	0	\$0.00		\$0.00	\$0.00	\$0.00	Dual Technology Occupancy Sensor	36.1	\$5.96	\$ 55.00	9.2
	6570	7	(1)32w T8 Lamp. Surface Mount w/Elec. Ballast-28w	196	\$212.47	7	Existing to Remain	196	0	0	\$0.00				\$0.00		128.8	\$21.25		
Women's Locker Rm	6570	1	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	55	\$59.62	1	Existing to Remain	55	0	0	\$0.00		\$0.00	\$0.00	\$0.00	Dual Technology Occupancy Sensor	36.1	\$5.96	\$ 55.00	9.2

Fixture Location	Existing Lt Fixtures					Proposed Lt Fixtures			Proposed Ltg Savings				Proposed Ltg Installation Cost			Proposed Ltg Control Annual Savings				
	Usage, Hrs/Yr	Fixt Qty	Lighting Fixture Description	Total Watts - Location	Annual Energy Cost	Fixt Qty	Lighting Fixture Description	Total Watts - Location	Energy Savings, Watts	Energy Savings, kWh/Yr	Savings/Yr, \$	Simple Payback, Yrs	Unit Cost, Installed	Total Cost, Installed	Rebate Estimate	Ltg Control Description	*Energy Savings kWh/Yr	Savings/Yr \$	**Unit Cost, Total	Simple Payback, Yrs
	6570	7	(1)32w T8 Lamp. Surface Mount w/Elec. Ballast-28w	196	\$212.47	7	Existing to Remain	196	0	0	\$0.00			\$0.00			128.8	\$21.25		
Vehicular Sally Port	1690	13	(2)32w T8 Lamps. Surface Mount w/Elec. Ballast-55w	715	\$199.38	13	(2)Sylvania Lamps FO28 48 Watts	624	91	154	\$25.38	9.7	\$18.90	\$245.70	\$0.00	Dual Technology Occupancy Sensor	120.8	\$19.94	\$ 55.00	2.8
Police Station First Floor Summary		87		5809	\$4,652	87		5292	\$17	2019	\$333	3.5		\$1,173	\$20		1,274	\$210	\$550	2.6
Police Station Second Floor																				
File/Storage Rm #1	600	1	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	108	\$10.69	1	(4)Sylvania Lamps FO28 95 Watts	95	13	8	\$1.29	21.6	\$27.80	\$27.80	\$0.00					
Secretary	1690	1	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	108	\$30.12	1	(4)Sylvania Lamps FO28 95 Watts	95	13	22	\$3.63	7.7	\$27.80	\$27.80	\$0.00					
Evidence Rm	600	1	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	108	\$10.69	1	(4)Sylvania Lamps FO28 95 Watts	95	13	8	\$1.29	21.6	\$27.80	\$27.80	\$0.00					
Corridor	8760	3	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	165	\$238.49	3	Existing to Remain	165	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Secretary/File Area	1690	4	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	432	\$120.46	4	(4)Sylvania Lamps FO28 95 Watts	380	52	88	\$14.50	7.7	\$27.80	\$111.20	\$0.00	Dual Technology Occupancy Sensor	73.0	\$12.05	\$ 55.00	4.6
Chief's Office	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00	Dual Technology Occupancy Sensor	36.5	\$6.02	\$ 55.00	9.1
Captain's Office	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00	Dual Technology Occupancy Sensor	36.5	\$6.02	\$ 55.00	9.1
Lieutenant's Office	1690	2	(4)32w T8 Lamps. 2'x4' w/Elec. Ballast-108w	216	\$60.23	2	(4)Sylvania Lamps FO28 95 Watts	190	26	44	\$7.25	7.7	\$27.80	\$55.60	\$0.00	Dual Technology Occupancy Sensor	36.5	\$6.02	\$ 55.00	9.1
Toilet Rm	1200	1	(2)T8-6" U-Tube Lamps. 2'x2' w/Elec. Ballast-55w	55	\$10.89	1	Existing to Remain	55	0	0	\$0.00		\$0.00	\$0.00	\$0.00					
Police Station Second Floor Summary		17		1624	\$602	17		1455	169	257	\$42	8.5		\$361	\$0		183	\$30	\$220	7.3
Totals:		245		18344	\$7,941	245		16800	1544	3567	\$589	5.7		\$3,370	\$20		1,844	\$304	\$1,155	3.8
COMMENTS:																				
*Based on ASHRAE Standard 90.1-2004, Appendix G.																				
**Occupancy Sensor unit cost includes a \$20 NJ Smart Start incentive per unit.																				
The estimated remaining lifecycle of the existing light fixtures is 40%.																				



Borough Hall – Wildwood Crest
6101 Pacific Ave,
Wildwood Crest, NJ 08260

↑ **NORTH**

Products that earn the ENERGY STAR prevent greenhouse gas emissions by meeting strict energy efficiency guidelines set by the U.S. Environmental Protection Agency and the U.S. Department of Energy.
www.energystar.gov



CHANGE FOR THE
BETTER WITH
ENERGY STAR

Life Cycle Cost Estimate for 10 ENERGY STAR Qualified Programmable Thermostat(s)

This energy savings calculator was developed by the U.S. EPA and U.S. DOE and is provided for estimating purposes only. Actual energy savings may vary based on use and other factors.

Enter your own values in the gray boxes or use our default values.

Number of Units	10	24 Hour Typical Usage Patterns*									
Initial Cost per ENERGY STAR Unit (retail price)	\$92	Nighttime Set-Back/Set-Up Hours	<table border="1"> <tr> <th>Weekday</th> <th>Weekend</th> </tr> <tr> <td>12</td> <td>12</td> </tr> <tr> <td>3</td> <td>7</td> </tr> <tr> <td>9</td> <td>5</td> </tr> </table>	Weekday	Weekend	12	12	3	7	9	5
Weekday	Weekend										
12	12										
3	7										
9	5										
Initial Cost per Conventional Unit (retail price)	\$73	Daytime Set-Back/Set-Up Hours									
Unit Fuel Cost (Cooling) (\$/kWh)	\$0.170	Hours without Set-Back/Set-Up									
Unit Fuel Cost (Heating) (\$/Therm)	\$1.59										
Choose your city from the drop-down menu		City NJ-Atlantic City									
Heating Season*		Cooling Season*									
Typical Indoor Temperature w/o Set-Back	70	Typical Indoor Temperature w/o Set-Up	78								
Nighttime Set-Back Temperature (Average)	62	Nighttime Set-Up Temperature (Average)	82								
Daytime Set-Back Temperature (Average)	62	Daytime Set-Up Temperature (Average)	82								
Heating System Type	Gas Boiler	Cooling System Type	Central AC								

*All temperatures are in degrees Fahrenheit. Setpoint is defined as the temperature setting for any given time period. Set-back temperature is defined as the lower setpoint temperature for the energy-savings periods during the heating season, generally nighttime and daytime. Set-up temperature is defined as the higher setpoint temperature for the energy-savings periods during the cooling season, generally nighttime and daytime.

Annual and Life Cycle Costs and Savings for 10 Programmable Thermostat(s)

	10 ENERGY STAR Unit(s)	10 Conventional Unit(s)	Savings with ENERGY STAR
Annual Energy Costs			
Heating Energy Cost	\$9,269	\$11,054	\$1,784
Heating Energy Consumption (MBTU)	583	695	112
Cooling Energy Cost	\$2,211	\$2,636	\$426
Cooling Energy Consumption (MBTU)	44.2	52.7	9
Total	\$11,480	\$13,690	\$2,210
Life Cycle Costs			
Energy Costs	\$127,639	\$152,210	\$24,571
Heating Energy Costs	\$103,059	\$122,899	\$19,839
Heating Energy Consumption (MBTU)	8,745	10,428	1,683
Cooling Energy Costs	\$24,580	\$29,311	\$4,732
Cooling Energy Consumption (MBTU)	663	791	128
Purchase Price for 10 Unit(s)	\$920	\$730	-\$190
Total	\$128,559	\$152,940	\$24,381
		Simple payback of initial cost (years)	0.1