



# **Orange County Utility and Fuel Use and Conservation Initiatives - Inaugural Report**

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## **A. Executive Summary**

Regardless of the underlying reasons, worldwide energy, water and fuel resources are becoming increasingly limited while the demand for these resources is rising. Simultaneously, global economic growth, (driven especially by emerging developing countries) and carbon emissions are negatively affecting much of the world's climate and ecosystems. The confluence of these realities means higher resource costs in the future, the need for investment in cleaner energy technologies, and, most importantly, the need for conservation and energy efficiency.

Orange County will continue to be a leader in this conservation and efficiency effort across its necessary use of energy, water and fuels. Actions taken will be reasonable, smart, and consistently achievable.

A re-established Orange County Energy Conservation Team ("ECT") intends to actively manage Orange County's energy, water and fuel conservation policies and to ensure their alignment with Orange County's interests in conservation, minimization of environmental impact and fiscal responsibility. The energy conservation team strives to:

1. Provide recommendations to update and manage the County's existing energy, water and fuel conservation policies and to ensure their alignment with Orange County's interests;
2. Record, analyze, and report energy, water and fuel use information to County stakeholders (Board, County staff, court-system staff, County taxpayers) on an annual basis;
3. Educate County stakeholders about energy, water and fuel use and conservation practices;
4. Recommend and use energy and water efficient/conserving building systems, maintenance procedures, and equipment to achieve optimal and consistent reductions in use of energy and water at County facilities;
5. Recommend and use fuel efficient/conserving vehicles, maintenance procedures, and equipment to achieve optimal and consistent reductions in use of fuel for County vehicles and equipment.
6. Manage these collective systems to achieve conservation goals of:
  - a. **20%** cumulative energy reduction from the FY 10 baseline, as measured in millions of BTUs per 1,000 sq. Ft. of occupied space by FY 15; and an additional 10% cumulative energy reduction by FY 17;
  - b. **5%** cumulative water savings as measured by gallons used per square foot of occupied space against the FY 10 baseline by FY 17;

- c. **10%** cumulative fuel savings as measured by total fuel usage against the FY10 baseline by FY 15, and an additional 5% by FY 17.

A summary of the County's trends in energy, water and fuel usage between FY05 and FY10<sup>1</sup> are as follows.

- Total energy usage as measured in millions of BTUs (MMBTU) per 1,000 square foot of occupied space<sup>2</sup> in FY10 decreased by 0.8%, when compared to weather normalized figures for FY05 energy usage;
- Total water usage per square foot of occupied space decreased significantly, reaching 16.5 gallons/ sq. ft. in FY 10, or 18% less than in FY 05;
- Total fuel usage was only 1% greater in FY 10 than in FY 05.

The composition and occupancy of County buildings and facilities changed so significantly between FY 08 and FY 10, that going forward FY 10 would provide a much more suitable baseline for future comparisons. There have also been changes in the composition of the County's vehicle fleet, including the addition of more alternative fuel vehicles<sup>3</sup>. For these reasons, the ECT intends to report future fiscal years' usage compared to the FY 10 "baseline" usage.

Most of the County's newest buildings, which are much more efficient than older buildings, have been online for less than two years. Going forward, energy use as measured by MMBTU/ 1,000 square feet will continue to decrease because of this efficiency. For example, comparing the following new buildings to Southern Human Services' energy use per sq. ft. finds

- The Main Library uses 32% less energy
- The West Campus Office Building uses 35% less energy
- The Justice Facility uses 57 % less energy

The ECT intends to report the County's energy use and progress on conservation on an annual basis. This is the inaugural report. Future reports will be presented as part of the annual budget process to allow appropriate consideration of items with financial implications.

The existing Energy, Water and Fuel use policies (originally adopted by the Board of County Commissioners in December 2005, effective January 1, 2006) are included as *Appendices B, C and D*.

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<sup>1</sup> The Animal Services Center provides significantly different service than typical County buildings and has therefore been excluded from County-wide energy usage figures.

<sup>2</sup> "Occupied" square footage is the actual portion of gross space that is actually occupied at a given point in time. There were a variety of methods use in the calculation of the occupied square footage figures.

<sup>3</sup> Refers to alternatives to traditional vehicles powered by gasoline or diesel only. See Appendix 'A' for a more detailed explanation.

## **B. Background**

In December 2005, the Board of County Commissioners adopted three conservation policies designed to conserve and reduce the County's use of energy (electricity, natural gas, fuel oil and propane gas) and water used in County buildings, and fuel used in County vehicles and equipment. The "Energy Conservation Policy," the "Water Conservation Policy for County Facilities," and the "Fuel Conservation Policy," went into effect January 1, 2006.

These policies identified a key role for the County's Public Works Department. In 2009, the Purchasing and Central Services Department, which had primary responsibility for capital projects, was combined with the Public Works Department, which had primary responsibility for facility and vehicle maintenance. Combining these departments meant that "cradle to grave" responsibility for facilities and vehicles was, for the first time, contained within a single department. A part of the new "Asset Management Services (AMS) Department" has included reconstitution of the Energy Conservation Team ("ECT"), originally established and introduced as part of the 2006 Energy, Fuel and Water conservation policies. The purpose of the ECT is to provide leadership, management, and technical expertise in meeting the County's objective to conserve and reduce the use of energy, water and fuel.

## **ECT Objectives**

ECT objectives include:

- 1) Updating and implementing Orange County's energy, fuel, and water use policies;
- 2) Putting into practice the elements of Orange County's energy, water and fuel conservation policies and to ensure alignment with Orange County's overall interests;
- 3) Recording, analyzing, and reporting energy usage information to County stakeholders on a periodic basis and against reasonable performance goals;
- 4) Educating County stakeholders in energy, water and fuel conservation practices;
- 5) Recommending and utilizing energy and water efficient building systems, maintenance procedures, and equipment to achieve optimal and consistent energy savings.

- 6) Recommending and utilizing fuel efficient vehicles and equipment, maintenance procedures, and equipment to achieve optimal and consistent fuel savings.

These initiatives will be staffed and managed by AMS. AMS is responsible for managing all County capital projects and related fiscal activity, space needs analysis and planning, facilities and vehicle management and maintenance, risk management, and energy management activities.<sup>4</sup>

The AMS team is fully qualified to manage and optimize these systems within the overall energy management and sustainable practices strategy of Orange County. AMS works as a team to ensure that these systems are optimally designed, purchased, installed, and maintained.

Team members include Pam Jones, the Director of Asset Management Services; Wayne Fenton, Sustainability Officer; Jeff Thompson, Value Engineer; and Alan Dorman, Management Analyst.

### ***Facilities***

At the time of this report, Orange County's Asset Management Services department maintained approximately 645,000 gross square feet<sup>5</sup> of space in approximately fifty buildings. The profile and composition of County facilities has changed (and continues to change) significantly over the past several years, with almost 50% of the square footage being new or newly renovated since 2006.

The new and newly renovated facilities include a number of devices and systems designed to reduce the consumption of energy and water. All of the facilities constructed or renovated since 2006 have incorporated elements of the Triangle 'J' Council of Government's "High Performance Guidelines for Public Facilities." The High Performance Guidelines included many elements of Leadership in Energy and Environmental Design ("LEED") designed buildings, but did not include the often-costly monitoring procedures required for LEED certification. Version 1.0 of the High Performance Guidelines was released in January 2001. A revised point system was introduced with version 2.0, which was released in September 2001.<sup>6</sup>

One of the first major systems designed to reduce energy use in County facilities was the inclusion of digital climate controls as part of the 2003-2004 heating, ventilation, & air conditioning ("HVAC") system replacement at the Whitted Human Services Center, located at 300 S. Tryon Street, Hillsborough. Digital controls allow for computerized control over all aspects of the HVAC system,

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<sup>4</sup> Excluding Solid Waste and Parks facilities.

<sup>5</sup> Includes entire footprint of building, measured by outside walls. See Appendix 'A' for more detailed explanation

<sup>6</sup>Version 2.0 of the guidelines added weighting to provide higher point values for initiatives that had greater impacts on reductions in energy, water, GHG, etc.

including large pieces of equipment, notification of equipment failures, remote access and monitoring capabilities to set temperatures, during both occupied and unoccupied periods. Digital control systems are now in place in seven County facilities, and programmable thermostats are in place in virtually all other locations. Lighting control systems and devices have also been installed in a number of new and existing facilities to reduce energy use.

Water conserving initiatives in place at County facilities include motion-controlled faucets and flush valves, low flow fixtures and valves, routine inspections of plumbing equipment for leaks, etc. Two of the County's newest buildings also include systems designed to reduce the amount of potable water consumed. The Animal Services Center located at 1601 Eubanks Road, Chapel Hill included a "non-potable water system" to capture rainwater, for non-potable uses within the building, including animal holding area wash down water. For periods when rainwater is not available, an on-site well provides backup. This system has experienced the expected challenges of leading-edge systems and has been out of operation periodically for necessary adjustments and modifications. As such, complete and consistent information is not available for determining the impact on reduction of potable water usage.

The West Campus Office Building includes a gray water system that captures water from kitchen sinks and restroom hand washing basins. This "gray water" is filtered, chlorinated and dyed, then used for flushing of toilets and urinals in the building. This system has also been out of service periodically since it was constructed for needed service and modifications. As with the non-potable system at Animal Services, complete and consistent information is not yet available to assess the impact of the gray water system.

### ***Vehicles and Equipment***

The composition of the County's fleet has also changed over the past number of years, although not as dramatically as its facilities. In addition to traditional gas and diesel powered vehicles, the fleet now has vehicles that use bio-diesel, ethanol blended fuel, and hybrid gas-electric vehicles. The County is also developing electric charging stations for, and the purchase of, all-electric powered vehicles. Grant funding has been secured to help offset the cost of this project.

### ***Monitoring and Verification***

A key component of any good process for implementing change with desired outcomes is the monitoring and verification of results. Meticulous utility records have been maintained since 2004 for all facilities managed by Asset Management Services. Initial performance reports were prepared in 2005-2006, but the rapid changes in use and composition of the County's facilities meant that reliable analysis was challenging, if not impossible, for many locations. Explained in greater detail elsewhere in this report, the measurement of energy and water consumption is essentially compared from year-to-year, with

adjustments for the different demands created by seasonal temperature variations. These comparisons do not provide reliable indicators of changes in energy or water use for newly constructed facilities, as they lack any performance history, nor do they provide reliable indicators of changes in use for renovated buildings or buildings with significant changes in occupancy and/or use. Between 2005 to early 2010 almost all County facilities have experienced one or more changes due to renovations and relocations. A summary of facility additions, modifications and departmental relocations, all of which have impacted energy and water use at County facilities has been included as Appendix 'E'.

### ***Energy Conservation Team Work plan***

The Energy Conservation Team, with support from other AMS staff, continues to maintain detailed records of energy and water consumption in maintained facilities. These data form the basis for measurement and verification of utility use, and reductions in utility use.

The Team's work plan for 2010/11 included:

- identification of projects and initiatives as part of the budget process that will directly impact utility reduction, if funded;
- systematic communication and education for staff that occupy County facilities (both County staff and outside agencies) to heighten awareness of systems and components in County facilities and of opportunities for occupants to make a difference through small changes to their every day habits.

The team's 2011/12 work plan includes:

1. Utility and fuel reduction initiatives:

The utility and fuel reduction work plan is composed of two sections:

- a) Lower cost initiatives that can be developed and implemented with little or no funding (primarily staff time)
  - i. "Know Your Building" Program – An individual building awareness program designed to continuously familiarize building occupants and maintenance personnel with key building systems, safety, security, and conservation topics. Each building is thoroughly reviewed at least once every two years.
  - ii. New Employee Orientation – Will participate in the Human Resource Department's scheduled training of new employees; providing information on building safety, security and conservation topics for buildings and vehicles.

iii. Vehicle Use Reporting – Provide departments with a quarterly report on the fuel used, miles driven, and the overall efficiency of each vehicle assigned to their department.

iv. Employee Consortium Presentations - 2 per year

b) Initiatives that require funding, either through operating or capital project budgets.

i. Geothermal HVAC system<sup>7</sup> design and installation (Link Center, first floor)

ii. Retro-Commissioning Efforts

iii. Lighting upgrades

### ***Work plan Goals***

The ECT will measure the County’s performance in energy, fuel and water usage through several means. The report of these measures will be presented to the BOCC, the general public and other stakeholders on an annual basis.

Energy Reduction Goals: ECT will use a version of the State’s published energy savings goals for State owned facilities.

<http://www.ncga.state.nc.us/Sessions/2007/Bills/Senate/PDF/S668v6.pdf> The County will strive for a 20% reduction from FY10 in overall BTU usage by the end of FY15. An additional 10% reduction will be the Team’s work plan through FY17.

Fuel Use Measure and Goal: ECT will reduce fuel consumption and increase fuel efficiency (MPG) by 10% by FY 15 as compared to FY 10. By FY 17, fuel usage will have decreased and efficiency increased by another 5%, for a cumulative change of 15% over FY 10 baseline levels.

Water Use Measure and Goal: ECT will reduce water usage per sq ft. by 5% by FY 17.

“Know Your Building” - 100% participation with occupying County Employees and individuals at every building review. Each facility will be reviewed at a minimum of once every two years.

Employee Consortium Presentations - 2 presentations per year

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<sup>7</sup> Geothermal/round source heat pumps use the earth as a heat sink in the cooling season and a heat source during the heating season to increase efficiency and reduce operating demand for energy.

## C. Orange County Energy, Water, and Fuel Use Summary

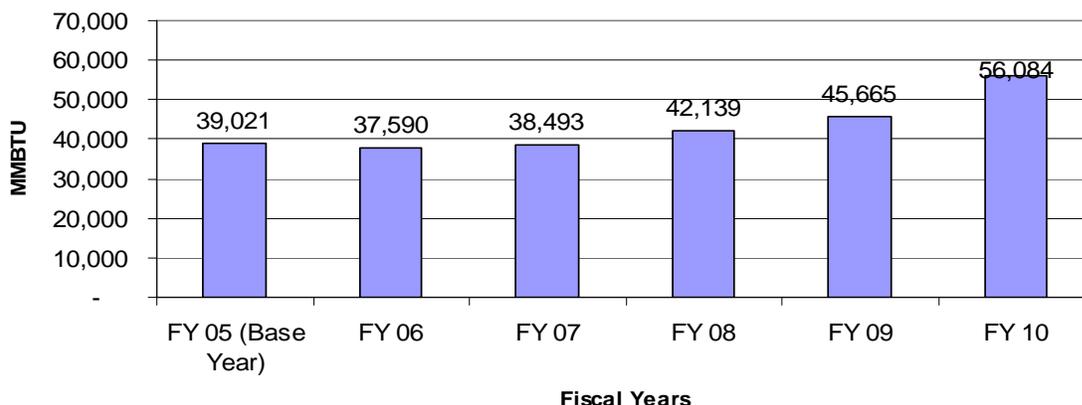
County facilities use electricity, natural gas, propane, and fuel oil to heat, cool and provide power for County owned and leased buildings. This report includes energy used by all County buildings in the graphs and charts below, excluding Animal Services Center<sup>8</sup>. The unique qualities of the Animal Services' facility and the services they provide require energy well beyond a typical County building. AMS staff is working with the Animal Services design team and departmental staff on a thorough analysis comparing the modeled energy usage of this facility with the actual energy use and will report on the results of this analysis in Fall of 2011.

Reporting on the County's total energy usage is easy; reporting on the County's total energy usage in a way that clearly communicates the County's energy performance from one year to the next, given changes in weather conditions and the changing inventory and composition of maintained facilities, is more difficult. Explaining the necessary steps and reasoning behind going from reporting raw total energy usage to weather normalized usage by square foot provides the reader with an understanding of the direct impact that weather conditions and occupied square footage play in affecting energy usage.

### Energy Usage

In order to show the combined energy used by all County facilities, each energy source (electricity, natural gas, propane, fuel oil) has been converted into MMBTUs in the graphs and charts of this report<sup>9</sup>. As Figure 1 shows, total energy used by the County has grown significantly over the last 6 fiscal years, from 39,021 MMBTUs in FY 05 to 56,084 in FY 10, a 43.7% increase.

**Figure 1: County Wide Energy Usage (MMBTU)**

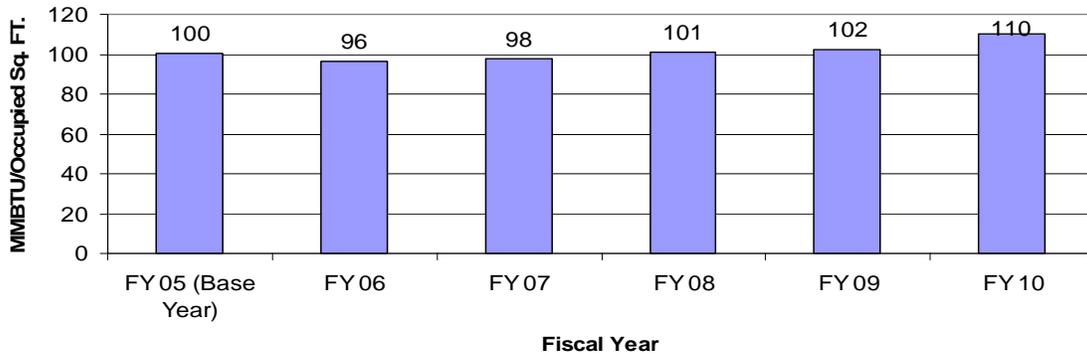


<sup>8</sup> This report includes energy used by County buildings that are managed by AMS. DEAPR manages parks facilities and the Solid Waste Department, as an enterprise fund, manages solid waste and recycling related facilities.

<sup>9</sup> MMBTU stands for one million BTUs. Since the conversion of energy to BTUs is such a large multiplier, (eg 1 KW = 3,412 BTUs) BTUs are typically displayed in units of a million. See Appendix 'A' for a more detailed explanation.

This increase in energy usage primarily reflects the growth in the County’s occupied square footage<sup>10</sup> (sq. ft.). As seen in Table 1, the County’s occupied square footage has increased by 30.8% since FY 05. Square footage significantly impacts a building’s energy use, both in terms of heating and cooling demand, but also as an indirect measure of other drivers of electricity usage; including staffing, visitors, and equipment. Therefore when comparing energy use between different time periods, energy use per 1,000 sq. ft<sup>11</sup> is a standard measure used to show building energy performance. As seen in Figure 2, energy use per sq. ft has increased from 100 (MMBTU/1,000 SQ.FT) in FY 05 to 110 (MMBTU/1,000 SQ.FT) In FY 10, a 9.9% increase.

**Figure 2: MMBTU/ Occupied Sq. Ft.**



**Table 1: County Wide Energy Use and Occupied Sq. Ft. by Fiscal Year**

Fiscal Year	MMBTUs	% Difference from Base Year	Avg. Sq. Ft. Occupied	% Difference from Base Year	MMBTU/1,000 Occupied SQ. FT.	% Diff. from Base Year
FY 05 (Base Year)	39,021		390,172		100	
FY 06	37,590	-3.7%	390,172	0.0%	96	-3.7%
FY 07	38,493	-1.4%	394,635	1.1%	98	-2.5%
FY 08	42,139	8.0%	417,263	6.9%	101	1.0%
FY 09	45,665	17.0%	447,270	14.6%	102	2.1%
FY 10	56,084	43.7%	510,294	30.8%	110	9.9%

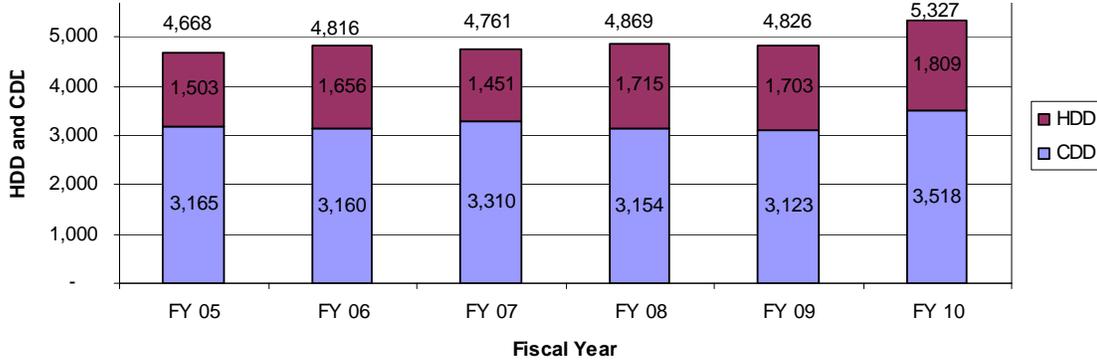
Even using energy usage per square foot to demonstrate the County’s energy performance across fiscal years is not an accurate comparison due to the direct impact of weather on energy use. The variation in weather from year to year may be seen in Figure 3, which shows a measure of “hot” and “cold” weather experienced in each fiscal year, expressed as total “heating” and “cooling degree

<sup>10</sup> Occupied sq. ft., unlike gross sq. ft, refers to just space that is being actively used by staff. For instance, during the renovation of Link Center, certain portions of the building were un-occupied. By not including the sq. ft. of the space undergoing renovations, the energy use per sq. ft, doesn’t decrease dramatically because half the staff was not using the space. See Appendix ‘A’ for a more detailed explanation.

<sup>11</sup> In order to show energy use per sq. ft. in an easily presentable form, the tables and graphs below use square footage figures in units of 1,000.

days”<sup>12</sup>. The combined demand for heating and cooling in FY 10 was 10% greater than the demand in FY 09 due to temperature differences between the two years.

**Figure 3: Total HDD and CDD Per Fiscal Year**

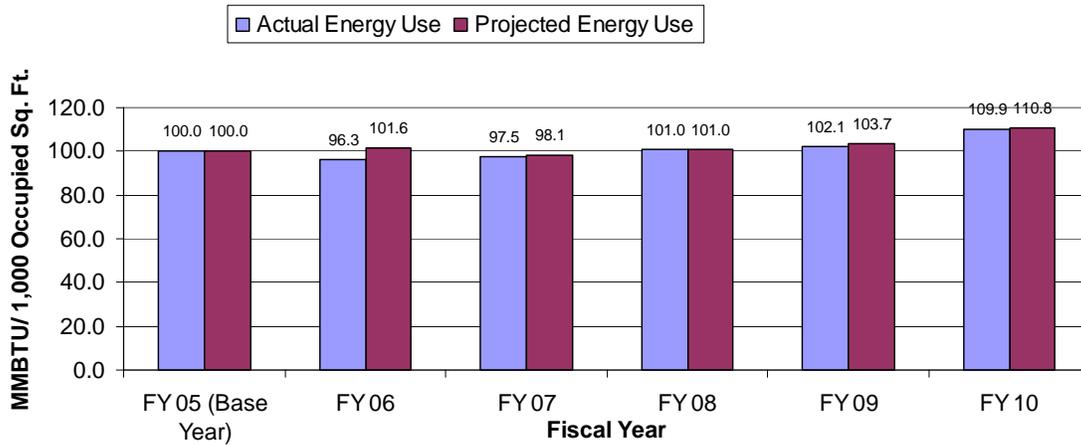


In order to remove weather as a factor when comparing energy use from one year to the next, a process referred to as “weather normalization” is undertaken. The first step in weather normalization is to determine how much of a building’s energy use is attributable to variations in weather conditions, specifically temperature. Once this has been determined, the amount of energy a building would use based on any set of weather conditions can be calculated. In other words, it can be shown how much energy a building would have used in FY 05 if it had experienced the weather conditions that occurred in FY 10. Figure 4 presents projected energy use that would have been used at County facilities in FY 10, based on their FY 05 energy performance. By using weather normalization, the difference in weather can be removed as a possible explanation for why a building used more or less energy in one period compared to another period, leaving only human behavior or building modifications to explain changes in energy use in a building. Such changes could include increased or decreased staffing levels or the installation of more efficient lighting. Since normalization requires at least one to two years of good quality data, most new County buildings, comprising approximately 240,000 sq. ft – or about half of the total County occupied space, cannot yet show weather normalized usage. In cases where projected figures can’t be used for new buildings, projected usage is calculated using actual usage figures.

As seen in Figure 4, total County energy use as measured in MMBTU/1000 sq. ft., when compared to weather normalized figures for FY 05 energy use, shows a 0.8% decrease.

<sup>12</sup> Heating degree day (HDD) is a measurement designed to reflect the demand for energy needed to heat a home or business. It is derived from measurements of outside air temperature. The heating requirements for a given structure at a specific location are considered to be directly proportional to the number of HDD at that location. A similar measurement, cooling degree day (CDD), reflects the amount of energy used to cool a home or business. A further explanation of the terms CDD and HDD can be found in the definitions section of the report.

**Figure 4: Actual VS. Projected Energy Use**



**Table 2: Comparison of MMBTU/1,000 Sq. Ft. with Base Line Usage (weather Normalized)**

Fiscal Year	MMBTU/1,000 SQ. FT.	MMBTU Baseline Usage(weather normalized)/1000 Occupied Sq. FT.	% diff. from Baseline
FY 05 (Base Year)	100.0	100.0	
FY 06	96.3	101.6	-5.2%
FY 07	97.5	98.1	-0.5%
FY 08	101.0	101.0	0.0%
FY 09	102.1	103.7	-1.6%
FY 10	109.9	110.8	-0.8%

**Energy Star**

The best measure for determining the results of the County’s new energy management and monitoring program will be the reduction in energy use per square foot, normalized for weather. However, the County also strives to compare the energy use of its buildings to similar facilities across the nation. The EPA established the Energy Star Program<sup>13</sup> as a way to allow consumers to select more energy efficient appliances based on a rating systems devised by the agency and listed on most large home appliances and equipment. The most efficient appliances are given an “Energy Star” rating by the program. In the same way that appliances can be rated, so can buildings. The EPA conducts a survey every 3 years to collect energy use data from thousands of business and institutions across the nation. Organizations interested in seeing how their buildings compare to other similar buildings, may enter their building’s energy

<sup>13</sup> See the definitions section for further details about the Energy Star Program and the methodology it uses to rate buildings on their energy use.

data in the Energy Star web-based energy management program, Portfolio Manager. Portfolio Manager allows comparison of a building's energy performance from year to year, as well as against similar buildings across the country. As part of that process, each building that meets certain criteria is given a rating from a low of 1 to the highest rating, 100, that describes how a building compares to similar buildings in using energy. The County has participated in the Energy Star program since 2008. However, for a variety of reasons, Energy Star does not provide a rating, or the rating is not valid, for many County buildings. A list of criteria that a facility must meet in order to receive an Energy Star rating and have that rating be valid is presented below.

The building:

- Must be over 5,000 Sq. Ft.
- Have at least 1 year of valid energy data
- Have no significant changes in use
- Must be a common building type (excludes the Jail, Animal Services)

The criteria eliminated all but a small sub-set of County buildings. For those buildings that have a rating, it is based on data from FY 10. In the following years, this report will include more buildings as they meet the above criteria to get an Energy Star rating and will also show how current buildings' ratings have changed from year to year.

**Table 3: EPA's Energy Star Rating - FY 10**

Facility Name	Rating
SOUTHERN HUMAN SERVICES	12
HISTORIC COURTHOUSE	24
SOUTHERN ORANGE SENIOR CENTER	31
RWHS COMPLEX	31
GOVERNMENT SERVICES ANNEX	33
LINK CENTER	36
MEADOWLANDS ANNEX	38
COURT STREET ANNEX	42
GATEWAY CENTER	64
SKILLS DEVELOPMENT CENTER	64
ENVIR. & AG. CENTER	74

## Fuel Use

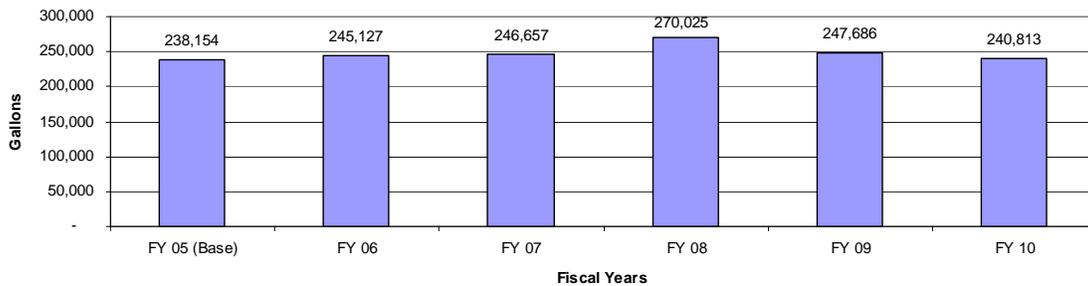
Orange County provides fuel to over 300 vehicles and 100 pieces of equipment; including passenger cars, buses, pursuit vehicles, dump trucks, generators, tractors, and many other vehicle and equipment types. Currently the fuel station located at AMS north campus dispenses E10 unleaded gasoline and B5 diesel. The figures and tables that follow represent all fuel (E10, Diesel, CNG)

dispensed by the County into County vehicles and equipment over the last 6 fiscal years<sup>14</sup>.

In the past, vehicles that were stationed or driven primarily on the south side of the County also got fuel from the Town of Chapel Hill or UNC. The County has now switched to the Gogas fuel card system which allows County drivers who have been issued a fuel card to get fuel at any location that accepts the card. The Gogas card will save money and time by allowing drivers to fuel up at many retail locations in North Carolina.

The cost for fuel has risen dramatically during the period covered by this report, going from \$1.29 in July of 2004, to a height of \$4.19 in September of 2008<sup>15</sup>, and ending at \$2.11 in June 2010. Over the last 6 fiscal years, the County's fleet has stayed fairly stable in size, with a little over 300 vehicles active at any given time. The fleet, however, has added 12 hybrid vehicles over that time period, which can reach as high as 50 miles per gallon. However the County's use of fuel has trended up and then down over the last 6 fiscal years as seen in figure 5. Fuel usage reached its height in FY 2008 at 270,025 gallons, a 13% increase from the FY 05 usage. Starting in FY 08, with the extra attention paid to the cost of fuel, County departments made a conscious effort to drive less and be more fuel efficient, causing fuel usage to drop by 11% between FY 08 and FY 10, reaching almost the same level of usage as in FY 05.

**Figure 5: Miles Traveled by Fiscal Year**



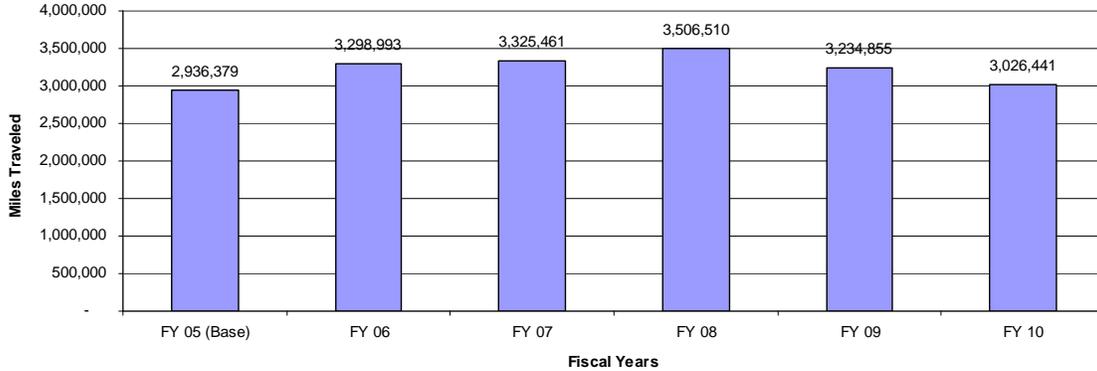
The miles traveled by the County's fleet have remained flat when comparing the FY 05 figure of 2,936,379 miles to the FY 10 figure of 3,026,441, an increase of only 3%. Both fuel consumed and miles driven by the County's fleet peaked in FY 08, with fuel usage 13% higher than in FY 05. Since FY 08, miles driven by

<sup>14</sup> In the past the County provided fuel at cost to outside agencies; including the Town of Hillsborough, the ABC Board, Orange Enterprises, and OPC Mental Health. However, due to a change in IRS regulations, it was deemed no longer permissible to provide fuel to outside entities. The last outside agency to fuel at the County fueling station, the Town of Hillsborough, stopped getting fuel on Jan. 24<sup>th</sup> 2011. Also not included in these figures is fuel used by the Sanitation Division when it was managed by the former Public Works Department and funded through the general fund. This ensures that the figures are comparable from year to year. The compressed natural gas (CNG) facility is no longer in operation due to high repairs costs and difficulty in obtaining replacement parts.

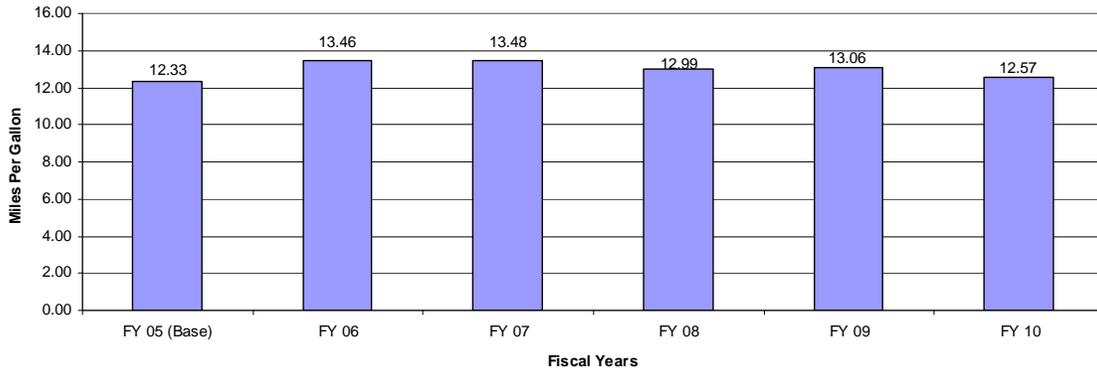
<sup>15</sup> Fuel prices were affected both by global demand and speculation in the oil market but also by the shutdown of the Gulf oil pipeline in August of 2008.

County departments has decreased by 14% due to conservation efforts and economic conditions.

**Figure 6: Miles Traveled by Fiscal Year**



**Figure 7: Miles Traveled by Fiscal Year**



**Table 4: County Fuel Usage, Miles Traveled, and MPG per Fiscal Year**

Fiscal Year:	Fuel Usage	% Change from Base Year	Miles Traveled	% Change from Base Year	Miles Per Gallon
FY 05 (Base)	238,154		2,936,379		12.33
FY 06	245,127	2.9%	3,298,993	12.3%	13.46
FY 07	246,657	3.6%	3,325,461	13.3%	13.48
FY 08	270,025	13.4%	3,506,510	19.4%	12.99
FY 09	247,686	4.0%	3,234,855	10.2%	13.06
FY 10	240,813	1.1%	3,026,441	3.1%	12.57

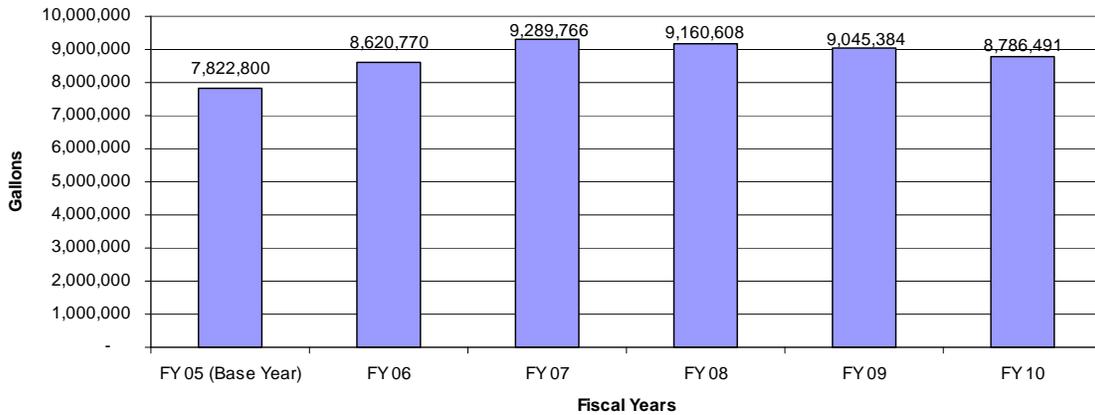
## Water Use

Total water used at County facilities has increased by about 12% since FY 05. Water usage in facilities, unlike energy, is impacted mostly by the number of staff and visitors; therefore as County staff levels have increased slowly over the reporting period, water use has increased with it. Employed FTEs have

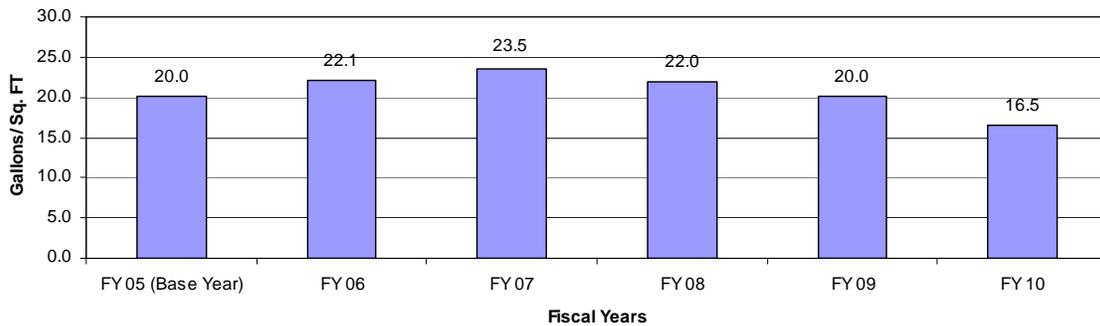
increased from 825 in FY 05 to 901 by FY 09, before decreasing to 832 in FY 10. Indeed, water usage also slightly decreased in FY 10, as compared to FY 09.

Water usage per square foot of occupied space has decreased significantly during the same time period, reaching 16.5 gallons/ sq. ft. in FY 10 or 18% less than FY 05 figure (figure 9). The decrease in water usage per sq. ft merely reflects the fact the while the County’s occupied sq. ft. has increased significantly over the last 6 fiscal years, the County’s staffing level has not.

**Figure 8: Water Usage (Gallons) by Fiscal Year**



**Figure 9: Water Usage (Gallons)/Occupied SQ. FT.**



**Table 5: Water Usage (Gallons) and Usage per Sq. FT.**

	<b>GALLONS</b>	<b>% Change from Base Year</b>	<b>Gallons/ Occupied Sq. Ft</b>	<b>% Change from Base Year</b>
FY 05 (Base Year)	7,822,800		20.0	
FY 06	8,620,770	10%	22.1	10%
FY 07	9,289,766	19%	23.5	17%
FY 08	9,160,608	17%	22.0	9%
FY 09	9,045,384	16%	20.0	0%
FY 10	8,786,491	12%	16.5	-18%

## ***Appendices***

## Appendix A – Definition of Terms

### DEFINITION OF TERMS

**Alternative fuels:** identifies “non-traditional” alternatives to gasoline and regular diesel fuel. The designation typically includes bio-diesel (i.e., B-5, B-100), alcohols (ethanol blends, i.e., E-10, E-85, methanol), compressed natural gas (CNG), liquefied natural gas (LNG), liquefied petroleum as (LPG), electricity/hybrid vehicles, flex-fuel vehicles, hydrogen. Orange County currently uses the following fuel types for vehicles: bio-diesel (B-5), ethanol blend (E-10), compressed natural gas (CNG), hybrid gas/electric vehicles.

**BTU usage:** In North America, the term "BTU" is used to describe the heat value (energy content) of fuels, and also to describe the power of heating and cooling systems, such as furnaces, stoves, and air conditioners. The rate of heat transfer can be described by adding the dimension of time, for example, BTU/hr or Btuh.

When measuring and comparing energy use between devices, systems or buildings, it is common to convert all forms of energy to BTUs. Converting all forms of energy used in a facility to BTUs, allows comparisons of BTUs per square foot between different buildings and energy-using systems.

MBTU is occasionally used as a standard unit of measurement for natural gas and provides a convenient basis for comparing the energy content of various grades of natural gas and other fuels. One cubic foot of natural gas produces approximately 1,000 BTUs, so 1,000 cu.ft. of gas is comparable to 1 MBTU. MBTU is occasionally expressed as MMBTU, which is intended to represent a thousand thousand BTUs.<sup>16</sup>

The table below provides a summary of conversions for the energy forms used in Orange County buildings.

#### Energy Forms Converted to BTUs

Energy form	Measured in	Equivalent BTUs
Electricity	Kilowatts (kW)	3,412
Natural gas	Therms	100,000
Propane gas	Gallons	91,330
Fuel oil	Gallons	139,000

**Building envelope:** refers to those building components that enclose conditioned spaces and through which thermal energy is transferred to or from the outdoor environment.

**Carbon footprint:** is "the total set of greenhouse gas (GHG) emissions caused by an organization, event, product or person". For simplicity of reporting, it is often expressed in terms of the amount of carbon dioxide, or its equivalent of other GHGs, emitted.<sup>17</sup>

**Commissioning** (includes new building commissioning, re-commissioning, and retro-commissioning of existing buildings): is the process of verifying, in new construction, that all the subsystems for HVAC, plumbing, Electrical, fire/life safety, building envelopes, interior systems (example laboratory units), sustainable systems, lighting, wastewater, controls, and building security achieve the owner's project requirements as intended by the building owner and as designed by the building architects and engineers.<sup>18</sup>

<sup>16</sup> [http://www.energyvortex.com/energydictionary/british\\_thermal\\_unit\\_\(btu\)\\_mbtu\\_mmbtu.html](http://www.energyvortex.com/energydictionary/british_thermal_unit_(btu)_mbtu_mmbtu.html)

<sup>17</sup> [http://en.wikipedia.org/wiki/Carbon\\_footprint](http://en.wikipedia.org/wiki/Carbon_footprint)

<sup>18</sup> [http://en.wikipedia.org/wiki/New\\_construction\\_Building\\_commissioning](http://en.wikipedia.org/wiki/New_construction_Building_commissioning)

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Commissioning for new buildings, “focuses on verifying and documenting the facility and all of its systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the owner’s project requirements.”<sup>19</sup>

Commissioning for existing buildings identifies causes and recommends solutions to typical problem areas such as high energy costs and poor comfort or indoor air quality.<sup>20</sup>

Commissioning is applicable throughout the lifecycle of a building to assure that the building is built and operates as intended. This assurance is needed not only at the beginning of a building’s life (i.e. design and construction) but also when any renovation work occurs as well as periodically during the on-going operation of a building.

New construction activities follow the construction process from pre-design planning through design, construction and acceptance. The commissioning provider becomes an integral part of the building team. New construction commissioning may include review and testing of all building systems (security, fire, life and safety, HVAC, lighting, electrical, etc.). Commissioning ends with assuring the operators are trained and O&M manuals are available and accurate.

**Re-commissioning:** No improvements made to systems should be considered one-time, permanent improvements. Systems require on-going inspection and maintenance to ensure proper operation of components. In general, 10-30 percent of energy usage can be saved in systems just by implementing good maintenance practices.

**Existing building commissioning/retro-commissioning** is a periodic event in the life of an existing building that applies a systematic investigation process for improving and optimizing a building’s O&M. Much of the service is similar to that for new-construction commissioning. The O&M staff work alongside the commissioning authority as they check equipment and make adjustments. Retro-commissioning usually focuses on energy-using equipment such as mechanical equipment, lighting, and related controls with the goal of reducing energy waste, obtaining energy cost savings for the owner, and identifying and fixing existing problems, using diagnostic testing and O&M tune-up activities.

**Degree days:** includes Heating Degree Days (HDD) and Cooling Degree Days (CDD). A degree day is a measure of heating or cooling. Totalized degree days from an appropriate starting date are used within energy monitoring and targeting to monitor the heating and cooling costs of climate controlled buildings, while annual figures can be used for estimating future costs.

A zero degree-day in Energy monitoring and targeting is when either heating or cooling consumption is at a minimum, which is useful with power utility companies in predicting seasonal low points in energy demand.<sup>21</sup> Degree-day figures quantify how cold (or hot) the weather has been in a given region, expressing the result as a single index number for each month or week.

Degree day calculations are necessary when comparing energy use for two different time periods. For example, the amount of energy required to cool the same building will be very different during a moderate summer with average temperatures than it will be for a summer such as was experienced in 2010 with record high temperatures. Similarly, more energy will be required to heat a building during periods with below average temperatures. 2010 brought periods of record low temperatures as well, requiring more energy to heat facilities than for the comparable time period in previous years.

Heating and cooling degree days are calculated by using the average temperature for the day (the high temperature added to the low temperature and the sum divided by two) and then subtracting the average temperature from the number 65 for heating degree days or subtracting 65 from the average temperature for cooling degree days. The number 65 is used as the base number because most buildings and homes would be most comfortable and energy efficient at our around 65 degrees.

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<sup>19</sup> ASHRAE Draft Guideline 0-2003

<sup>20</sup> WA Department of General Administration

<sup>21</sup> [http://en.wikipedia.org/wiki/Degree\\_day](http://en.wikipedia.org/wiki/Degree_day)

## Appendix A – Definition of Terms

Example: On a summer day the high was 90 degrees and the low was 70 degrees. The average temperature was 80 degrees ( $90 + 70 = 160 / 2 = 80$ ). The average temperature of 80 minus the base temperature of 65 yields 15 cooling degree days ( $80 - 65 = 15$ ). Cooling degree days can be used to calculate the amount of energy needed to cool homes or businesses.

Example: On a winter day the high was 40 degrees and the low was 20 degrees. The average temperature was 30 degrees ( $40 + 20 = 60 / 2 = 30$ ). The base temperature of 65 minus the average temperature of 30 yields 35 heating degree days ( $65 - 30 = 35$ ). Heating degree days can be used to calculate the amount of energy needed to heat homes or businesses.<sup>22</sup>

**Energy audit:** An energy audit is an inspection, survey and analysis of energy flows for energy conservation in a building, process or system to reduce the amount of energy input into the system without negatively affecting the output(s). Beyond simply identifying the sources of energy use, an energy audit seeks to prioritize the energy uses according to the greatest to least cost effective opportunities for energy savings.<sup>23</sup>

Common types/levels of energy audits are distinguished below, although the actual tasks performed and level of effort may vary with the consultant providing services under these broad headings.

Generally, four levels of analysis can be outlined (ASHRAE):

- Level 0 – Benchmarking: This first analysis consists of a preliminary Whole Building Energy Use (WBEU) analysis based on the analysis of the historic utility use and costs and the comparison of the performances of the buildings to those of similar buildings. This benchmarking of the studied installation allows determining if further analysis is required;
- Level I – Walk-through audit: Preliminary analysis made to assess building energy efficiency to identify simple and low-cost improvements but also a list of energy conservation measures (ECMs, or energy conservation opportunities, ECOs) to orient the future detailed audit. This inspection is based on visual verifications, study of installed equipment and operating data and detailed analysis of recorded energy consumption collected during the benchmarking phase;
- Level II – Detailed/General energy audit: Based on the results of the pre-audit, this type of energy audit consists in energy use survey in order to provide a comprehensive analysis of the studied installation, a more detailed analysis of the facility, a breakdown of the energy use and a first quantitative evaluation of the ECOs/ECMs selected to correct the defects or improve the existing installation. This level of analysis can involve advanced on-site measurements and sophisticated computer based simulation tools to evaluate precisely the selected energy retrofits;
- Level III – Investment-Grade audit: Detailed Analysis of Capital-Intensive Modifications focusing on potential costly ECOs requiring rigorous engineering study.

**Benchmarking:** The impossibility of describing all possible situations that might be encountered during an audit means that it is necessary to find a way of describing what constitutes good, average and bad energy performance across a range of situations. The aim of benchmarking is to answer this question. Benchmarking mainly consists in comparing the measured consumption with reference consumption of other similar buildings or generated by simulation tools to identify excessive or unacceptable running costs. As mentioned before, benchmarking is also necessary to identify buildings presenting interesting energy saving potential. An important issue in benchmarking is the use of performance indexes to characterize the building.

These indexes can be:

- Comfort indexes, comparing the actual comfort conditions to the comfort requirements;
- Energy indexes, consisting in energy demands divided by heated/conditioned area, allowing comparison with reference values of the indexes coming from regulation or similar buildings;

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<sup>22</sup> <http://www.erh.noaa.gov/rah/faq/>

<sup>23</sup>

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- Energy demands, directly compared to “reference” energy demands generated by means of simulation tools.

**Walk-through or preliminary audit:** The preliminary audit (alternatively called a simple audit, screening audit or walk-through audit) is the simplest and quickest type of audit. It involves minimal interviews with site-operating personnel, a brief review of facility utility bills and other operating data, and a walk-through of the facility to become familiar with the building operation and to identify any glaring areas of energy waste or inefficiency.

Typically, only major problem areas will be covered during this type of audit. Corrective measures are briefly described, and quick estimates of implementation cost, potential operating cost savings, and simple payback periods are provided. A list of energy conservation measures (ECMs, or energy conservation opportunities, ECOs) requiring further consideration is also provided. This level of detail, while not sufficient for reaching a final decision on implementing proposed measure, is adequate to prioritize energy-efficiency projects and to determine the need for a more detailed audit.

**General Audit:** The general audit (alternatively called a mini-audit, site energy audit or detailed energy audit or complete site energy audit) expands on the preliminary audit described above by collecting more detailed information about facility operation and by performing a more detailed evaluation of energy conservation measures. Utility bills are collected for a 12 to 36 month period to allow the auditor to evaluate the facility's energy/demand rate structures and energy usage profiles. If interval meter data is available, the detailed energy profiles that such data makes possible will typically be analyzed for signs of energy waste. Additional metering of specific energy-consuming systems is often performed to supplement utility data. In-depth interviews with facility operating personnel are conducted to provide a better understanding of major energy consuming systems and to gain insight into short and longer term energy consumption patterns. This type of audit will be able to identify all energy-conservation measures appropriate for the facility, given its operating parameters. A detailed financial analysis is performed for each measure based on detailed implementation cost estimates, site-specific operating cost savings, and the customer's investment criteria. Sufficient detail is provided to justify project implementation.

**Investment-grade audit:** In most corporate settings, upgrades to a facility's energy infrastructure must compete for capital funding with non-energy-related investments. Both energy and non-energy investments are rated on a single set of financial criteria that generally stress the expected return on investment (ROI). The projected operating savings from the implementation of energy projects must be developed such that they provide a high level of confidence. In fact, investors often demand guaranteed savings. The investment-grade audit expands on the detailed audit described above and relies on a complete engineering study in order to detail technical and economical issues necessary to justify the investment related to the transformations.<sup>24</sup>

**Energy reduction:** Reductions in the amount of energy (electricity, natural gas, etc.) used by a piece of equipment or an entire system of facility may or may not lead to a reduction in energy billings. Increases in the unit cost of energy (kWh, therms) over time may outweigh savings from reduced energy use. However, billing increase would have been substantially greater had reduction measures not been taken.

**Energy Star & Portfolio Manager:** Energy Star offers a proven energy management strategy that helps in measuring current energy performance, setting goals, tracking savings, and rewarding improvements. EPA provides an innovative energy performance rating system which businesses have already used for more than 130,000 buildings across the country. EPA also recognizes top performing buildings with the ENERGY STAR designation.

**Portfolio Manager** is an interactive energy management tool that allows you to track and assess energy and water consumption across your entire portfolio of buildings in a secure online environment. Portfolio Manager can help you set priorities, identify under-performing buildings, verify efficiency improvements, and receive EPA recognition for superior energy performance.

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<sup>24</sup> [http://en.wikipedia.org/wiki/Energy\\_audit](http://en.wikipedia.org/wiki/Energy_audit)

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For many facilities, you can rate their energy performance on a scale of 1–100 relative to similar buildings nationwide. Your building is *not* compared to the other buildings entered into Portfolio Manager to determine your ENERGY STAR rating. Instead, statistically representative models are used to compare your building against similar buildings from a national survey conducted by the Department of Energy's Energy Information Administration. This national survey, known as the Commercial Building Energy Consumption Survey (CBECS), is conducted every four years, and gathers data on building characteristics and energy use from thousands of buildings across the United States. Your building's peer group of comparison is those buildings in the CBECS survey that have similar building and operating characteristics. A rating of 50 indicates that the building, from an energy consumption standpoint, performs better than 50% of all similar buildings nationwide, while a rating of 75 indicates that the building performs better than 75% of all similar buildings nationwide.

EPA's [energy performance rating system](#), based on [source energy](#), accounts for the impact of weather variations (see "Degree Days.") as well as changes in key physical and operating characteristics of each building. Buildings rating 75 or greater may qualify for the [ENERGY STAR label](#).

EPA's Commercial Building Energy Consumption Survey includes several different types of facilities, not all of which are easily comparable with local government facilities, especially those that have mixed usage.

Orange County's use of Portfolio Manager, and the Energy Star program are discussed in the "Energy Use: Reporting and Methodology" section of this report, which presents the data analysis procedures for County facilities.

**Geo-thermal HVAC systems (ground source heat pumps):** A geothermal heat pump, ground source heat pump (GSHP), or ground heat pump is a [central heating](#) and/or cooling system that pumps heat to or from the ground. It uses the earth as a heat source (in the winter) or a [heat sink](#) (in the summer). This design takes advantage of the moderate temperatures in the ground to boost efficiency and reduce the operational costs of heating and cooling systems.

Depending on latitude, the upper 3 meters (9.8 ft) of Earth's surface maintains a nearly constant temperature between 10 and 16 °C (50 and 60 °F).<sup>14</sup> Like a refrigerator or air conditioner, these systems use a [heat pump](#) to force the transfer of heat from there. Heat pumps can transfer heat from a cool space to a warm space, against the natural direction of flow, or they can enhance the natural flow of heat from a warm area to a cool one.

Ground source heat pumps (GSHPs) are among the most energy efficient technologies for providing [HVAC](#) and [water heating](#).<sup>25</sup>

**Green buildings/LEED/TJCOG High Performance Guidelines:** LEED (Leadership in Energy & Environmental Design) is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies intended to improve performance in metrics such as energy savings, water efficiency, CO<sub>2</sub> emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts.

Developed by the [U.S. Green Building Council](#) (USGBC), LEED is intended to provide building owners and operators a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions.

The U.S. Green Building Council (USGBC): is a Washington, D.C.-based 501(c)(3) nonprofit organization committed to a prosperous and sustainable future for our nation through cost-efficient and energy-saving green buildings. USGBC works toward its mission of market transformation through its LEED green building certification program, robust educational offerings, a nationwide network of chapters and

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<sup>25</sup> [http://en.wikipedia.org/wiki/Geothermal\\_heat\\_pump](http://en.wikipedia.org/wiki/Geothermal_heat_pump)

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affiliates, the annual Greenbuild International Conference & Expo, and advocacy in support of public policy that encourages and enables green buildings and communities.

The aim of the TJCOG High Performance Guidelines is to provide a roadmap for the design and construction of efficient, cost-effective, durable, and environmentally sound buildings and landscapes. Its intended audience is local governments and schools in the region served by Triangle J Council of Governments. This region includes the 3,300 square miles in North Carolina that lie within the counties of Chatham, Durham, Johnston, Lee, Orange, and Wake, an area with a population of just over one million.

The Guidelines are designed to be an expandable document in which future case studies and technology examples can be added.

**Gross Square Footage (GSF)/Occupiable/occupied square footage:** Unit of measurement of a building from outside the exterior walls. Example: An [office](#) building that was 100 feet by 100 feet as measured by outside walls has an area of 10,000 *gross square feet*. This is greater than the [Usable Area](#).<sup>26</sup>

The occupiable part of an [office](#) or a building floor; generally measured from "paint to paint" inside the permanent walls and to the middle of partitions separating one tenant's space from that of other tenants on the same floor. There is no deduction for interior beams or columns.<sup>27</sup>

The occupied part of a building is the portion of the occupiable square footage actually in use at a given time. For example, the first floor of the Whitted Human Services Center, although in occupiable condition, was unoccupied from December 2009 to the time of this report and the basement and second floors were unoccupied from January 2010 to the time of this report.. As such, the occupied square footage of the building was significantly less than the occupiable square footage.

**Life cycle cost analysis:** All costs over the life of a project are considered, including owning, operating, maintaining and eventually disposing of a system over the useful life of the system. All costs are adjusted or discounted to reflect the time-value of money.

**Payback analysis:** Payback analysis focuses on how quickly the initial investment can be recovered and is therefore not a measure of long-term economic performance.

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<sup>26</sup> <http://www.answers.com/topic/gross-square-foot>

<sup>27</sup> <http://www.answers.com/topic/usable-area>

## **Energy Conservation Policy**

### **A. General**

Orange County's "Environmental Responsibility in County Government" goal includes the objective: "Initiate policies and programs that conserve energy, reduce fuel/utility/resource consumption..." In support of this goal, the County has adopted this Energy Conservation Policy.

Energy cost for electricity, natural gas, propane and fuel oil for County facilities is a significant County cost. Beyond this, energy consumption has significant environmental impacts. As a result, it is both necessary and beneficial for the County to adopt a policy of energy conservation and efficiency.

Water conservation and vehicle fuel conservation will be addressed in separate policies.

### **B. Purpose**

The purpose of this policy is to reduce the County government's energy consumption, wherever possible, and improve energy efficiency for that energy that must be used throughout Orange County government buildings, consistent with the need for safe and secure County facilities.

### **C. Policy Goals**

The policy addresses both short and long term goals.

#### **1. Short Term (One to Two Years)**

- Establish the policy foundation of responsibilities, planning, programs, standards, performance measures and the like to manage the County government's energy use and conserve energy.
- Manage energy and other utility consumption to minimize use to the greatest extent possible while maintaining safe and acceptable work conditions.
- Achieve a reduction in average energy consumption per square foot annually.

#### **2. Long Term (Three Years or More)**

- Incorporate energy conservation and efficiency systems, techniques and design in all major renovations, system replacements and new construction.

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- Support change to State utility budgeting and public utility commission policy that fosters monetary incentives to make energy conservation and efficiency efforts economically attractive and streamline program justification requirements so that projects can be executed within a timely interval and savings quickly realized.

### **D. Scope**

#### 1. Facilities

This policy applies to County owned and leased buildings, whether occupied by the County, the courts or other agencies.

#### 2. Equipment

This policy applies to County owned or leased equipment, including computer equipment.

#### 3. Energy Sources

This policy applies to use of electricity, natural gas, propane and fuel oil.

### **E. Responsibilities**

#### 1. Energy Conservation Task Group

The Manager appoints an Energy Conservation Task Group that includes the:

- County Manager
- One County Commissioner
- Assistant County Managers
- Chief Information Officer
- Cooperative Extension Director
- County Engineer
- Energy Conservation Manager
- Environment and Resource Conservation Director
- Personnel Director
- Public Works Director
- Purchasing and Central Services Director
- Others as appointed by the Manager.

The Task Group provides direction, counsel and oversight as to implementation of the Energy Conservation Policy. As necessary, the Task Group addresses questions of policy interpretation and adherence.

## 2. Energy Conservation Manager

The Manager appoints an Energy Conservation Manager who provides leadership, analytical, monitoring, coordination and communication support to the energy conservation initiative. Among other things, the Energy Conservation Manager:

- Coordinates development and implementation of the County's annual energy conservation action plan.
- Tracks and assesses the County's energy conservation performance and progress, including building data collection and analytical tools.
- Working through the departments involved, identifies and appoints a volunteer Building Energy Representative for each County facility.
- Conducts spot check energy audits after normal business hours to assess the County's adherence to policies and standards.

## 3. Building Energy Representatives

The appointed volunteer Building Energy Representatives serve as:

- A resource to building occupants about policies and responsibilities.
- "Energy conservation champions" to support awareness of energy conservation and goal achievement.
- Field representatives to the Energy Conservation Manager, observing and reporting to the Conservation Manager on building conformity during normal business hours with energy conservation standards such as those for heating and air conditioning thermostat settings.

## 4. Public Works Department

The Public Works Department is responsible for:

- Up fitting as authorized and maintaining County facilities in accordance with the requirements of this policy, including installation of energy conservation equipment and verification of correct equipment settings and operation.
- Identifying situations above and beyond those envisioned in this policy that may require individual analysis and action to provide a comfortable, functional work environment.

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### 5. Department Heads

Department heads are responsible for:

- Communicating the County's energy conservation goals and policies to staff, providing guidance and promoting adherence.
- Working with the Public Works Department and Energy Conservation Manager to identify energy reduction techniques or systems that can be implemented without affecting service delivery to the department's customers as well as bringing to their attention any areas that require further action to address.

### 6. Employees

County employees are responsible for:

- Becoming knowledgeable about the County's energy conservation policies and initiatives and complying with these policies.
- Advising the supervisor of any circumstance that prevents adherence to the County's policies.
- Bringing forward ideas and suggestions for energy conservation and efficiency that may not have been identified to them.

## **F. Energy Conservation Action Plan**

1. The Energy Conservation Manager, in conjunction with the Energy Task Group, Public Works Department and others involved coordinates the development of an annual "Energy Conservation Action Plan."
2. This annual plan identifies specific actions to be implemented, proposed or estimated time lines and responsibilities for implementation.
3. The action plan is submitted to the Board of County Commissioners for review and approval, in coordination with the annual budget process.
4. The action plan is reviewed and updated annually along with evaluation of the previous year's performance, during the annual budget process.

## **G. Reporting, Benchmarking and Performance Measurement**

### 1. Reporting

In conjunction with the Public Works department, the Energy Conservation

Manager:

- Obtains information for all billing periods for each energy utility (electricity, natural gas, fuel oil and propane gas) to provide reports on a monthly/quarterly and annual basis assessing progress, by building and/or department where feasible as well as for the County as a whole, in reducing energy demand. This includes analysis of the information and assessment of trends.
- Presents reports to department heads and the County Manager to aid in determining if conservation efforts are meeting goals or additional efforts are required.
- Presents reports to the Board of County Commissioners to advise them of progress in conserving energy.

## 2. Benchmarking/Performance Measurement

The Energy Conservation Manager uses reporting information to benchmark and measure performance:

- From year-to-year (aggregate and by individual building) adjusted for heat and cooling degree days, humidity levels, and the like in keeping with accepted industry practices, and
- Compared to results for organizations located in similar geographic areas.

## H. Energy Use Standards

### 1. General

The intent of the energy conservation policy and program is to achieve reductions in energy consumption while maintaining reasonable comfort levels for building occupants.

Initial temperature set points were based upon ASHRAE comfort chart for 50 percent relative humidity, and employees at light work.

### 2. Heating and Air Conditioning Standards

Except as otherwise noted, temperature set points are based on the standards (Attachment) of the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) and are as follows:

<b>Cooling Season Set Points</b>	<b>75° F – 78° F</b>
<b>Heating Season Set Points</b>	<b>68° F – 72° F</b>

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Occupied air conditioning temperature settings are not set below 75 degrees and heating settings are not set above 72 degree, except for operations which require other settings based on function such as Health Department examination rooms, medical laboratories, computer equipment rooms, library stacks, recreation rooms, animal quarters or the like.

### 3. Use of Windows

Windows are to be kept closed, unless specifically authorized such as when the HVAC system is disengaged, because open windows throw the HVAC system off balance, and interfere with providing uniform heating or cooling in large buildings.

### 4. Auxiliary Heating and Cooling Sources

Personal portable space heaters are not allowed because of their excessive energy consumption, fire code and safety issues. If a room is not consistently within the heating/air conditioning set-point range, Public Works should be notified so that the problem can be addressed. If building conditions are such that acceptable temperatures cannot be achieved by the HVAC system, Public works takes necessary measures to resolve/rectify. If auxiliary heating or fans are required, Public Works will provide these.

### 5. Night, Weekend and Holiday Temperature Set-backs

The heating temperatures are set to 60 degrees for all buildings for periods when buildings are not normally occupied. The air conditioning temperatures are set to 80 degrees when buildings are not normally occupied. Normal occupancy for most buildings is from 7:30 a.m. to 6:00 p.m. This means that from 7:30 a.m., until 6:00 p.m., the temperature will be within the set points defined in Item H2 above.

Note: Exceptions to the set backs are made for those functions that must remain operational during these periods such as for night meetings, Emergency Management or the Jail. Also some buildings have unique requirements for longer start up times to reach heating or cooling set points.

If a building has complete digital control, and individual zone or office temperature control, occupants will be able to override the schedule to provide heating/cooling for their office at any time, for a limited period (typically two hour intervals).

## I. Lighting Policy

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1. Office and conference room lights are to be turned off whenever rooms are likely to be unoccupied for more than 15 minutes.
2. Each department or agency shall assign an employee to turn off common area lighting other than corridor lights at the end of the business day. Lights are to be turned off even if it is anticipated that custodial staff will soon be in the area.
3. Custodial staff are responsible for turning lights on as needed basis while working; that is, turning on lights only while an office or room is being cleaned, and turning lights off as soon as cleaning has been completed. Custodial staff turns off corridor and related lighting prior to leaving the building at the completion of cleaning.
4. Parking lot lights and streetlights located near buildings are typically owned by power companies such as Duke Power and are controlled by photocells or timers. Costs for this lighting are on a flat rate basis, and turning them off does not result in cost savings regardless of usage.
5. Athletic Field lights are to be operated only as needed. They should not be in operation during daylight hours. Lights generally will not be operated on weekends, except for special events.

### **J. Refrigerators, Microwaves, and Similar Devices**

As a longer-term goal, the County will assess the use of refrigerators, microwaves and similar devices and possible replacement of less energy efficient equipment with more energy efficient equipment and approaches.

### **K. Computer Equipment**

The Chief Information Officer assesses energy consumption of personal computers, printers and related devices and recommends to the County Manager guidelines for turning on or off and setting the “sleep” modes that reflect the technology in place. The County Manager issues guidelines for such equipment that apply to all County departments. Later as experience is gained this will be issued as policy.

### **L. Programs**

To support the Energy Conservation Policy and initiative, the County implements a variety of programs including:

1. Employee Awareness

The County conducts communications programs to promote employee awareness of the need for energy conservation. This includes such activities as distribution of this Energy Conservation Policy, reminders via pamphlets, e-mails,

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Orange Alive, coverage in new employee orientation, and opportunities at employee events to reinforce the conservation ethic.

### 2. Incentives

Incentive programs will be developed to improve compliance and acceptance by County employees and other building occupants. These may include building versus building contests, department versus department contests, financial incentives, preferred parking and the like.

### 3. Preventive Maintenance

Preventive Maintenance procedures are used to obtain optimal energy-efficient operation of equipment.

### 4. Repairs

Repairs/replacement of equipment take into consideration the most cost effective solution over the life of the repair/equipment. Considerations shall include future maintainability, improved operation, improvements to energy efficiency, requirement for additional or reduced Preventive Maintenance, and the like.

### 5. Energy Efficiency Retrofits

The County bases energy efficiency retrofitting project priorities upon the availability of capital improvements plan funds and maintenance needs such as the condition of the equipment. The County develops and maintains a priority list of retrofit needs.

### 6. Renovations

Renovations to County facilities, whether major or minor, are to meet standards for energy-efficient equipment and design.

### 7. New Construction

New construction is required to follow energy efficient standards as set forth by the Guidelines for Sustainable Public Facility Design and Development. Life-cycle cost analyses are required, and energy efficient designs, including Passive and Active Solar systems, natural lighting, cogeneration and thermal storage, are considered as feasible.

### 8. Equipment Selection

## Appendix B – Energy Policy

The selection of all equipment procured for Orange County, to include computer equipment, printers, copy machines, equipment, refrigerators, and so forth is to consider carefully the anticipated energy use and available energy saving devices.

### 9. Automation

With the direction and leadership of the Energy Task Group, each County department pursues automation solutions, as feasible, to replace travel-intensive, paper-intensive or other energy consuming activities.

## From American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standards

1. Thermal comfort is that condition of mind that expresses satisfaction with the thermal environment. There are large variations, both physiologically and psychologically, from person to person, which makes it difficult to satisfy everybody in a space. The environmental conditions required for comfort are not the same for everyone. However, extensive laboratory and field data have been collected that provide the necessary statistical data to define conditions that a specified percentage of occupants will find thermally comfortable.  
<http://industries.bnet.com/whitepaper.aspx?scname=Plumbing+and+HVAC+Equipment&docid=114190>
  
2. This standard specifies the combinations of indoor space environment and personal factors that will produce thermal environmental conditions acceptable to 80% or more of the occupants within a space. The environmental factors addressed are temperature, thermal radiation, humidity, and air speed; the personal factors are those of activity and clothing.  
<http://www.constructionbook.com/xq/ASP/ProductID.3695/id.402/subID.636/qx/default2.htm>
  
3. ASHRAE Standard 55-1992 Thermal Environmental Conditions for Human Occupancy, recommends the following acceptable temperature ranges at relative humidity (RH) of 50% and air speed less than 0.15 m/sec. (30 fpm).

<b>Acceptable Temperatures</b>		
<b>Season</b>	<b>Clothing</b>	<b>Temperature</b>
Winter	Heavy slacks, long sleeve shirt and/or sweater	20-23.5°C (68-75°F)
Summer	Light slacks and short sleeve shirt	23-26°C (73-79°F)

[http://www.ccohs.ca/oshanswers/phys\\_agents/hot\\_cold.html](http://www.ccohs.ca/oshanswers/phys_agents/hot_cold.html)

## **Water Conservation Policy For County Facilities**

### **A. General**

Orange County’s “Environmental Responsibility in County Government” goal includes the objective: “Initiate policies and programs that conserve energy, reduce fuel/utility/resource consumption...” In support of this goal, the County has adopted this Water Conservation Policy.

The cost for water for County facilities is a significant County cost. Beyond this, water consumption has significant environmental impacts, including direct local impacts. As a result, it is both necessary and beneficial for the County to adopt a policy of water conservation and efficiency for County government.

Energy conservation and vehicle fuel conservation are addressed in separate policies.

### **B. Purpose**

The purpose of this policy is to reduce the County government’s water consumption, wherever possible, and improve the efficiency of use for that water that must be used in Orange County government facilities.

### **C. Policy Goals**

- Establish the policy foundation of responsibilities, planning, programs, standards, performance measures and the like to manage the County government’s water use and conserve water.
- Manage water use to minimize use to the greatest extent possible while maintaining safe and acceptable work conditions.
- Achieve a reduction in average water consumption per square foot annually.
- Incorporate water conservation systems, devices, and design in renovations, replacements and new construction.

### **D. Scope**

#### **4. Facilities**

This policy applies to County owned and leased buildings, whether occupied by the County, the courts or other agencies.

## 5. Water Sources

This policy applies to use of water from municipal sources and wells.

## E. Responsibilities

### 1. Energy Task Group

As provided in the County's energy conservation policy, the Manager appoints an Energy Conservation Task Group. The Task Group provides direction, counsel, and oversight as to implementation of the Water Conservation Policy. As necessary the Task Group addresses questions of policy interpretation and adherence. The Task Group also seeks input on innovative tools and techniques to support water conservation in County facilities.

### 2. Public Works Department

The Public Works Department is responsible for:

- Up fitting as authorized and maintaining County facilities in accordance with the requirements of this policy, including installation of water conserving devices and verification of correct equipment settings and operation.
- Development of the annual Water Conservation Action Plan and identifying any associated costs, as part of the annual budget process.

### 7. Department Heads

Department heads are responsible for:

- Communicating the County's water conservation goals and policies to staff, providing guidance and promoting adherence.

### 8. Employees

County employees are responsible for:

- Becoming knowledgeable about the County's water conservation policies and initiatives and complying with these policies.
- Advising the supervisor of any circumstance that prevents adherence to the County's policies.
- Bringing forward ideas and suggestions for water conservation that may not have been identified to them.

## **F. Water Conservation Action Plan**

5. The Energy Task Group, Public Works Department and others involved coordinate the development of an annual “Water Conservation Action Plan.”
6. This annual plan identifies specific actions to be implemented or proposed and estimated time lines and responsibilities for implementation.
7. The action plan is submitted to the Board of County Commissioners for review and approval, in coordination with the annual budget process.
8. The action plan is reviewed and updated annually along with evaluation of the previous year’s performance, during the annual budget process.

## **G. Reporting, Benchmarking and Performance Measurement**

### 3. Reporting

The Public Works department:

- Obtains information for all billing periods for each water billing to provide reports on a monthly/quarterly and annual basis assessing progress, by building and/or department where feasible as well as for the County as a whole, in reducing water demand. This includes analysis of the information and assessment of trends.
- Presents reports to department heads and the County Manager to aid in determining if conservation efforts are meeting goals or additional efforts are required.
- Presents reports to the Board of County Commissioners to advise them of progress in conserving water.

### 4. Benchmarking/Performance Measurement

Reporting information is used to benchmark and measure performance:

- From year-to-year (aggregate and by individual building) in keeping with accepted industry practices, and
- Compared to results for organizations located in similar geographic areas.

## **H. Water Use Standards**

### 2. General

## Appendix C– Water Conservation Policy

The intent of the water conservation policy and program is to achieve reductions in water consumption while maintaining reasonable comfort levels for building occupants.

6. Waterless or low-flow fixtures are used for any replacement fixtures, unless technically impractical.
7. The County gives preference to drought-tolerant plants when new or replacement plants and/or trees are required for landscaping. Large areas of grass are avoided in favor of alternative plantings and landscaping techniques, whenever possible.
8. Irrigation is limited to critical needs to support survival of plants, and if allowed by local watering restrictions. Permanently installed irrigation systems are preferred to provide most efficient distribution of water.
9. Vehicle washing is performed only as permitted by local watering restrictions. If performed, it is done only with water conserving spraying devices rather than an open garden hose. Rain collection for vehicle washing is pursued as feasible.

### I. Programs

To support the Water Conservation Policy and initiative, the County implements a variety of programs including:

#### 3. Employee Awareness/Public Awareness

The County conducts communications programs to promote employee awareness of the need for water conservation. This includes such activities as distribution of this Water Conservation Policy, reminders via pamphlets, e-mails, Orange Alive, coverage in new employee orientation, and opportunities at employee events to reinforce the conservation ethic.

As appropriate, the County also informs the public of water conservation measures in use such in County restrooms or in grounds care activities.

#### 4. Incentives

Incentive programs will be developed to improve compliance and acceptance by County employees and other building occupants. These may include building versus building contests, department versus department contests, financial incentives, preferred parking, recognition of employees who demonstrate the conservation ethic and the like.

#### 10. Preventive Maintenance

## Appendix C– Water Conservation Policy

Preventive maintenance procedures are used to eliminate water loss through drips and leaks

### 11. Repairs

Repairs/replacement of equipment take into consideration the most cost effective solution over the life of the repair/equipment. Such consideration includes improvements to water efficiency.

### 12. Low Demand Retrofits

The County determines priority needs and pursues water conserving system retrofitting, based on the availability of funds and maintenance needs such as the condition of the equipment.

### 13. New Construction

New construction is required to follow water efficiency standards as set forth by the Guidelines for Sustainable Public Facility Design and Development. Consideration is given to the feasibility of rainwater collection for non-potable uses

## **Vehicle Fuel Conservation Policy**

### **A. General**

Orange County’s “Environmental Responsibility in County Government” goal includes the objective: “Initiate policies and programs that conserve energy, reduce fuel/utility/resource consumption...” In support of this goal, the County has adopted this Vehicle Fuel Conservation Policy.

Costs for gasoline and diesel fuel for County vehicles and motorized equipment are significant. Beyond this, fuel consumption for vehicles and motorized equipment has significant environmental impacts. As a result, it is both necessary and beneficial for the County to adopt a policy of fuel conservation and efficiency.

Water conservation and energy conservation for County buildings are addressed in separate policies.

### **B. Purpose**

The purpose of this policy is to reduce the County government’s vehicle fuel consumption, wherever possible; improve fuel efficiency; and maximize the use of alternative fuels for that fuel that must be used to operate Orange County vehicles and motorized equipment, consistent with the need for safe, and reliable County vehicles and motorized equipment.

### **C. Policy Goals**

- Establish the policy foundation of responsibilities, planning, programs, standards, performance measures and the like to manage the County government’s vehicle fuel use and conserve fuel.
- Manage vehicle and motorized equipment fuel consumption to minimize use to the greatest extent possible while maintaining safe and reliable vehicles and motorized equipment.
- Provide for the use of alternative fuel (which may include compressed natural gas, bio-diesel, hybrid gas/electric, or the like) vehicles and motorized equipment, unless service needs cannot be met with an alternative fuel vehicle or motorized equipment – as determined by the County Manager.
- Purchase vehicles and motorized equipment that meet service delivery needs with the greatest fuel efficiency possible whether alternative or traditional fuel.

## Appendix D– Vehicle Fuel Conservation Policy

- Achieve a reduction in average fuel consumption per mile annually for vehicles and per hour of operation for motorized equipment.
- Support change to State agency policies that fosters monetary incentives to make fuel efficiency and alternative fuel efforts economically attractive and to streamline program justification requirements so that projects can be executed within a timely interval, and savings quickly realized.

### **D. Scope**

This policy applies to all County owned and leased vehicles and motorized equipment and the operators of these vehicles and equipment.

### **E. Responsibilities**

#### 1. Energy Conservation Task Group

As provided in the County's Energy Conservation Policy, the Manager appoints an Energy Conservation Task Group. The Task Group provides direction, counsel and oversight as to implementation of the Vehicle Fuel Conservation Policy. As necessary, the Task Group addresses questions of policy interpretation and adherence.

#### 2. Purchasing and Central Services Director

The Purchasing and Central Services Director manages the vehicle acquisition or replacement process as provided in this policy.

#### 3. County Manager

The County Manager's advance approval is required for purchase of any new or replacement vehicle or motorized equipment.

#### 4. Public Works Department

The Public Works Department is responsible for:

- Performing preventive and corrective maintenance for County vehicles and motorized equipment to ensure maximum fuel efficiency is achieved.
- Preparing the annual vehicle replacement report.

#### 5. Department Heads

Department Heads are responsible for:

## Appendix D– Vehicle Fuel Conservation Policy

- Communicating the County’s fuel conservation goals and policies to staff, providing guidance and promoting adherence.
- The assignment of departmental vehicles to departmental staff.
- For vehicles not assigned to a single individual, designating one operator and one backup operator to monitor use and schedule preventive maintenance service as needed.
- Communicating and justifying any request for new and replacement vehicles and motorized equipment as part of the annual budget process.
- Monitoring employee conformance with requirements for vehicle and motorized equipment maintenance, including scheduling of preventive maintenance service.

### 6. Employees

Employees who operate County vehicles and motorized equipment are responsible for ensuring that:

- Tire and fluid inspections for vehicles are performed (by self, or by Motor Pool staff) according to published directions from the Public Works Department.
- The assigned vehicle is scheduled and delivered to Public Works for preventive maintenance service within time and/or mileage intervals identified by Public Works.
- Corrective maintenance is scheduled with Public Works as soon as possible when a problem with the vehicle is encountered or identified.
- Vehicles are operated according to all applicable laws and rules of the road. This increases fuel conservation and safety.
- Information about fuel transactions other than those through the automated fuel system are reported to Public Works as provided by Public Works procedures.

### **F. Vehicle Operation**

1. Vehicles are to be operated in keeping with manufacturers recommendations and specifications, and applicable County policy.
2. To maximize fuel efficiency, vehicles are to be serviced at intervals identified by the Public Works Department.

## Appendix D– Vehicle Fuel Conservation Policy

3. To meet department specific service levels while achieving the highest fuel economy, departments, where applicable, use geographic information systems (GIS) or other industry tools and standards to design and implement vehicular routes/schedules and deployment strategies/schedules.

### **G. Fuel Conservation Action Plan**

1. Public Works, in consultation with the Energy Task Group and others involved, coordinates the development of an annual “Vehicle Fuel Conservation Action Plan.” The annual action plan includes recommended charge back rates to departments for vehicle operation costs and recommendations for the annual “Vehicle Replacement Report.”
2. The annual plan identifies specific actions to be implemented, proposed and estimated time lines and responsibilities for implementation.
3. The action plan is submitted to the Board of Commissioners for review and approval, in coordination with the annual budget process.
4. The action plan is reviewed and updated annually along with evaluation of the previous year’s performance during the annual budget process.

### **H. Charge Back Rates**

As part of the annual budget process, vehicle cost charge back rates to departments are set each year. Among other things, these take account of fuel and repair costs and are designed to promote the use of alternatively fueled and fuel efficient vehicles.

### **I. Vehicle Acquisition**

1. The Purchasing and Central Services Director develops, communicates and maintains a written process for the systematic consideration of vehicle acquisition needs (whether new or replacement) and the decision-making as to the type of vehicle to be purchased, including whether it is an alternative fuel vehicle (which may include compressed natural gas, bio-diesel, hybrid gas/electric, etc.). Among other things, this process provides for the following:
  - Determination as to whether the vehicle needs to be acquired or replaced.
  - Determination as to whether an alternative fuel vehicle will meet the service needs.
  - Whether an alternative fuel vehicle that will meet the needs is available on State contract; or if not available on State contract otherwise available; or

## Appendix D– Vehicle Fuel Conversation Policy

whether a retrofit of a standard fuel vehicle is an option.

- Analysis of the costs of the alternative vehicle versus standard fuel vehicle
  - Report and recommendation to the County Manager on vehicle acquisition and replacement.
  - County Manager decision as to the specific vehicle to be acquired.
2. As part of the Item I1 process, Public Works prepares an annual “Vehicle Replacement Report” which includes recommended priorities for vehicle replacement. This report considers the following factors in prioritizing vehicle replacements:
- Miles driven to date (odometer reading).
  - Mileage (miles per gallon) compared to baseline/industry standards for comparable vehicle.
  - Repair and maintenance cost per mile for most recent 12 months, compared to baseline/industry standards for comparable vehicles.
  - Vehicle use (front-line emergency response vehicle versus Motor Pool fleet vehicle).
  - Overall mechanical assessment by Public Works staff.
3. Vehicles identified for replacement are removed from service within one month of the replacement being placed in service, except with the written approval of the County Manager for the vehicle to continue in service.

## **J. Monitoring and Reporting**

1. The Public Works automated fuel system provides records of most fuel transactions. Public Works obtains information regarding fuel received at other locations (UNC Chapel Hill, Town of Chapel Hill, etc.) and adjusts the transactions database accordingly. These data are used to create performance reports.
2. Information is used to benchmark performance:
  - From year-to-year for total miles driven and average miles per gallon.

## Appendix D– Vehicle Fuel Conservation Policy

- Compare to results for similar vehicles/vehicle use in other local governments.

In addition to actual vehicle fuel performance, the County reviews other benchmarks such as reducing reliance on fossil fuel vehicles.

### **K. Programs**

To support the vehicle fuel conservation, the County implements a variety of programs including:

#### 1. Employee Awareness

The County conducts communications programs to promote employee awareness of the need for fuel conservation. This includes activities such as distribution of the Vehicle Fuel Conservation Policy, reminders via pamphlets, e-mails, Orange Alive, coverage in new employee orientation, and opportunities at employee events to reinforce the conservation ethic.

#### 2. Incentives

Incentive programs will be developed to improve compliance and acceptance by employees who operate County vehicles. These may include department versus department contests, financial incentives, preferred parking and the like.

#### 3. Preventive Maintenance

Preventive Maintenance procedures are used to obtain optimal fuel-efficient operation of all equipment.

#### 4. Repairs

Repairs/replacement of all vehicles and motorized equipment take into consideration the most cost-effective solution over the life of the repair/equipment. This includes future maintainability, improved operation, improvements to fuel efficiency, requirement for additional or reduced preventive maintenance, and the like.

#### 5. Innovative Strategies

The County considers and pursues innovative strategies that may reduce the need for gasoline consumption such as video conferencing, “smart travel” with other departments and County car pooling, including educating employees about these.

Appendix D– Vehicle Fuel Conversation Policy

Appendix E

Unit ID	Name	BLT DATE	ADD DATE	GSF	ACTIVE	NOTES
BLDG008	COURTHOUSE (HISTORIC)	1845	1845	7,128	7,128	
BLDG024-1	JAIL (ORIGINAL - 1925)	1925	1925	3,600	3,600	Former Jailer's house section unoccupied. Cells, with upgrades over the years, remain in use
BLDG006-1	COURT STREET ANNEX (ORIGINAL)	1936	1936	2,640	2,640	Economic Development relocated to WCOB - 2009
BLDG007-1	COURTHOUSE - NEW (ORIGINAL - 1954)	1954	1954	20,825	20,825	Renovated 2009-10.
BLDG006-2	COURT STREET ANNEX (ADDITION)	1962	1962	5,860	5,860	Board of Elections relocated to GSA/208 S Cameron Street 2009
BLDG037	DISTRICT ATTORNEY BUILDING	1967	1967	7,359	7,359	Facility occupied by Sheriff Department until relocation to Justice Center in 2009
BLDG017	GOVERNMENT SERVICES ANNEX	1968	1968	12,450	12,450	Human Resources, Finance and Budget relocated to Link Center, 2009. IT Department relocated to WCOB, 2009
BLDG034-1	WHITTED HUMAN SERVICES - 'A' BUILDING (ORIGINAL)	1922	1975	33,000	33,000	Social Services relocated to Hillsborough Commons, 2010. Facility set to undergo renovations to expand and improve Health Department services
BLDG034-2	WHITTED HUMAN SERVICES - 'A' BUILDING (ADDITION)	1936	1975		0	Social Services relocated to Hillsborough Commons, 2010. Facility set to undergo renovations to expand and improve Health Department services
BLDG034-3	WHITTED HUMAN SERVICES - 'B' BUILDING	1957	1975	27,450	27,450	Human Rights & Relations consolidated with Housing & CD, 2010. Included relocation from 501 W Franklin Street. Dental services to relocate to renovated space from Carr Mill Mall, 2011
BLDG035	CENTRAL RECREATION CENTER	1957	1975	19,000	19,000	
BLDG028	MOTOR POOL FACILITY (FORMER)	1976	1976	4,663	4,663	
BLDG029-1	NORTHSIDE BUILDING 1	1950	1976	15,639		Facilities transferred to Chapel Hill/Carroboro School system. To be deconstructed/demolished Fall 2011.
BLDG029-2	NORTHSIDE BUILDING 2	1950	1976	12,630		Facilities transferred to Chapel Hill/Carroboro School system. To be deconstructed/demolished Fall 2011.
BLDG029-3	NORTHSIDE BUILDING 3	1950	1976	2,982		Facilities transferred to Chapel Hill/Carroboro School system. To be deconstructed/demolished Fall 2011.
BLDG033	PUBLIC WORKS STORAGE	1976	1976	2,400	2,400	
BLDG022-1	NORTHERN HUMAN SVC CENTER (ORIGINAL - 1951)	1951	1977	30,732	30,732	Former school. Currently occupied by Cedar Grove Day Care. Periodic use by Recreation Department.
BLDG022-2	NORTHERN HUMAN SVC CENTER (ADDITION - 1957)	1957	1977	3,818	3,818	Former school. Currently occupied by Cedar Grove Day Care. Periodic use by Recreation Department.
BLDG002-1	ANIMAL SHELTER (ORIGINAL - 1979)	1979	1979	2,000		Facility deconstructed following relocation of Animal Services operations to Animal Services Center in 2009.
BLDG019	CARR MILL MALL		1979	5,580	5,580	Leased space to be vacated following relocation of Dental Clinic to renovated space at REWHS and Public Defender to 129 Kin St
BLDG034-4	WHITTED HUMAN SERVICES - CONNECTING CORRIDOR	1979	1979	2,100	2,100	
BLDG013-1	EMS-911 CENTER (ORIGINAL)	1983	1983	1,520		Facility vacated following phased relocation to Emergency Services Center at 510 Meadowlands, completed ____.
BLDG024-2	JAIL (ADDITION - 1982)	1983	1983	15,917	15,917	
BLDG001	ES SUBSTATION	1960	1985	1,310	1,310	Former Animal Control building. Converted for Emergency Services use 2010.
BLDG030	PIEDMONT FOOD & AG FACILITY	1985	1985	10,400		Facility formerly occupied by Orange Enterprises. Will open in 2011 as Piedmont Food & Agriculture Processing Facility
BLDG031	ENVIRONMENT & AGRICULTURE CENTER	1960	1985	20,172	20,172	Planning & Inspections and Environmental Health relocated to WCOB, 2009
BLDG038	STORAGE BUILDING AT EAC	1960	1985	1,702	1,702	
BLDG010	DRIVER'S LICENSE BUREAU		1986	1,200		Facility not maintained by AMS
BLDG021	HOMESTEAD COMMUNITY BUILDING	1960	1986	3,198		Facility sold 2009
BLDG002-2	ANIMAL SHELTER (ADDITION - 1987)	1987	1987	1,879		Facility deconstructed following relocation of Animal Services operations to Animal Services Center in 2009.
BLDG026	MOODY BUILDING		1987	4,800	4,800	Leased space to be vacated following relocation of Court system staff to space owned by Orange County.
BLDG036	SAWYER BUILDING		1988	3,311	3,311	Leased facility
BLDG032	PUBLIC WORKS ADMINISTRATION BUILDING	1989	1989	2,400	2,400	Several staff relocated to WCOB, 2010
BLDG002-3	ANIMAL SHELTER (ADDITION - 1990)	1990	1990	3,828		Facility deconstructed following relocation of Animal Services operations to Animal Services Center in 2009.
BLDG015	GALLERIA		1990	11,240		Formerly leased space for Senior Center. Vacated following relocation to Seymour Senior Center in ____
BLDG009-1	DICKSON HOUSE - HISTORIC RESIDENCE	1790	1992	2,713	2,713	Limited maintenance by AMS
BLDG011-1	EFLAND COMMUNITY CENTER - MAIN BUILDING	1992	1992	2,755	2,755	Reduced usage following relocation of senior center programs to Central Orange Senior Center, 2009
BLDG012	EFLAND RESCUE		1992	1,200	1,200	Upgrades and change in occupancy, 2010
BLDG013-2	EMS-911 CENTER (ADDITION)	1992	1992	4,620		Facility vacated following phased relocation to Emergency Services Center at 510 Meadowlands, completed ____.
BLDG016	GRAHAM BUILDING	1936	1992	750		Facility unoccupied at time this report was prepared (03/2011)
BLDG018	JOHN LINK, JR GOVERNMENT SERVICES CENTER	1992	1992	25,991	25,991	Revenue and Register of Deeds relocated to Gateway Center, 2008
BLDG051	STORAGE BUILDING ON HIGHWAY 49 (FORMER ABC STOR	1974	1995	1,342		Facility sold 2010
BLDG027	MOTOR POOL FACILITY (CURRENT)	1995	1996	10,800	10,800	
BLDG070	FUEL STATION	1995	1996	88	88	

Appendix E

<u>Unit ID</u>	<u>Name</u>	<u>BLT DATE</u>	<u>ADD DATE</u>	<u>GSF</u>	<u>ACTIVE</u>	<u>NOTES</u>
BLDG007-2	COURTHOUSE - NEW (BATTLE COURT ADDITION - 1997)	1997	1997	3,885	3,885	
BLDG020	COURTS ANNEX	1960	1997	3,500		Facility unoccupied at time this report was prepared (03/2011)
BLDG024-3	JAIL (ADDITION - 1997)	1997	1997	17,536	17,536	
BLDG040	501 WEST FRANKLIN		1997	7,408	7,408	Includes three suites occupied by Visitor's Bureau, two suites leased to Terra Dotta, Inc., and one suite to be occupied by Court system staff
BLDG041	SKILLS DEVELOPMENT CENTER		1997	13,232	13,232	
BLDG023-1	SOUTHERN HUMAN SERVICES CENTER	1997	1998	28,612	28,612	Some DSS staff relocated to Hillsborough Commons, 2010
BLDG055	129 KING STREET		2001	7,060	7,060	Building formerly occupied by Purchasing & Central Services until their relocation to West Campus Office Building, 2009
BLDG057-400	CENTRAL ORANGE SENIOR CTR - STE 400	0	2001	2,000		Leased facility occupied by Dept on Aging until relocation to Central Orange Senior Center, 2009
BLDG057-500	CENTRAL ORANGE SENIOR CTR - STE 500	0	2001	2,000		Leased facility occupied by Dept on Aging until relocation to Central Orange Senior Center, 2009
BLDG062	OPT MODULAR OFFICE BUILDING		2003	2,520	2,520	Leased modular building, occupied by Orange Public Transportation
BLDG057-600	CENTRAL ORANGE SENIOR CTR - STE 600	0	2004	2,000		Leased facility occupied by Dept on Aging until relocation to Central Orange Senior Center, 2009
					<b>362,017</b>	
BLDG067	EMERGENCY SERVICES (MEADOWLANDS)	1989	2005	22,069	22,069	Emergency Services staff relocated to this facility from 1914 New Hope Church Road
BLDG068	ROBERT & PEARL SEYMOUR SENIOR CENTER	2006	2007	25,000	25,000	Department on Aging programs relocated to this facility from Galleria location in 2007
BLDG079	GATEWAY CENTER	2007	2008	22,846	22,846	County occupies top two floors of this facility
BLDG080	PUBLIC MARKET HOUSE	2007	2008	3,453	3,453	Facility not maintained by AMS
BLDG082-1	HILLSBOROUGH COMMONS (PHASE 1)	1989	2008	56,000	56,000	Renovated 2009, occupied by DSS early 2010
BLDG069	CENTRAL ORANGE SENIOR CENTER (@ SPORTSPLEX)	2008	2009	15,000	15,000	Consolidated Hillsborough area senior programs and services from Efland CC, Northern Center and leased space in the Meadowlands complex
	ADULT DAY TREATMENT	2008	2009	4,000	4,000	
BLDG078	WEST CAMPUS OFFICE BUILDING	2009	2009	46,716	46,716	
BLDG081	ANIMAL SERVICES CENTER	2008	2009	23,500	23,500	Consolidated Animal Services programs from Revere Road in Hillsborough (Animal Control), 501 W Franklin Street (administration) and Martin Luther King Jr. Drive in Chapel Hill (sheltering and adoption operations)
BLDG083	JUSTICE FACILITY	2008	2009	40,227	40,227	Major addition to the New Courthouse, included relocation of Sheriff Department operations from 144 E. Margaret Lane
BLDG084	MAIN LIBRARY	2009	2009	23,454	23,454	Became the new home of the Orane County Library following relocation from Whitted Human Services Center in 2009

**282,265**  
644,282  
43.81078472

**Facilities and Vehicle Energy Conservation Annual Performance Report**

	Baseline Use (FY10)	FY11		FY12		FY13		FY14		FY15		FY 16		FY 17	
		Goal	Actual												
<b>Energy (Million BTUs per 1,000 Square Feet)</b>	110.0	105.6		101.2		96.8		92.4		88.0		82.5		77	
<b>Fuel Consumption (Total Gallons)</b>	240,813	235,997		231,180		226,364		221,548		216,732		210,711		204,691	
<b>Fuel Efficiency (Miles per Gallon)</b>	12.57	12.82		13.07		13.32		13.58		13.83		14.14		14.46	
<b>Water Consumption (Gallons per Square Foot)</b>	16.5	16.38		16.27		16.15		16.03		15.91		15.79		15.68	