

BUNCOMBE COUNTY

# Energy Use and Carbon Emission Report

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Buncombe County General Services

3/5/2012

# Executive Summary

The purpose of this report is to provide details regarding the total energy use and carbon emissions of Buncombe County Government for the calendar year 2012.

## Energy Use

### Buildings

- 64,848 BTUs per square foot in 2012; a slight rise attributed to bringing renovated space back into use.
- Utility Cost: \$1.16 per square foot in 2012, this is due to more accurate reporting.

### Fleet

- 5.7 million miles traveled in 2012; an increase in travel of over 167,000 miles. Increased request for service and better accountability
- An average of 14.6 mpg for all vehicles

### Mechanized Equipment<sup>1</sup>

- 78,456 gallons of fuel used in 2012, decrease of 14,453 gallons

## Carbon Footprint

- Total of 26,528 MT<sup>2</sup> CO<sub>2</sub> emitted in 2012, increase of 432 MT eCO<sub>2</sub>

\*County buildings are a large component of this energy consumption at 11,184 MT CO<sub>2</sub>; approximately 42% of the total CO<sub>2</sub> emissions.

## Water Consumption

- 28,485,000 gallons of water consumed in 2012, decrease of 4.6 million gallons. Weather and conservation attributing factors.

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<sup>1</sup> Revised from 2009 report due to mistake in calculation of fuel consumed

<sup>2</sup> MT- Metric Tons (2204lbs)

## Introduction

Increased knowledge of energy consumption and methods for improved energy efficiency are of ever increasing importance for local governments. Buncombe County is constantly implementing the tried and true methods as well as the cutting edge technologies of energy management with the goal of reducing the tax burden and preserving our natural resources.

In the mid 1990s Buncombe County unknowingly began reducing its carbon emissions. With the goal of obtaining new light fixtures for 12 floors of the Courthouse we used the projected energy dollars saved as justification for the purchase. The avoided utility costs have since passed the \$400,000.00 mark for this project. This proved to be the springboard for similar projects which grew into our energy management program today. In planning for new construction as well as renovation of existing facilities energy efficiency is looked at as closely as any other aspect of the project.

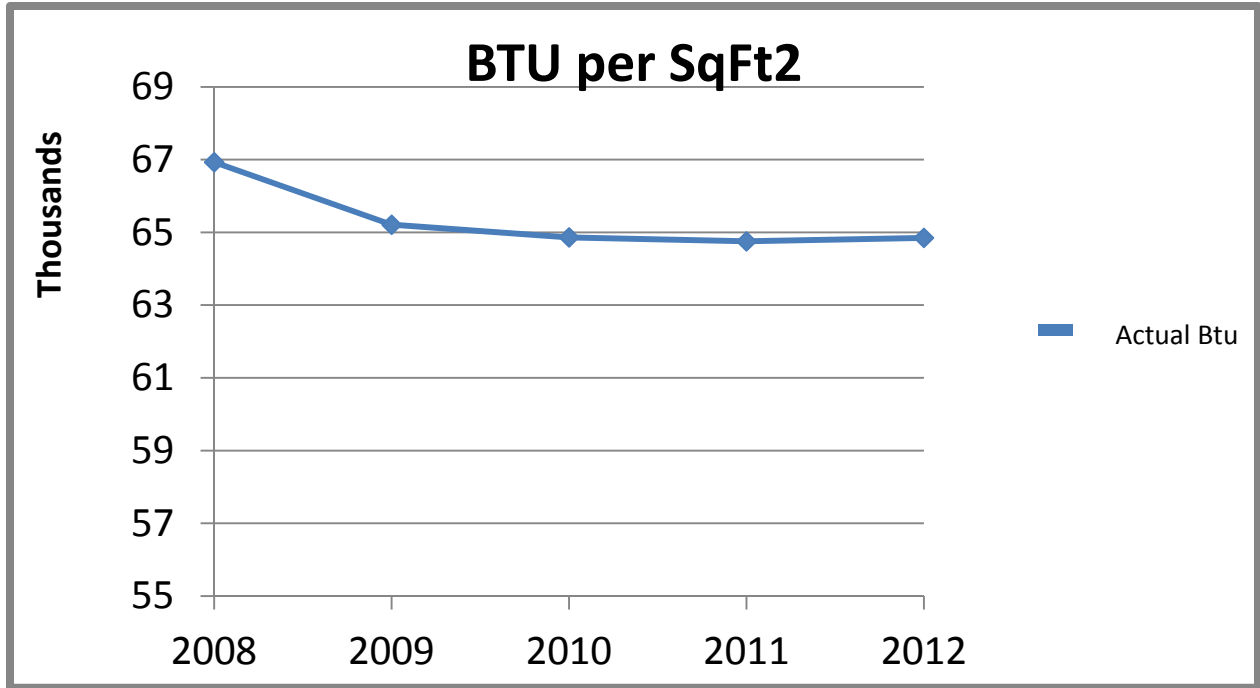
In late 2000 the ability to accurately report these savings and the resulting reduction in carbon emissions suddenly became paramount. The accurate tracking of our energy consumption has proved to be a daunting task. The data was scattered across the County and in varied formats. We report on three aspects of energy use; type, amount and cost. This year alone several gray areas have been defined and our report is the most accurate to date. This data not only shows us where we have been but also is our roadmap to where we want to be. The annual Energy Use and Emission Report provide the accountability required by the public sector as well as setting benchmarks to track our progress toward sustainable government. Fiscal responsibility while supporting mandated services coupled with environmental consciousness moves us toward sustainability.

County Fleet is the largest single sector of energy consumption and carbon emissions, followed by buildings and finally mechanized equipment. Part I: Total Energy Use by Sector; details and explains the total energy consumption and associated costs. Part II: Carbon Footprint; delves into the county's effect on the surrounding environment and quantifies carbon emissions for each sector of government operations. Part III: Water Consumption, quantifies water purchased from the City of Asheville. Part IV: Project Review; explains completed projects that have succeeded in reducing both carbon emissions and energy consumption.

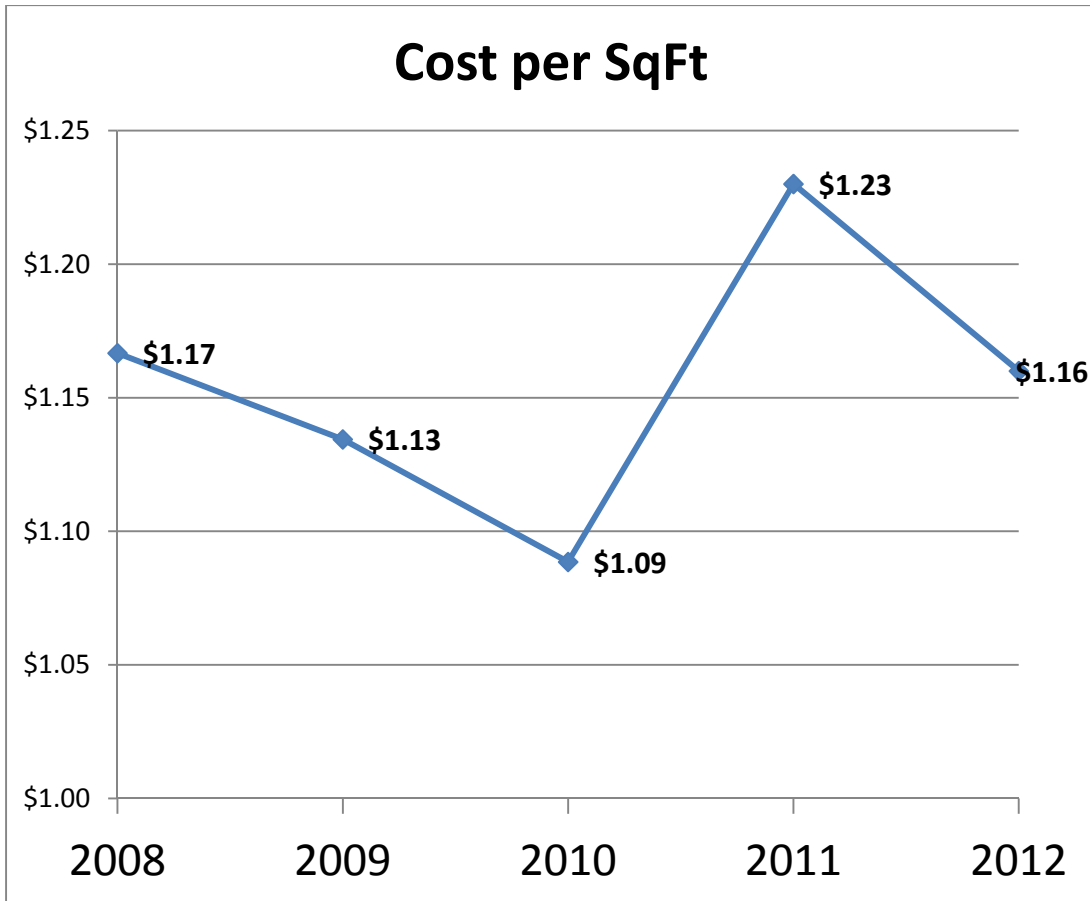
## Part I: Energy Use by Sector

## Buildings

Buncombe County operates a wide array of facilities; from small restrooms at public parks to the County Court House and Detention Center. By the end of calendar year 2012, the county was responsible for the operation of over 1,501,149 square feet of building space.



Calendar Year	BTU per Square Foot
2008	66,930
2009	65,211
2010	64,863
2011	64,422
2012	64,848



Calendar Year	Cost per Square Foot
2008	\$1.17
2009	\$1.13
2010	\$1.09
2011	\$1.23
2012	\$1.16

Analysis

It was determined that BTU per square foot and cost per square foot would be the two performance indicators used to track energy usage.

The overall trend is a reduction of energy use per square foot, which has helped to combat the rising prices of energy. The national average BTU per square foot is approximately 90,500. Buncombe County energy use for 2012 was approximately 29.5% lower. This can be attributed to both the many innovative energy projects from the past fifteen years and in part to the milder climate in Buncombe County compared to much of the country. The average consumption of North Carolina State owned buildings is approximately 135,000 BTU per square foot<sup>3</sup>.

**Fleet**

<sup>3</sup>“North Carolina State Energy Report for 2010” North Carolina Energy Office March 2010

Buncombe County's vehicle fleet consisted of 397 vehicles at the end of 2012. The fleet includes many types of vehicles from Sherriff's Department patrol vehicles to transfer trucks.

▶ Fleet Details for 2012

- Total Miles Traveled: 5,712,248
- Fuel Consumed: 479,486 Gallons
- Total Fuel Cost: \$1,458,383\*

Analysis

The 2012 Fleet report is the most accurate to date. The 2009 and 2010 reports show a lot of fluctuation in the fleet numbers which was due to surplus vehicles still in the system at the time of the report. The 2011 was low due to the opposite problem; new vehicles were not yet entered into the system. Buncombe County's fleet for 2012 numbered 397 vehicles. Total fleet mileage was up 167,424 miles from the 2011 report; we attribute this to elevated request for services and more accurate reporting on mileage.

There is a significant increase in the miles per gallon of the fleet. Again we were hurting ourselves with our reporting measures. We have found that alternative fuel vehicles need to be tracked separately so not to skew the MPG numbers of our gasoline and diesel vehicles. The county continues to explore alternative fuel options and other ways to improve overall fuel economy. With the introduction of our first electric vehicle to the County Fleet we are moving toward that goal.

## Mechanized Equipment

Buncombe County operates several pieces of machinery at the landfill as well as 34 emergency back-up electrical generators and grounds maintenance equipment. This category covers all energy used by non-vehicle motorized equipment.

### Off Road Fuel Use

Calendar Year	Total Gallons
2008	89,710
2009	109,361
2010	89,849
2011	92,909
2012	78,456

Analysis

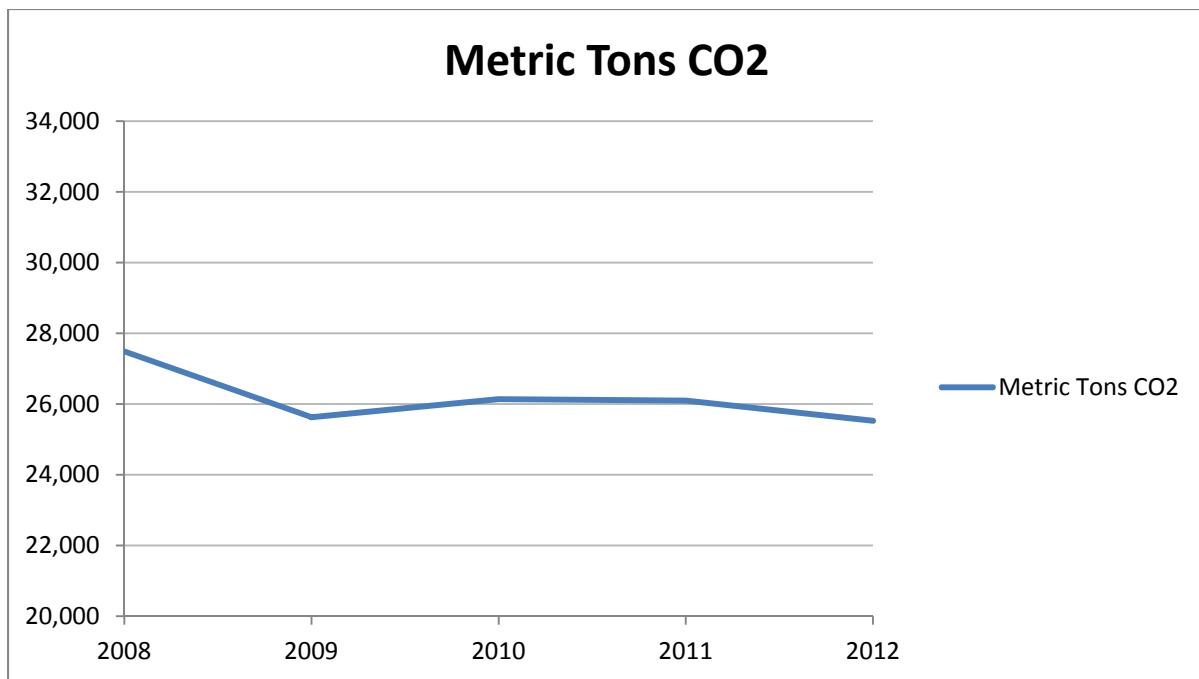
Fuel consumed by off-road equipment has fluctuated between 2008 and 2012. The primary driving factor is amount of waste processed at the county landfill.

## Part II: Carbon Footprint

For 2012, buildings contributed 11,546 MT CO2  
 2012, 6<sup>th</sup> consecutive year of reduction in per square foot carbon emissions  
 Fleet and mechanized equipment make up the majority of the remaining emissions  
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Calendar Year	Metric Tons CO2 <sup>4</sup>
2008	27,491
2009	25,628
2010	26,139
2011	26,096
2012	26,528

### Total Carbon Emissions



### Part III: Water Consumption

<sup>4</sup> 1 Metric Ton equal to 2,204 lbs

# Water Consumption

This section includes all water purchased from municipal water systems.

Calendar Year	Water (gallons)
2007	45,720,992
2008	36,629,452
2009	29,906,148
2010	33,993,644
2011	33,078,000
2012	28,458,000

## Analysis

The County has been continuously working to reduce its water consumption. The peak that occurred in 2007 was due to an unnoticed leak at one of the county’s recreation facilities. Another factor behind the increases in 2007 and 2008 was a record breaking drought experience throughout the region. Anytime that water use drastically increases without accompanying sewer volume that spike can be attributed to additional irrigation at county parks and increased evaporation from county swimming pools.

# Part IV: Efficiency Projects

## **Buildings**

- ▶ Buildings are a major energy consumer and emission source and have presented many opportunities to reduce; energy consumption, operating expense and carbon emissions. The information below relates to square feet of County facility that has received an energy upgrade since 1997.
  
- ▶ HVAC upgrades 709,955 Sq Ft.
- ▶ Window Replacement 467,014 Sq Ft
- ▶ Lighting System 929,476 Sq Ft
- ▶ Roof Replacement 498,955 Sq Ft
- ▶ Total Sq Ft of County buildings 1.5 Million
- ▶ 396,653 Sq Ft of facility less than 15 year old

## **Fleet**



Fleet is the largest emission source for which Buncombe County has direct control. Within the past few years the county has worked at reducing fleet energy consumption by matching the vehicle to the specific job. We have purchased many 4 cylinder vehicles for Sheriffs Dept, Permits and Tax. We continue to maintain a strong hybrid fleet and with our new Chevy Volt we are reducing fleet impact on the budget and the environment. With new standards set by the Federal Government for fuel mileage this generation of vehicles provide the power to accomplish the job and the MPG to meet our fuel budget. The county has also expanded the electric vehicle infrastructure to include 6 electric vehicle charging stations.

## Part IV:

### **Conclusion**

Buncombe County has long realized the numerous benefits of reducing energy consumption. Its early efforts to reduce consumption materialized with projects to more efficiently light all facilities and have branched into many other aspects of building function. The county's ongoing efforts have been able to realize reductions in energy consumption per square foot and help mitigate some of the effects of rising energy prices.

The annual energy report strives to gather all the information from past projects and to determine the effect they had on energy consumption and carbon emissions. Buncombe County has made great strides in managing its energy use and reducing the fiscal burden on county residents. The Buncombe County General Services department has been working to reduce energy consumption since 1997 and pledges to continue working toward improving all facilities and vehicles to the best of its ability.

Special thanks to the Finance Department for collecting and compiling the data used in the report.