



## **ENERGY AUDIT – FINAL REPORT**

### **MARGATE BUILDING DEPARTMENT**

**101 NORTH WASHINGTON AVENUE**

**MARGATE, NJ 08402**

**ATTN: MR. THOMAS D. HILTNER**

**City Clerk**

**CEG PROJECT No. 9C09047**

## **CONCORD ENGINEERING GROUP**



**520 SOUTH BURNT MILL ROAD**

**VOORHEES, NJ 08043**

**TELEPHONE: (856) 427-0200**

**FACSIMILE: (856) 427-6529**

**[WWW.CEG-INC.NET](http://WWW.CEG-INC.NET)**

### **CONTACTS:**

**RAYMOND JOHNSON**

**Cell: (609) 760-4057**

**[rjohnson@ceg-inc.net](mailto:rjohnson@ceg-inc.net)**

## Table of Contents

I.	EXECUTIVE SUMMARY .....	3
II.	INTRODUCTION .....	5
III.	METHOD OF ANALYSIS.....	6
IV.	HISTORIC ENERGY CONSUMPTION/COST.....	8
	A. Energy Usage / Tariffs .....	8
	B. Energy Use Intensity (EUI) .....	13
	C. EPA Energy Benchmarking System .....	14
V.	FACILITY DESCRIPTION .....	16
VI.	MAJOR EQUIPMENT LIST .....	17
VII.	ENERGY CONSERVATION MEASURES (ECM).....	18
VIII.	RENEWABLE/DISTRIBUTED ENERGY MEASURES .....	22
X.	ENERGY PURCHASING AND PROCUREMENT STRATEGY .....	23
X.	INSTALLATION FUNDING OPTIONS.....	26
XI.	ADDITIONAL RECOMMENDATIONS .....	27

Appendix A – Detailed Energy Usage and Costing Data

Appendix B – Detailed Cost Breakdown per ECM

Appendix C – New Jersey Smart Start<sup>®</sup> Program Incentives

Appendix D – Major Equipment List

Appendix E – Investment Grade Lighting Audit

Appendix F – Building Aerial Photo

Appendix G – Energy Star Benchmarking System

**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:

Margate Building Department  
101 N. Washington Avenue  
Margate City, NJ 08402

Municipal Contact Person: Mr. Thomas D. Hiltner, City Clerk  
Facility Contact Person: Mr. Fred Verna, Director of Facilities

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	\$ 5,717
Natural Gas	\$ 3,185
Total	\$ 8,902

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  $\pm 20\%$  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	Install Lighting Controls	\$605	\$82	7.4	13.5 %
2	Programmable Thermostats	\$400	\$472	0.85	117.6 %

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	Install Lighting Controls	-	4,847	-
2	Programmable Thermostats	-	1,380	154

**Recommendations:**

Concord Engineering Group recommends the implementation of all ECM's that provide a calculated simple payback at or under ten (10) years. The potential energy and cost savings from these ECM's are economically justifiable. The following Energy Conservation Measures are recommended for the Building Department Facility:

- **ECM #1:** Install Lighting Controls
- **ECM #2:** Programmable Thermostats

## II. INTRODUCTION

This comprehensive energy audit covers the Building Department that includes construction and code enforcement offices. The 3653 sq.ft. space is leased by the city and is housed within a portion of the 2<sup>nd</sup> floor of an office complex that houses other tenants. However, the electric and gas use is separately metered and billed to Margate city.

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<sup>2</sup>/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

###### Electric

The following tables and figures represent the electrical usage for the surveyed facility from April-08 to March-09. Atlantic City Electric Utility provides electricity to the facility. The 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.

###### Natural Gas

Table 4 and Figure 2 show the natural gas energy usage from May-08 to April-09. South Jersey Gas supplies the natural gas and delivers the fuel to the burner at the facility. Below is the average unit cost for the utilities at this facility.

<u>Description</u>	<u>Average</u>
Electricity	\$0.1709 / kWh (5.0¢ / kBtu)
Natural Gas	\$1.53 / therm (1.5¢ / kBtu)

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

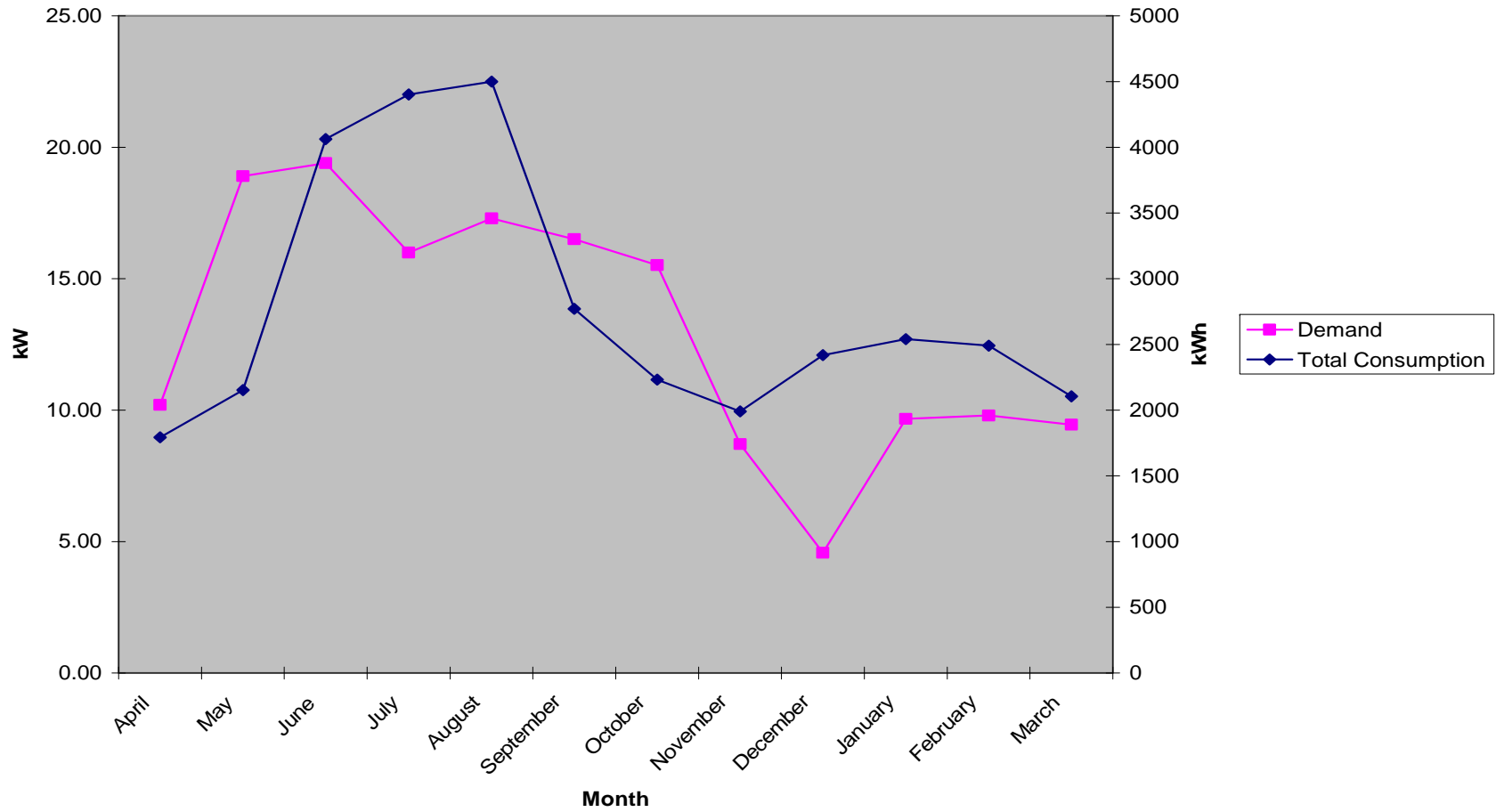
**Table 3  
Electricity Billing Data**

**Building Department**

Provider	Month	Start Date	End Date	Account	Utility Type	Billing Days	Peak Demand	Units	Load Factor (%)	Total Consumption	Units	Delivery Charge	Supply Charge	Total \$	
Atlantic City Electric	April	4/10/2008	5/9/2008	0119 6979 9987	Electric	29	10.20	kw	25.27	1794	kwh	\$ 117.42	\$ 179.16	\$ 296.58	
Atlantic City Electric	May	5/9/2008	6/10/2008	0119 6979 9987	Electric	32	18.90	kw	14.83	2153	kwh	\$ 146.47	\$ 217.55	\$ 364.02	
Atlantic City Electric	June	6/10/2008	7/10/2008	0119 6979 9987	Electric	30	19.40	kw	29.08	4062	kwh	\$ 223.97	\$ 529.38	\$ 753.35	
Atlantic City Electric	July	7/10/2008	8/8/2008	0119 6979 9987	Electric	29	16.00	kw	39.53	4403	kwh	\$ 202.07	\$ 617.93	\$ 820.00	
Atlantic City Electric	August	8/8/2008	9/9/2008	0119 6979 9987	Electric	32	17.30	kw	33.86	4500	kwh	\$ 218.78	\$ 640.01	\$ 858.79	
Atlantic City Electric	September	9/9/2008	10/9/2008	0119 6979 9987	Electric	30	16.50	kw	23.32	2771	kwh	\$ 154.40	\$ 338.82	\$ 493.22	
Atlantic City Electric	October	10/9/2008	11/7/2008	0119 6979 9987	Electric	29	15.52	kw	20.67	2233	kwh	\$ 125.73	\$ 231.08	\$ 356.81	
Atlantic City Electric	November	11/7/2008	12/9/2008	0119 6979 9987	Electric	32	8.71	kw	29.74	1990	kwh	\$ 91.74	\$ 224.97	\$ 316.71	
Atlantic City Electric	December	12/9/2008	1/10/2009	0119 6979 9987	Electric	32	4.58	kw	68.77	2419	kwh	\$ 87.05	\$ 255.88	\$ 342.93	
Atlantic City Electric	January	1/10/2009	2/9/2009	0119 6979 9987	Electric	30	9.67	kw	36.48	2540	kwh	\$ 108.55	\$ 285.17	\$ 393.72	
Atlantic City Electric	February	2/9/2009	3/11/2009	0119 6979 9987	Electric	30	9.80	kw	35.28	2490	kwh	\$ 107.53	\$ 280.30	\$ 387.83	
Atlantic City Electric	March	3/11/2009	4/9/2009	0119 6979 9987	Electric	29	9.45	kw	32.01	2106	kwh	\$ 94.49	\$ 238.81	\$ 333.30	
							<b>Max Peak:</b>	19.4	kw	<b>Total:</b>	33,461	kwh	<b>Total:</b>	\$ 5,717.26	
* Electric Tariff (MGS) Monthly General Service												<b>Avg. Cost per kwh:</b>	\$ 0.171		
														<b>Avg. Cost per kBtu:</b>	\$ 0.050

**Figure 1**  
**Electrical Usage Profile**

**Margate Building Dept.**



**Table 4  
Natural Gas Billing Data**

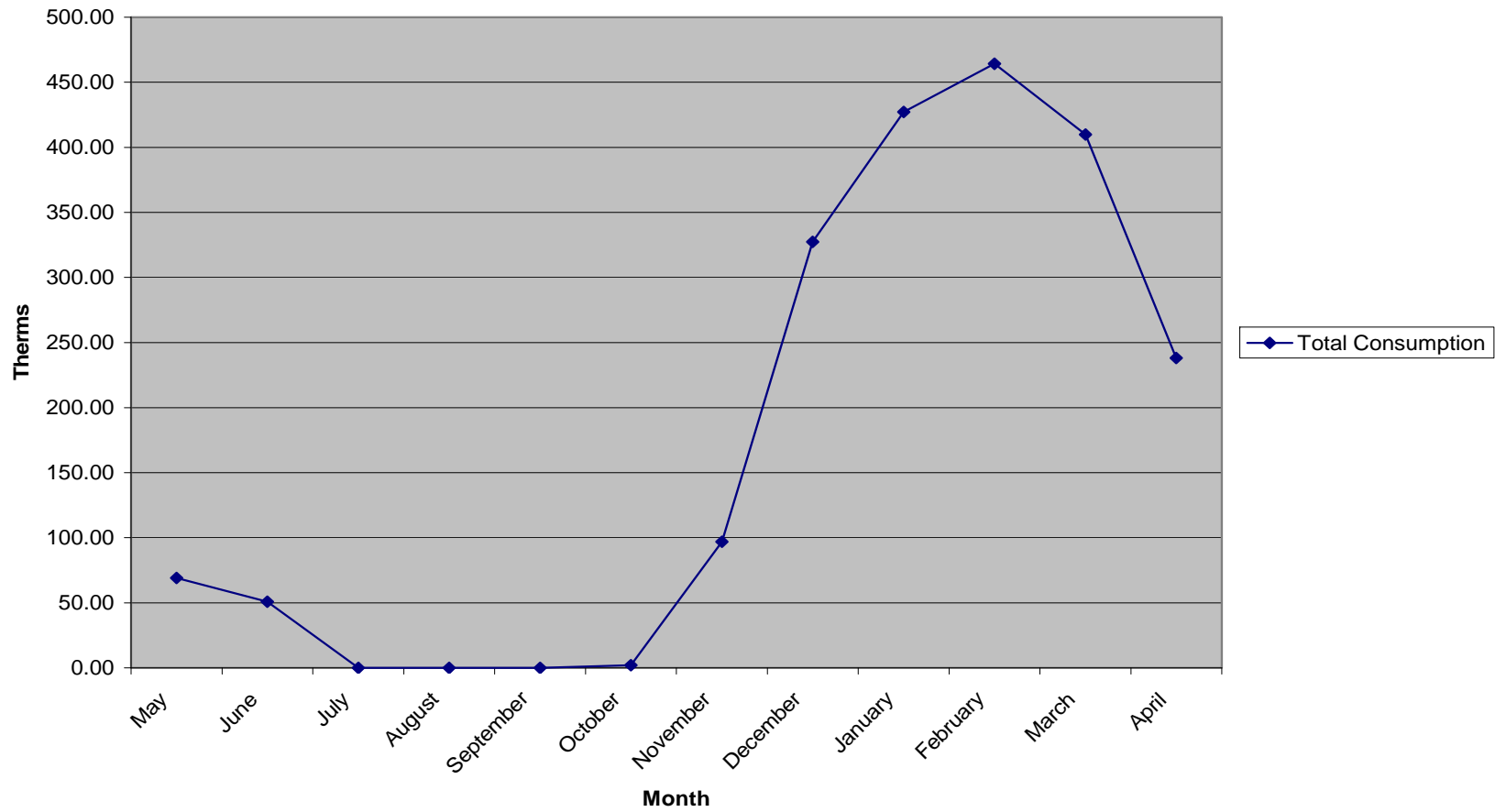
**Building Department**

Provider	Month	Start Date	End Date	Account	Utility Type	Billing Days	Consumption	Units	Total \$
South Jersey Gas	May	5/9/2008	6/10/2008	119 32 3150 28	Gas	32	69.08	therms	\$ 112.07
South Jersey Gas	June	6/10/2008	7/10/2008	119 32 3150 28	Gas	30	50.96	therms	\$ 89.31
South Jersey Gas	July	7/10/2008	8/8/2008	119 32 3150 28	Gas	29	0.00	therms	\$ 19.35
South Jersey Gas	August	8/8/2008	9/9/2008	119 32 3150 28	Gas	32	0.00	therms	\$ 17.48
South Jersey Gas	September	9/9/2008	10/9/2008	119 32 3150 28	Gas	30	0.00	therms	\$ 20.60
South Jersey Gas	October	10/9/2008	11/7/2008	119 32 3150 28	Gas	29	2.07	therms	\$ 20.90
South Jersey Gas	November	11/7/2008	12/9/2008	119 32 3150 28	Gas	32	97.01	therms	\$ 150.90
South Jersey Gas	December	12/9/2008	1/9/2009	119 32 3150 28	Gas	31	327.34	therms	\$ 455.76
South Jersey Gas	January	1/9/2009	2/9/2009	119 32 3150 28	Gas	31	427.28	therms	\$ 583.91
South Jersey Gas	February	2/9/2009	3/11/2009	119 32 3150 28	Gas	30	464.13	therms	\$ 710.49
South Jersey Gas	March	3/11/2009	4/9/2009	119 32 3150 28	Gas	29	409.70	therms	\$ 631.17
South Jersey Gas	April	4/9/2009	5/11/2009	119 32 3150 28	Gas	32	238.16	therms	\$ 373.39
<b>12 Month Total:</b>							2085.73	therms	\$ 3,185.33
<b>Average Cost per therm:</b>							\$	1.527	
<b>Average Cost per KBtu:</b>							\$0.015		

\* Rate (GSG) General Service Gas

**Figure 2**  
**Natural Gas Usage Profile**

**Margate Building Dept.**



B. Energy Use Intensity (EUI)

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. Their website allows the user to determine how well the client’s building Energy Use Intensity compares with similar facilities throughout the U.S. and in your specific region or state.

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 (electricity, gas, 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. The EUI for this facility is calculated as follows:

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

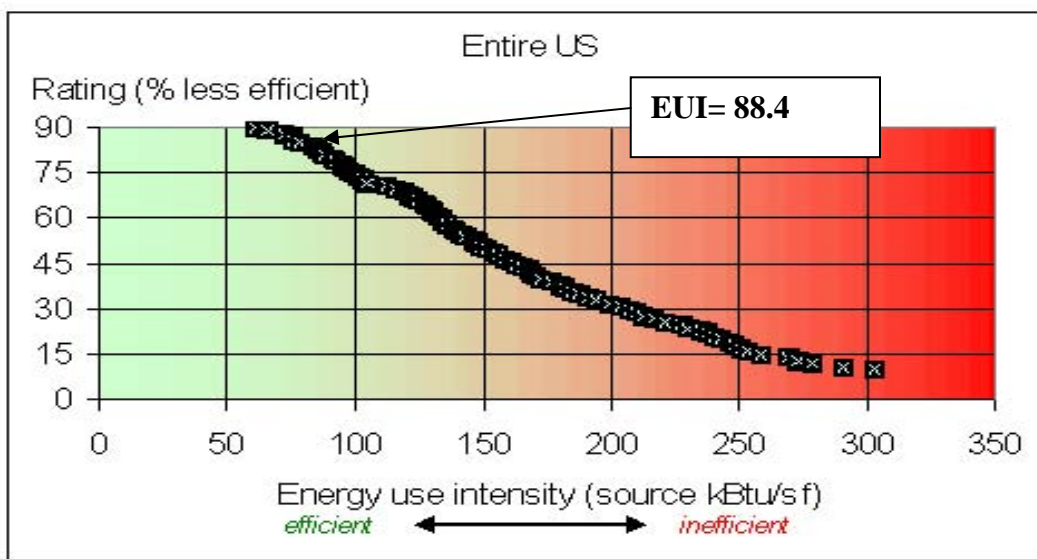
$$\begin{aligned} \text{Electric} &= ((33,461 \text{ kWh}) * (1000 \text{ W/kW}) * (3.414 \text{ Btu/h} / 1 \text{ W})) / (1000 \text{ Btu} / 1 \text{ kBtu}) \\ &= 114,235 \text{ kBtu} \end{aligned}$$

$$\text{Gas} = ((2,086 \text{ therms}) * (100,000 \text{ Btu/h} / 1 \text{ therm})) / (1000 \text{ Btu} / 1 \text{ kBtu}) = 208,600 \text{ kBtu}$$

$$\text{Building EUI} = \frac{(114,235 \text{ kBtu} + 208,600 \text{ kBtu})}{3,653 \text{ SF}} = \frac{322,835 \text{ kBtu}}{3,653 \text{ SF}} = 88.4 \text{ kBtu/SF}$$

$$\text{Building Department EUI} = \underline{88.4 \text{ kBtu/SF}}$$

**Figure 3**  
**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](http://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:	margatecity
Password:	lgeaceg09008

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**

<b>FACILITY DESCRIPTION</b>	<b>ENERGY PERFORMANCE RATING</b>	<b>NATIONAL AVERAGE</b>
Building Department	N/A	N/A

\* 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.

The Building Department is less than 5,000 square feet of office floor space so an Energy Star Performance Rating could not be calculated. 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 City of Margate 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 Building Department in the absence of the Energy Star Performance Rating.

The EUI distribution, Figure 3, is specific for Office Buildings. The Building Department has an EUI of 88.4 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.

## V. FACILITY DESCRIPTION

The Building Department space is approximately 3,653 square feet, located within a portion of the 2<sup>nd</sup> floor of an office complex. The building is stick-built with roof trusses and asphalt shingles, and a ventilated attic space, which is insulated from the space below. Windows are clear, double-pane, insulating replacement type. Walls are assumed to be insulated with 3 ½” fiber glass batt insulation. The building houses the building department offices.

### Heating System

The heating system consists of two (2) gas-fired furnaces located in the attic space. The gas furnaces are vented out through the roof. Ductwork connected to ceiling diffusers distributes air to the offices. Each unit has a corresponding wall thermostat, which is a non-programmable type.

### Cooling System

Each air handler described above is equipped with a DX cooling coil. The outdoor condensing units are located on a flat portion of the roof in the rear of the building.

### Domestic Hot Water

Domestic hot water for the toilet rooms is a 19 gallon electric unit located in the closet.

### Lighting System

All offices and public areas within this building are lit using 2-foot fixtures containing T8 lamps and electronic ballasts. Standard switching is utilized and there are no other types of lighting controls present.

**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 manufacturer's 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)

### ECM #1: Install Lighting Controls

#### Description:

#### *Install Lighting Controls to Reduce the Lighting Use*

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 the Office and Storage Building office spaces, conference room, document storage room, time-clock area and entrance area. Occupancy sensors are recommended in the Water Treatment Building treatment room and garage area, and in the Water Meter Repair Shop in the garage, storage area and shop area.

CEG would recommend wall switches for individual rooms, ceiling mount sensors for large office areas, 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 annual kilowatt hours (kWh) savings for the areas where the proposed occupancy sensors will be located:

$$\text{Savings} = \text{Total Kilowatts} \times \text{Annual Average Burn Hours}$$

$$= 4847 \text{ kWh/yr.} \times 10\% \times \$0.17/\text{kWh}$$

$$\text{Annual Savings} = \underline{\$82 / \text{yr.}}$$

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 11.

Total cost to install sensors is \$55 x 11 units = \$605.

Total ECM Lifetime Energy Savings = 15 Years (Est.) x \$82 / yr. = \$1,230

Simple Payback (yrs.) = (Cost – Incentive) / (Annual Energy Savings + Annual Maintenance Savings)

Simple Return on Investment (%) = (((Annual Energy Savings + Annual Maintenance Savings) x (ECM Lifetime)) – (Cost – Incentive)) / (Cost – Incentive)

### Energy Savings Summary:

<b>ECM #1 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	<b>\$825</b>
<b>NJ Smart Start Equipment Incentive (\$):</b>	<b>(\$220)</b>
<b>Net Installation Cost (\$):</b>	<b>\$605</b>
<b>Maintenance Savings (\$ / yr):</b>	<b>\$0</b>
<b>Energy Savings (\$ / yr):</b>	<b>\$82</b>
<b>Net Savings (\$ / yr):</b>	<b>\$82</b>
<b>Simple Payback (yrs):</b>	<b>7.4</b>
<b>Simple Return On Investment (%):</b>	<b>13.5 %</b>
<b>Simple Lifetime ROI (%):</b>	<b>1.03 %</b>
<b>Estimated ECM Lifetime (yr):</b>	<b>15</b>
<b>Simple Lifetime Savings (\$):</b>	<b>\$625</b>

- 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: Programmable Thermostats

### Description:

Two 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.

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 for heating are as follows:

Occupied Heating =	70° F
Unoccupied Heating =	60° 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](http://www.energystar.gov).

Calculated energy savings for heating only = \$236/Unit x 2 = \$472

Simple Payback (yrs.) = (Cost – Incentive) / (Annual Energy Savings + Annual Maintenance Savings)

Simple Return on Investment (%) = (((Annual Energy Savings + Annual Maintenance Savings) x (ECM Lifetime)) – (Cost – Incentive)) / (Cost – Incentive)

**Energy Savings Summary:**

<b>ECM #2 - ENERGY SAVINGS SUMMARY</b>	
<b>Installation Cost (\$):</b>	<b>\$400</b>
<b>NJ Smart Start Equipment Incentive (\$):</b>	<b>(\$0)</b>
<b>Net Installation Cost (\$):</b>	<b>\$400</b>
<b>Maintenance Savings (\$ / yr):</b>	<b>\$0</b>
<b>Energy Savings (\$ / yr):</b>	<b>\$472</b>
<b>Net Savings (\$ / yr):</b>	<b>\$472</b>
<b>Simple Payback (yrs):</b>	<b>0.85</b>
<b>Simple Return On Investment (%):</b>	<b>117.6 %</b>
<b>Simple Lifetime ROI (%):</b>	<b>16.7 %</b>
<b>Estimated ECM Lifetime (yr):</b>	<b>15</b>
<b>Simple Lifetime Savings (\$):</b>	<b>\$6,680</b>

## 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 Margate Building Department, 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 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 Margate Building Department being audited for the purposes of determining a potential for a roof mounted photovoltaic system. Due to the limited roof area facing south, and the degree of roof pitch, it is our opinion that a roof mounted PV Solar Panel system is not feasible for the Building Department.

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

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 Margate City and has determined it is not a viable option.

## **X. 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 load profile associated with summer cooling (air conditioner load). There is an increase in electric consumption April through September, with a fairly steady load profile the balance of the year. Air conditioning load is supplied by air-handlers equipped with DX cooling coils which add to the summer consumption. Base-load (flat) shaping is important because a flat consumption profiles will yield more competitive pricing when shopping for Third Party Suppliers.

### Natural Gas:

The Natural Gas Usage Profile demonstrates a very typical heating load profile, with increasing consumption in the winter months (November – March) and a dramatic drop in consumption in the summer months (April – October). This is due to the presence of (2) natural gas fired furnaces. Natural gas prices will be higher in the winter period as they are related to heating demand and the increase in use during this time. The flatter, (base-load,) the consumption profile the more competitive the pricing when shopping for alternative suppliers for energy.

### **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, or when a new supplier is contracted and 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 scope. CEG's observations are seen in both the electric and natural gas costs. The average "price to compare" per kWh (kilowatt hour) for all buildings is \$.1271 / kWh (kWh is the common unit of electric measure). The average "price to compare" per decatherm for natural gas is \$.09975 /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 city 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 2008 – March 2009) and current electric rates, Margate City can see an improvement of over 20 % in its electric costs. (Note: Savings were calculated using an Average Annual Consumption of 637,617 kWh and a

fixed one-year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG recommends that the city seek an energy advisor to maximize energy savings and to apply a managed approach to procuring energy.

CEG's secondary recommendation coincides with the city's natural gas costs. Based on the current market, (which is very competitive), the city could see a savings of over 15% in its natural gas expenditures. Again CEG recommends the use of any energy advisor to review alternative energy sourcing strategies.

CEG recommends the city 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 city will learn more about the competitive supply process. The town can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at [www.nj.gov/bpu](http://www.nj.gov/bpu), and 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 given to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with their utility representative. In addition, they 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 city frequently changes its supplier for energy (natural gas), CEG recommends it 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 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. 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**  
**Margate City Building**  
**Department**  
**ATLANTIC CITY**  
**ELECTRIC**  
**Acct.No: 0119 6979 9987**

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	4/10/2008	5/9/2008	6/10/2008	7/10/2008	8/8/2008	9/9/2008	10/9/2008	11/7/2008	12/9/2008	1/10/2009	2/9/2009	3/11/2009	4/10/2008
Current Meter Read Date	5/9/2008	6/10/2008	7/10/2008	8/8/2008	9/9/2008	10/9/2008	11/7/2008	12/9/2008	1/10/2009	2/9/2009	3/11/2009	4/9/2009	4/9/2009
Billing Days	29	32	30	29	32	30	29	32	32	30	30	29	364
KWH	1,794	2,153	4,062	4,403	4,500	2,771	2,233	1,990	2,419	2,540	2,490	2,106	33,461
KW	10	19	19	16	17	17	16	9	5	10	10	9	19
Monthly Load Factor	25%	15%	29%	40%	34%	23%	21%	30%	69%	36%	35%	32%	32%
Electric Delivery, \$	\$117	\$146	\$224	\$202	\$219	\$154	\$126	\$92	\$87	\$109	\$108	\$94	\$1,678
Delivery \$/kwh	\$0.065	\$0.068	\$0.055	\$0.046	\$0.049	\$0.056	\$0.056	\$0.046	\$0.036	\$0.043	\$0.043	\$0.045	\$0.051
Electric Supply, \$	\$179	\$218	\$529	\$618	\$640	\$339	\$231	\$225	\$256	\$285	\$280	\$239	\$4,039
Supply \$/kwh	\$0.100	\$0.101	\$0.130	\$0.140	\$0.142	\$0.122	\$0.103	\$0.113	\$0.106	\$0.112	\$0.113	\$0.113	\$0.116
Total Cost, \$	\$297	\$364	\$753	\$820	\$859	\$493	\$357	\$317	\$343	\$394	\$388	\$333	\$5,717
\$/KWH	\$0.1653	\$0.1691	\$0.1855	\$0.1862	\$0.1908	\$0.1780	\$0.1598	\$0.1592	\$0.1418	\$0.1550	\$0.1558	\$0.1583	\$0.1709

**Natural Gas Cost Summary**  
**Margate City Building**  
**Department**  
**SOUTH JERSEY GAS**  
**Acct. No. 119 32 3150 28**

Month	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	Total
Billing Days	32	30	29	32	30	29	32	31	31	30	29	32	367
Last Meter Read Date	5/9/2008	6/10/2008	7/10/2008	8/8/2008	9/9/2008	10/9/2008	11/7/2008	12/9/2008	1/9/2009	2/9/2009	3/11/2009	4/9/2009	5/9/2008
Current Meter Read Date	6/10/2008	7/10/2008	8/8/2008	9/9/2008	10/9/2008	11/7/2008	12/9/2008	1/9/2009	2/9/2009	3/11/2009	4/9/2009	5/11/2009	5/11/2009
Gas Used per 100 cu ft	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BTU Factor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Therms (Burner Tip)	69	51	0	0	0	2	97	327	427	464	410	238	2,086
Total Distribution Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cost per Therm	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Total Commodity Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cost per Therm	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total Cost	\$112	\$89	\$19	\$17	\$21	\$21	\$151	\$456	\$584	\$710	\$631	\$373	\$3,185
Cost per Therm	\$1.62	\$1.75	#DIV/0!	#DIV/0!	#DIV/0!	\$10.10	\$1.56	\$1.39	\$1.37	\$1.53	\$1.54	\$1.57	\$1.53

# Margate Building Dept.

<b>CONSTRUCTION COST AND REBATES</b>					
<b><u>ECM # 1 - INSTALL LIGHTING CONTROLS</u></b>	<u>Qty</u>	<u>Unit Cost \$</u>	<u>Material \$</u>	<u>Labor \$</u>	<u>Total \$</u>
Occupancy Sensors	11	\$75	\$825	\$0	\$825
<b>Total Cost</b>					\$825
Utility Incentive					-\$220
<b>Total Net Cost</b>					<b>\$605</b>
<b><u>ECM # 6 - PROGRAMMABLE THERMOSTAT</u></b>	<u>Qty</u>	<u>Unit Cost \$</u>	<u>Material \$</u>	<u>Labor \$</u>	<u>Total \$</u>
Programmable Thermostat	2	\$100	\$200	\$200	\$400
<b>Total Cost</b>					\$400
Utility Incentive					\$0
<b>Total Net Cost</b>					<b>\$400</b>

# 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

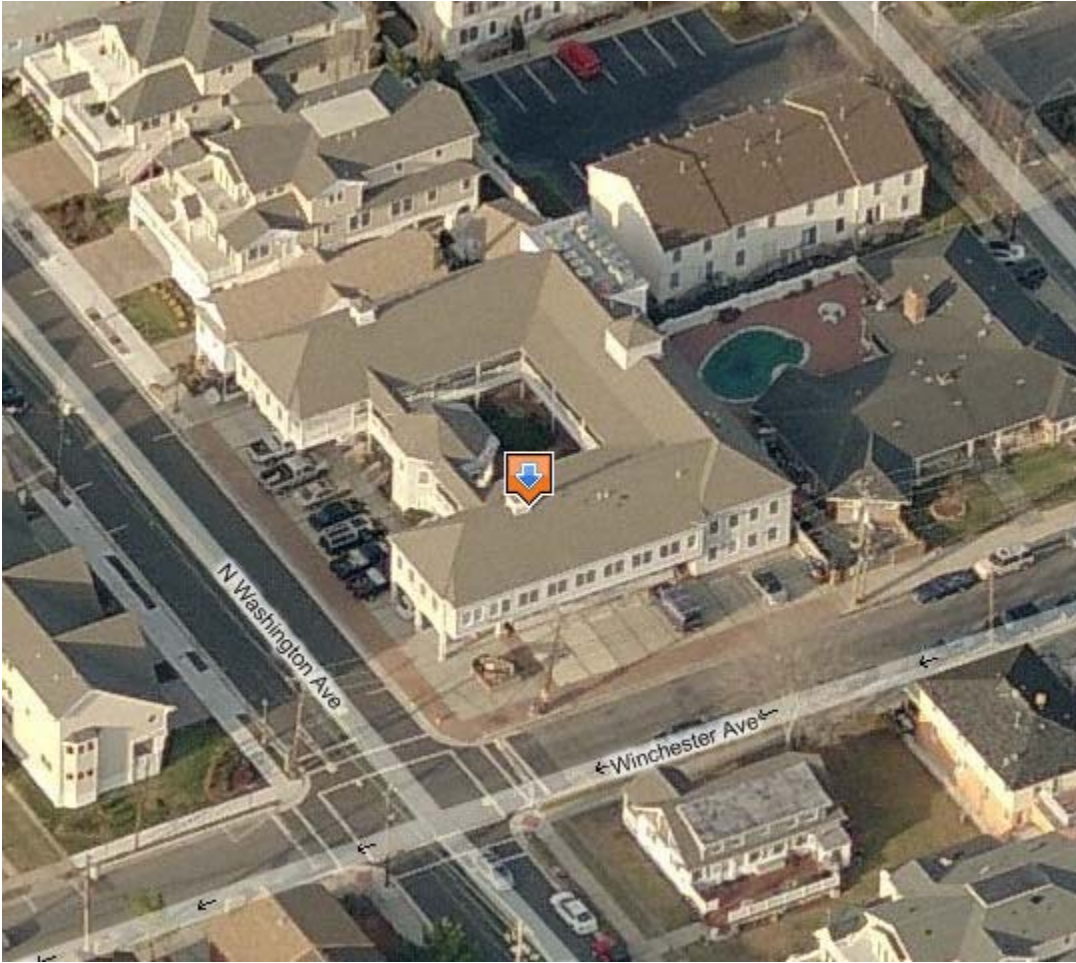
**Other Equipment Incentives**

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

# Margate Building Dept.

EQUIPMENT LIST									
TAG	MAKE	MODEL	TYPE	CAPACITY	EFFICIENCY	SERVES	LOCATION	REMAINING USEFUL LIFE	NOTES
1	-	-	GAS-FIRED FURNACE WITH DX COIL	-	80.0%	WEST SIDE	ATTIC	-	LEASED OFFICE SPACE - EQUIPMENT IS PART OF BUILDING INFRASTRUCTURE.
2	-	-	GAS-FIRED FURNACE WITH DX COIL	-	80.0%	EAST SIDE	ATTIC	-	LEASED OFFICE SPACE - EQUIPMENT IS PART OF BUILDING INFRASTRUCTURE.
3	-	-	CONDENSING UNIT	-	-	WEST SIDE	ROOF	-	LEASED OFFICE SPACE - EQUIPMENT IS PART OF BUILDING INFRASTRUCTURE.
4	-	-	CONDENSING UNIT	-	-	EAST SIDE	ROOF	-	LEASED OFFICE SPACE - EQUIPMENT IS PART OF BUILDING INFRASTRUCTURE.
DHW	BRADFORD WHITE	M120U665-INAC	ELECTRIC WITH STORAGE	1500 WATTS, 19 GALLON	100%	RESTROOMS	CLOSET	-	





Building Department  
101 N. Washington Ave.  
Margate City, NJ 08402

↑ NORTH



# STATEMENT OF ENERGY PERFORMANCE

## Building Department

**Building ID:** 1813174

**For 12-month Period Ending:** March 31, 2009<sup>1</sup>

**Date SEP becomes ineligible:** N/A

**Date SEP Generated:** August 06, 2009

**Facility**  
Building Department  
101 N. Washington Ave.  
Margate City, NJ 08402

**Facility Owner**  
N/A

**Primary Contact for this Facility**  
N/A

**Year Built:** 2001

**Gross Floor Area (ft<sup>2</sup>):** 3,653

**Energy Performance Rating<sup>2</sup> (1-100)** N/A

### Site Energy Use Summary<sup>3</sup>

Natural Gas (kBtu) <sup>4</sup>	201,659
Electricity (kBtu)	112,083
Total Energy (kBtu)	313,742

### Energy Intensity<sup>5</sup>

Site (kBtu/ft <sup>2</sup> /yr)	88
Source (kBtu/ft <sup>2</sup> /yr)	164

### Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO <sub>2</sub> e/year)	29
---	----

### Electric Distribution Utility

Atlantic City Electric Co

### National Average Comparison

National Average Site EUI	77
National Average Source EUI	182
% Difference from National Average Source EUI	-10%
Building Type	Office

### Meets Industry Standards<sup>6</sup> 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"/>
<b>Building Name</b>	Building Department	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		<input type="checkbox"/>
<b>Type</b>	Office	Is this an accurate description of the space in question?		<input type="checkbox"/>
<b>Location</b>	101 N. Washington Ave., Margate City, NJ 08402	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		<input type="checkbox"/>
<b>Single Structure</b>	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"/>
Building Department (Office)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
<b>Gross Floor Area</b>	3,653 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"/>
<b>Weekly operating hours</b>	35 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"/>
<b>Workers on Main Shift</b>	12	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"/>
<b>Number of PCs</b>	10	Is this the number of personal computers in the Office?		<input type="checkbox"/>
<b>Percent Cooled</b>	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"/>
<b>Percent Heated</b>	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: Electric (kWh (thousand Watt-hours)) Space(s): Entire Facility		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
02/10/2009	03/09/2009	2,490.00
01/10/2009	02/09/2009	2,540.00
12/10/2008	01/09/2009	2,419.00
11/10/2008	12/09/2008	1,990.00
10/10/2008	11/09/2008	2,233.00
09/10/2008	10/09/2008	2,771.00
08/10/2008	09/09/2008	4,500.00
07/10/2008	08/09/2008	4,403.00
06/10/2008	07/09/2008	4,062.00
05/10/2008	06/09/2008	2,153.00
04/10/2008	05/09/2008	1,794.00
<b>Electric Consumption (kWh (thousand Watt-hours))</b>		<b>31,355.00</b>
<b>Electric Consumption (kBtu)</b>		<b>106,983.26</b>
<b>Total Electricity Consumption (kBtu)</b>		<b>106,983.26</b>
<b>Is this the total Electricity consumption at this building including all Electricity meters?</b>		<input type="checkbox"/>

Fuel Type: Natural Gas		
Meter: Gas (therms) Space(s): Entire Facility		
Start Date	End Date	Energy Use (therms)
02/10/2009	03/09/2009	409.70
01/10/2009	02/09/2009	464.13
12/10/2008	01/09/2009	427.28
11/10/2008	12/09/2008	327.34
10/10/2008	11/09/2008	97.01
09/10/2008	10/09/2008	2.07
08/10/2008	09/09/2008	0.00
07/10/2008	08/09/2008	0.00
06/10/2008	07/09/2008	0.00
05/10/2008	06/09/2008	50.96

04/10/2008	05/09/2008	69.08
<b>Gas Consumption (therms)</b>		<b>1,847.57</b>
<b>Gas Consumption (kBtu)</b>		<b>184,757.00</b>
<b>Total Natural Gas Consumption (kBtu)</b>		<b>184,757.00</b>
<b>Is this the total Natural Gas consumption at this building including all Natural Gas meters?</b>		<input type="checkbox"/>

<b>Additional Fuels</b>	
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"/>

## 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**  
Building Department  
101 N. Washington Ave.  
Margate City, NJ 08402

**Facility Owner**  
N/A

**Primary Contact for this Facility**  
N/A

## General Information

Building Department	
Gross Floor Area Excluding Parking: (ft <sup>2</sup> )	3,653
Year Built	2001
For 12-month Evaluation Period Ending Date:	March 31, 2009

## Facility Space Use Summary

Building Department	
Space Type	Office
Gross Floor Area(ft <sup>2</sup> )	3,653
Weekly operating hours	35
Workers on Main Shift	12
Number of PCs	10
Percent Cooled	50% or more
Percent Heated	50% or more

## Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 03/31/2009)	Baseline (Ending Date 03/31/2009)	Rating of 75	Target	National Average
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft <sup>2</sup> )	88	88	50	N/A	77
Source (kBtu/ft <sup>2</sup> )	164	164	94	N/A	182
Energy Cost					
\$/year	\$ 8,697.42	\$ 8,697.42	\$ 4,957.11	N/A	\$ 7,605.06
\$/ft <sup>2</sup> /year	\$ 2.38	\$ 2.38	\$ 1.36	N/A	\$ 2.08
Greenhouse Gas Emissions					
MtCO <sub>2</sub> e/year	29	29	17	N/A	25
kgCO <sub>2</sub> e/ft <sup>2</sup> /year	8	8	5	N/A	7

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

**Notes:**

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