

# Energy Efficiency: City of Raleigh One Exchange Plaza

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# EXECUTIVE SUMMARY

## Overview

The Environmental Defense Fund Climate Corps Program places trained M.B.A., Master of Public Policy, and Master of Environmental Management fellows into businesses, universities, and local government offices across the country to identify and analyze energy efficient investments that can reduce costs and energy use. The Environmental Defense Fund (EDF) partnered with the City of Raleigh in North Carolina to place two Climate Corps Fellows in the Parks & Recreation Department's Facilities and Operations Division to analyze the energy consumption of the office building, One Exchange Plaza (OEP), and identify cost-effective energy efficiency improvements that could be applied to the building and city-wide. The City of Raleigh is the first city in the country to host EDF Climate Corps Fellows.

Efforts to reduce energy consumption will not only reduce the City of Raleigh's facilities' operating expenses, but also reduce greenhouse gas emissions in keeping with the city's greenhouse gas emission reduction strategy. These efforts could also provide positive recognition for the City of Raleigh and inspire other cities around the nation to implement their own energy efficiency measures.

## Analysis and Results

The Climate Corps fellows conducted a thorough analysis of the operations at One Exchange Plaza in order to gain a better understanding of the building's energy usage. The building's recent energy bills were analyzed to establish a baseline of energy consumption. The fellows developed a list of energy saving opportunities related to lighting, HVAC, and office/kitchen equipment for the building.

The table below summarizes the energy savings and paybacks associated with various projects recommended by the fellows. If all of these projects were implemented, the total energy savings would be 1,099,297 kWh/year, representing a 40% reduction in the building's cumulative consumption. The Facilities and Operations Division could also realize an annual reduction of \$81,902.61, or 41%, in energy and maintenance costs. In keeping with the City of Raleigh's goal to reduce green house gas emissions, implementing these projects would reduce CO2 emissions by 623.85 Tons/Year.

## Recommended projects

Project	Costs (Equipment & Labor)	Estimated Annual Energy Savings (kWh)	Estimated Cost Savings		Payback (Years)	CO2 Reduction (Tons/Yr)
			Annual	5-Year		
Lighting: T-12/T-8 to LED	\$263,686.25	818,187	\$62,182.22	\$310,911.10	4.24	464.32
HVAC: VFDs and Fans	\$167,400.00	273,986	\$19,179.00	\$95,895.00	8.73	155.49
Vending Machines	\$296.00	7,124	\$541.39	\$2,706.96	0.55	4.04
<b>TOTAL</b>	<b>\$431,382.25</b>	<b>1,099,297</b>	<b>\$81,902.61</b>	<b>\$409,513.06</b>	<b>5.27</b>	<b>623.85</b>

Many of the projects listed above have additional non-quantifiable benefits as well. For example, improving the lighting provides building occupants with a better working environment and may improve productivity while reducing absenteeism.

## Barriers

### Financial

The City of Raleigh's Facilities and Operations Division manages the operations and maintenance of the majority of city-owned buildings. The division is city-funded and given a strict annual budget sanctioned by the City Council in which to operate, making it difficult to finance new projects that are not in the current budget. In addition, any money not used or saved by the division during the given fiscal year

must be returned to the city operating budget, with a few exceptions, making it difficult to invest in continual efficiency improvement projects. The division is currently utilizing stimulus money from the Energy Efficiency and Conservation Block Grant (EECBG), in conjunction with the Raleigh Office of Sustainability, as part of the American Recovery and Reinvestment Act (ARRA). Additionally, the division obtains other grant money as well as Capital Improvement Project (CIP) city budget money to implement energy efficiency projects, but the projects are often piecemeal due to limited funds.

## **Recommendations and Action Plan**

The recommended projects above, which are described in more detail in the full report, will decrease energy use, reduce carbon emissions, lower maintenance costs, and improve the overall functionality at One Exchange Plaza.

### Lighting

It is understood that the Facilities and Operations Division has already flagged OEP for a T12 to T8 lighting retrofit project, but the fellows recommend that the division install LED lighting in lieu of T8 lighting to capture greater energy and cost savings. Although installing LED lighting has greater upfront costs than installing T8 lighting, the payback periods are comparable. This project may even qualify for Custom Incentives from Progress Energy of \$0.08/kWh saved, which would lower the upfront costs considerably. If multiple budget cycles are needed to meet upfront costs, the LED lighting retrofit projects can be phased in. However, the fellows recommend that the LED lighting retrofit project be implemented as soon as possible to take advantage of the potential utility rebates and significant energy savings.

### HVAC

The supply and return fans that provide fresh air to OEP's occupants are re-built every 5 years at great expense and are due to be rebuilt soon. This presents an opportunity to replace the current fans with fans that can utilize variable frequency drives, to maximize energy savings. Variable frequency drives regulate fan motors allowing the motors to perform at their most efficient. These drives also qualify for Progress Energy utility rebates. The fellows recommend that the VFD project be implemented immediately to take advantage of the utility rebates and gain energy savings.

### Vending Machine Controls

The vending machine project should also be implemented immediately to take advantage of utility rebates and instant energy savings.

### Other Recommendations

This report also identifies other actions that will improve the operations and working environment of the building. Replacing the pneumatic controls that currently operate the major HVAC equipment, except for the chiller, with DDC controllers, will allow the Facilities and Operations staff to remotely control and more accurately program the equipment, as well as monitor the equipment for any malfunctions. The current dampers used throughout the building to control the air flow and temperature in occupied spaces do not function properly resulting in daily complaints from occupants. These dampers should be replaced with more effective dampers in order to improve the working environment and reduce maintenance calls. Educating the building's occupants about the benefits of energy efficiency will also make these projects smoother to implement and help secure participation in making energy savings a reality. These actions should be considered in tandem with the recommended projects for implementation.

*We would like to thank Billy Jackson, Suzanne Walker and the rest of the staff in the Facilities and Operations division for their unwavering support and enthusiasm as we tackled this project. We would also like to thank Scott and Andrew at OEP for their patience and accessibility, which allowed us to complete a thorough energy assessment of the entire building. We hope this report will provide valuable insight and guidance for the Facilities and Operations division as they continue to strive for new levels of energy efficiency in their operations.*

## OVERVIEW AND BACKGROUND

The City of Raleigh launched an Office of Sustainability in 2008 to responsibly address environmental and energy issues for a growing municipality. The Office of Sustainability has initiated projects that fund energy efficiency projects, inventory greenhouse gas emissions, develop an electric car program and create a green jobs training program. The Office works collaboratively with the Parks and Recreation's Facilities and Operations Division to promote the implementation of energy efficiency projects throughout the city.

The Parks and Recreation's Facilities and Operations Division oversees the operations and maintenance of over 3,000,000 SF of facilities, including almost 500,000 SF of commercial space, and employs an energy management team dedicated to reducing energy consumption while improving the quality of the facilities. The division is actively engaged in a number of energy efficiency projects that include installing LED light fixtures in building parking lots across the city, utilizing energy management technologies in conjunction with building automation systems, and implementing lighting controls with occupancy sensors.

### One Exchange Plaza

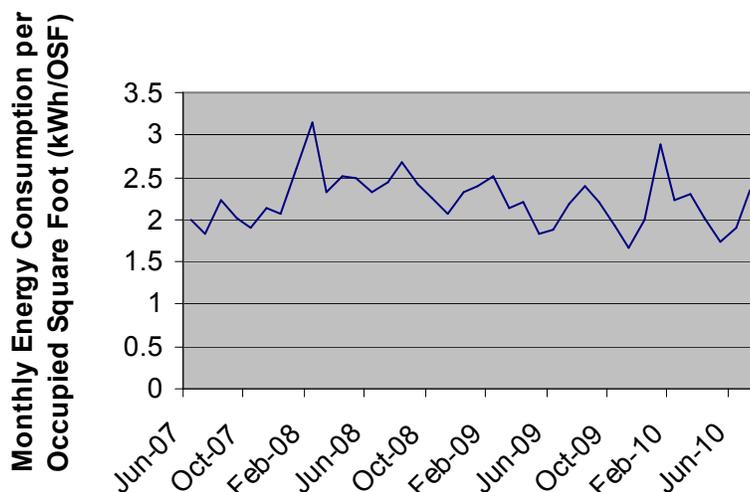
The main focus of this report is One Exchange Plaza, a 104,000 SF office tower completed in 1984. The building contains 10 stories of office space that houses a number of city departments as well as tenant space leased to the state. A restaurant is located on the ground level, but it is independently metered.

The building is well maintained and some improvements in lighting efficiency have been implemented. Facilities staff has upgraded almost all the incandescent light fixtures to compact fluorescents and has installed occupancy sensors in the restrooms on each floor. The staff has also changed out about 30% of the building's T12 fluorescent lamps and ballasts to more efficient T8 fluorescent lamps and ballasts.

The HVAC system is a patchwork of original and new equipment. The chiller was recently replaced and new controls for it were installed; however the supply/return fans and fan motors are the original design from 1984, rebuilt every 5 years. The dampers are original and must be kept open all the time to ensure adequate air circulation. Pneumatic controls are utilized throughout the building and are not compatible with the division's energy management technologies. There is significant room for energy efficiency improvement if the city is willing to approve capital improvement expenditures for this system.

Overall, the energy consumption for One Exchange Plaza is cyclical, peaking when HVAC load is highest in the late summer and mid-winter. Figure 1, shows the monthly data for the past 3 years of energy consumption. This information can be used to assess the effectiveness of future energy efficiency and conservation initiatives and track monthly progress.

**Figure 1: Monthly energy consumption per occupied square foot at One Exchange Plaza**



# RECOMMENDED ENERGY EFFICIENCY PROJECTS AND ACTIONS

## Project 1 – Lighting Retrofit: T12/T8 to LED

### Basic Project Information

Currently installed at OEP are T12 and T8 fluorescent lamps. The T12 lamps are either 40W or 34W with ballasts that bring total wattage to at least 50W per lamp. The T8 lamps are 32W with ballasts that bring total wattage to 40W per lamp. There are also CFL lamps on numerous floors throughout the building. See **Appendix A** for a complete lighting inventory at OEP.

### Pictures: T12 and T8 lamps compared to LEDs



T8 lamps on 7<sup>th</sup> floor



LED lamps on 7<sup>th</sup> floor



T12 stairway lighting



LED stairway lighting

The fellows recommend using LED lamps to replace the existing lighting in most areas. A tube LED lamp is 15W and has no ballast. The lamps last up to 80,000 hours – significantly longer than the 12,000 – 20,000 hour lamp life of tube fluorescent lamps (see **Appendix B** for LED product specifications). Given the operating hours at OEP, a non-emergency LED lamp can last up to 30 years.

### Picture: T12 and LED comparison in stairwell at OEP (T12 lighting floor 8, LED floor 7)



## Project Summary

- Replace existing lighting with LED lamps
- Energy Savings: 818,187 kWh
- Equipment and Labor Cost: \$263,686.25
- **Total Estimated Annual Energy Cost Savings: \$62,182**
- **Payback Period: 4.24 years**

## Financial Analysis

### Assumptions

- Annual electricity rate: \$0.0763 per kWh – no growth factor included
- Installation cost: \$60 per hour (16 lamps per hour)
- Business hours are 55 hours per week and emergency-powered lighting remains on 168 hours per week
- Emergency-powered lighting included in each floor's lamp count
- Maintenance cost savings based on life span of existing lamp and LED
- All T12 lamps considered 34W lamps in analysis
- Financial analysis based on entire project, but can be phased-in
- Cost estimates based on quoted product prices from Lite Energy Solutions

**Figure 2: One Exchange Plaza LED Lighting Retrofit Project (separated by floor/area)**

Floor/ Area*	Number of lamps on floor/ in area	Total Cost (\$)	Annual savings** (\$)	Payback	Annual Energy (kWh) savings
Stairs/ Mechanical floor	80	5,360	4,374	1.23	57,555
Elevators and Elev. Lobbies	137	6,855	6,220	1.10	81,838
Ground floor	166	11,182	4,553	2.46	59,903
Mezzanine	287	19,301	3,965	4.87	52,176
5th Floor	554	36,934	7,534	4.90	99,135
6th Floor	565	37,855	7,691	4.92	101,201
7th Floor	571	38,257	8,199	4.67	107,880
8th Floor	481	32,479	6,022	5.39	79,240
9th Floor	494	30,098	7,624	3.95	100,322
10th Floor	460	31,134	5,999	5.19	78,937
<b>Combined lamps</b>	<b>3,795</b>	<b>\$249,455</b>	<b>\$62,182</b>	<b>4.01</b>	<b>818,187</b>
<b>Installation</b>		<b>\$14,231.25</b>			
<b>TOTAL PROJECT</b>		<b>\$263,686.25</b>	<b>\$62,182</b>	<b>4.24</b>	<b>818,187</b>
* Includes emergency lighting					
**Includes energy and maintenance cost savings					
Source: Lite Energy Solutions					

## *Progress Energy Rebate*

LED retrofits are not specifically included under Progress Energy's energy efficiency rebates for lighting. Given the substantial energy savings involved, the fellows recommend working with Progress Energy to establish possible rebates.

*\* Were LED lighting retrofits to qualify for Progress Energy's custom energy efficiency program, the \$.08 per kWh hour incentive would generate \$65,455 in rebates – lowering total project cost to \$198,231 and payback to 3.19 years. See **Appendix C** for Progress Energy's Custom Incentive rebates.*

## *Phased installation option*

If the project costs are better absorbed over a number of budget cycles, the fellows recommend a phasing in of LED lighting. See **Appendix D** for a financial and energy analysis for each floor/ area at OEP – emergency-powered lighting is separated in analysis. Emergency lighting (or any lighting that remains on 24/7) provides the quickest payback and should be implemented immediately. Then LEDs can be installed floor by floor, based on cost and savings. Below is a recommended LED installation schedule:

- *Phase 1: Stairs, emergency lighting on mechanical floor, elevators, and elevator lobbies*
  - Total lamps: 217
  - Total cost: \$12,215
  - Total annual savings: \$10,594 and 139,393 kWh
  - Payback: 1.15 years
  
- *Phase 2: Ground floor, 9<sup>th</sup> floor*
  - Total lamps: 660
  - Total cost: \$41,280
  - Total annual savings: \$12,177 and 160,225 kWh
  - Payback: 3.39 years
  
- *Phase 3: Mezzanine, 5<sup>th</sup> floor, 6<sup>th</sup> floor, and 7<sup>th</sup> floor*
  - Total lamps: 660
  - Total cost: \$132,347
  - Total annual savings: \$27,390 and 360,392 kWh
  - Payback: 4.83 years
  
- *Phase 4: 8<sup>th</sup> floor, 10<sup>th</sup> floor*
  - Total lamps: 941
  - Total cost: \$63,613
  - Total annual savings: \$12,021 and 158,177 kWh
  - Payback: 5.29 years

## *Remaining areas at OEP*

The basement level at OEP has 257 T12, T8, and CFL lamps. However, it is excluded from the financial analysis because estimating the lighting hours is difficult, as it is occupied sporadically throughout the day and night. The 3rd and 4th floors at OEP have recently received new T8 and CFL lighting upgrades, so the fellows do not recommend installing LEDs until the remaining building has been retrofitted.

## Recommendation

The fellows recommend replacing existing lighting with LEDs throughout most areas in OEP (all floor/ areas listed in Figure 2 above). The stairwell and elevator lighting will achieve significant energy savings and will payback upfront investment in just over one year. The other floors will also produce significant energy and maintenance savings. Additionally, the hours used to calculate energy use did not include “off hours” when cleaning staff might occupy the building. The duration of “off hour” lighting use will only add to OEP’s energy savings.

The stronger, focused lighting will enhance the tenant work environments and improve the overall quality of the building. LED lighting also provides a safer, mercury-free work environment. Fluorescent and compact fluorescent lighting contain mercury that can harm individuals if there is frequent contact with a damaged lamp.

If the project cannot be completed in one phase, the fellows recommend a multi-phased approach that utilizes the near-instant savings of the emergency lighting to help fund the remainder of the project.

## Project 2 – HVAC: Variable Frequency Drives and Air Circulation Fans

### Basic Project Information

OEP’s current HVAC system uses two 90 base horsepower supply fans and two 50 base horsepower return fans to control the airflow in the building. The supply fans bring outside air to circulate through the building and the return fans send out inside air or send inside air through the system again. These fans send air supply through the building at a constant volume, irrespective of the load requirement (based on, among many things, occupancy of building and outside temperature). According to Western Michigan’s Sustainability department, these constant speed fans are often designed to “handle peak loads that have a safety factor. This often leads to energy inefficiency in systems that operate for extended periods at reduced load.”<sup>1</sup>

A variable frequency drive (VFD) will enable the fan motor to match output to load. It will slow down the fan, reduce excess air flow, and lead to significant energy savings. Additionally, the VFDs will lower maintenance costs because the fan motors will no longer run consistently at maximum speed. VFDs can be mounted next to the fan units and connect directly with the fan motors.

### Picture: Example of a variable frequency drive (VFD)



<sup>1</sup> [http://www.wmich.edu/sustainability/campus/learn/frequency\\_drives.html](http://www.wmich.edu/sustainability/campus/learn/frequency_drives.html)

While VFDs can be installed to work with existing fans and fan motors, those currently installed at OEP are not compatible with VFDs because an older design is used (see **Appendix E** for fan specifications). The older style varofoil fans are designed with blades that rotate based on static pressure. VFDs require induction fan blades that remain fixed to optimally reduce fan motor speed. The varofoil fans somewhat control the air supply volume as the blades rotate, but not nearly as effectively as VFDs and also cannot gauge the building load. A VFD with the older, rotating varofoil blades will likely disrupt (or fail to provide) the optimal air supply flow in the building.

The fellows recommend purchasing VFDs for the two supply fans and two return fans, and additionally, replacing the existing fans and fan motors. This will reduce HVAC system energy costs and enhance the durability of the equipment.

**Pictures: One of two air system 90 HP supply fans at OEP (motor built inside fan)**



**Project Summary**

- Install four VFDs and replace the four existing HVAC system supply and return fans
- Energy Savings: 273,986 kWh
- Equipment and Labor Cost: \$167,400 after Progress Energy Incentives (\$12,600).
- **Total Estimated Annual Energy Cost Savings: \$ 19,179**
- **Payback Period: 8.73 years**

**Financial Analysis**

*Assumptions*

- Electricity rate: \$0.07
- Hours per week HVAC system is powered on: 76.5 hrs
- Progress Energy rebate: \$45 per horsepower when installing VFDs (See **Appendix F**)
- Energy savings based upon building load factor and energy modeling from Atlantec Engineers, PA
- Capital costs and installation based on estimate from Newcomb and Company

### Energy Savings

Atlantec Engineers, PA was consulted for the energy savings analysis. See **Appendix G** for a detailed analysis of the energy savings. Below is the energy cost of the VFD fans compared to the existing constant volume fans.

**Figure 3: One Exchange Plaza HVAC System Fan Comparison (Annual Cost)**

Component	Current Fans (\$)	VFD Fans (\$)
Air System Fans	31,857	14,613
Cooling	15,095	13,602
Heating	0	341
Pumps	6,609	5,980
Cooling tower fans	3,305	3,150
<b>Total Cost</b>	<i>(56,865)</i>	<i>(37,686)</i>
<b>Cost Savings</b>		<b>19,179</b>

*Source: Atlantec Engineers, PA*

### Capital Cost

Installing VFDs and replacing supply fans, return fans and fan motors will cost an estimated \$180,001 including installation and overhead. See **Appendix H** for a detailed cost estimate. The recommended equipment purchase costs are below (labor/installation excluded):

- 4 variable frequency drives (VFDs): \$30,000
- 4 HVAC System fans (2 supply, 2 return): \$80,000

### Recommendation

The fellows recommend installing VFDs and replacing the HVAC system supply and return fans at OEP. Nearly \$20,000 in annual energy savings will be obtained and less stress will be placed on the HVAC system. The projected energy savings are based on very conservative estimates that set the electricity rate at \$0.07 per kWh – lower than the current rate and without expected growth.

*\* The annual energy consumption of the air system supply fans will be reduced by 54% and 246,343 kWh.*

This recommendation will also benefit those who work in the building. The maintenance staff at OEP constantly struggles to maintain proper temperatures for each tenant floor. Complaints range between too hot and too cold at the same time. The VFD installation will help the building sufficiently meet load requirements and improve the overall working environment of the building.

## Project 3 – Vending Machines

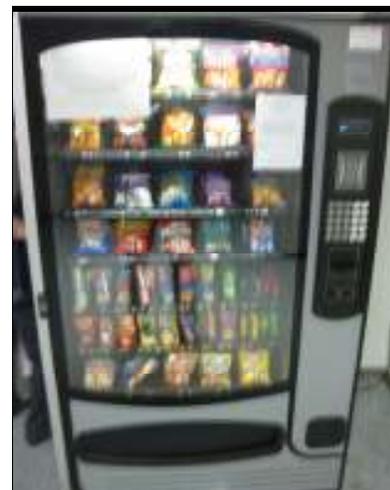
### Basic Project Information

The 2.5 million refrigerated beverage vending machines in place in the United States consume approximately 7.5 billion kWh per year. This equipment costs American businesses nearly \$600 million annually to power.<sup>2</sup> One Exchange Plaza has 3 refrigerated vending machines and 1 non-refrigerated located in the building.

The two major energy consuming systems in vending machines are refrigeration and lighting. While the City of Raleigh has negotiated with vending machine distributors to remove the lighting in the refrigerated vending machines, installing vending machine controls can substantially save energy and reduce operating expenses. The fellows recommend installing a “VendingMiser”, a product from USA Technologies, on all the vending machines.

The VendingMiser monitors the occupancy levels and ambient temperature changes in the area surrounding the vending machine and regulates the power usage of the machine. The device powers down the machine when the area is vacant and automatically re-powers the cooling system at one- to three-hour intervals, independent of sales, to ensure the product stays cold. The VendingMiser for non-refrigerated machines powers down the lighting and electrical systems. Maintenance savings can also be generated through the reduced run-time of vendor components.

### Pictures: Vending Machines in One Exchange Plaza



### Project Summary

- Install VendingMisers on all vending machines located in One Exchange Plaza
- Energy Savings: 7,124 kWh
- Equipment and Labor Cost: \$296, after Progress Energy Incentives.
- **Total Estimated Annual Energy Cost Savings: \$541.39**
- **Payback Period: 6.6 months**

<sup>2</sup> [www.aceee.org](http://www.aceee.org). The American Council for an Energy-Efficient Economy's Online Guide to Energy Efficient Commercial Equipment.

## Financial Analysis

### *Assumptions*

- Energy Savings: Used the current wattage and conservative estimates of power-on hours for the machines before and after VendingMiser installation. Duration of auto-repower estimated at 0.4 hours and time between auto-repower estimated at 2 hours.
- Equipment Cost & Labor: VendingMiser cost is listed at \$179.00 and SnackMiser is listed at 79.00.<sup>3</sup> Progress Energy has an incentive of \$90.00 for beverage machine controls and an incentive of \$50.00 for snack machine controls making costs \$89.00 and \$29.00 respectively. See **Appendix I** for Progress Energy Vending Machine Incentives Policies. Labor costs assumed to be free since the VendingMisers are plug-in devices.
- CO2 emission reductions: CO2 savings were calculated using 1.135lb/kWh.<sup>4</sup>
- Cost of electricity: \$0.076/kWh

### **Recommendations**

The fellows recommend purchasing and installing VendingMisers on the vending machines located in One Exchange Plaza as soon as possible. The devices will reduce energy consumption and costs. The Facilities and Operations division should also continue to request that the vending machine distributors remove the lighting in the vending machines to eliminate lighting costs altogether.

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<sup>3</sup> [www.usatech.com](http://www.usatech.com).

<sup>4</sup> [www.epa.gov](http://www.epa.gov). eGRID 2007 Version 1.1.

# Installation of Vending Miser Analysis

City of Raleigh

Input Variables	
Energy Costs (\$0.000 per kwh)	\$0.076
Facility Occupied Hours per Week	60
K Factor of Air Conditioner (1.0 - 3.0)	2.0
Air Conditioning weeks/year (0-52)	52
Air Conditioning hrs/week (0-168)	168
Number of Cold Drink Vending Machines	3
Number of Uncooled Snack Machines	1
Power Requirements of Cold Drink Machine (avg watts)	233
Power Requirements of Snack Machine (avg watts)	138
VendingMiser Sale Price (for cold drink machines)	\$89.00
Snack Miser Sale Price (for snack machines)	\$29.00
Corporate Tax Rate	0%

## One Year Savings Analysis

	Before	After	Savings	
Cold Drink Machines	\$ 696.14	\$243.10	\$453.04	Cost of Operation
	9,160	3,199	5,961	kWh
			65%	% Energy Savings
Snack Machines	\$ 137.43	\$49.08	\$88.35	Cost of Operation
	1,808	646	1,163	kWh
			64%	% Energy Savings

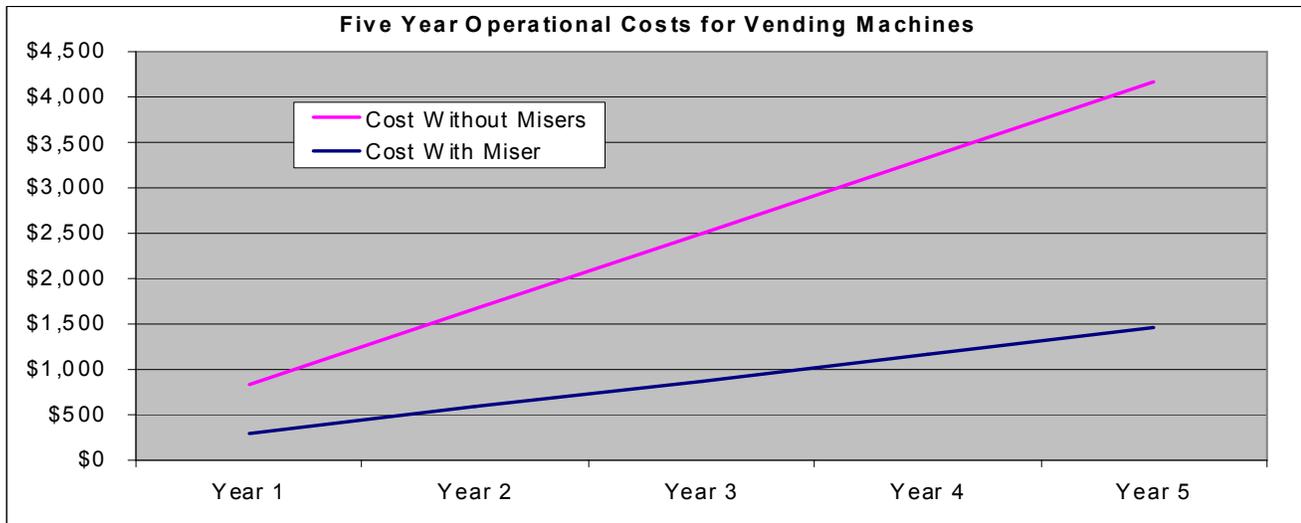
## Project Summary

Present kWh	Projected kWh	kWh Savings per Year	CO <sub>2</sub> Emission Savings (Tons)
10,968	3,844	7,124	4.04

Present Cost	Projected Costs	Annual Savings	Savings	Total Project Cost	Break Even (Months)
\$833.57	\$292.18	\$541.39	65%	\$296.00	6.6

Five Year Savings on 4 Machines = \$2,706.96 Five Year Return on Investment = 815%
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Version 1.0

	Source Data for Generating Chart				
	Year 1	Year 2	Year 3	Year 4	Year 5
Cost With Miser	\$292.18	\$584.36	\$876.54	\$1,168.72	\$1,460.90
Cost Without Misers	\$833.57	\$1,667.14	\$2,500.71	\$3,334.29	\$4,167.86

\* Savings results shown are estimates only. Estimates are based on average savings, as documented by hundreds of tests performed by independent parties. Actual "% Energy Savings" for individual machines may be higher or lower than estimated. All calculations depend upon the actual values for energy costs, facility occupied hours, machine power requirements and other variables.

## Other General Recommendations

### Upgrade HVAC controls: replace current pneumatic controls with DDC controls



**OEP Pneumatic controls**



**OEP Chiller DDC controls**

With the exception of the new chiller, all other major HVAC equipment in One Exchange Plaza is controlled by circa 1984 pneumatic controls. While pneumatic controls were the advanced technology of their day, they are not programmable and therefore do not offer the energy efficiency gains that newer control technologies offer.

The fellows recommend that the pneumatic controls be replaced with direct digital controls (DDC) identical to the new chiller's controls. DDC controllers can dictate the position of every damper in the system and can set the run speed or capacity of the fans and pumps thereby achieving significant energy savings. DDC can directly connect with the energy management interface that the Facilities and Operations staff currently uses to remotely control building systems.

### Replace dampers/diffusers



**OEP pneumatic controlled damper/diffuser**



**OEP plastic air bladder used in damper/diffuser**

Dampers are used to control air flow and help to maintain comfortable temperatures in a given space. The dampers currently installed in OEP have pneumatic thermostats that, when manually set to a desired temperature, inflate or deflate plastic bladders that restrict or allow cooled or heated air. These plastic bladders are relatively flimsy and over time degrade causing the air to flow constantly at uncontrollable temperatures. This in turn causes building occupants to complain about air temperature. Maintenance on these dampers is also time-consuming and disruptive.

Mechanized electric dampers with blades connected to DDC controllers will provide more comfortable air temperatures as well as save energy by fine tuning the air flow based on occupant load without degrading over time. Maintenance costs would also be reduced.

## Educate building occupants about energy efficiency

Educating the building's occupants about energy efficiency measures can be a powerful tool in ensuring that energy efficiency gains are realized. The lighting recommendation calls for the installation of LED tube lighting in a number of occupied areas in the building. LED lighting casts a slightly brighter light than typical fluorescent lighting and that may surprise some of the building's occupants. The fellows recommend that the facilities staff inform the occupants of the new lighting retrofits and the benefits of the new lighting.

While OEP has some signage in the building's restrooms about turning the lights off when leaving a room and low flow water fixtures, there is no signage about the lighting occupancy sensors that are located in the restrooms. After surveying the restrooms, it was found that the majority of the sensors had been over-ridden or switched off, which meant that the lights stayed on when no one was in the restrooms and energy was not being saved. The fellows recommend signage in the restrooms informing the users about how the sensors work and ask that they not be switched off.

## Summary of Energy Efficiency Projects

These projects, when fully implemented, could result in 1,099,297 kWh of annual electricity savings, \$81,902 of annual cost savings, and 623.85 metric tons of CO<sub>2</sub> emissions reductions.

<b>Total Investment:</b>	<b>\$431,382.25</b>
<b>Annual kWh savings:</b>	<b>1,099,297</b>
<b>Payback Period:</b>	<b>5.27 years</b>
<b>CO<sub>2</sub> emissions avoided:</b>	<b>623.85 metric tons</b>

## Action Plan & Timeline

The City of Raleigh should consider projects that offer a quick payback, have a low initial investment, and/or high annual energy savings. Keep in mind any projects that might be eligible for Progress Energy utility rebates (typically investments in equipment upgrades, but custom incentives are available too).

### Short Term Implementation (0 months – 1 year)

- Install **Vending Misers** on all the vending machines in OEP and apply for the Progress Energy utility rebates associated with vending machine controls
- Begin **LED lighting retrofit** in a phased approach beginning with stairwell emergency lighting and apply for Custom Incentive rebates from Progress Energy
- Begin installation of **new fans/fan motors and VFDs** with DDC controllers and apply for Progress Energy utility rebates associated with variable frequency/speed drive installations.
- Educate building occupants about energy efficiency improvements taking place at OEP and provide information on how to use occupancy sensors properly.

### Medium Term Implementation (1 Year – 5 Years)

- Continue LED lighting retrofit on all floors of OEP, if not completed yet.
- Begin replacing pneumatic controls with DDC controllers and replace pneumatic dampers/diffusers with electric mechanized dampers with blades

# OVERCOMING BARRIERS TO ENERGY EFFICIENCY

## Barriers

### Financial

The City of Raleigh's Facilities and Operations Division manages the operations and maintenance of all city-owned buildings, with the exception of the Fire Department's fire stations and the Raleigh Convention Center. The division is city-funded and given a strict annual budget sanctioned by the City Council in which to operate, making it difficult to finance new projects that are not in the current budget. In addition, any money not used or saved by the department during the given fiscal year must be returned to the city operating budget, with a few exceptions, making it difficult to invest in continual efficiency improvement projects. The division is currently utilizing stimulus money from the Energy Efficiency and Conservation Block Grant (EECBG) as part of the American Recovery and Reinvestment Act (ARRA) and other grant money as well as Capital Improvement Project (CIP) city budget money to implement energy efficiency projects, but the projects are often piecemeal due to limited funds.

## Recommended Strategies for Overcoming Barriers

### Financial

The Facility and Operations Division should be given the opportunity to keep all or a portion of the savings it will earn through energy efficiency projects. As it stands, the savings that the division obtains, with limited exceptions, must be returned to the city's general fund. The incentives are not properly aligned. The City Council should consider a means to allow the Facilities and Operations Division, or any other city entity, to keep some of the savings earned through efficient and sustainable projects that improve the quality of the city-owned buildings and reduce energy consumption.

In addition, City Council should restructure Capital Improvement Project funding to include a separate account for life-cycle analysis costs to ensure that the continual improvements, which are so vital to the overall operations of the city-buildings, are covered. This could also free up funds for energy efficiency projects that would save the city energy and money.

Continue to seek grants and stimulus money to implement energy efficiency projects. Databases like the Database of State Incentives for Renewables and Efficiency (DSIRE) have a wealth of information on incentives and where to find incentives for energy efficiency projects. Also, continue to collaborate with other city departments to implement energy efficiency improvements.

## Lessons from Overcoming Barriers

While conducting the energy efficiency assessment of One Exchange Plaza, it was important to keep in mind the financial situation of the city and the Facilities and Operations division. Therefore, the recommendations made in this report are sensitive to up-front costs, payback periods, overall cost savings, and the ability to secure utility rebates that will decrease those up-front costs.

## **CONCLUSIONS AND RECOMMENDED NEXT STEPS**

One Exchange Plaza is a well maintained building full of energy efficiency opportunities. The recommended projects in this report, if implemented, could generate significant savings for the City of Raleigh. Retrofitting the current fluorescent lighting to LED lighting, replacing the fans/fan motors and installing variable frequency drives, and installing vending machine controls are all projects that should be implemented immediately to capture efficiency gains and provide a better working environment for the building's occupants. The general recommendations should also be adopted, when possible, to achieve energy savings.

The recommended projects in this report are not entirely unique to One Exchange Plaza and could be applied city-wide. The City of Raleigh's civic leaders should choose to continue to reinvest in energy efficiency projects that would further the city's mission to become a sustainability leader.

Once again, we would like to thank the Facilities and Operations staff for giving us so much of their valuable time while we were working on this report.

# APPENDIX A

## LIGHTING - One Exchange Plaza

Floor	INTERIOR LIGHTING												Emergency Lighting per Floor			EXTERIOR LIGHTING		
	40W T-12	34W T-12	20W T-12	32W T-8	40W U-Shape	32W U-Shape	60W Incandescent	23W CFL	13W CFL	25W CFL	175W Metal Halide	13W 2-prong CFL	TOTAL LAMPS PER FLOOR	34W T-12	32W T-8	44W Circular	100W Metal halide	Photocell
Basement	10	207		22				8					247	36				
Ground Floor	6	116		8							4		134	32			6	Y
Mezzanine	1	22	2	144		66		12					247	10	30			
3	1	19		364		158							542	8	24			
4	2	29		284		154							469	14	41			
5	25	477			2							8	512	42				
6	26	490											516	49				
7	25	482											507	64				
8	17	327		60				23		5			432	44	5			
9	19	367		24									410	76	8			
10	16	296		60			1	44					417	38	4			
Mechanical*	2	32					4						38	16				
<b>TOTAL LAMPS</b>	<b>150</b>	<b>2,864</b>	<b>2</b>	<b>966</b>	<b>2</b>	<b>378</b>	<b>5</b>	<b>79</b>	<b>8</b>	<b>5</b>	<b>4</b>	<b>8</b>	<b>4,471</b>	<b>429</b>	<b>111</b>	<b>0</b>	<b>6</b>	
<b>TOTAL WATTAGE**</b>	<b>5,988</b>	<b>97,386</b>	<b>40</b>	<b>30,912</b>	<b>80</b>	<b>12,096</b>	<b>300</b>	<b>1,817</b>	<b>104</b>	<b>125</b>	<b>700</b>	<b>104</b>	<b>149,652</b>				<b>600</b>	

\* Includes 34W T-12 emergency lighting  
 \*\* Excluding ballasts

Elevator and Elevator Lobby Lighting (on 24/7)						
Floor	34W T-12	32W T-8	11W CFL	23W CFL	15W CFL	25W Halogen
Basement				7		
Ground Floor	16					
Mezzanine		6		3		
3		8		3		
4	12					8
5				8		
6				8		
7				8		
8				8		
9	8					
10					6	
Elevators	4		24			
<b>TOTAL LAMPS</b>	<b>40</b>	<b>14</b>	<b>24</b>	<b>45</b>	<b>6</b>	<b>8</b>
<b>TOTAL WATTAGE*</b>	<b>1,360</b>	<b>448</b>	<b>264</b>	<b>1,035</b>	<b>90</b>	<b>200</b>

\* Excluding ballasts

Stairways and Mechanical Floor Emergency Lighting		
Area	34W T-12	44W Circular
Stairways	64	10
Mechanical	16	
<b>TOTAL LAMPS</b>	<b>80</b>	<b>10</b>
<b>TOTAL WATTAGE*</b>	<b>2720</b>	<b>440</b>

\* Excluding ballasts

# Lite Energy Solutions

Specializing in Efficient Lighting Technologies

www.LiteEnergySolutions.com



## Product Specifications

- Lengths Available  
1, 2, 3, 4, 5, 6 & 8 feet
- Power Consumption:  
4 Watts/Linear Foot
- Input Voltage: AC 100~277V
- Luminous Flux:  
400 Lumens/Linear Foot
- Color Temperature:  
2800 K (Warm)  
4100 K (Natural)  
5500 K (Day)
- CRI: >80
- Lifespan: > 60,000 Hours
- LED Beam Angle: 120°
- LED Quantity:  
75 LEDs/Linear Foot
- Operating Temperature:  
-4F to 113F (-20~45°C)
- UL Listed to UL 1598, 1598B
- ETL Listed to UL STD 1993
- Construction: Clear, impact resistant plastic lens and an integrated Aluminum heat sink
- Physical Characteristics:  
Diameter – 1.0 Inches

## LED Retrofit Solutions for T8/T12 Fixtures

The T8/T12 LED Replacement Lamps by **Lite Energy Solutions** are the most advanced LED replacement solution for conventional fluorescent fixtures available today.

Our LED lamps fit directly into your existing fixtures with minimal modification converting your current fixtures to state-of-the-art LED lighting technology.

Compared to traditional Fluorescent lamps, our LED lamps will reduce current energy usage by 50% to 60%. LED technology does not require the use of ballast, therefore eliminating the associated energy and maintenance costs.

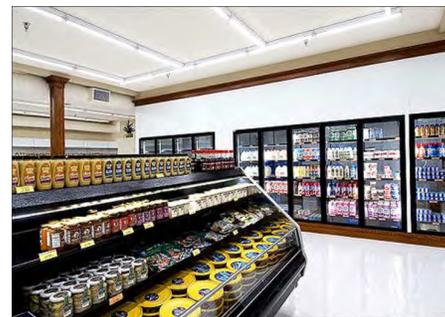
LED lighting technology produces a higher quality of light that is better perceived and processed by our eyes. Therefore, lower lumens (or foot candles) are required to provide the same level of perceived light. Averaging 89 Lumens/Watt, our LED Replacement Lamps are the most powerful LED T8/T12 retrofit solution available in today's market.

The U.S. Department of Energy developed a standard for measuring a lamp's end-of life, which is 70% of its original light output. In accordance with this rating standard, our LED Replacement Lamps are rated for 60,000 hours of maintenance free operation.

LED products do not contain mercury, phosphorus, lead and other environmental contaminants that today's fluorescent tubes contain. Expired fluorescent lamps are considered hazardous waste and it is illegal to dispose of with normal trash or place in a landfill. It only takes 1 gram of mercury to contaminate a 20-acre lake to the extent that fish living in the lake would be unfit for human consumption. Our LED products are 100% recyclable; eliminating EPA disposal requirements, costly compliance management processes, and liability exposure.

Our LED lighting technology eliminates hidden issues of fluorescent lighting technology such as harmful ultraviolet rays and undetectable flickering, which causes eye-strain and headaches.

Replacing fluorescent lamps is not only a way to save on your electric bill, but will also provide better light quality and reduce your environmental impact.



**“Get More from LESS”**

# Lite Energy Solutions

Specializing in Efficient Lighting Technologies

www.LiteEnergySolutions.com



## Product Specifications

- Lengths Available  
2 foot; 3" or 6" Leg Spacing
- Power Consumption:  
15 Watts
- Input Voltage: AC 100~240V
- Luminous Flux:  
1400 Lumens
- Color Temperature:  
2800 K (Warm)  
4100 K (Natural)  
5500 K (Day)
- CRI: >80
- Lifespan: > 60,000 Hours
- LED Beam Angle: 120°
- LED Quantity:  
288 LEDs
- Operating Temperature:  
-4F to 113F (-20~45°C)
- UL Listed to STD 1310
- Construction: Clear, impact resistant plastic lens and an integrated Aluminum heat sink
- Physical Characteristics:  
Diameter – 1.0 Inches

## LED Retrofit Solutions for T8 U-Lamp Fixtures

The T8 U-Lamp LED Replacement Lamps by **Lite Energy Solutions** are the most advanced LED replacement solution for conventional fluorescent fixtures available today.

Our LED lamps fit directly into your existing fixtures with minimal modification converting your current fixtures to state-of-the-art LED lighting technology.

Compared to traditional Fluorescent lamps, our LED lamps will reduce current energy usage by 50% to 60%. LED technology does not require the use of ballast, therefore eliminating the associated energy and maintenance costs.

LED lighting technology produces a higher quality of light that is better perceived and processed by our eyes. Therefore, lower lumens (or foot candles) are required to provide the same level of perceived light. Averaging 89 Lumens/Watt, our LED Replacement Lamps are the most powerful LED T8 U-Lamp retrofit solution available in today's market.

The U.S. Department of Energy developed a standard for measuring a lamp's end-of life, which is 70% of its original light output. In accordance with this rating standard, our LED Replacement Lamps are rated for 60,000 hours of maintenance free operation.

LED products do not contain mercury, phosphorus, lead and other environmental contaminants that today's fluorescent tubes contain. Expired fluorescent lamps are considered hazardous waste and it is illegal to dispose of with normal trash or place in a landfill. It only takes 1 gram of mercury to contaminate a 20-acre lake to the extent that fish living in the lake would be unfit for human consumption. Our LED products are 100% recyclable; eliminating EPA disposal requirements, costly compliance management processes, and liability exposure.

Our LED lighting technology eliminates hidden issues of fluorescent lighting technology such as harmful ultraviolet rays and undetectable flickering, which causes eye-strain and headaches.

Replacing fluorescent lamps is not only a way to save on your electric bill, but will also provide better light quality and reduce your environmental impact.



**“Get More from LESS”**

# Lite Energy Solutions

Specializing in Efficient Lighting Technologies

www.LiteEnergySolutions.com



## Product Specifications

- Types Available  
PAR 16, 20, 30 & 38
- Power Consumption:  
5 - 15 Watts
- Input Voltage: AC 110~277V
- Luminous Flux:  
Average 58lm/watt
- Color Temperature:  
2800 K (Warm)  
4100 K (Natural)  
5500 K (Day)
- CRI: 80
- Lifespan: > 60,000 Hours
- LED Beam Angle: 120°
- LED Type: CREE
- LED Quantity:  
5 - 12 LEDs
- Operating Temperature:  
-4F to 113F (-20~45°C)
- Listing Standards  
UL or ETL Listed
- Construction:  
Extruded Aluminum Housing  
Open or Lens Options

## LED Retrofit Solutions for PAR Lamps

The LED Replacement Lamps by **Lite Energy Solutions** are the most advanced LED replacement solution for conventional PAR lamps available today.

Our fully dimmable LED PAR lamps screw directly into the existing fixture allowing them to utilize the latest state-of-the-art LED lighting technology.

Compared to traditional PAR lamps, our LED lamps will reduce current energy usage by 75% to 85%. We have LED PAR lamps available in all standard sizes in both spot/flood and dimmable/non-dimmable configurations.

LED lighting technology produces a higher quality of light that is better perceived and processed by our eyes. Therefore, lower lumens (or foot candles) are required to provide the same level of perceived light. Averaging 58 Lumens/Watt, our LED Replacement Lamps are the most powerful LED PAR Lamp retrofit solution available in today's market.

The U.S. Department of Energy developed a standard for measuring a lamp's end-of life, which is 70% of its original light output. In accordance with this rating standard, our LED Replacement Lamps are rated for 60,000 hours of maintenance free operation.

LED products do not contain mercury, phosphorus, lead and other environmental contaminants that today's fluorescent tubes contain. Expired fluorescent lamps are considered hazardous waste and it is illegal to dispose of with normal trash or place in a landfill. It only takes 1 gram of mercury to contaminate a 20-acre lake to the extent that fish living in the lake would be unfit for human consumption. Our LED products are 100% recyclable; eliminating EPA disposal requirements, costly compliance management processes, and liability exposure.

Our LED lighting technology eliminates hidden issues of traditional lighting technology such as harmful ultraviolet rays and undetectable flickering, which causes eye-strain and headaches.

Replacing traditional lamps is not only a way to save on your electric bill, but will also provide better light quality and reduce your environmental impact.



**“Get More from LESS”**

### 6.2 Retrofit Custom Incentives

---

The Energy Efficiency for Business Program offers custom incentives for eligible improvements not listed as prescriptive measures. Measures listed in prescriptive tables that do not meet minimum program specifications cannot be submitted as a custom measure. Qualified custom ECMs reduce electric energy use due to an improvement in system efficiency, i.e. a net decrease in energy use without a reduction in the level of service. For example, installing a lower wattage lamp in place of a higher wattage lamp of the same type does not qualify for a custom incentive. However should the lighting *system* (i.e., lamp, ballast and fixture) demonstrably improve the total lumens per Watt delivered, an incentive will be considered.

Examples of custom measures include, but are not limited to, the following:

- Economizers – air side or water-side
- Energy Star<sup>®</sup> solid door commercial freezers
- High Intensity Discharge (HID) or fluorescent light fixture improvements not covered under the prescriptive measures
- Variable frequency drives on non-HVAC pump and fan motors serving variable-capacity loads, such as air compressors, pumps, fans, blowers, process chillers and cooling towers.
- Automatic controls, including time switches, sensors, etc.
- Day lighting or light harvesting, when combined with appropriate lighting controls.
- Building envelope improvements (windows, window films, solar screens, cool roofs, etc.)<sup>2</sup>.
- Improved process efficiency.
- Compressed air system improvements.
- LED lighting fixtures or retrofit packages.

**Incentives for custom measures are based on the electrical energy savings that result from the energy efficiency measure installation and are based upon the calculated annual kWh savings.** The applicant must provide sufficient back-up descriptive information, equipment performance data, operating assumptions, measurements, calculations and models to support the energy savings estimates. Guidelines for calculating custom measure energy savings are detailed in **Section 16**.

The Custom incentive shown in Table 6-5 is based on the expected life of the measure. Custom projects eligible for an incentive must have a payback period  $\geq$  one year and  $\leq$  7 years to qualify for a \$0.08 per kWh incentive. Project simplified payback is calculated as follows:

$$\text{Simplified Payback Period} = \frac{\text{Project Cost}}{\text{Annual Energy Savings (kWh)} \times \text{Electricity Rate (\$/kWh)}}$$

---

<sup>2</sup> Only if facility has electric cooling or heating present.

**Table 6-5  
Custom Incentives**

Incentive	<b>\$0.08 / kWh<sup>3</sup></b>
Minimum Payback Period	<b>One year</b>
Maximum Payback Period	<b>7 years</b>

All Custom incentive applications are subject to the Program's review and analysis. Incentive payments for custom ECMs are capped at 75% of the incremental cost of the measure<sup>4</sup>.

### **6.3 Retrofit Technical Assistance Incentives**

The program offers technical assistance incentives for ECMs in qualified existing facilities (retrofit) that may result in sustained energy efficiency improvements. Incentive types, values and limits described in this section are based upon task scope and anticipated outcomes. A detailed work scope of technical assistance activities and costs should be submitted for review and pre-approval to qualify for any technical assistance incentives.

Technical assistance incentives are intended to assist with the initial cost of identifying ECMs and may be combined with Prescriptive and Custom incentive offerings.

Retrofit technical assistance incentives are available for, but not limited to: **feasibility studies**, **energy assessments** and **retro-commissioning**. **Sections 6.3.1 and 6.3.2** briefly summarize the project requirements associated with each service type and both are intended to provide information and assistance to customers towards implementing ECMs at existing facilities.

All technical assistance incentive payments should be considered "one-time" payments for each Facility during a three year period. These incentives are issued to applicants that agree to implement cost effective ECMs in a timely manner. Failure to implement these ECMs in a timely manner constitutes a forfeit of any future technical assistance incentives until cost effective ECMs are investigated further and/or implemented.

Incentives for qualified retrofit Technical Assistance will be 50% of the total technical assistance costs associated directly with electrical energy savings efforts and will be capped at \$10,000 for facilities that use 500,000 kWh to 2,000,000 kWh annually. The cap is increased to \$20,000 for facilities who use over 2,000,000 kWh annually. Facilities currently using less than 500,000 kWh annually do not qualify for Retrofit Technical Assistance incentives.

#### **6.3.1 Retrofit Technical Assistance Feasibility Study/Energy Assessment**

A feasibility study consists of a detailed engineering analysis to investigate the economics and technical feasibility of one or more ECM options. For purposes of this program, this includes comprehensive energy audits and technology feasibility studies.

A qualified service provider must produce a concise written report detailing the study findings, methodology and supporting documentation. The customer must submit the report plus an Energy Efficiency for Business Program application and copy of the paid invoice.

<sup>3</sup> Incentive is a one-time payment for the value shown multiplied by the annual energy savings for a one year period.

<sup>4</sup> Incremental measure cost is the difference in the cost of energy efficient measure and standard efficient measure. In some cases the incremental measure cost is the full cost of the measure.



Specializing in Efficient Lighting Technologies

www.LiteEnergySolutions.com

Customer: One Exchange Plaza	Contact Person: Matt Jentgen
Address:	Phone Number: 502-664-6541
City, ST Zip: Raleigh, NC	E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>

Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	STAIRS + MECH EMERGENCY	Net 30	100812-14

Item Number	Description	Qty	Total
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**T8/T12 REPLACEMENTS**

4T8-15W-D	4 FOOT LED DAYWHITE - 1600 LM+ - 5500K	<b>80</b>	\$	5,360.00
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**CIRCULAR FLUORESCENT**

THERE ARE CURRENTLY NO DIRECT REPLACEMENTS FOR THIS PRODUCT IN LED OPTIONS ARE TO LEAVE AS IS OR REPLACE WITH A NEW LED FIXTURE.

**Total Amount \$ 5,360.00**

Thank You for the opportunity to provide this quotation for our quality products and services.

Price does not include freight or applicable sales tax. Quote valid for 30-days.

# STAIRWAYS & MECHANICAL LED ROI WORKSHEET

## Energy Savings

Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
2 Lamp 4' T12	40	155	6.200	1.200	168.0	52	8760	54,312	10,512	43,800	\$4,143.07	\$801.89	\$3,341.19	\$26,061.27
Subtotal											\$4,143.07	\$801.89	\$3,341.19	\$26,061.27

## Bulb, Ballast and Maintenance Savings

Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
2 Lamp 4' T12	40	34	\$2.50	\$200.00	1.3	9.1	\$1,400	\$4,200	\$65.00	10	\$2,600.00	\$1,200.00	\$1,032.97	\$9,400.00
Subtotal													\$1,032.97	\$9,400.00

### Complete Utility Rate Calculator

Month	Total KWH	Total Bill Amount	Avg KWH Rate
Jan	301500	\$20,983	\$0.0696
April	210750	\$15,549	\$0.0738
July	245250	\$19,371	\$0.0790
Oct	199500	\$16,513	\$0.0828
Annual KWH Rate		\$0.0763	

<b>Total Cost</b>	<b>\$ 5,360.00</b>
<b>First Year Tax Savings</b>	<b>\$ -</b>
<b>Annual Energy &amp; Maintenance Savings</b>	<b>\$ 4,374.15</b>
<b>Total First Year Savings</b>	<b>\$ 4,374.15</b>
<b>Remaining Energy &amp; Maintenance Savings</b>	<b>\$ 35,430.65</b>
<b>Total Savings on Investment</b>	<b>\$ 39,804.81</b>
<b>Payback (Years)</b>	<b>1.23</b>
<b>Return on Investment</b>	<b>643%</b>

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.



# Lite Energy Solutions

*Specializing in Efficient Lighting Technologies*

www.LiteEnergySolutions.com

Customer: One Exchange Plaza		Contact Person: Matt Jentgen		
Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	ELEVATORS AND LOBBIES	Net 30	100812-13
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>54</b>	\$ 3,618.00
<b>CFL/HALOGEN LED REPLACEMENTS</b>				
MR16-3W-W-DM	3 WATT MR16 WARM WHITE - 200LM+, 2800K		<b>83</b>	\$ 3,237.00
			<b>Total Amount</b>	<b>\$ 6,855.00</b>
<p>Thank You for the opportunity to provide this quotation for our quality products and services.  Price does not include freight or applicable sales tax. Quote valid for 30-days.</p>				

APPENDIX D

# ELEVATORS & LOBBIES LED ROI WORKSHEET

## Energy Savings

Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
2 Lamp 4' T12	27	155	4.185	0.810	168.0	52	8760	36,661	7,096	29,565	\$2,796.57	\$541.27	\$2,255.30	\$17,591.35
CFL / Halogen	83	19.15	1.589	0.249	168.0	52	8760	13,924	2,181	11,742	\$1,062.13	\$166.39	\$895.74	\$7,524.21
Subtotal											\$3,858.70	\$707.66	\$3,151.04	<b>\$25,115.56</b>

## Bulb, Ballast and Maintenance Savings

Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
2 Lamp 4' T12	27	34	\$2.50	\$135.00	1.3	9.1	\$945	\$2,835	\$65.00	10	\$1,755.00	\$810.00	\$697.25	\$6,345.00
CFL / Halogen	83	Varies	\$5.00	\$415.00	0.7	9.1	\$5,395	\$16,185	\$0.00	10	\$0.00	\$0.00	\$2,371.43	\$21,580.00
												\$3,068.68	<b>\$27,925.00</b>	

### Complete Utiliy Rate Calculator

Month	Total KWH	Total Bill Amount	Avg KWH Rate
Jan	301500	\$20,983	\$0.0696
April	210750	\$15,549	\$0.0738
July	245250	\$19,371	\$0.0790
Oct	199500	\$16,513	\$0.0828
Annual KWH Rate		\$0.0763	

<b>Total Cost</b>	<b>\$ 6,855.00</b>
<b>First Year Tax Savings</b>	<b>\$ -</b>
<b>Annual Energy &amp; Maintenance Savings</b>	<b>\$ 6,219.72</b>
<b>Total First Year Savings</b>	<b>\$ 6,219.72</b>
<b>Remaining Energy &amp; Maintenance Savings</b>	<b>\$ 50,379.75</b>
<b>Total Savings on Investment</b>	<b>\$ 56,599.47</b>
<b>Payback (Years)</b>	<b>1.10</b>
<b>Return on Investment</b>	<b>726%</b>

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.



Customer: One Exchange Plaza		Contact Person: Matt Jentgen		
Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	EMERGENCY LIGHTS	Net 30	100812-15
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>540</b>	\$ 36,180.00
			<b>Total Amount</b>	<b>\$ 36,180.00</b>
Thank You for the opportunity to provide this quotation for our quality products and services. Price does not include freight or applicable sales tax. Quote valid for 30-days.				

APPENDIX D

# EMERGENCY LIGHTS LED ROI WORKSHEET

## Energy Savings

Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
4 Lamp 4' T12	135	223	30.105	8.100	168.0	52	8760	263,720	70,956	192,764	\$20,117.29	\$5,412.72	\$14,704.57	\$114,695.63
Subtotal											\$20,117.29	\$5,412.72	\$14,704.57	\$114,695.63

## Bulb, Ballast and Maintenance Savings

Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
4 Lamp 4' T12	135	34	\$2.50	\$1,350.00	1.3	9.1	\$9,450	\$14,175	\$65.00	10	\$8,775.00	\$4,050.00	\$4,005.49	\$36,450.00
													\$4,005.49	\$36,450.00

### Complete Utility Rate Calculator

Month	Total KWH	Total Bill Amount	Avg KWH Rate
Jan	301500	\$20,983	\$0.0696
April	210750	\$15,549	\$0.0738
July	245250	\$19,371	\$0.0790
Oct	199500	\$16,513	\$0.0828
Annual KWH Rate		\$0.0763	

<b>Total Cost</b>	<b>\$ 36,180.00</b>
<b>First Year Tax Savings</b>	<b>\$ -</b>
<b>Annual Energy &amp; Maintenance Savings</b>	<b>\$ 18,710.06</b>
<b>Total First Year Savings</b>	<b>\$ 18,710.06</b>
<b>Remaining Energy &amp; Maintenance Savings</b>	<b>\$ 151,551.51</b>
<b>Total Savings on Investment</b>	<b>\$ 170,261.57</b>
<b>Payback (Years)</b>	<b>1.93</b>
<b>Return on Investment</b>	<b>371%</b>

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.



Specializing in Efficient Lighting Technologies

www.LiteEnergySolutions.com

Customer: One Exchange Plaza	Contact Person: Matt Jentgen
Address:	Phone Number: 502-664-6541
City, ST Zip: Raleigh, NC	E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>

Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	MECHANICAL	Net 30	100812-01

Item Number	Description	Qty	Total
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**T8/T12 REPLACEMENTS**

4T8-15W-D	4 FOOT LED DAYWHITE - 1600 LM+ - 5500K	34	\$	2,278.00
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**INCANDESCENT LED REPLACEMENT**

A19-6W-D-DM	6 WATT A19 DIMMABLE DAY WHITE 475LM+, 5500K	4	\$	208.00
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**Total Amount \$ 2,486.00**

Thank You for the opportunity to provide this quotation for our quality products and services.

Price does not include freight or applicable sales tax. Quote valid for 30-days.





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Customer: One Exchange Plaza		Contact Person: Matt Jentgen		
Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	GROUND FLOOR	Net 30	100812-03
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>130</b>	\$ 8,710.00
<b>METAL HALIDE LEDREPLACEMENT</b>				
PAR38-15-W	15 WATT PAR 38 WARM WHITE, NON-DIMMABLE 1000LM+ - 2800K		<b>4</b>	\$ 328.00
			<b>Total Amount \$</b>	<b>9,038.00</b>
Thank You for the opportunity to provide this quotation for our quality products and services.				
Price does not include freight or applicable sales tax. Quote valid for 30-days.				

# GROUND FLOOR LED ROI WORKSHEET

## Energy Savings

Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
2 Lamp 4' T8	4	64	0.256	0.120	55.0	52	2868	734	344	390	\$56.00	\$26.25	\$29.75	\$717.03
2 Lamp 4' T12	3	155	0.465	0.090	55.0	52	2868	1,334	258	1,075	\$101.73	\$19.69	\$82.04	\$1,977.12
4 Lamp 4' T12	29	223	6.467	0.870	55.0	52	2868	18,546	2,495	16,051	\$1,414.77	\$190.33	\$1,224.45	\$29,509.15
175W MH	4	207	0.828	0.060	168.0	52	8760	7,253	526	6,728	\$553.30	\$40.09	\$513.21	\$4,208.29
<b>Subtotal</b>											\$2,125.81	\$276.36	\$1,849.44	<b>\$36,411.59</b>

## Bulb, Ballast and Maintenance Savings

Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
2 Lamp 4' T8	4	32	\$2.50	\$20.00	3.8	27.9	\$147	\$441	\$65.00	10	\$260.00	\$120.00	\$34.67	\$967.37
2 Lamp 4' T12	3	34	\$2.50	\$15.00	3.8	27.9	\$110	\$330	\$65.00	10	\$195.00	\$90.00	\$26.00	\$725.53
4 Lamp 4' T12	29	34	\$2.50	\$290.00	3.8	27.9	\$2,129	\$3,194	\$65.00	10	\$1,885.00	\$870.00	\$289.53	\$8,078.03
175W MH	4	13	\$35.00	\$140.00	0.9	9.1	\$1,416	\$607	\$75.00	10	\$300.00	\$9,000.00	\$1,244.20	\$11,322.22
													<b>\$1,594.41</b>	<b>\$21,093.14</b>

### Complete Utiliy Rate Calculator

Month	Total KWH	Total Bill Amount	Avg KWH Rate
Jan	301500	\$20,983	\$0.0696
April	210750	\$15,549	\$0.0738
July	245250	\$19,371	\$0.0790
Oct	199500	\$16,513	\$0.0828
Annual KWH Rate			\$0.0763

<b>Total Cost</b>	<b>\$ 9,038.00</b>
<b>First Year Tax Savings</b>	<b>\$ -</b>
<b>Annual Energy &amp; Maintenance Savings</b>	<b>\$ 3,443.86</b>
<b>Total First Year Savings</b>	<b>\$ 3,443.86</b>
<b>Remaining Energy &amp; Maintenance Savings</b>	<b>\$ 92,639.71</b>
<b>Total Savings on Investment</b>	<b>\$ 96,083.57</b>
<b>Payback (Years)</b>	<b>2.62</b>
<b>Return on Investment</b>	<b>963%</b>

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.

Lite Energy Solutions, Inc. PO Box 1330 Kannapolis, NC 28082

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www.liteenergysolutions.com



# Lite Energy Solutions

Specializing in Efficient Lighting Technologies

www.LiteEnergySolutions.com

Customer: One Exchange Plaza		Contact Person: Matt Jentgen		
Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	MEZZANINE	Net 30	100812-04
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>167</b>	\$ 11,189.00
2T8-8W-N	2 FOOT NATURAL WHITE - 800LM+, 4100K		<b>2</b>	\$ 98.00
<b>U SHAPE LED REPLACEMENTS</b>				
2T8-8W-N-U	2 FOOT, 15 WATTS, 1400 LUMENS, 4100K		<b>66</b>	\$ 4,422.00
<b>CFL LED REPLACEMENTS</b>				
PAR38-12-WDM	12 WATT PAR 38 DIMMABLE WARM WHITE, 800LM+, 2800K		<b>12</b>	\$ 912.00
<b>Total Amount \$</b>				<b>16,621.00</b>
Thank You for the opportunity to provide this quotation for our quality products and services.				
Price does not include freight or applicable sales tax. Quote valid for 30-days.				

APPENDIX D

MEZZANINE LED ROI WORKSHEET														
Energy Savings														
Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
4 Lamp 4' T8	48	128	6.144	1.440	55.0	52	2868	17,620	4,130	13,490	\$1,344.11	\$315.03	\$1,029.09	\$24,800.97
2 Lamp 4' T12	11	155	1.705	0.330	55.0	52	2868	4,890	946	3,943	\$373.00	\$72.19	\$300.81	\$7,249.43
1 Lamp 4' T12	1	78	0.078	0.030	55.0	52	2868	224	86	138	\$17.06	\$6.56	\$10.50	\$253.07
2 Lamp 2' T12	1	64	0.064	0.015	55.0	52	2868	184	43	141	\$14.00	\$3.28	\$10.72	\$258.34
U Lamp 2' T8	33	64	2.112	0.990	55.0	52	2868	6,057	2,839	3,218	\$446.88	\$209.47	\$237.40	\$5,721.40
23W CFL	12	23	0.276	0.144	55.0	52	2868	792	413	379	\$58.40	\$30.47	\$27.93	\$701.04
Subtotal											\$2,253.45	\$637.01	\$1,616.44	\$38,984.25
Bulb, Ballast and Maintenance Savings														
Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
4 Lamp 4' T8	48	32	\$2.50	\$480.00	3.8	27.9	\$3,524	\$5,286	\$65.00	10	\$3,120.00	\$1,440.00	\$479.23	\$13,370.53
2 Lamp 4' T12	11	34	\$2.50	\$55.00	3.8	27.9	\$404	\$1,211	\$65.00	10	\$715.00	\$330.00	\$95.35	\$2,660.26
1 Lamp 4' T12	1	34	\$2.50	\$2.50	3.8	27.9	\$18	\$110	\$65.00	10	\$65.00	\$30.00	\$8.01	\$223.49
2 Lamp 2' T12	1	20	\$2.50	\$5.00	3.8	27.9	\$37	\$110	\$65.00	10	\$65.00	\$30.00	\$8.67	\$241.84
U Lamp 2' T8	33	32	\$2.50	\$165.00	3.8	27.9	\$1,211	\$3,634	\$65.00	10	\$2,145.00	\$990.00	\$286.05	\$7,980.79
23W CFL	12	23	\$5.00	\$60.00	2.8	27.9	\$598	\$1,794	\$0.00	10	\$0.00	\$0.00	\$85.71	\$2,391.43
													\$963.02	\$26,868.34
Complete Utiliity Rate Calculator														
Month	Total KWH	Total Bill Amount	Avg KWH Rate											
Jan	301500	\$20,983	\$0.0696											
April	210750	\$15,549	\$0.0738											
July	245250	\$19,371	\$0.0790											
Oct	199500	\$16,513	\$0.0828											
Annual KWH Rate			\$0.0763											
											<b>Total Cost \$</b>	<b>16,621.00</b>		
											<b>First Year Tax Savings \$</b>	<b>-</b>		
											<b>Annual Energy &amp; Maintenance Savings \$</b>	<b>2,579.47</b>		
											<b>Total First Year Savings \$</b>	<b>2,579.47</b>		
											<b>Remaining Energy &amp; Maintenance Savings \$</b>	<b>69,387.68</b>		
											<b>Total Savings on Investment \$</b>	<b>71,967.15</b>		
											<b>Payback (Years)</b>	<b>6.44</b>		
											<b>Return on Investment</b>	<b>333%</b>		

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.



Specializing in Efficient Lighting Technologies

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Customer: One Exchange Plaza		Contact Person: Matt Jentgen		
Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	3RD FLOOR	Net 30	100812-05
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>384</b>	\$ 25,728.00
<b>U SHAPE LED REPLACEMENTS</b>				
2T8-8W-N-U	2 FOOT, 15 WATTS, 1400 LUMENS, 4100K		<b>158</b>	\$10,586.00
			<b>Total Amount \$</b>	<b>36,314.00</b>
Thank You for the opportunity to provide this quotation for our quality products and services. Price does not include freight or applicable sales tax. Quote valid for 30-days.				

APPENDIX D

## 3RD FLOOR LED ROI WORKSHEET

### Energy Savings

Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
4 Lamp 4' T8	91	128	11.648	5.460	55.0	52	2868	33,405	15,658	17,746	\$2,548.21	\$1,194.47	\$1,353.74	\$32,625.08
2 Lamp 4' T12	10	155	1.550	0.300	55.0	52	2868	4,445	860	3,585	\$339.09	\$65.63	\$273.46	\$6,590.39
U-Lamp 2' T8	79	64	5.056	2.370	55.0	52	2868	14,500	6,797	7,703	\$1,106.09	\$518.48	\$587.61	\$14,161.44
Subtotal											\$3,993.40	\$1,778.59	\$2,214.81	<b>\$53,376.92</b>

### Bulb, Ballast and Maintenance Savings

Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
4 Lamp 4' T8	91	32	\$2.50	\$910.00	3.8	27.9	\$6,681	\$10,022	\$65.00	10	\$5,915.00	\$2,730.00	\$908.54	\$25,348.29
2 Lamp 4' T12	10	34	\$2.50	\$50.00	3.8	27.9	\$367	\$1,101	\$65.00	10	\$650.00	\$300.00	\$86.68	\$2,418.42
U-Lamp 2' T8	79	32	\$2.50	\$197.50	3.8	27.9	\$1,450	\$8,700	\$65.00	10	\$5,135.00	\$2,370.00	\$632.81	\$17,655.46
Subtotal													\$1,628.03	<b>\$45,422.17</b>

#### Complete Utility Rate Calculator

Month	Total KWH	Total Bill Amount	Avg KWH Rate
Jan	301500	\$20,983	\$0.0696
April	210750	\$15,549	\$0.0738
July	245250	\$19,371	\$0.0790
Oct	199500	\$16,513	\$0.0828
Annual KWH Rate		\$0.0763	

<b>Total Cost</b>	<b>\$ 36,314.00</b>
<b>First Year Tax Savings</b>	<b>\$ -</b>
<b>Annual Energy &amp; Maintenance Savings</b>	<b>\$ 3,842.84</b>
<b>Total First Year Savings</b>	<b>\$ 3,842.84</b>
<b>Remaining Energy &amp; Maintenance Savings</b>	<b>\$ 103,372.52</b>
<b>Total Savings on Investment</b>	<b>\$ 107,215.36</b>
<b>Payback (Years)</b>	<b>9.45</b>
<b>Return on Investment</b>	<b>195%</b>

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.



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Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	4TH FLOOR	Net 30	100812-06
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>315</b>	\$ 21,105.00
<b>U SHAPE LED REPLACEMENTS</b>				
2T8-8W-N-U	2 FOOT, 15 WATTS, 1400 LUMENS, 4100K		<b>154</b>	\$10,318.00
			<b>Total Amount</b>	<b>\$ 31,423.00</b>
<p>Thank You for the opportunity to provide this quotation for our quality products and services.</p> <p>Price does not include freight or applicable sales tax. Quote valid for 30-days.</p>				

# APPENDIX D

## 4TH FLOOR LED ROI WORKSHEET

### Energy Savings

Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
4 Lamp 4' T8	71	128	9.088	4.260	55.0	52	2868	26,063	12,217	13,846	\$1,988.17	\$931.95	\$1,056.21	\$25,454.74
2 Lamp 4' T12	15	155	2.325	0.450	55.0	52	2868	6,668	1,291	5,377	\$508.64	\$98.45	\$410.19	\$9,885.59
U-Lamp 2' T8	77	64	4.928	2.310	55.0	52	2868	14,133	6,625	7,508	\$1,078.09	\$505.35	\$572.74	\$13,802.92
Subtotal											\$3,574.89	\$1,535.75	\$2,039.14	<b>\$49,143.25</b>

### Bulb, Ballast and Maintenance Savings

Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
4 Lamp 4' T8	71	32	\$2.50	\$710.00	3.8	27.9	\$5,213	\$7,819	\$65.00	10	\$4,615.00	\$2,130.00	\$708.86	\$19,777.24
2 Lamp 4' T12	15	34	\$2.50	\$75.00	3.8	27.9	\$551	\$1,652	\$65.00	10	\$975.00	\$450.00	\$130.02	\$3,627.63
U-Lamp 2' T8	77	20	\$2.50	\$192.50	3.8	27.9	\$1,413	\$8,480	\$65.00	10	\$5,005.00	\$2,310.00	\$616.79	\$17,208.49
													\$1,455.68	<b>\$40,613.36</b>

### Complete Utility Rate Calculator

Month	Total KWH	Total Bill Amount	Avg KWH Rate
Jan	301500	\$20,983	\$0.0696
April	210750	\$15,549	\$0.0738
July	245250	\$19,371	\$0.0790
Oct	199500	\$16,513	\$0.0828
Annual KWH Rate		\$0.0763	

<b>Total Cost</b>	<b>\$ 31,423.00</b>
<b>First Year Tax Savings</b>	<b>\$ -</b>
<b>Annual Energy &amp; Maintenance Savings</b>	<b>\$ 3,494.81</b>
<b>Total First Year Savings</b>	<b>\$ 3,494.81</b>
<b>Remaining Energy &amp; Maintenance Savings</b>	<b>\$ 94,010.52</b>
<b>Total Savings on Investment</b>	<b>\$ 97,505.33</b>
<b>Payback (Years)</b>	<b>8.99</b>
<b>Return on Investment</b>	<b>210%</b>

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.



# Lite Energy Solutions

Specializing in Efficient Lighting Technologies

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Customer: One Exchange Plaza		Contact Person: Matt Jentgen		
Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	5TH FLOOR	Net 30	100812-07
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>502</b>	\$ 33,634.00
<b>U SHAPE LED REPLACEMENTS</b>				
2T8-8W-N-U	2 FOOT, 15 WATTS, 1400 LUMENS, 4100K		<b>2</b>	\$134.00
<b>CFL LED REPLACEMENT</b>				
PL9W-N	P WALL 2-PRONG NATURAL WHITE - 920L+, 4100K		<b>8</b>	\$ 352.00
<b>Total Amount \$</b>				<b>34,120.00</b>
Thank You for the opportunity to provide this quotation for our quality products and services. Price does not include freight or applicable sales tax. Quote valid for 30-days.				

APPENDIX D

## 5TH FLOOR LED ROI WORKSHEET

Energy Savings														
Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
4 Lamp 4' T12	100	223	22.300	6.000	55.0	52	2868	63,953	17,207	46,746	\$4,878.53	\$1,312.61	\$3,565.92	\$85,938.73
3 Lamp 4' T12	32	189	6.048	1.440	55.0	52	2868	17,345	4,130	13,215	\$1,323.11	\$315.03	\$1,008.08	\$24,294.83
2 Lamp 4' T12	3	155	0.465	0.090	55.0	52	2868	1,334	258	1,075	\$101.73	\$19.69	\$82.04	\$1,977.12
U-Lamp 2' T12	1	155	0.155	0.030	55.0	52	2868	445	86	358	\$33.91	\$6.56	\$27.35	\$659.04
13W CFL	8	13	0.104	0.072	55.0	52	2868	298	206	92	\$22.75	\$15.75	\$7.00	\$175.71
Subtotal											\$6,360.03	\$1,669.64	\$4,690.39	<b>\$113,045.43</b>

Bulb, Ballast and Maintenance Savings														
Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
4 Lamp 4' T12	100	34	\$2.50	\$1,000.00	3.8	27.9	\$7,342	\$11,013	\$65.00	10	\$6,500.00	\$3,000.00	\$998.40	\$27,855.26
3 Lamp 4' T12	32	34	\$2.50	\$240.00	3.8	27.9	\$1,762	\$3,524	\$65.00	10	\$2,080.00	\$960.00	\$298.43	\$8,326.32
2 Lamp 4' T12	3	34	\$2.50	\$15.00	3.8	27.9	\$110	\$330	\$65.00	10	\$195.00	\$90.00	\$26.00	\$725.53
U-Lamp 2' T12	1	34	\$2.50	\$5.00	3.8	27.9	\$37	\$110	\$65.00	10	\$65.00	\$30.00	\$8.67	\$241.84
13W CFL	8	13	\$5.00	\$40.00	2.8	27.9	\$399	\$1,196	\$0.00	10	\$0.00	\$0.00	\$57.14	\$1,594.29
													<b>\$1,388.65</b>	<b>\$38,743.23</b>

Complete Utility Rate Calculator			
Month	Total KWH	Total Bill Amount	Avg KWH Rate
Jan	301500	\$20,983	\$0.0696
April	210750	\$15,549	\$0.0738
July	245250	\$19,371	\$0.0790
Oct	199500	\$16,513	\$0.0828
Annual KWH Rate		\$0.0763	

<b>Total Cost</b>	<b>\$ 34,120.00</b>
<b>First Year Tax Savings</b>	<b>\$ -</b>
<b>Annual Energy &amp; Maintenance Savings</b>	<b>\$ 6,079.04</b>
<b>Total First Year Savings</b>	<b>\$ 6,079.04</b>
<b>Remaining Energy &amp; Maintenance Savings</b>	<b>\$ 163,526.11</b>
<b>Total Savings on Investment</b>	<b>\$ 169,605.15</b>
<b>Payback (Years)</b>	<b>5.61</b>
<b>Return on Investment</b>	<b>397%</b>

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.



Customer: One Exchange Plaza		Contact Person: Matt Jentgen		
Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	6TH FLOOR	Net 30	100812-08
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>516</b>	\$ 34,572.00
			<b>Total Amount</b>	<b>\$ 34,572.00</b>
Thank You for the opportunity to provide this quotation for our quality products and services. Price does not include freight or applicable sales tax. Quote valid for 30-days.				

APPENDIX D

## 6TH FLOOR LED ROI WORKSHEET

### Energy Savings

Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
4 Lamp 4' T12	125	223	27.875	7.500	55.0	52	2868	79,942	21,509	58,433	\$6,098.17	\$1,640.76	\$4,457.40	\$107,423.42
3 Lamp 4' T12	0	189	0.000	0.000	55.0	52	2868	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
2 Lamp 4' T12	8	155	1.240	0.240	55.0	52	2868	3,556	688	2,868	\$271.27	\$52.50	\$218.77	\$5,272.31
Subtotal											\$6,369.44	\$1,693.27	\$4,676.17	<b>\$112,695.73</b>

### Bulb, Ballast and Maintenance Savings

Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
4 Lamp 4' T12	125	34	\$2.50	\$1,250.00	3.8	27.9	\$9,178	\$13,766	\$65.00	10	\$8,125.00	\$3,750.00	\$1,248.00	\$34,819.08
3 Lamp 4' T12	0	34	\$2.50	\$0.00	3.8	27.9	\$0	\$0	\$65.00	10	\$0.00	\$0.00	\$0.00	\$0.00
2 Lamp 4' T12	8	34	\$2.50	\$40.00	3.8	27.9	\$294	\$881	\$65.00	10	\$520.00	\$240.00	\$69.35	\$1,934.74
													<b>\$1,317.34</b>	<b>\$36,753.82</b>

#### Complete Utility Rate Calculator

Month	Total KWH	Total Bill Amount	Avg KWH Rate
Jan	301500	\$20,983	\$0.0696
April	210750	\$15,549	\$0.0738
July	245250	\$19,371	\$0.0790
Oct	199500	\$16,513	\$0.0828
Annual KWH Rate			\$0.0763

<b>Total Cost</b>	<b>\$ 34,572.00</b>
<b>First Year Tax Savings</b>	<b>\$ -</b>
<b>Annual Energy &amp; Maintenance Savings</b>	<b>\$ 5,993.51</b>
<b>Total First Year Savings</b>	<b>\$ 5,993.51</b>
<b>Remaining Energy &amp; Maintenance Savings</b>	<b>\$ 161,225.49</b>
<b>Total Savings on Investment</b>	<b>\$ 167,219.00</b>
<b>Payback (Years)</b>	<b>5.77</b>
<b>Return on Investment</b>	<b>384%</b>

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.



Customer: One Exchange Plaza		Contact Person: Matt Jentgen		
Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	7TH FLOOR	Net 30	100812-09
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>507</b>	\$ 33,969.00
			<b>Total Amount</b>	<b>\$ 33,969.00</b>
Thank You for the opportunity to provide this quotation for our quality products and services. Price does not include freight or applicable sales tax. Quote valid for 30-days.				

APPENDIX D

# 7TH FLOOR LED ROI WORKSHEET

## Energy Savings

Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
4 Lamp 4' T12	120	223	26.760	7.200	55.0	52	2868	76,744	20,649	56,095	\$5,854.24	\$1,575.13	\$4,279.11	\$103,126.48
3 Lamp 4' T12	0	189	0.000	0.000	55.0	52	2868	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
2 Lamp 4' T12	14	155	2.170	0.420	55.0	52	2868	6,223	1,204	5,019	\$474.73	\$91.88	\$382.84	\$9,226.55
Subtotal											\$6,328.97	\$1,667.01	\$4,661.95	<b>\$112,353.03</b>

## Bulb, Ballast and Maintenance Savings

Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
4 Lamp 4' T12	120	34	\$2.50	\$1,200.00	3.8	27.9	\$8,811	\$13,216	\$65.00	10	\$7,800.00	\$3,600.00	\$1,198.08	\$33,426.32
3 Lamp 4' T12	0	34	\$2.50	\$0.00	3.8	27.9	\$0	\$0	\$65.00	10	\$0.00	\$0.00	\$0.00	\$0.00
2 Lamp 4' T12	14	34	\$2.50	\$70.00	3.8	27.9	\$514	\$1,542	\$65.00	10	\$910.00	\$420.00	\$121.35	\$3,385.79
													<b>\$1,319.43</b>	<b>\$36,812.11</b>

### Complete Utility Rate Calculator

Month	Total KWH	Total Bill Amount	Avg KWH Rate
Jan	301500	\$20,983	\$0.0696
April	210750	\$15,549	\$0.0738
July	245250	\$19,371	\$0.0790
Oct	199500	\$16,513	\$0.0828
Annual KWH Rate			\$0.0763

<b>Total Cost</b>	<b>\$ 33,969.00</b>
<b>First Year Tax Savings</b>	<b>\$ -</b>
<b>Annual Energy &amp; Maintenance Savings</b>	<b>\$ 5,981.38</b>
<b>Total First Year Savings</b>	<b>\$ 5,981.38</b>
<b>Remaining Energy &amp; Maintenance Savings</b>	<b>\$ 160,899.17</b>
<b>Total Savings on Investment</b>	<b>\$ 166,880.55</b>
<b>Payback (Years)</b>	<b>5.68</b>
<b>Return on Investment</b>	<b>391%</b>

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.



Specializing in Efficient Lighting Technologies

www.LiteEnergySolutions.com

Customer: One Exchange Plaza		Contact Person: Matt Jentgen		
Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	8TH FLOOR	Net 30	100812-10
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>404</b>	\$ 27,068.00
<b>CFL LED REPLACEMENTS</b>				
PAR38-12-WDM	12 WATT PAR 38 DIMMABLE WARM WHITE, 800 LM+ - 2800K		<b>28</b>	\$2,128.00
			<b>Total Amount</b>	<b>\$ 29,196.00</b>
Thank You for the opportunity to provide this quotation for our quality products and services. Price does not include freight or applicable sales tax. Quote valid for 30-days.				

## 8TH FLOOR LED ROI WORKSHEET

### Energy Savings

Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
4 Lamp 4' T8	15	128	1.920	0.900	55.0	52	2868	5,506	2,581	2,925	\$420.04	\$196.89	\$223.14	\$0.00
4 Lamp 4' T12	82	223	18.286	4.920	55.0	52	2868	52,442	14,110	38,332	\$4,000.40	\$1,076.34	\$2,924.06	\$70,469.76
2 Lamp 4' T12	8	155	1.240	0.240	55.0	52	2868	3,556	688	2,868	\$294.35	\$56.97	\$237.38	\$5,720.81
23W CFL	28	23	0.644	0.336	55.0	52	2868	1,847	964	883	\$145.88	\$76.11	\$69.77	\$0.00
<b>Subtotal</b>											<b>\$4,440.62</b>	<b>\$1,209.42</b>	<b>\$3,231.20</b>	<b>\$76,190.57</b>

### Bulb, Ballast and Maintenance Savings

Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
4 Lamp 4' T8	15	32	\$2.50	\$150.00	3.8	27.9	\$1,101	\$1,652	\$65.00	10	\$975.00	\$450.00	\$149.76	\$4,178.29
4 Lamp 4' T12	82	34	\$2.50	\$820.00	3.8	27.9	\$6,021	\$9,031	\$65.00	10	\$5,330.00	\$2,460.00	\$818.69	\$22,841.32
2 Lamp 4' T12	8	34	\$2.50	\$60.00	3.8	27.9	\$441	\$881	\$65.00	10	\$520.00	\$240.00	\$74.61	\$2,081.58
23W CFL	28	23	\$5.00	\$140.00	2.8	27.9	\$1,395	\$4,185	\$0.00	10	\$0.00	\$0.00	\$200.00	\$5,580.00
<b>\$1,093.29</b>													<b>\$30,502.89</b>	

### Complete Utiliy Rate Calculator

Month	Total KWH	Total Bill Amount	Avg KWH Rate
Jan	301500	\$20,983	\$0.0696
April	210750	\$15,549	\$0.0738
July	245250	\$19,371	\$0.0790
Oct	199500	\$16,513	\$0.0828
Annual KWH Rate		\$0.0763	

<b>Total Cost</b>	<b>\$ 29,196.00</b>
<b>First Year Tax Savings</b>	<b>\$ -</b>
<b>Annual Energy &amp; Maintenance Savings</b>	<b>\$ 4,324.50</b>
<b>Total First Year Savings</b>	<b>\$ 4,324.50</b>
<b>Remaining Energy &amp; Maintenance Savings</b>	<b>\$ 116,328.93</b>
<b>Total Savings on Investment</b>	<b>\$ 120,653.42</b>
<b>Payback (Years)</b>	<b>6.75</b>
<b>Return on Investment</b>	<b>313%</b>

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.

Lite Energy Solutions, Inc. PO Box 1330 Kannapolis, NC 28082

Office: (704) 932-0573 Fax: (704) 932-7830

www.liteenergysolutions.com



Customer: One Exchange Plaza		Contact Person: Matt Jentgen		
Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	9TH FLOOR	Net 30	100812-11
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>410</b>	\$ 24,470.00
			<b>Total Amount</b>	<b>\$ 24,470.00</b>
Thank You for the opportunity to provide this quotation for our quality products and services. Price does not include freight or applicable sales tax. Quote valid for 30-days.				





# Lite Energy Solutions

*Specializing in Efficient Lighting Technologies*

www.LiteEnergySolutions.com

Customer: One Exchange Plaza		Contact Person: Matt Jentgen		
Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	10TH FLOOR	Net 30	100812-12
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>372</b>	\$ 24,924.00
<b>CFL LED REPLACEMENTS</b>				
PAR38-12-WDM	12 WATT PAR 38 DIMMABLE WARM WHITE, 800 LM+ - 2800K		<b>44</b>	\$3,344.00
<b>INCANDESCENT LED REPLACEMENT</b>				
A19-6W-W-DM	6 WATT A19 DIMMABLE WARM WHITE - 475LM+, 2800K		<b>1</b>	\$ 52.00
<b>Total Amount \$</b>				<b>28,320.00</b>
Thank You for the opportunity to provide this quotation for our quality products and services.				
Price does not include freight or applicable sales tax. Quote valid for 30-days.				

## 10TH FLOOR LED ROI WORKSHEET

### Energy Savings20

Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
3 Lamp 4' T8	20	96	1.920	0.900	55.0	52	2868	5,506	2,581	2,925	\$420.04	\$196.89	\$223.14	\$5,377.76
4 Lamp 4' T12	74	223	16.502	4.440	55.0	52	2868	47,325	12,733	34,592	\$3,610.11	\$971.33	\$2,638.78	\$63,594.66
2 Lamp 4' T12	8	155	1.240	0.240	55.0	52	2868	3,556	688	2,868	\$294.35	\$56.97	\$237.38	\$5,720.81
23W CFL	44	23	1.012	0.528	55.0	52	2868	2,902	1,514	1,388	\$229.24	\$119.60	\$109.63	\$2,751.82
60W A19	1	60	0.060	0.006	55.0	52	2868	172	17	155	\$13.59	\$1.36	\$12.23	\$315.58
Subtotal											\$4,567.32	\$1,346.15	\$3,221.17	<b>\$77,760.63</b>

### Bulb, Ballast and Maintenance Savings

Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
3 Lamp 4' T8	20	32	\$2.50	\$150.00	3.8	27.9	\$1,101	\$2,203	\$65.00	10	\$1,300.00	\$600.00	\$186.52	\$5,203.95
4 Lamp 4' T12	74	34	\$2.50	\$740.00	3.8	27.9	\$5,433	\$8,150	\$65.00	10	\$4,810.00	\$2,220.00	\$738.81	\$20,612.89
2 Lamp 4' T12	8	34	\$2.50	\$60.00	3.8	27.9	\$441	\$881	\$65.00	10	\$520.00	\$240.00	\$74.61	\$2,081.58
23W CFL	44	23	\$5.00	\$220.00	2.8	27.9	\$2,192	\$6,576	\$0.00	10	\$0.00	\$0.00	\$314.29	\$8,768.57
60W A19	1	60	\$1.00	\$3.00	2.1	27.9	\$40	\$199	\$0.00	10	\$0.00	\$0.00	\$8.57	\$239.14
													<b>\$1,322.80</b>	<b>\$36,906.14</b>

### Complete Utility Rate Calculator

Month	Total KWH	Total Bill Amount	Avg KWH Rate
Jan	301500	\$20,983	\$0.0696
April	210750	\$15,549	\$0.0738
July	245250	\$19,371	\$0.0790
Oct	199500	\$16,513	\$0.0828
Annual KWH Rate		\$0.0763	

<b>Total Cost</b>	<b>\$ 28,320.00</b>
<b>First Year Tax Savings</b>	<b>\$ -</b>
<b>Annual Energy &amp; Maintenance Savings</b>	<b>\$4,543.97</b>
<b>Total First Year Savings</b>	<b>\$ 4,543.97</b>
<b>Remaining Energy &amp; Maintenance Savings</b>	<b>\$ 122,232.82</b>
<b>Total Savings on Investment</b>	<b>\$ 126,776.79</b>
<b>Payback (Years)</b>	<b>6.23</b>
<b>Return on Investment</b>	<b>348%</b>

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.



Customer: One Exchange Plaza		Contact Person: Matt Jentgen		
Address:		Phone Number: 502-664-6541		
City, ST Zip: Raleigh, NC		E-mail Address: <a href="mailto:matt.jentgen@raleighnc.gov">matt.jentgen@raleighnc.gov</a>		
Date	FOB	Project Reference	Terms	Quote Number
8/12/2010	Manufacturer	BASEMENT	Net 30	100812-02
Item Number	Description		Qty	Total
<b>T8/T12 REPLACEMENTS</b>				
4T8-15W-N	4 FOOT NATURAL WHITE - 1600LM+ - 4100K		<b>240</b>	\$ 16,080.00
<b>CFL LED REPLACEMENTS</b>				
PAR30-9-WWDM	9 WATT PAR 30 DIMMABLE WARM WHITE 600LM+ - 2800K		<b>8</b>	\$ 520.00
			<b>Total Amount \$</b>	<b>16,600.00</b>
Thank You for the opportunity to provide this quotation for our quality products and services. Price does not include freight or applicable sales tax. Quote valid for 30-days.				

# BASEMENT LED ROI WORKSHEET

## Energy Savings

Fixture Type	Total # Fixtures	Watts/ Fixture	Total KW Used	Total LED KW	Wkly Hours "ON"	Wks/Yr	Annual Hours "ON"	Current Annual KWH	LED Annual KWH	Annual KWH SAVED	Current Energy Costs	LED Energy Costs	Annual Energy Savings	TOTAL ENERGY SAVINGS
2 Lamp 4' T8	11	64	0.704	0.330	168.0	52	8760	6,167	2,891	3,276	\$470.44	\$220.52	\$249.92	\$1,949.38
2 Lamp 4' T12	5	155	0.775	0.150	168.0	52	8760	6,789	1,314	5,475	\$517.88	\$100.24	\$417.65	\$3,257.66
4 Lamp 4' T12	52	223	11.596	1.560	168.0	52	8760	101,581	13,666	87,915	\$7,748.88	\$1,042.45	\$6,706.43	\$52,310.17
13W CFL	8	13	0.104	0.072	168.0	52	8760	911	631	280	\$69.50	\$48.11	\$21.38	\$175.35
<b>Subtotal</b>											<b>\$8,806.70</b>	<b>\$1,411.32</b>	<b>\$7,395.39</b>	<b>\$57,692.56</b>

## Bulb, Ballast and Maintenance Savings

Fixture Type	Total # Fixtures	Lamp Rating	Cost/Lamp	Total Lamp Cost	Life Cycle (yrs)	LED Life Cycle (yrs)	Re-Lamp Savings	Re-Lamp Labor (\$15/Fixt.)	Ballast Costs	Life Cycle (yrs)	Ballast Savings	Ballast Labor (\$30/fixt)	Annual Maint. Savings	Total Maintenance Savings
2 Lamp 4' T8	11	32	\$2.50	\$55.00	1.3	9.1	\$385	\$1,155	\$65.00	10	\$715.00	\$330.00	\$284.07	\$2,585.00
2 Lamp 4' T12	5	34	\$2.50	\$25.00	1.3	9.1	\$175	\$525	\$65.00	10	\$325.00	\$150.00	\$129.12	\$1,175.00
4 Lamp 4' T12	52	34	\$2.50	\$520.00	1.3	9.1	\$3,640	\$5,460	\$65.00	10	\$3,380.00	\$1,560.00	\$1,542.86	\$14,040.00
13W CFL	8	13	\$5.00	\$40.00	0.9	9.1	\$404	\$1,213	\$0.00	10	\$0.00	\$0.00	\$177.78	\$1,617.78
													<b>\$2,133.82</b>	<b>\$19,417.78</b>

### Complete Utility Rate Calculator

Month	Total KWH	Total Bill Amount	Avg KWH Rate
Jan	301500	\$20,983	\$0.0696
April	210750	\$15,549	\$0.0738
July	245250	\$19,371	\$0.0790
Oct	199500	\$16,513	\$0.0828
Annual KWH Rate		\$0.0763	

<b>Total Cost</b>	<b>\$ 16,600.00</b>
<b>First Year Tax Savings</b>	<b>\$ -</b>
<b>Annual Energy &amp; Maintenance Savings</b>	<b>\$ 9,529.21</b>
<b>Total First Year Savings</b>	<b>\$ 9,529.21</b>
<b>Remaining Energy &amp; Maintenance Savings</b>	<b>\$ 77,186.58</b>
<b>Total Savings on Investment</b>	<b>\$ 86,715.78</b>
<b>Payback (Years)</b>	<b>1.74</b>
<b>Return on Investment</b>	<b>422%</b>

\*Note: Additional Tax Incentives and Rebates may be available. Please consult your tax accountant for additional information.

THE ENGLISH ELECTRIC CORPORATION **APPENDIX E**

102 MIDLAND AVENUE  
PORT CHESTER, NEW YORK 10573

Telex No. 137376  
Fax No. (914) 937-7450

TELEPHONE (914) 937-7450

DATE: Oct. 16, 1985

Job Ref: Raleigh Federal Savings & Loan

EQ/NO: 3837

Location/Unit No.	SF- 1 & 2	RF- 3 & 4
Quantity	two (2)	two (2)
Performance Required	62,500 cfm at 7"SP	53,125 cfm at 4" SP
Fan Type	varofoil	varofoil
Code No.	125JG-56A-4-9 D250MP	125JG-56A-4-6 D200/46
Electrical Supply	480/3/60	480/3/60
RPM	1765	1765
Volume Flow, CFM	62,500	53,125
Pressure, Inches SP	7" (6.45" with cone)	4"
Pressure, Inches TP	8.3" (7.85" with cone)	5"
Pitch Angle	22 degrees	16 degrees
Total Efficiency	77 %	83.5 %
BHP (Absorbed)	90	50
Motor HP Rating	100 Nema B	60 Nema B
Sound Power Level, db (10-12 Watts)	117	114
SWL, Spectrum, db	105/107/113/111/109/105/99/93	104/107/109/107/106/102/96/90
Form of Running	b	b
Bearings	ball	ball
Special Features	controllable pitch	controllable pitch
Accessories	Inlet bell/screen flexible connectors & clips pilot positioner pneumatic actuator Mt. ft.	Pilot positioner pneumatic operator Mt. ft. flexible connectors & clips
Full Load/Starting Amps	114/780	73/500

**Table 6-2  
Prescriptive HVAC Incentives**

Equipment Type	Size Category	Qualifying Efficiency	Incentive (per ton)
Unitary and Split Air Conditioning Units and Air Source Heat Pumps	< 65,000 Btuh (5.4 Tons)	14 SEER	\$25
		15 SEER	\$45
	≥ 65,000 Btuh (5.4 Tons) and <240,000 Btuh (20 Tons)	11.5 EER	\$30
		12 EER	\$55
	≥240,000 Btuh (20 Tons) and <760,000 Btuh (63.3 Tons)	10.5 EER	\$30
		10.8 EER	\$55
	≥ 760,000 Btuh (63.3 Tons)	9.7 EER	\$30
		10.2 EER	\$55
Water-Cooled Chillers <sup>1</sup>	ALL	Level 1 (see Section 11.2)	\$18
		Level 2 (see Section 11.2)	\$35
Air-Cooled Chillers	ALL	1.04 kW / ton-IPLV	\$35
Room Air Conditioners	ALL	Level 1 (see Section 11.3)	\$25
		Level 2 (see Section 11.3)	\$45
PTAC	ALL	13.08-(0.2556 x Btuh / 1000) EER	\$30
<b>Equipment Type</b>	<b>Incentive</b>		
Variable Speed Drive (VSD) on HVAC Fan and Pump Motors <sup>2</sup>	\$45.00 / HP		

<sup>1</sup> Single pass water cooled chillers (& other equipment) do not qualify for an incentive payment.

<sup>2</sup> Refer to **Section 9.5** for qualified VSD applications pertaining to chillers, fans, pumps and other equip.

**Table 9-3  
Room Air Conditioner Qualifying Efficiencies**

Size (Btuh)	Level 1 2000 ENERGY STAR® (EER)	Level 2 SEHA Tier 1 (EER)
< 8,000	10.7	11.2
8,000 to 13,999	10.8	11.3
14,000 to 19,999	10.7	11.2
≥ 20,000	9.4	9.8

**9.4 Package Terminal Air Conditioning Units (PTAC)**

Package terminal air conditioners and heat pumps are through-the-wall, self-contained units.<sup>12</sup> All EER values must be rated at 95°F outdoor dry-bulb temperature. Minimum requirements are shown in the **Table 9-4**.

**Table 9-4  
PTAC Minimum Efficiency Requirements**

Capacity (Btuh)	Minimum Efficiency (EER)
≤ 7,000	11.3
7,001 - 8,000	11.0
8,001 - 9,000	10.8
9,001 - 10,000	10.5
10,001 - 11,000	10.3
11,001 - 12,000	10.0
12,001 - 13,000	9.8
13,001 - 14,000	9.5
14,001 - 15,000	9.4
≥ 15,000	9.2

**9.5 Variable Speed Drive on HVAC Chillers, Cooling Towers, Fans, and Pumps**

Variable-speed drives (VSDs) installed on existing chillers, cooling towers, HVAC fans, or HVAC pumps used for human comfort are eligible for a prescriptive incentive. The installation of a VSD must accompany the permanent removal or disabling of any flow control or throttling devices such as inlet vanes, bypass dampers, and valves.

New chillers or other equipment with integrated VSDs are likely eligible as a custom measure.

VSDs for non-HVAC applications, including chillers, fans, pumps, cooling towers, air compressors and other equipment may be eligible for a custom measure incentive.

<sup>12</sup> These units have a combination of heating and cooling assemblies intended for mounting through the wall. It includes refrigeration, outdoor louvers, forced ventilation, and may connect to external heating source or have electric resistance heating.

## Annual Cost Summary

09080 - OEP Chiller  
ATLANTEC ENGINEERS08/11/2010  
07:52PM

Table 1. Annual Costs

Component	OEP - Current fans (\$)	OEP - VFD Fans (\$)
Air System Fans	31,857	14,613
Cooling	15,095	13,602
Heating	0	341
Pumps	6,609	5,980
Cooling Tower Fans	3,305	3,150
<b>HVAC Sub-Total</b>	<b>56,865</b>	<b>37,686</b>
Lights	48,809	48,809
Electric Equipment	24,404	24,404
Misc. Electric	0	0
Misc. Fuel Use	0	0
<b>Non-HVAC Sub-Total</b>	<b>73,213</b>	<b>73,213</b>
<b>Grand Total</b>	<b>130,079</b>	<b>110,900</b>

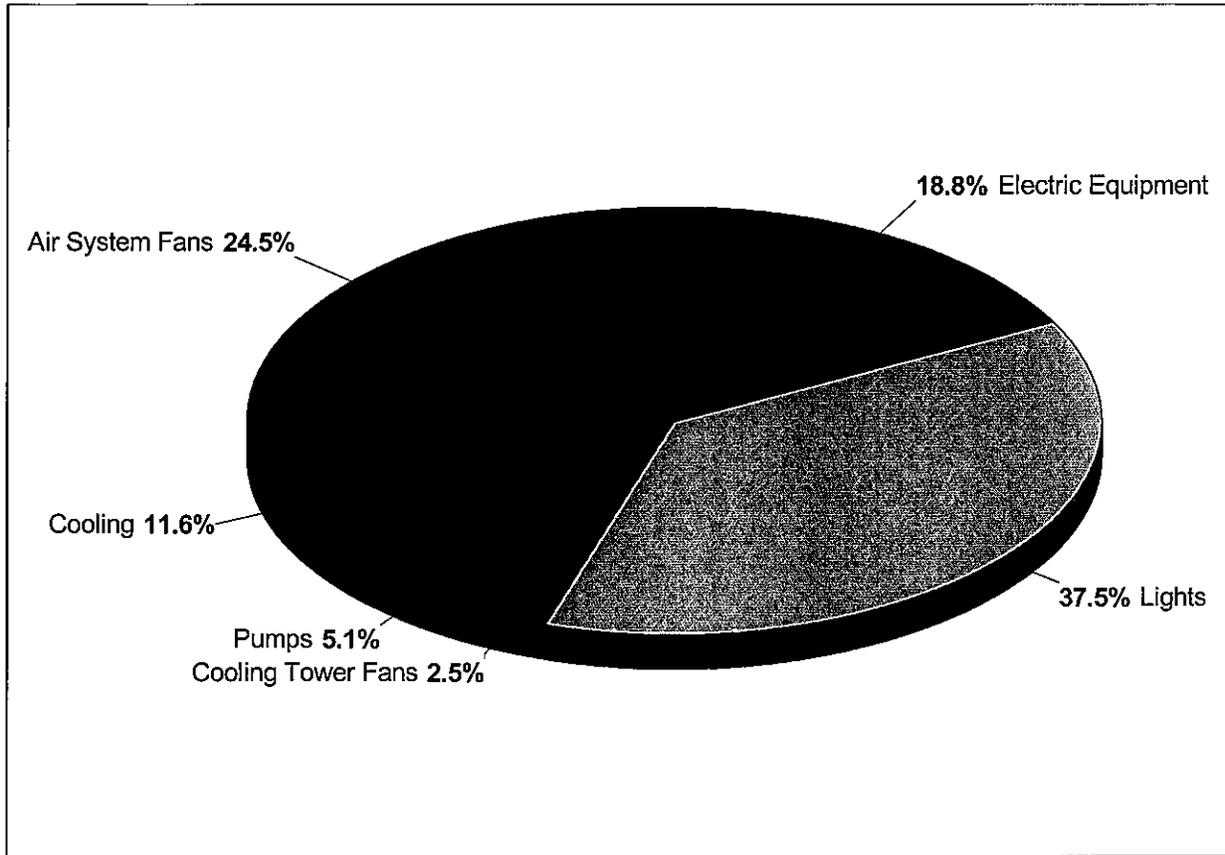
Table 2. Annual Cost per Unit Floor Area

Component	OEP - Current fans (\$/ft <sup>2</sup> )	OEP - VFD Fans (\$/ft <sup>2</sup> )
Air System Fans	0.286	0.131
Cooling	0.135	0.122
Heating	0.000	0.003
Pumps	0.059	0.054
Cooling Tower Fans	0.030	0.028
<b>HVAC Sub-Total</b>	<b>0.510</b>	<b>0.338</b>
Lights	0.438	0.438
Electric Equipment	0.219	0.219
Misc. Electric	0.000	0.000
Misc. Fuel Use	0.000	0.000
<b>Non-HVAC Sub-Total</b>	<b>0.657</b>	<b>0.657</b>
<b>Grand Total</b>	<b>1.167</b>	<b>0.995</b>
Gross Floor Area (ft <sup>2</sup> )	111494.0	111494.0
Conditioned Floor Area (ft <sup>2</sup> )	111494.0	111494.0

Note: Values in this table are calculated using the Gross Floor Area.

Table 3. Component Cost as a Percentage of Total Cost

Component	OEP - Current fans (%)	OEP - VFD Fans (%)
Air System Fans	24.5	13.2
Cooling	11.6	12.3
Heating	0.0	0.3
Pumps	5.1	5.4
Cooling Tower Fans	2.5	2.8
<b>HVAC Sub-Total</b>	<b>43.7</b>	<b>34.0</b>
Lights	37.5	44.0
Electric Equipment	18.8	22.0
Misc. Electric	0.0	0.0
Misc. Fuel Use	0.0	0.0
<b>Non-HVAC Sub-Total</b>	<b>56.3</b>	<b>66.0</b>
<b>Grand Total</b>	<b>100.0</b>	<b>100.0</b>



1. Annual Costs

Component	Annual Cost (\$)	(\$/ft²)	Percent of Total (%)
Air System Fans	31,857	0.286	24.5
Cooling	15,095	0.135	11.6
Heating	0	0.000	0.0
Pumps	6,609	0.059	5.1
Cooling Tower Fans	3,305	0.030	2.5
<b>HVAC Sub-Total</b>	<b>56,865</b>	<b>0.510</b>	<b>43.7</b>
Lights	48,809	0.438	37.5
Electric Equipment	24,404	0.219	18.8
Misc. Electric	0	0.000	0.0
Misc. Fuel Use	0	0.000	0.0
<b>Non-HVAC Sub-Total</b>	<b>73,213</b>	<b>0.657</b>	<b>56.3</b>
<b>Grand Total</b>	<b>130,079</b>	<b>1.167</b>	<b>100.0</b>

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... 111494.0 ft²  
 Conditioned Floor Area ..... 111494.0 ft²

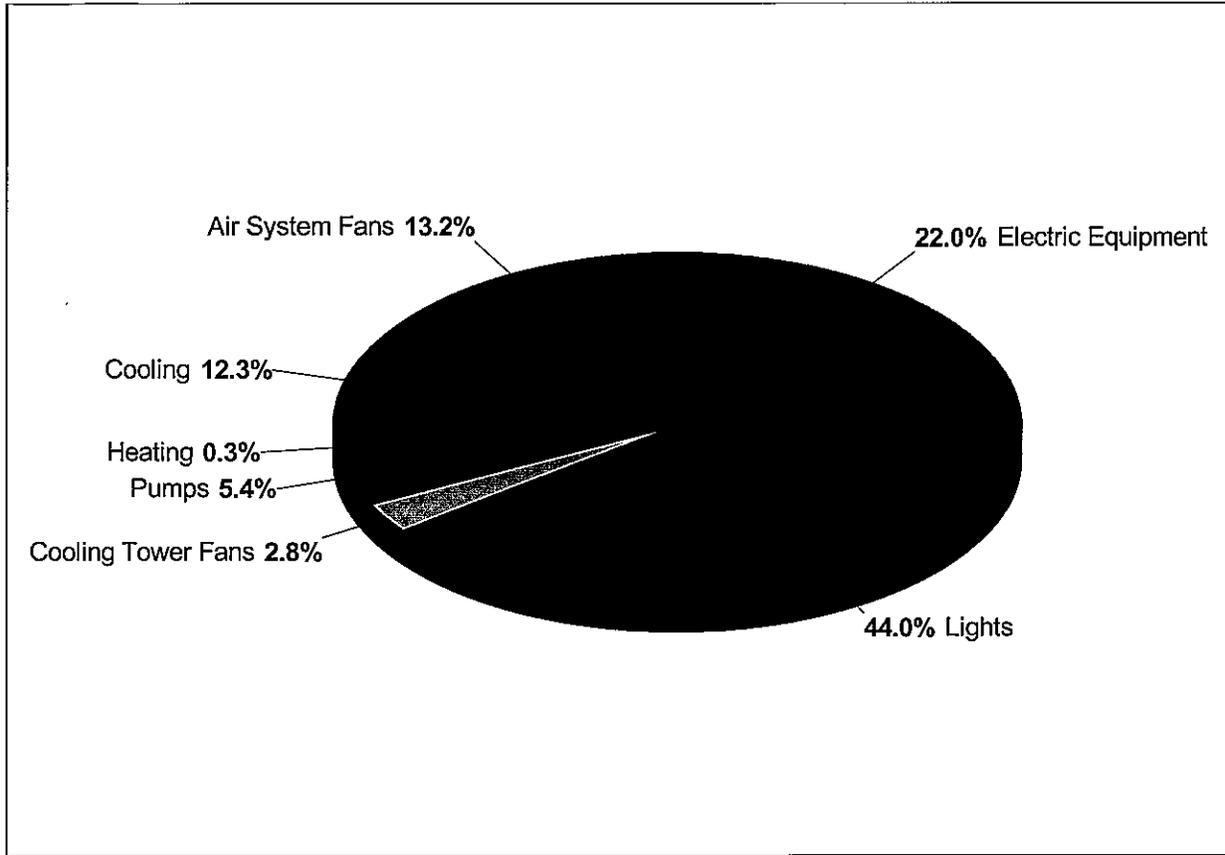
Monthly Energy Use by Component - OEP - Current fans

09080 - OEP Chiller  
ATLANTEC ENGINEERS

08/11/2010  
07:52PM

1. Monthly Energy Use by System Component

Component	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Air System Fans (kW/h)	30554	27866	31881	34964	37478	39252	43319	40870	39902	37973	29998	31269
<i>Cooling</i>												
Electric (kWh)	3336	3904	6585	10849	20430	31001	37836	38995	24881	14294	5891	3530
Natural Gas (na)	0	0	0	0	0	0	0	0	0	0	0	0
Fuel Oil (na)	0	0	0	0	0	0	0	0	0	0	0	0
Propane (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote HW (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote Steam (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote CW (na)	0	0	0	0	0	0	0	0	0	0	0	0
<i>Heating</i>												
Electric (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
Natural Gas (na)	0	0	0	0	0	0	0	0	0	0	0	0
Fuel Oil (na)	0	0	0	0	0	0	0	0	0	0	0	0
Propane (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote HW (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote Steam (na)	0	0	0	0	0	0	0	0	0	0	0	0
Pumps (kWh)	2656	3054	4733	6469	9905	11130	12118	12041	10065	8538	4940	2587
Clg. Tower Fans (kW/h)	945	606	1535	2759	5239	6865	7653	7575	5825	3420	921	781
Lighting (kW/h)	56906	49949	53160	54587	55211	52536	56906	53160	54587	56906	50841	56906
Electric Eqpt. (kW/h)	28453	24975	26580	27294	27606	26268	28453	26580	27294	28453	25420	28453
Misc. Electric (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
<i>Misc. Fuel</i>												
Natural Gas (na)	0	0	0	0	0	0	0	0	0	0	0	0
Propane (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote HW (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote Steam (na)	0	0	0	0	0	0	0	0	0	0	0	0



1. Annual Costs

Component	Annual Cost (\$)	(\$/ft <sup>2</sup> )	Percent of Total (%)
Air System Fans	14,613	0.131	13.2
Cooling	13,602	0.122	12.3
Heating	341	0.003	0.3
Pumps	5,980	0.054	5.4
Cooling Tower Fans	3,150	0.028	2.8
<b>HVAC Sub-Total</b>	<b>37,686</b>	<b>0.338</b>	<b>34.0</b>
Lights	48,809	0.438	44.0
Electric Equipment	24,404	0.219	22.0
Misc. Electric	0	0.000	0.0
Misc. Fuel Use	0	0.000	0.0
<b>Non-HVAC Sub-Total</b>	<b>73,213</b>	<b>0.657</b>	<b>66.0</b>
<b>Grand Total</b>	<b>110,900</b>	<b>0.995</b>	<b>100.0</b>

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... 111494.0 ft<sup>2</sup>  
 Conditioned Floor Area ..... 111494.0 ft<sup>2</sup>

Monthly Energy Use by Component - OEP - VFD Fans

09080 - OEP Chiller  
ATLANTEC ENGINEERS

08/11/2010  
07:52PM

1. Monthly Energy Use by System Component

Component	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Air System Fans (kWh)	7305	7999	11882	14746	18356	23105	26173	25541	23252	17750	10718	8272
<i>Cooling</i>												
Electric (kWh)	2110	2671	5416	9192	18351	29145	35889	37095	22990	12235	3936	2572
Natural Gas (na)	0	0	0	0	0	0	0	0	0	0	0	0
Fuel Oil (na)	0	0	0	0	0	0	0	0	0	0	0	0
Propane (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote HW (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote Steam (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote CW (na)	0	0	0	0	0	0	0	0	0	0	0	0
<i>Heating</i>												
Electric (kWh)	1659	1316	2	0	0	0	0	0	0	0	0	1578
Natural Gas (na)	0	0	0	0	0	0	0	0	0	0	0	0
Fuel Oil (na)	0	0	0	0	0	0	0	0	0	0	0	0
Propane (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote HW (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote Steam (na)	0	0	0	0	0	0	0	0	0	0	0	0
Pumps (kWh)	1696	2200	4007	5534	9196	10946	12065	11911	9690	7549	3304	1740
Clg. Tower Fans (kWh)	698	435	1344	2600	5011	6801	7590	7495	5634	3107	641	705
Lighting (kWh)	56906	49949	53160	54587	55211	52536	56906	53160	54587	56906	50841	56906
Electric Eqpt. (kWh)	28453	24975	26580	27294	27606	26268	28453	26580	27294	28453	25420	28453
Misc. Electric (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
<i>Misc. Fuel</i>												
Natural Gas (na)	0	0	0	0	0	0	0	0	0	0	0	0
Propane (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote HW (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote Steam (na)	0	0	0	0	0	0	0	0	0	0	0	0

**Newcomb and Company  
Mechanical Estimate Summary**

Job Name:

OEP Fans and VFD's  
City of Raleigh

Page 1

Total Tonnage of Equipment		
Labor Rate per Crew Hour	OT	\$ 72.60
Warehouse Labor % of Materials		8.00%
Supervision Cost % of Labor		7.5%
Direct Cost		\$157,675.15
Gross Margin		\$22,326.27

Tax Rate 7.75%

0.0%  
14.16%

Material and labor		Material	Labor	Man Hours	Tax
Fans	4	80,000.00	\$2,178.00	30.00	\$5,600
VFD's	4	30,000.00	\$1,452.00	20.00	\$2,100
Start-up	4	100.00	\$726.00	10.00	\$7
		0.00	\$0.00	0.00	\$0
		0.00	\$0.00	0.00	\$0
		0.00	\$0.00	0.00	\$0
Misc	5.00%	5,505.00	\$217.80	3.00	\$385
		0.00	\$0.00	0.00	\$0
Demo	4	0.00	\$2,904.00	40.00	\$0
		0.00	\$0.00	0.00	\$0
<b>Total Piping</b>		<b>\$115,605.00</b>	<b>\$7,477.80</b>	<b>103.00</b>	<b>\$8,092</b>
<b>Project Sub-Totals</b>		<b>\$115,605.00</b>	<b>\$7,477.80</b>	<b>103.00</b>	<b>\$8,092</b>
<b>Project Totals</b>		<b>\$115,605.00</b>	<b>\$7,477.80</b>	<b>103.00</b>	<b>\$8,092</b>

Subcontracts		
Controls		\$8,500.00
Insulation		\$1,500.00
Electrical		\$3,500.00
Crane and Rigging		\$10,500.00
Test and Balance		\$2,500.00
<b>Total Subcontracts</b>		<b>\$26,500.00</b>

TOTAL MATERIALS		115,605
SALES TAX		8,092
Overhead and Profit on Materials		18,555
LABOR		7,478
Overhead and Profit on Labor		1,122
WARRANTY		0
SUBCONTRACT		26,500
Overhead on Subs		2,650
<b>TOTAL COST</b>		<b>180,001</b>
<b>SELLING PRICE</b>		<b>180,001</b>

		0
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Quote Price		180,001
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**6.1.3 Retrofit Prescriptive - Refrigeration**

The following are some common methods of reducing energy usage in refrigeration. The Energy Efficiency for Business Program is offering incentives for the refrigeration measures shown in **Table 6-3**. The specifications for each of these measures are provided in **Section 10**.

**Table 6-3  
Prescriptive Refrigeration Incentives**

Refrigeration Measures		
Measure	Incentive Unit	Incentive/Unit
Strip Curtains on Walk-In Coolers and Freezers	Per Square Foot	\$3.00
Anti-Sweat Heater Control	Per Linear Foot	\$20.00
Electrically Commutated Motor for Walk-in	Per Motor	\$50.00
Electrically Commutated Motor for Reach-in	Per Motor	\$40.00
Evaporator Fan Control	Per Motor	\$60.00
Automatic Door Closers for Walk-in Freezers	Per Door	\$140.00
Beverage Machine Control	Per Unit	\$90.00
ENERGYSTAR® Beverage Machine	Per Unit	\$90.00
Snack Machine Control	Per Unit	\$50.00
High-Efficiency Ice Makers (Air Cooled Only) ENERGY STAR® or CEE Tier 1		
Size (lbs / 24 hrs)	Qualifying kWh per 100 lbs	Incentive per Ice Maker
101 - 200	8.5	\$75.00
201 - 300	7.7	\$125.00
301 - 400	6.5	\$175.00
401 - 500	5.5	\$225.00
501 – 1,000	5.2	\$300.00
1,001 – 1,500	5.0	\$450.00
> 1,500	4.6	\$600.00