

August
2014

South Carolina Energy
Statistical Highlights



South Carolina Energy Office

SC Budget and Control Board



This document may be downloaded from the South Carolina Energy Office website
<http://www.energy.sc.gov/edata>

Prepared by Jacob Scoggins
jscoggins@energy.sc.gov

This work is supported by the United States Department of Energy and the South Carolina Energy Office, under Award Number DE-EE0003884, State Energy Program.

Disclaimer: This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Forward

Energy is more important than ever for the functioning of modern economic and civic life. However, households, businesses, non-profit organizations and public agencies in South Carolina continue to face obstacles in their pursuit of affordable and cost-effective sources of energy. As energy prices continue to rise and the state continues on the road to recovery from an economic recession, policy-makers and energy consumers in all sectors require up-to-date energy data to inform their planning and decision-making in the years to come.

South Carolina Energy Statistical Highlights is the South Carolina Energy Office's (SCEO) summary of current and historical energy statistics, with a focus on new and important developments in the state's consumption of energy resources. This report is designed to illustrate and underscore trends in energy consumption that are directly relevant for statewide energy policy and long-range planning.

All efforts have been made to ensure that the information provided in this report is compiled from the best and most recent sources in the public domain. Please note that, because of the broad scope, these data are typically released with a significant time lag. As a result, the majority of the statistics presented in this report are current as of 2012. Please visit www.energy.sc.gov to find the latest updates as new data become available.

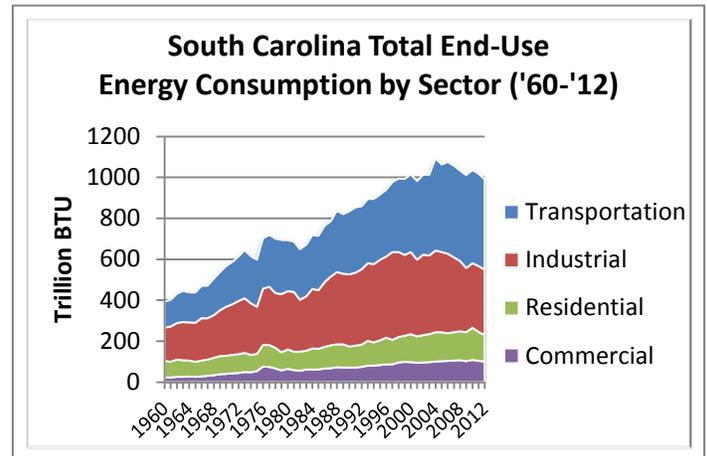
The SCEO, a part of the South Carolina Budget and Control Board, provides a broad range of services to help the state's citizens, businesses, non-profits, and public agencies to save energy and money. You can find out more about us online at www.energy.sc.gov.

Table of Contents

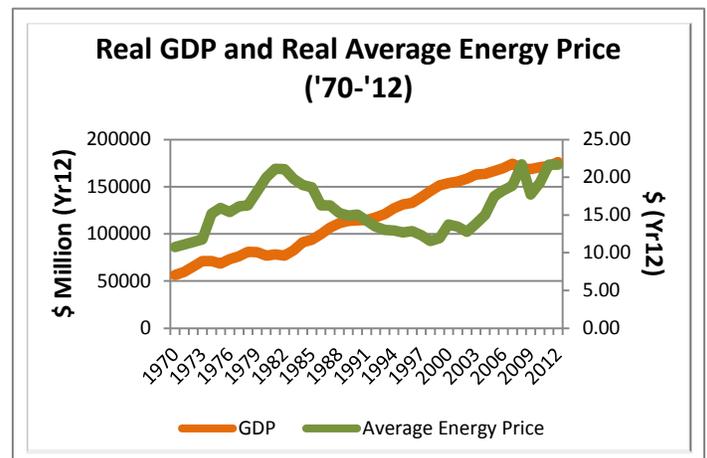
Section 1: Overview - S.C. Energy Demand (2012)	5
Section 2: Energy Expenditures and Prices (2012)	6
<u>Energy Consumption by sector:</u>	
Section 3: Transportation Sector (2012)	7
Section 4: Industrial Sector (2012)	8
Section 5: Residential Sector	9
Section 6: Commercial Sector	10
Section 7: Electricity (2012)	11
<u>Energy Consumption by fuel type:</u>	
Section 8: Petroleum (2012)	13
Section 9: Nuclear, Coal, and Natural Gas (2012)	14
Section 10: Renewable and Alternative Fuels (2012)	15

1. Overview—S.C. Energy Demand (2012)

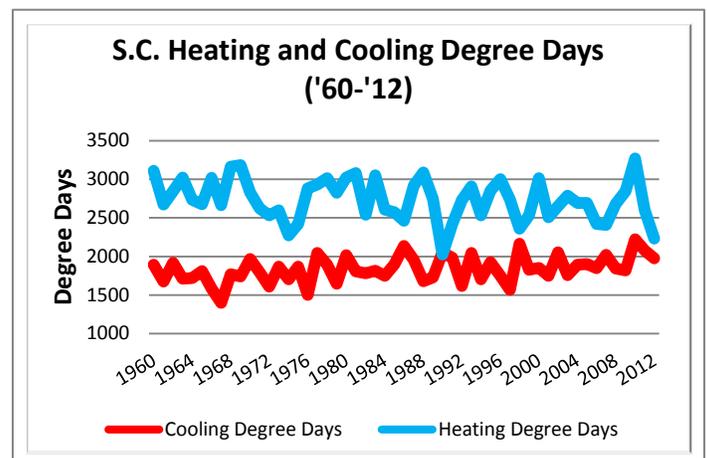
Total end-use energy consumption in South Carolina decreased 2.5% in 2012, as part of a multi-year trend of marginal reductions likely stemming from increasing fuel prices and declining or flat consumption in the transportation, industrial, residential and commercial end-use sectors.¹ (“End-use” is the energy used at the point of consumption; it does not include energy expended in the generation, transmission, or distribution of electricity.)



The 2012 decrease in energy demand occurred alongside flat inflation-adjusted energy prices in the state, and a recovering state economy that experienced a 2.3% increase in real gross domestic product (GDP) four years after the contraction seen in 2008-2009.² Furthermore, leveling off of energy prices occurred after sharp real price increases in the years preceding the 2008-2009 economic downturn.³



Heating degree days (a measure of need for building heating) decreased 14.3% over 2011 levels, contributing to lower energy demand in winter months. Additionally, cooling degree days (a measure of need for building cooling) fell by 5% in 2012, reducing summertime demand for electric-powered air conditioning units.⁴



¹ U.S. Energy Information Administration (EIA): <http://www.eia.gov/state/seds/>

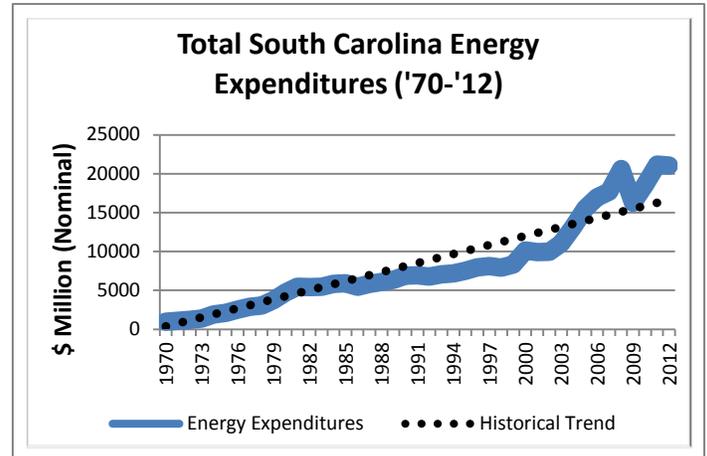
² EIA: <http://www.eia.gov/state/seds/>

³ EIA: <http://www.eia.gov/state/seds/>

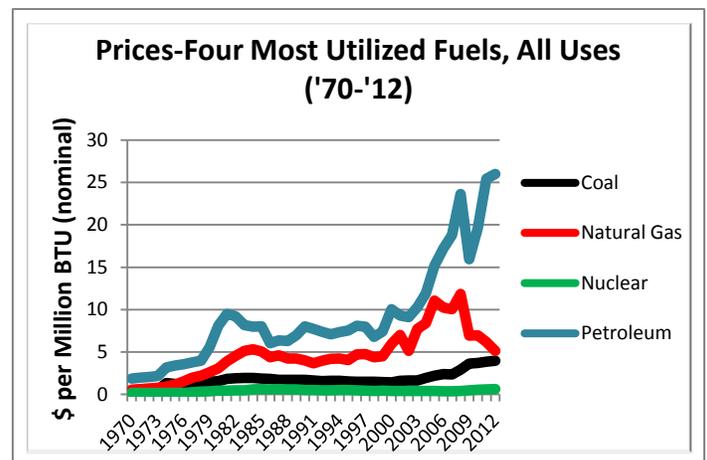
⁴ National Oceanic and Atmospheric Administration: <http://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp#>

2. Energy Expenditures and Prices (2012)

Total South Carolina energy expenditures decreased 0.6% in 2012, to \$21.05 billion but are still well above historically anticipated energy spending levels. The stabilization of energy expenditures from 2010 to 2012 has followed a period of high volatility in expenditures between 2007 and 2009.⁵ A dotted line showing predicted values based on the historical trend is provided at right for reference. (Data for energy expenditures and prices are only available beginning in 1970.)



This slight spending decrease was the result of similarly flat or decreasing year-over-year energy prices, and was coupled with a decline in energy usage. Fuel costs grew modestly in most cases or dropped, with petroleum products increasing 2.16%, coal increasing 3.4%, and natural gas decreasing 16.8%.⁶ (“All uses” takes into account both primary fuels that are used at the point of consumption—such as heating oil or motor gasoline—and fuels burned in the generation of electricity for distribution by utilities.)



Money Leaving South Carolina for Coal Imports ('12)



South Carolina has no indigenous sources of petroleum or coal; therefore, these expenditures represent money leaving this state’s economy and flowing to the states that are depended on to supply these fuels.⁷

⁵ EIA: <http://www.eia.gov/state/seds/>

⁶ EIA: <http://www.eia.gov/state/seds/>

⁷ Coal graphic courtesy of Union of Concerned Scientists: <http://www.ucsusa.org/> Data source-EIA: <http://www.eia.gov/electricity/data/eia923/index.html>

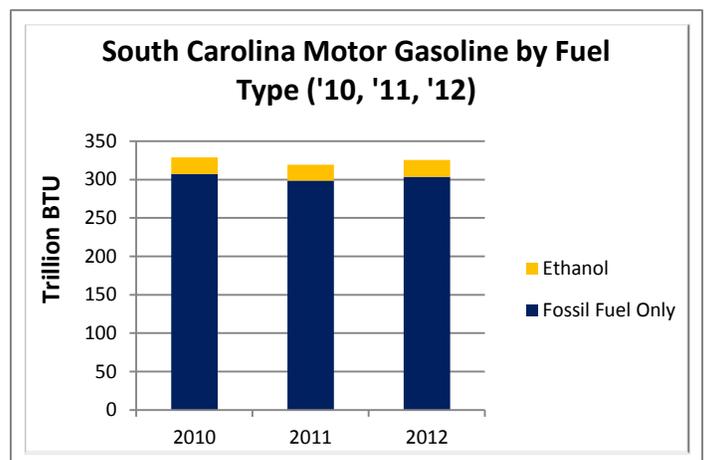
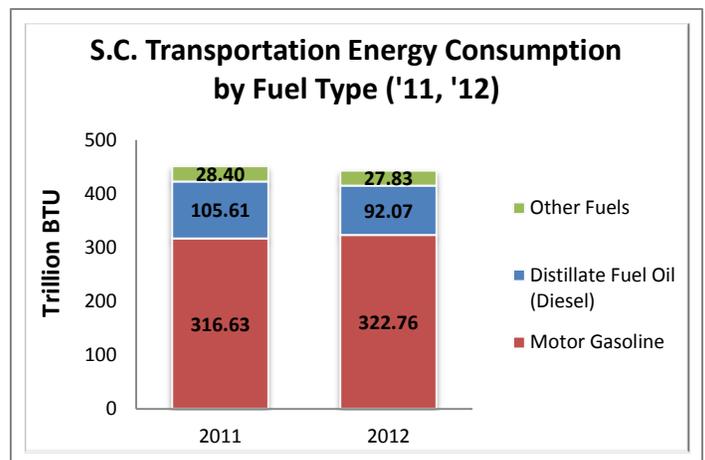
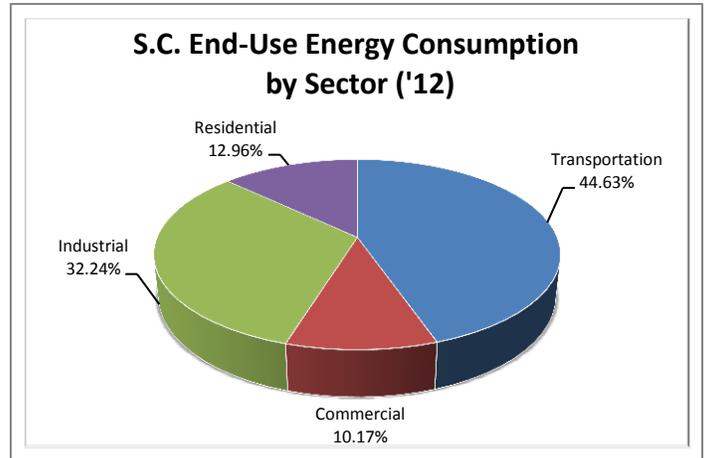
3. Transportation Sector (2012)

South Carolina’s transportation sector was responsible for the largest share of end-use energy consumption in 2012, accounting for 44.6% of the state’s energy usage at the point of consumption.⁸ “Transportation” includes energy usage in all air and ground-based vehicles fueling in the state.

Total transportation energy use decreased in 2012, dipping 1.77% as consumption of diesel fuels declined and despite increased consumption of motor gasoline.

Automobiles are responsible for the majority of energy consumption in South Carolina’s transportation sector. Total motor gasoline consumption increased 1.9% in 2012. Some of the additional consumption was of fuel ethanol, which increased 3% in 2012 (largely through gasoline-ethanol mixes, such as E10). However, these increases in ethanol use are modest compared to much larger increases seen in previous years when ethanol initially gained popularity. Furthermore, ethanol contributed only 6.7% of the total motor gasoline mix in 2012⁹. (South Carolina does not mandate blended gasoline.)

It should be noted that state-level data on transportation energy consumption includes purchases made by out-of-state consumers – for example, cars and trucks traveling on interstate highways. Given that South Carolina has the lowest tax inclusive gas prices on the southeastern portion of the I-95 corridor, it is likely that these data are inflated by trips originating from elsewhere and overstate the transportation energy consumed by South Carolina residents and businesses.¹⁰



⁸ EIA: <http://www.eia.gov/state/seds/>

⁹ EIA: <http://www.eia.gov/state/seds/>

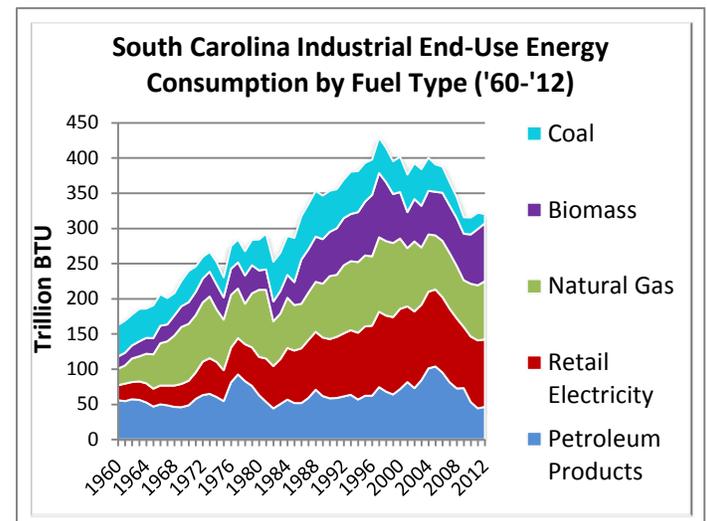
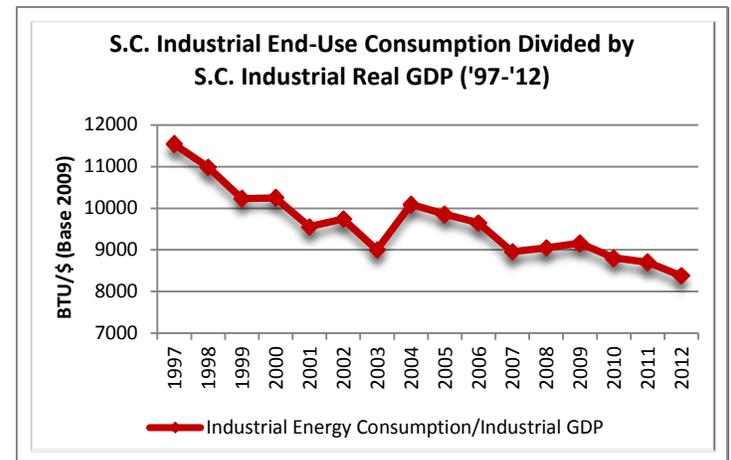
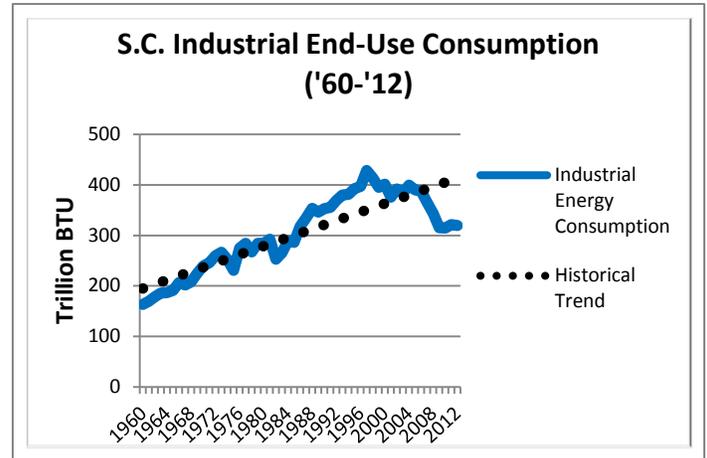
¹⁰ AAA: <http://fuelgaugereport.aaa.com/>

4. Industrial Sector (2012)

The industrial sector was responsible for the second-largest share of end-use energy consumption in 2012, accounting for 32.24% of energy expended. However, total industrial energy usage fell 0.6% in 2012, following a 2.2% increase in 2011. Prior to the increase in 2011, industrial energy consumption had been following a six-year trend of historically anomalous declines. Industrial energy consumption continues to be below historically predicted levels.¹¹

The recent trend of energy consumption decreases can be partially attributed to the effects of declining industrial activity during and following the economic recession. However, the fact that industrial energy consumption per dollar of industrial output has also decreased – through periods of both expansion and contraction – suggests that other factors, such as increased energy efficiency, may be responsible.¹²

Industrial reliance on coal decreased sharply in 2012, falling by over 44%. This was partially mitigated by increases in biomass (3.2%), natural gas (5.2%), petroleum (3.3%), and purchased electricity (0.25%). While overall energy use in the industrial sector has been decreasing, there has been increased reliance on natural gas, biomass and electricity as exploitation of petroleum and coal has declined over a multi-year period.¹³



¹¹ EIA: <http://www.eia.gov/state/seds/>

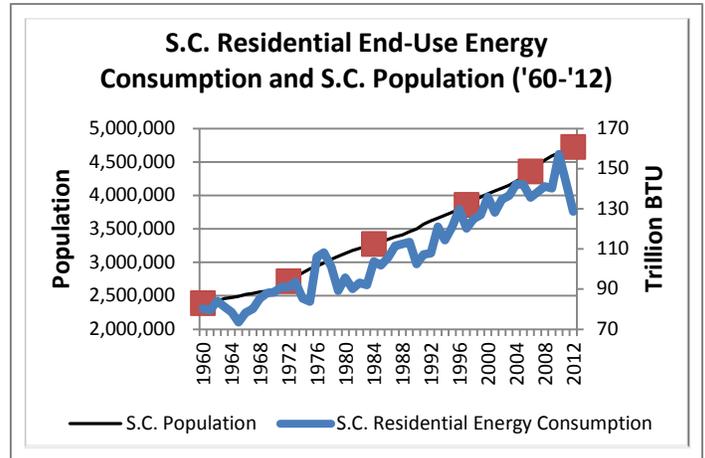
¹² EIA: <http://www.eia.gov/state/seds/>

BEA: <http://www.bea.gov/regional/index.htm>

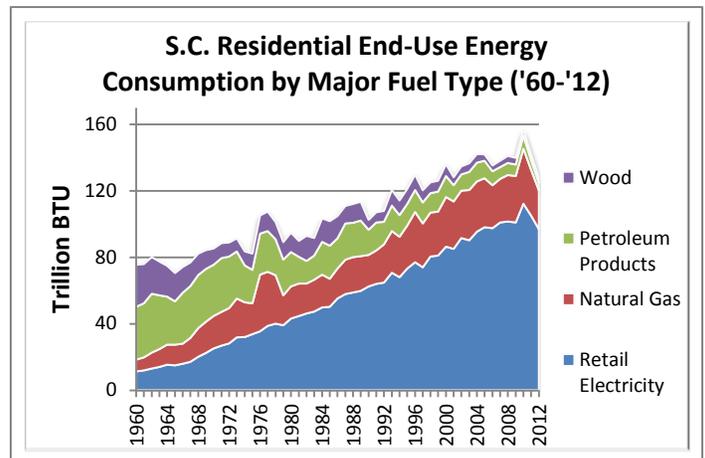
¹³ EIA: <http://www.eia.gov/state/seds/>

5. Residential Sector (2012)

End-use energy consumption in the residential sector decreased 10% in 2012. This continues a historically anomalous period in which residential energy consumption has continued to decrease as population has increased. Prior to this recent period, residential energy use correlated closely with population growth and remained constant on a per capita basis. However, the recent declines have deviated sharply from the historical trend.¹⁴



The significant decline in residential end-use consumption is associated with decreases in the fuels that are primarily consumed by homes. Petroleum continued its recent trend, with residential use falling 26%. Natural gas, which has been replacing petroleum in recent years, also fell by 15%. Electricity continues to predominate as the preferred energy source for heating, cooling, and power of South Carolina homes. However, consumption of retail electricity also fell by 7.9%.¹⁵



South Carolina had the 7th lowest median household income in 2012. Low-income households are typically less able to invest in cost-effective methods of climate control and home weatherization¹⁶. A South Carolina household earning the median income spent on average 4.8% of their wages on home energy expenditures in 2012, higher than the United States average of 3.9%.¹⁷



¹⁴ EIA: <http://www.eia.gov/state/seds/>

¹⁵ EIA: <http://www.eia.gov/state/seds/>

¹⁶ U.S. Census Bureau:

<http://quickfacts.census.gov/qfd/index.html>

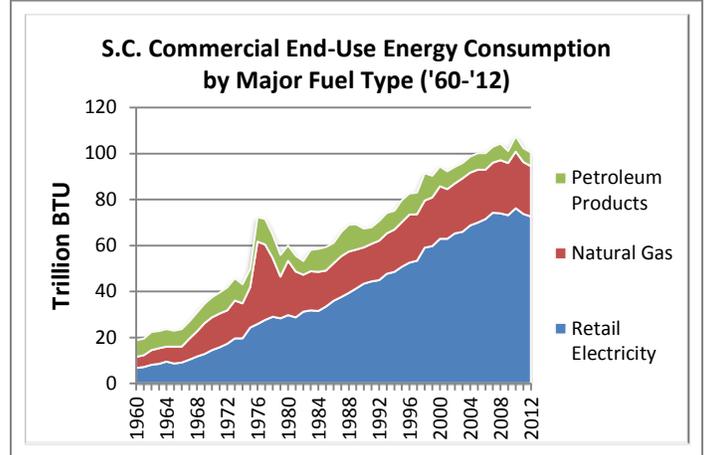
For relevant data on fuel use and home quality by income, see EIA: <http://www.eia.gov/consumption/residential/>

¹⁷ EIA: <http://www.eia.gov/state/seds/>

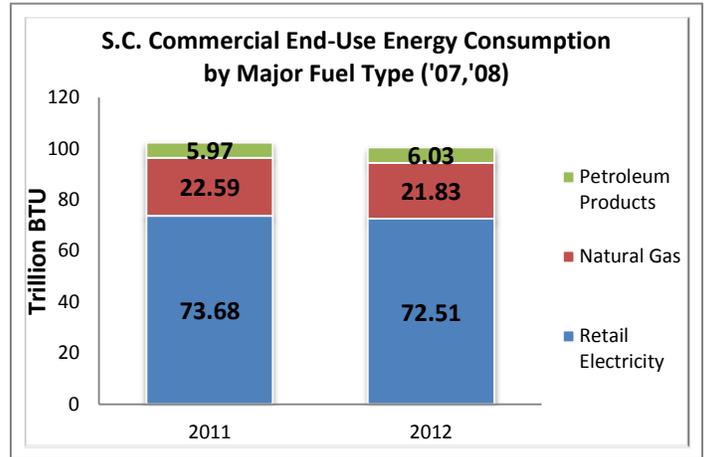
Census: <http://quickfacts.census.gov/qfd/index.html>

6. Commercial Sector (2012)

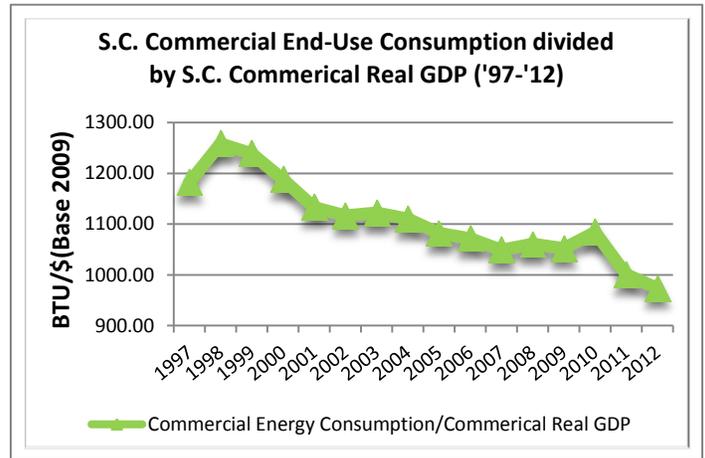
Commercial end-use energy consumption decreased 1.9% in 2012. The commercial sector has grown increasingly reliant on electricity purchases, from which it derived 72.2% of total energy needs at the point of consumption in 2012¹⁸. The commercial demand for natural gas and fuel oil spiked between 1976 and 1978 during a period of unusually cold winters.¹⁹



Commercial electricity purchases decreased 1.6% in 2012, while natural gas decreased 3.3%. Petroleum consumption increased 1%.²⁰



Commercial end-use energy consumption has tracked closely with commercial output in recent years, although energy use per dollar of commercial GDP has decreased 17.6% since 1997.²¹



¹⁸ EIA: <http://www.eia.gov/state/seds/>

¹⁹ SCDNR: <http://www.dnr.sc.gov/>

²⁰ EIA: <http://www.eia.gov/state/seds/>

²¹ EIA: <http://www.eia.gov/state/seds/>

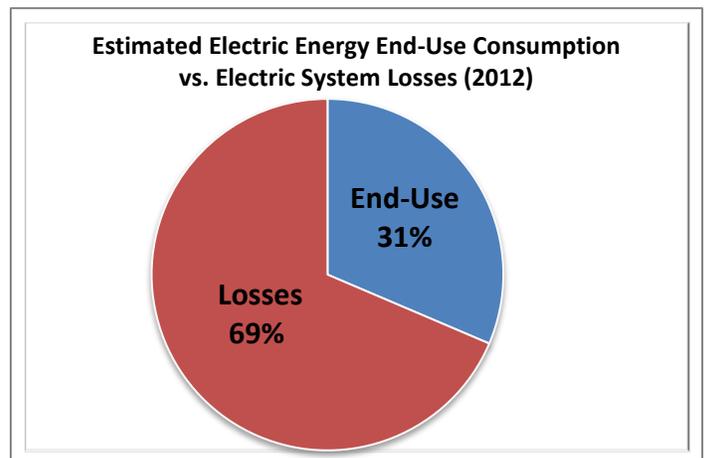
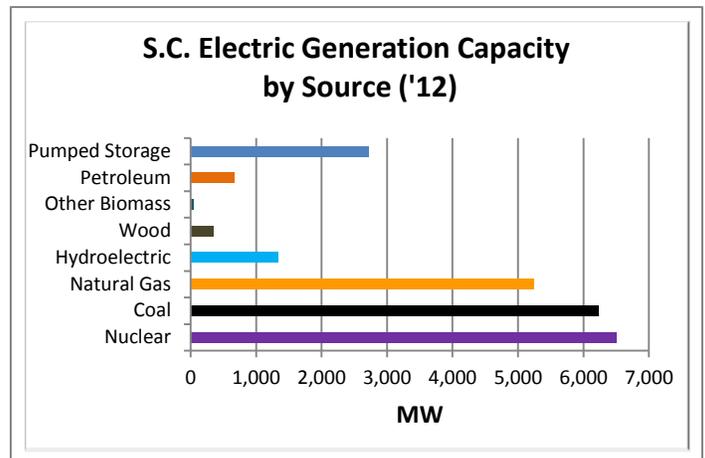
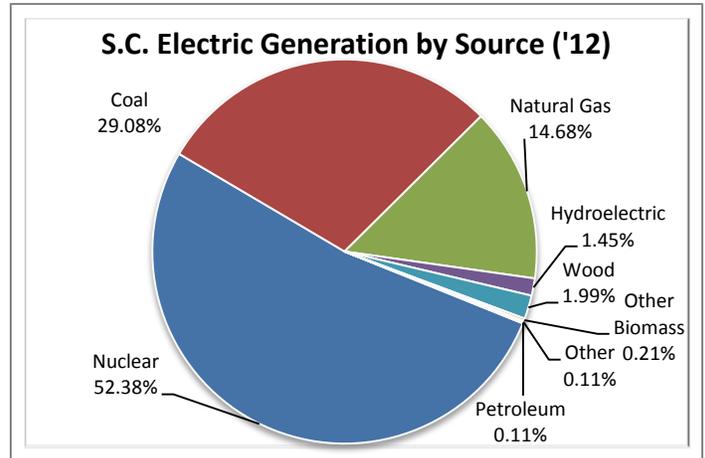
BEA: <http://www.bea.gov/regional/index.htm>

7. Electricity (2012)

More than one half of electricity generated in South Carolina comes from nuclear power. Coal and natural gas make up the bulk of the remaining generation. Hydroelectric and biomass generation account for the largest renewable electricity generation resources in the state.²² However, it is important to note that electricity generated in South Carolina is not necessarily consumed in the state. South Carolina utilities generate more electricity than their in-state customers consume and export excess power. This means that the generation fuel mix is not necessarily representative of the consumption mix.

South Carolina has the third largest amount of nuclear generating capacity in the United States. While coal continues to be the second largest resource by capacity, there has been a dramatic increase in natural gas capacity since 2008. In the electric power sector, natural gas consumption more than doubled in that 4 year time period as natural gas prices have fallen. Again, the state generates more electricity than it consumes and sends this surplus power to other states.²³

The disparity between end-use and total energy consumption is a result of the substantial energy losses that occur in the electrical system. The US Energy Information Administration estimates that over two-thirds of the energy that enters the electrical system in the form of fuel is lost in the process of electricity generation, transmission over long distances, and distribution within service areas.²⁴



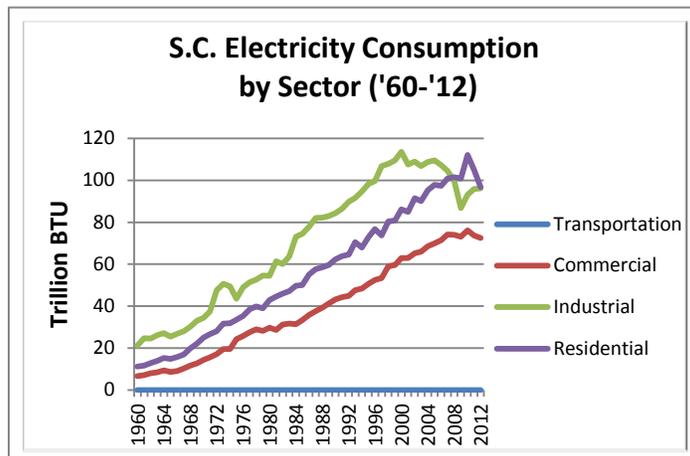
²² EIA: <http://www.eia.gov/state/seds/>

²³ EIA: <http://www.eia.gov/state/seds/>

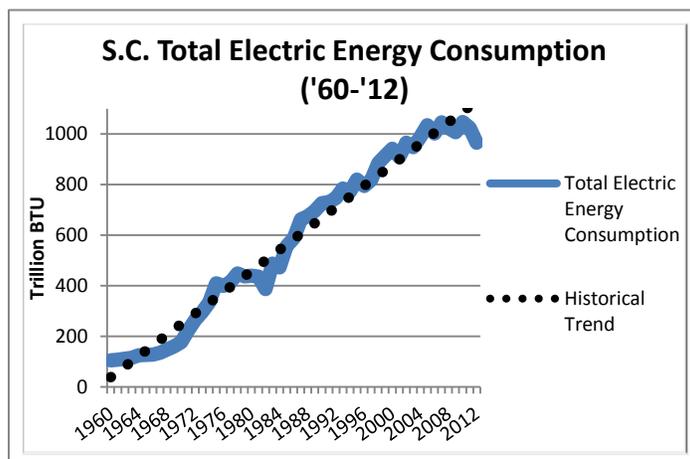
²⁴ EIA: <http://www.eia.gov/state/seds/>

7. Electricity (2012)

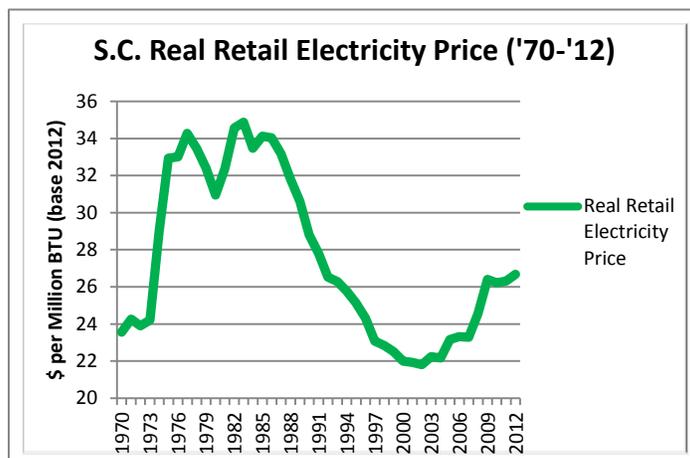
Commercial, residential and industrial end-use sectors in South Carolina have significantly increased their consumption of electricity over the last 40 years. However, 2012 did see a decrease of 7.9% in electricity consumption in the residential sector and a decrease of 1.6% in the commercial sector. The industrial sector increased its consumption slightly following a sharp decrease in the period directly after the economic recession.²⁵



Total South Carolina electricity consumption fell 5.7% in 2012. Electricity consumption plateaued and began to decrease in the past few years after almost forty years of steady increases.²⁶



The leveling in electricity demand can be partially attributed to retail electric prices, which have increased in inflation adjusted terms after a long period of real declines.²⁷



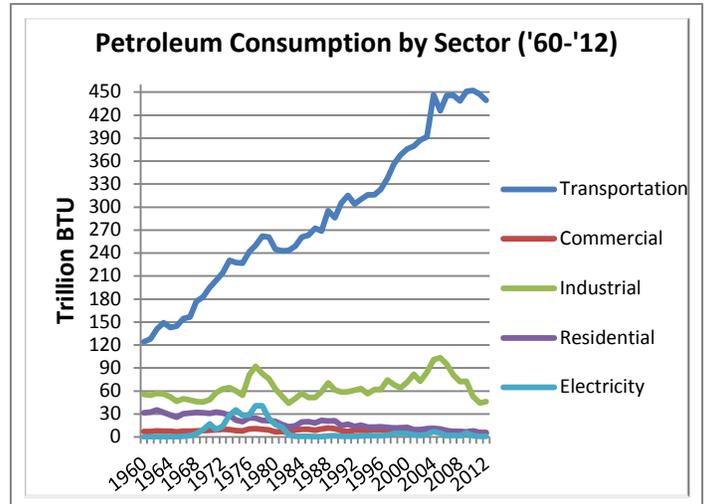
²⁵ EIA: <http://www.eia.gov/state/seds/>

²⁶ EIA: <http://www.eia.gov/state/seds/>

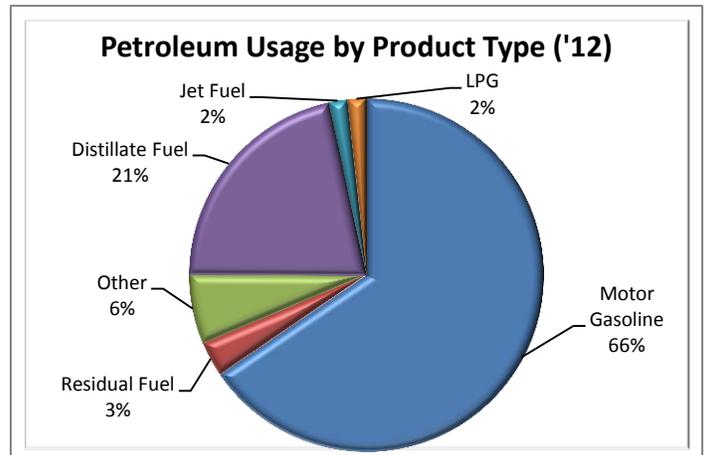
²⁷ EIA: <http://www.eia.gov/state/seds/>

8. Petroleum (2012)

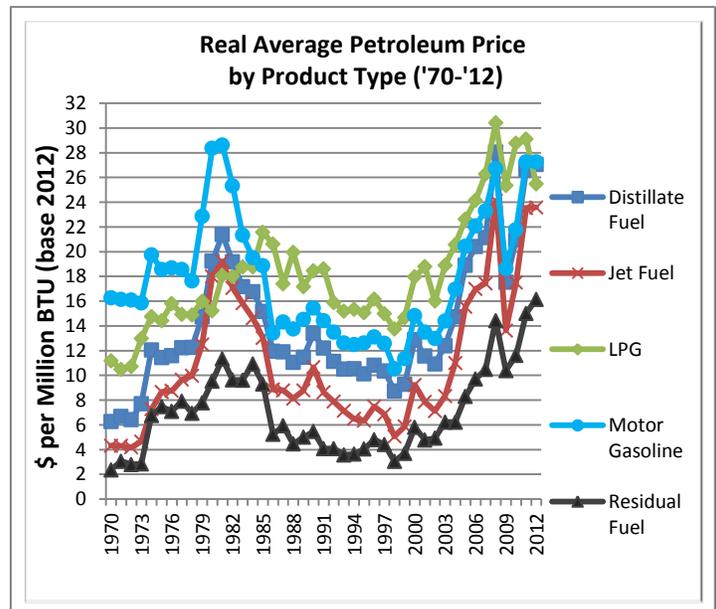
The transportation sector has seen a drastic increase in its use of petroleum products since 1960. However, this consumption has leveled out somewhat in the previous eight years. All other sectors have seen a decrease in their use of petroleum over the same time period.²⁸



With transportation being the largest petroleum consuming sector, motor gasoline is by far the most consumed petroleum product. The two petroleum products most regularly used in ground transportation (diesel and motor gasoline) account for 87% of the petroleum used in the state.²⁹



The real average price of all major petroleum products has increased since 1998. Motor gasoline prices increased 158% and distillate fuel increased by 209%. However, the year-over-year change in price for these two fuels was relatively flat. While there have been steady price increases over the last fourteen years, consumption of petroleum products has continued to grow.³⁰ This is consistent with academic findings that demand for transportation fuels is highly inelastic, and has become even more so in recent years.³¹



²⁸ EIA: <http://www.eia.gov/state/seds/>

²⁹ EIA: <http://www.eia.gov/state/seds/>

³⁰ EIA: <http://www.eia.gov/state/seds/>

³¹ See Hughes, J., Knittel, C. and Sperling, D. "Evidence of a Shift in the Short-Run Price Elasticity of Gasoline Demand". National Bureau of Economic Research (2006).

9. Nuclear, Coal and Natural Gas (2012)

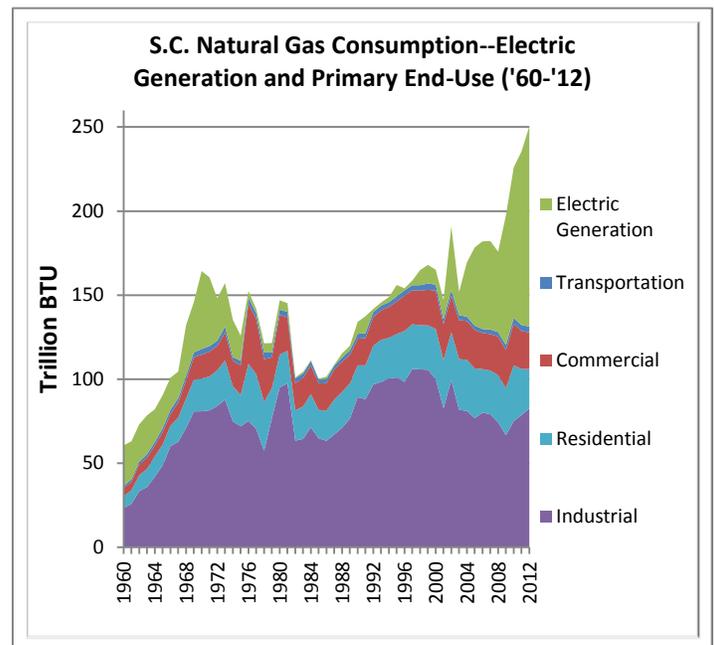
Nuclear power is vital energy resource for the state of South Carolina. There are currently seven reactors at four nuclear power plants in the state, and two more are being constructed. Nuclear power continued as the most cost-effective source of energy from a price-per-BTU perspective, but the price did increase by 8.6% in 2012.³²



South Carolina has no coal mines of its own. However, coal continues to be a major energy resource in the state. This means that coal must be imported from a number of other states to power domestic coal fired power plants. The price of electricity produced from coal increased 3.38% in 2012.³³



Natural gas met 14.8% of South Carolina's total energy needs in 2012, through both direct on-site consumption for building heating and industrial production and for electric power generation. Between 2008 and 2012 natural gas consumption by the electric power sector more than doubled. Since 2009 the industrial sector has been the second largest consumer of natural gas after being overtaken by the electric power sector. Additionally, about one-fourth of households in South Carolina use natural gas for heating. However, the residential sector lags behind in consumption due to relatively mild winters with low demand for heating. This greater use of this resource has come as prices have decreased over fifty percent over four years.³⁴ But the demand for, and cost of, natural gas has historically been very volatile, shifting in response to both supply-side factors, such as refinery disruptions and changing availability of fuels for which natural gas is a substitute, and demand-side factors, such as fluctuations in temperature and peak demand for electric power.³⁵



³² EIA: <http://www.eia.gov/state/seds/>

³³ EIA: <http://www.eia.gov/state/seds/>

³⁴ EIA: <http://www.eia.gov/state/seds/>

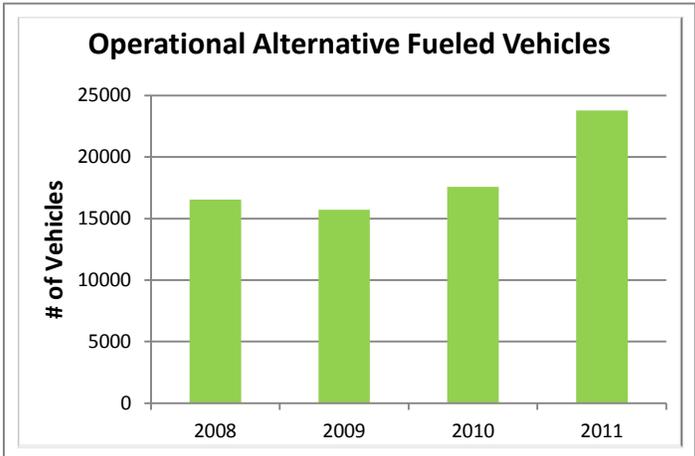
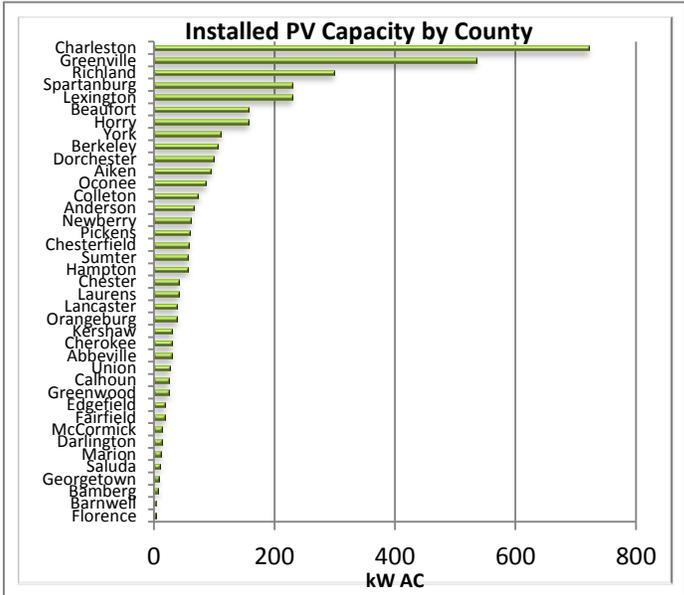
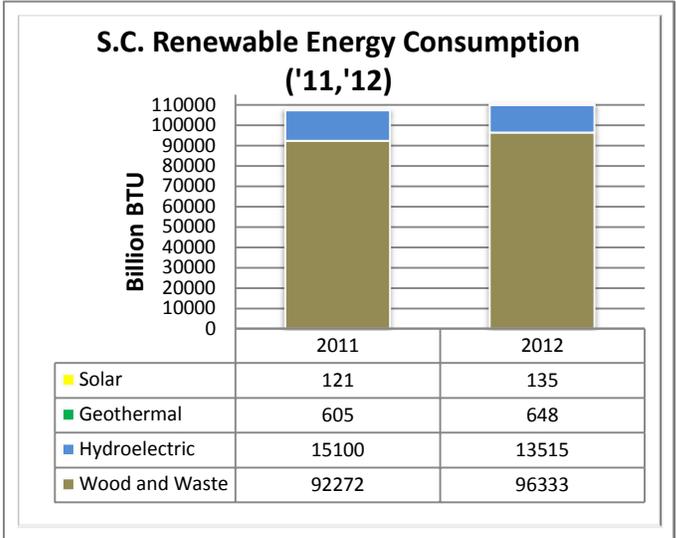
³⁵ See EIA, "An Analysis of Price Volatility in Natural Gas Markets.":

10. Renewables and Alternative Fuels (2012)

Renewable energy consumption in South Carolina grew 2.3% in 2012, with the largest percentage increases coming from solar (11.5%) and geothermal (7.1%). However, these two resources make up a very small portion of the renewable portfolio in South Carolina. Biomass, in the form of wood and waste, and hydroelectricity are the two largest renewable resources in the state. Biomass consumption grew 4.4%, while hydroelectric fell by 10% in 2012.³⁶ The drop in hydroelectric generation coincided with a period of moderate to severe drought conditions in much of the state.³⁷ Renewable sources continued to meet only a small fraction of the consumption needs of the state in 2012.³⁸

In spring of 2014 the South Carolina General Assembly passed, and the governor signed, the Distributed Energy Resource Program Act. This legislation is meant to encourage development of solar energy in the state and give citizens greater access to distributed photovoltaic systems. Currently most distributed solar generation facilities are located in the most populous counties and coastal counties. Charleston County has the most installed capacity with over 700 kW.³⁹

As mentioned in Section 3 (Transportation Sector), consumption of ethanol and other alternative vehicle fuels increased in 2012. The number of alternative fueled vehicles has also increased by 43.6%⁴⁰. This has been made possible in part by the expansion in the number of alternative fueling stations available in the state.



³⁶ EIA: <http://www.eia.gov/state/seds/>
³⁷ SC DNR: http://www.dnr.sc.gov/climate/sco/Drought/drought_current_info.php
³⁸ EIA: <http://www.eia.gov/todayinenergy/detail.cfm?id=4850&src=email>
³⁹ South Carolina Energy Office: Internal Data
⁴⁰ EIA: <http://www.eia.gov/renewable/afv/users.cfm>