DURHAM 1869 CITY OF MEDICINE	City Manager's Office **Policy Memorandum**	**Date of Issue** Sept.11, 2009	**Effective Date** Sept. 14, 2009	**Number** #SUS-300
To: All Employees		**Subject: Facilities Strategic Energy Conservation Policy (FACSTEP)**		
Signature: Thomas J. Bonfield, City Manager				

Comments: PLEASE POST

1. PURPOSE

To establish policies and implement procedures to promote energy conservation and to outline energy conservation measures to be taken by all City employees in the operation of City facilities and equipment. Energy efficient measures shall be taken to reduce electric, natural gas and water consumption in existing as well as future facilities of the City for cost savings through an overall reduction in energy consumption with a goal of ten percent (10%) reduction during the first year and (5%) reductions during subsequent years. Additionally, the City shall implement procedures to promote energy conservation to be aligned with the Durham Local Action Plan for Greenhouse Gas Reductions.

2. REQUIRED ACTION

At a minimum, each Department Director shall implement this policy and its procedures. The measures outlined below shall be strictly adhered to by all City employees, in order to immediately achieve the reduction of energy use. Each department shall appoint an employee to function as their department's Lead Energy (Advocate) Representative for the purpose of coordinating and reporting energy conservation efforts by their department to the City's Green Team. Departments with multiple work locations shall appoint an Energy Representative for each location.

3. IMPLEMENTATION

On the effective date of this policy Department Directors shall strive toward full implementation and to assist in the implementation process, the following guidelines are offered:

A. Educate all members of your organization on the content, purpose and goals of the

policy.

B. Establish internal departmental objectives and processes to achieve energy reduction goals to include workplace behavioral changes.

C. Identify, publish and establish action changes needed at the organizational level as well as individual responsibility level to achieve required energy reduction in the timeframe stated.

D. Monitor or cooperate with the monitoring of energy consumption on a monthly basis. Record and report such results to the General Services' City Energy Manager and prominently display these achievements to encourage continuing success, or promote required course adjustments in order to meet established reduction goals.

E. Continuously coordinate with the General Services Department in identifying future CIP projects which can possibly replace excessive energy consuming buildings with more energy efficient structures.

4. CONSERVATION GUIDELINES

A. ENERGY AND WATER CONSERVATION

1. Turn off the lights when they are not needed as employees leave their work areas during the day or at the end of work.

2. Use Task Lighting in place of multiple over-head lighting fixtures and turn all lights off when leaving rooms or work areas.

3. Help manage the City's Peak Electrical Load by running discretionary equipment in the morning (in the summer) and in the afternoon. (in the winter). Peak Load Rates (Summer 1–9 pm), (Winter 6am-1pm)

4. Portable Heaters shall not to be used in City facilities. If indoor temperatures are uncomfortable, dress for the condition. Dress for work in layers, as appropriate for the season and the task. Notify your building maintenance personnel of excessive cool temperatures in the cooling season or excessive heating during the heating season.

5. Use the stairs instead of the elevators if possible.

6. When using small appliances, turn them off as soon as their work is done. Coffee and Tea pots especially should not be left on for extended periods of time.

7. Ensure all non-essential equipment is turned-off before leaving the work area. Examples are: radios, fans, all small appliances, desk lamps, personal printers, etc. Remove redundant microwaves, refrigerators, clocks, radios, and the likes.

8. Install water savings devices in buildings.

B. HEATING, VENTILATION AND AIR CONDITIONDING OPERATIONS

1. Keep all exterior doors and windows closed when Heating, Ventilation and Air Conditioning units are in use.

2. For those facilities not equipped with effective central air conditioning systems temperature control should be achieved by the use of fans and window adjustments instead of using window air conditioning units when possible

3. Achieving thermal comfort temperature and humidity conditions that are acceptable to all occupants is a difficult, if not impossible, task. The American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) has published recommended standards for thermal comfort parameters. The temperature in occupied air-conditioned buildings shall be set between 73^0 and 79^0 thermal comfort settings during working hours during the cooling seasons and between 68.5^0 and 74.5^0 thermal comfort setting during the heating seasons to reduce energy costs. (Table 1).

4. In buildings with centralized electronic/computerized controls, the start time for the HVAC equipment shall be set as late as possible while still allowing time to condition the building to guideline temperatures by the beginning of the workday.

5. In buildings and areas with individual thermostats controls, the thermostats will be set appropriately at the beginning of the day in accordance with the thermal comfort ranges cited in paragraph B.3, above. HVAC units shall be turned on in phases of no less than 30 minute intervals for the purpose of lessening electrical Peak Demand usage. Night-time settings shall be at least 10^0 above the summer time setting and 10^0 below the winter time settings. These HVAC units shall be equipped with on/off timing devices.

6. All HVAC equipment, including supply and return air fans are to be at minimum operation on weekends, holidays and for varying periods each night except for those facilities conducting City business, i.e., Fire Stations and Police locations. These down times also include any time the building is minimally occupied and not serving its primary function. This includes times when only security, cleaning or maintenance personnel are present. Those buildings or areas which have been assessed as a special environmental conditions needs space may be exempt from this requirement.

7. Occupants will use minimum lighting at all time to reduce energy consumption as well as reducing heat gain generation from the lights which places additional load on the air-conditioning equipment.

8. All natural gas fired boilers in City owned buildings will be tuned annually and brought up to maximum efficiency. Verification of combustion efficiency shall be made by a licensed operators and a permanent record of these readings will be maintained at each boiler location.

C. <u>LIGHTING</u>

1. Indoor lighting will be reduced by the number bulbs used and /or wattage, wherever possible, to provide for the minimum but adequate lighting levels consistent with the

needs of particular work tasks. Lighting levels shall be as outlined by the 2006 North Carolina Energy Conservation Code and the Illuminating Engineering Society of North America (IESNA) Lighting Handbook 8th edition (Table 2).

2. Existing incandescent lamps for general purpose lighting will be phased out and future incandescent lamps shall not be allowed unless exempted for very limited and specialized tasks by the City Energy Manager. New lighting systems shall be in the form of the latest energy saving technology within budgetary limits.

3. Decorative lighting will not be used except for traditional holiday purposes and they shall be of the most energy efficient lighting. These decorative lights shall be on a timing device or photocells to turn them on and off at predetermined times at night.

4. Timers, photocells and motion detectors shall be implemented to the fullest extent possible at City facilities, and individual departments shall review and identify potential locations for use. In addition, maintenance staff shall perform routine inspections of all devices to maintain proper operation.

5. All athletic lighting shall be in use only during scheduled events. Athletic lighting turned on when no one is using a facility or after scheduled hours shall be reported to the Parks Superintendent. Where possible, new sports field lighting installations shall take advantage of low-energy-use lights and computerized lighting control systems.

6. Skylights and windows with day light capabilities should be utilized if possible. Light fixtures mounted in and around skylights should be used only when necessary.

7. Evening shift workers and contractors shall turn on lights only in the specific area where and when they are working. Lighting in work areas shall be kept off during breaks and lunches. They shall ensure that all lighting is turned off at the conclusion of their work and prior to the next day's business hours.

8. Lights in all building areas and workspaces shall not be turned on unless needed. Employees will make certain that lights are turned off when leaving an area.

9. All outside lights shall be turned off during daylight hours, except for those on photocells.

10. Outside lighting and building accent lighting will be used only when the building or facilities are occupied, unless the lighting is used for security purposes. Nighttime security lighting will be minimized to a level that is adequate to reasonably protect the building and facilities.

11. The installation of Exit Signs that employ light-emitting diode (LED) technology shall be used as replacements for less energy efficient devices during routine maintenance of individual units.

12. Lights in vending machines and coolers shall have their lights removed to reduce energy consumption. Only machines that need lighting to display perishable food type products may use lights as functional verses decorative and these machines will be on timers to turn lights off during non-business hours.

D. ELECTRIC MOTORS

1. Departments with responsibility for the operation and maintenance of electric motors used in fans, pumps, compressors and other facilities operational function shall develop and implement an Electric Motor Program. Such a program shall:

   a. Provide a motor inventory of critical motors for sustainable operations in case of motor failure with data plate information and vendor listings.

   b. Specify premium efficiency motors for high use applications which can provide significant savings. D.O.E. offers a free software program (MotorMaster+4) which provides an analysis tool in determining the cost effectiveness of using premium efficiency motors.

   c. Ensure the manufactures recommended preventive maintenance cycles and tasks accomplished such as lubrication, adequate ventilation, enhanced drive belting and electric load surveying.

5. FACILITIES CONSERVATION IMPROVEMENTS

A. RETROFITTING EXISTING BUILDINGS

1. When an Energy Audit is conducted in an existing City facility the audit should identify and recommend any facility as suitable for building retro-commissioning to reduce energy consumption within the facility or as suitable for installing an energy savings measure. When considering these recommendations the life expectancy of the facility and a cost/benefit analysis to complete the work will be done.

2. All results and recommendations of Energy Audits will be provided to the Director of General Services who will develop a Retrofit Plan which will be executed as funding is available or alternative funding mechanisms are identified.

3. The use of materials and systems with reduced environmental impacts are encouraged and construction waste shall be separated for appropriate recycling and disposal.

4. Install water –savings devices.

B. FUTURE CAPITAL IMPROVEMENT PROJECTS

1. Planning for new capital facilities should be modeled on the U.S. Department of Energy, Center for Excellence of Sustainable Development's "Green Building

Principles." These principles are to optimize site potential, optimize energy use, protect and conserve water, use environmentally preferable products, enhance indoor environmental quality and optimize operational and maintenance practices. Any RFP's submitted for construction of future CIP facilities should demonstrate that the consultant is familiar with designing for these principles and demonstrate the ability to calculate energy conservation by measurable standards.

2. Durham Comprehensive Plan, Objective 4.2.5 states:

> **Objective 4.2.5. High Performance Design**
> Encourage new construction that uses high performance design, including energy and water efficient design, minimizing construction waste; and use of renewable, recycled or reused building materials.

3. Durham Comprehensive Plan, Policy 4.2.5a states:

> **Policy 4.2.5a. Design of Public Buildings.** In the design of public buildings, the City and County shall require the incorporation of environmentally responsible building practices through compliance with *LEED* (*Leadership in Energy and Environmental Design*) or the Triangle J Council of Governments' (TJCOG) *High Performance Guidelines*.

4. Durham Comprehensive Plan, Policy 7.1.5a states:

> **Policy 7.1.5a Energy Consumption in City, County and Schools Buildings.** "The City General Services Department...shall establish ongoing programs, appropriately staffed, to identify opportunities for cost-effective energy conservation in all buildings.

5. Durham Comprehensive Plan, Policy 7.1.5b states:

> **Policy 7.1.5a Energy Savings Designs.** "The City General Services Department...shall ensure that new facilities planned by the City ...incorporate energy conservation features in accordance with the Triangle J Council of Governments High Performance Building Standards."

6. A life-cycle cost analysis shall be commenced at the schematic design phase of the construction project and shall be updated or amended as needed at the design development phase. It shall also be updated or amended again as needed at the construction document phase. The life-cycle cost analysis will be based on the five principles of the "Green Building Principles."

7. The decision process for the design of future facility projects will be conducted by the General Services' "Design Review Committee", consisting of the Director of General Services, the Assistant Director of Project Management (facilities planning and construction), the Assistant Director of Operations, the City/County Sustainability Manager and Director of the client department or their designees.

6. ENERGY CONSERVATION REPORTING

A. Energy Audits of City facilities shall be conducted for the purpose of energy conservation planning, budget development and serving as a basis for operational reviews to identify methods of increasing energy use reduction.

B. Department Directors who are responsible for the operation of specific buildings shall maintain energy use and costs records of electric, natural gas and water on a monthly basis and benchmark this data with the previous year's use and costs records. It shall identify percentages of reduction or increases of energy use compared to the previous year. By the end of the first week of August a Fiscal Year Energy Consumption Analysis Report will be provided to the City/County Sustainability Manager for consolidation with other department's data and submitted to the City Manager. Plans for continued energy use reductions or justification for not achieving energy use reductions shall be included in the report. (Table 3).

7. ENERGY CONSERVATION ADMINISTRATION

A. ENERGY CONSERVATION TRAINING

All employees shall be made aware of the contents of this policy and the reasoning behind it during the implementation of the policy, during regular training conducted by individual departments as well as during New Employee Training.

B. POLICY ENFORCEMENT

Supervisors shall ensure all members of their department / division adhere to this policy. Violations of the policy will be documented as to the circumstances of the infraction and the employee will be duly counseled. Department and Division Managers will be responsible for the discipline of employees found to be in flagrant violation of this policy. Discipline will be per City of Durham PER 304, R-4 Disciplinary Policy. Discipline will be progressive as described in PER 304, R-4.

C. POLICY REVIEW

The City/County Sustainability Manger and Director of General Services are responsible for the annual review of this policy. They are to review and ensure compliance with City Policies SUS -100 and SUS-200. All employees are encouraged to submit recommendations for improving reduction of energy usage to the City/County Sustainability Manager for consideration by the City's Green Team and adoption by the City Manager.

D. Establish a Cost-Recovery Capital Energy Program

Reinvest a portion of energy savings into energy efficiency measures. These funds may be derived from amounts budgeted for utilities expenses which were not incurred (savings) due to diligent energy conservation efforts. An additional source for this program may be to contract a Utilities Auditing Service which will provide a percentage of refunded utilities cost for over-charged or erroneous bills to the City.

E. RECOGNITION AND AWARDS

All employees of the City are to be continuously encouraged to reduce energy consumption and lower our utilities operating cost by recognizing and rewarding meritorious achievements by persons going beyond normal expectations. Department Directors are encouraged to promote the City's Green Star Recognition Program for those deserving such recognition. Appropriate comments should be noted in the person's Performance Evaluation for outstanding efforts to reduce energy use.

ACCEPTABLE TEMPERATURE AND HUMIDITY RANGES (ASHRAE STANDARD 55-1992)

MEASUREMENT TYPE	WINTER	SUMMER
Dry Bulb at 30% RH	$68.5^0F - 76^0F$	74^0F-80^0F
Dry Bulb at 50% RH	$68.5^0F - 74.5^0F$	$73^0F - 79^0F$
Wet Bulb – Maximum	64^0F	68^0F
Relative Humidity*	30% - 60%	30% - 60%

*Upper bound of 50% RH will also control dust mites

Table 1

CITY OF DURHAM INTERIOR LIGHT LEVEL STANDARDS

Workplace Reference	Activity Type	Area/Activity/Task	Footcandles	Watts/Sqft
General Lighting throughout Space	Public Space-Dark Surroundings	Parking Lot	.2 - .9	0.1
"	"	Storage- Inactive	2 - 5	0.3
"	Simple Orientation, Short Temporary Visit	Parking Decks/Storage-Active	5 -10	0.8
"	Visual Tasks only Occasionally performed	Locker Room/Lobbies/Restrooms/ Exercise Centers	10 - 20	0.9
Illuminance on Task	High Contrast or Large Tasks	Keyboard/ Reading /Offices/ConfRoom/Duplicating Area	20 - 50	1.0
"	Medium Contrast or Small Tasks	Machine Work/Police/Fire Sta./Mail Sorting/Kitchen	50 - 100	1.2
"	Low Contrast or very Small Tasks	Gym Playing Surface	100 - 200	1.4
Illuminance on task, both General & Supplementary Lighting Components	Low Contrast or very Small Tasks for a Prolonged Period	Identification Records	200 - 500	1.7

NC Energy Conservation Code IESNA

Table 2

Fiscal Year Energy Consumption Analysis Report (Enter Department Name)

Year	Electric	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Yr. Total
(Previous Yr)	Consumption (KWH)													
	Cost ($)													
(Reporting Yr)	Consumption (KWH)													
	Cost ($)													
Consumption / %-difference														
Year	Natural Gas	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Yr. Total
(Previous Yr)	Consumption (Therms)													
	Cost ($)													
(Reporting Yr)	Consumption (Therms)													
	Cost ($)													
Consumption / %-difference														
Year	Water	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Yr. Total
(Previous Yr)	Consumption (Gal)													
	Cost ($)													
(Reporting Yr)	Consumption (Gal)													
	Cost ($)													
Consumption / %-difference														
Year	Propane	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Yr. Total
(Previous Yr)	Consumption (Gal)													
	Cost ($)													
(Reporting Yr)	Consumption (Gal)													
	Cost ($)													
Consumption / %-difference														

Comments: