

October
2015



South Carolina Energy Statistical Highlights

Office of Regulatory Staff
Energy Office



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Contact: Jacob Scoggins, Energy Specialist
jscoggins@regstaff.sc.gov

This work is supported by the United States Department of Energy and the South Carolina Energy Office, under Award Number DE-EE0006996, State Energy Program.

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Forward

Energy is more important than ever for the functioning of modern economic and civic life. As new regulations are implemented and grid infrastructure investments are needed, policy-makers and energy consumers in all sectors require relevant data to inform their planning and decision-making in the years to come.

South Carolina Energy Statistical Highlights is the Office of Regulatory Staff -- Energy Office's (EO) 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 most accurate and most recent sources in the public domain. Unless otherwise noted, the source of all data in this report is the United States Energy Information Administration. 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 2013. Please visit www.energy.sc.gov to find the latest updates as new data become available.

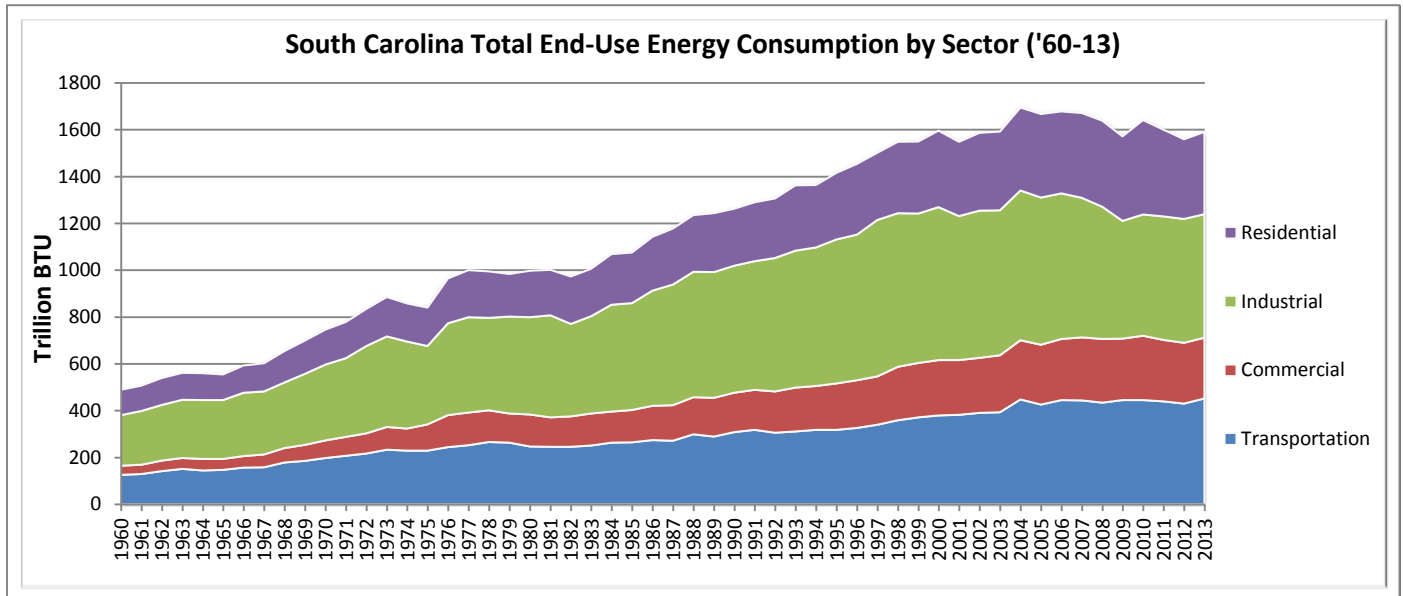
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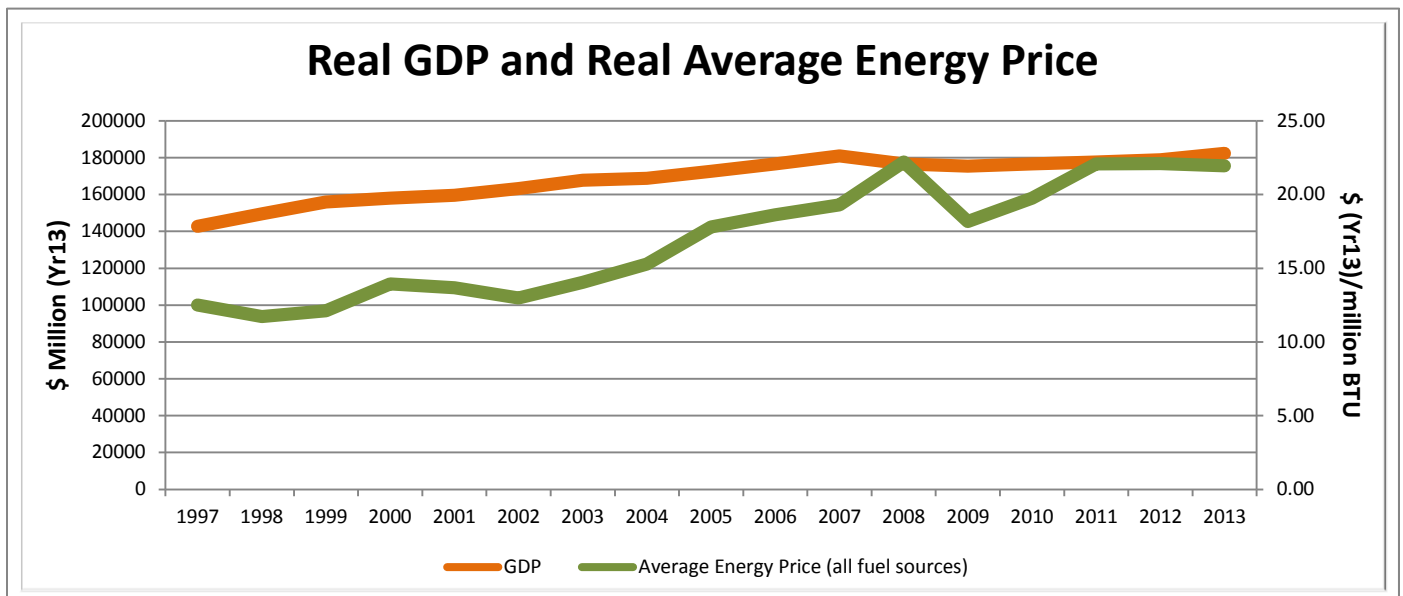
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1. Overview—S.C. Energy Demand

Total end-use energy consumption in South Carolina increased 2.5% in 2013, thus reversing a multi-year trend of marginal reductions. Consumption in the residential, commercial and transportation sectors increased, while the industrial sector saw a small decrease (“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.)

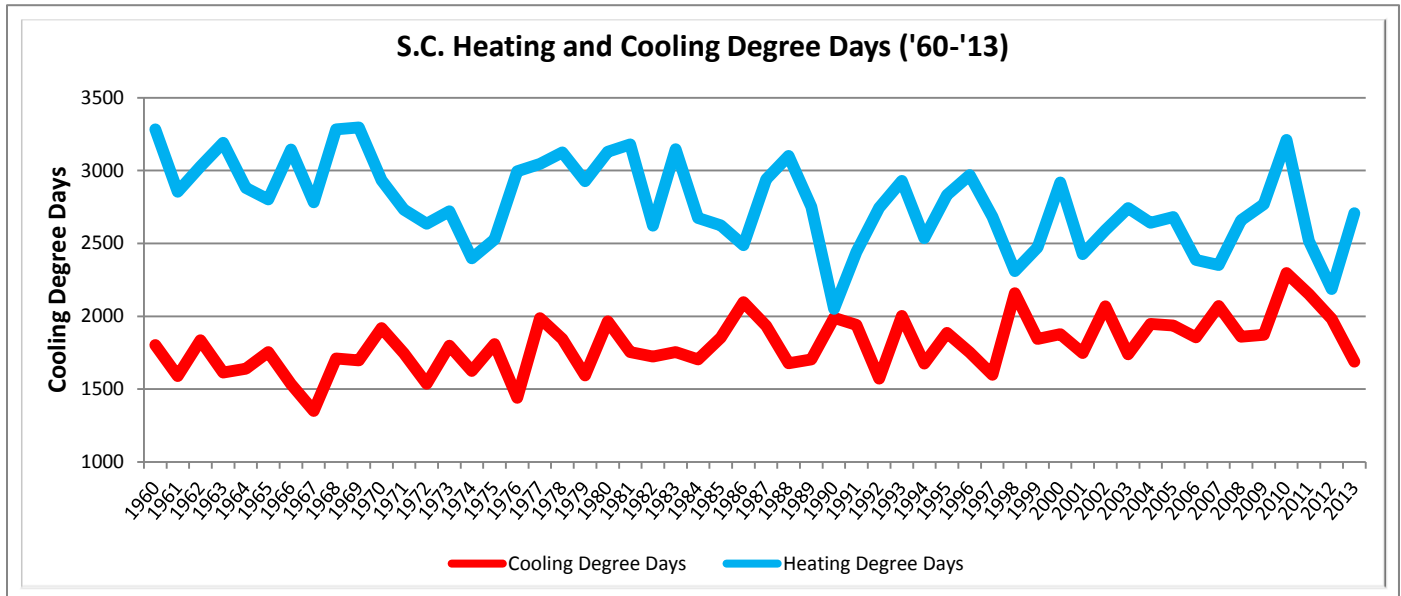


The 2013 increase in energy demand occurred alongside flat (and slightly decreasing) inflation-adjusted energy prices in the State, and a recovering State economy that experienced a nearly 2% increase in real gross domestic product (GDP) five years after the contraction seen in 2008-2009. Furthermore, leveling off of energy prices occurred after sharp real price increases in the years preceding the 2008-2009 economic downturn.



1. Overview—S.C. Energy Demand

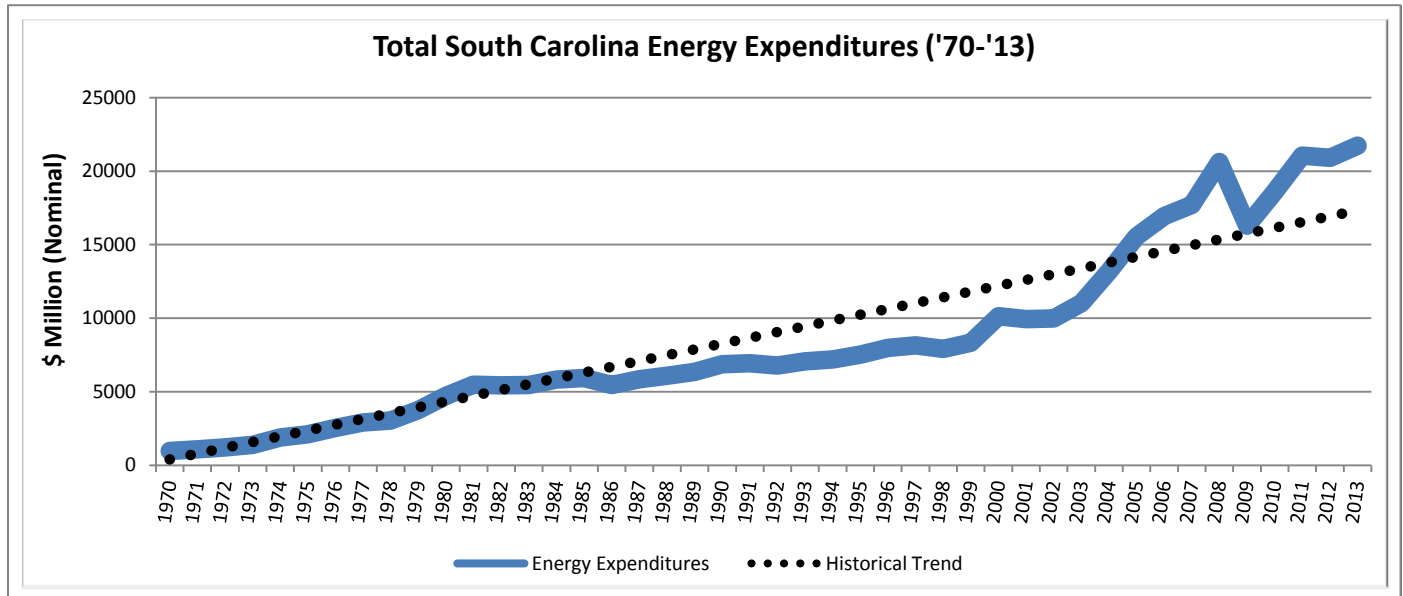
Heating degree days (a measure of need for building heating) increased 23.7% over 2012 levels, thus contributing to higher energy demand in winter months. Conversely, cooling degree days (a measure of need for building cooling) fell by 14.8% in 2013, reducing summertime demand for electric-powered air conditioning units. There were 1,874 cooling degree days in 2013, and 2,943 heating degree days.¹



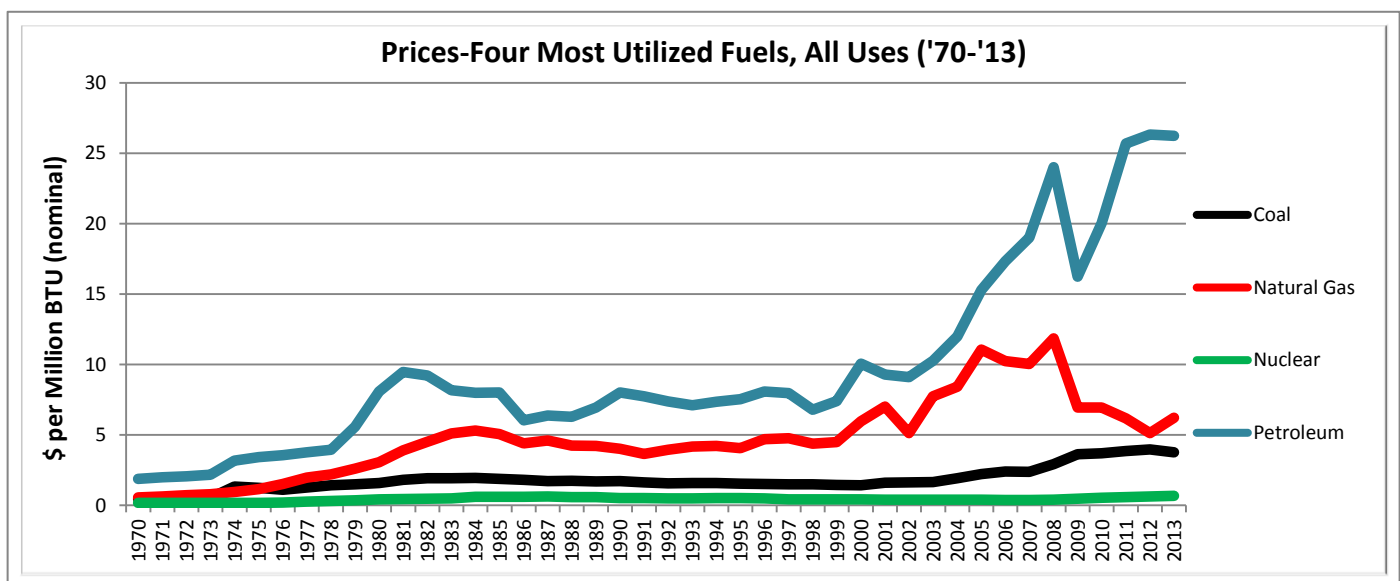
¹ National Oceanic and Atmospheric Administration: <http://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp#>

2. Energy Expenditures and Prices

Total South Carolina energy expenditures increased 3.9% in 2013, to \$21.73 billion and were above historically anticipated energy spending levels. The stabilization of energy expenditures from 2010 to 2013 has followed a period of high volatility in expenditures between 2007 and 2009. A dotted line showing predicted values based on the historical trend is provided at right for reference.

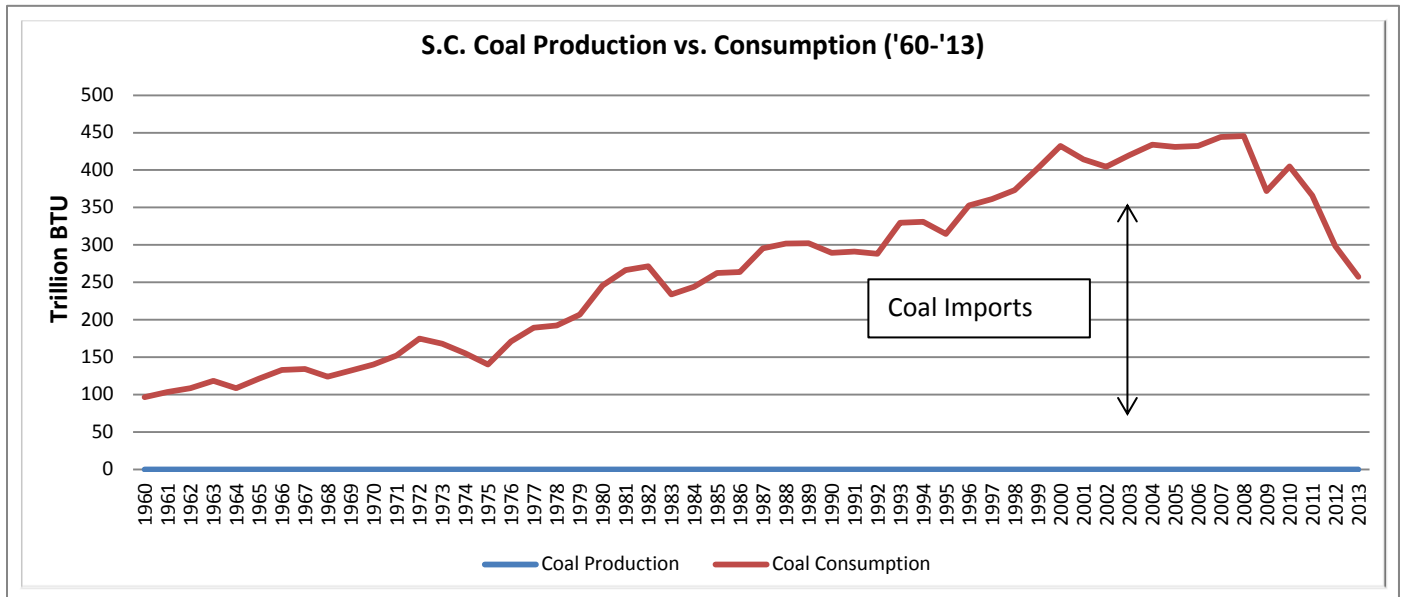


This spending increase can be partly attributed to flat or increasing fuel costs and was coupled with a decline in energy usage. Fuel costs grew significantly in some cases and dropped modestly in others. Petroleum products decreased 0.3% and coal by 5.5%; natural gas increased 21% between 2012 and 2013. ("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.)



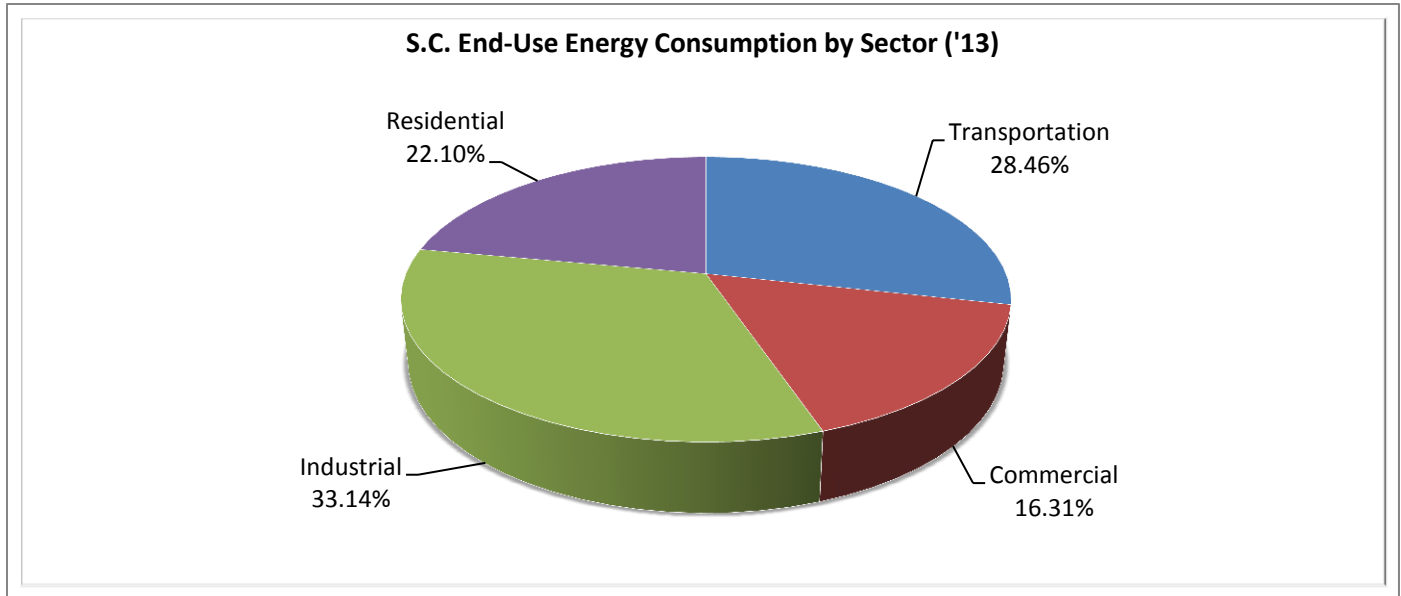
2. Energy Expenditures and Prices

South Carolina has no indigenous sources of petroleum or coal; therefore, these resources must be purchased from other States or countries to be used for electricity generation and as transportation fuel.

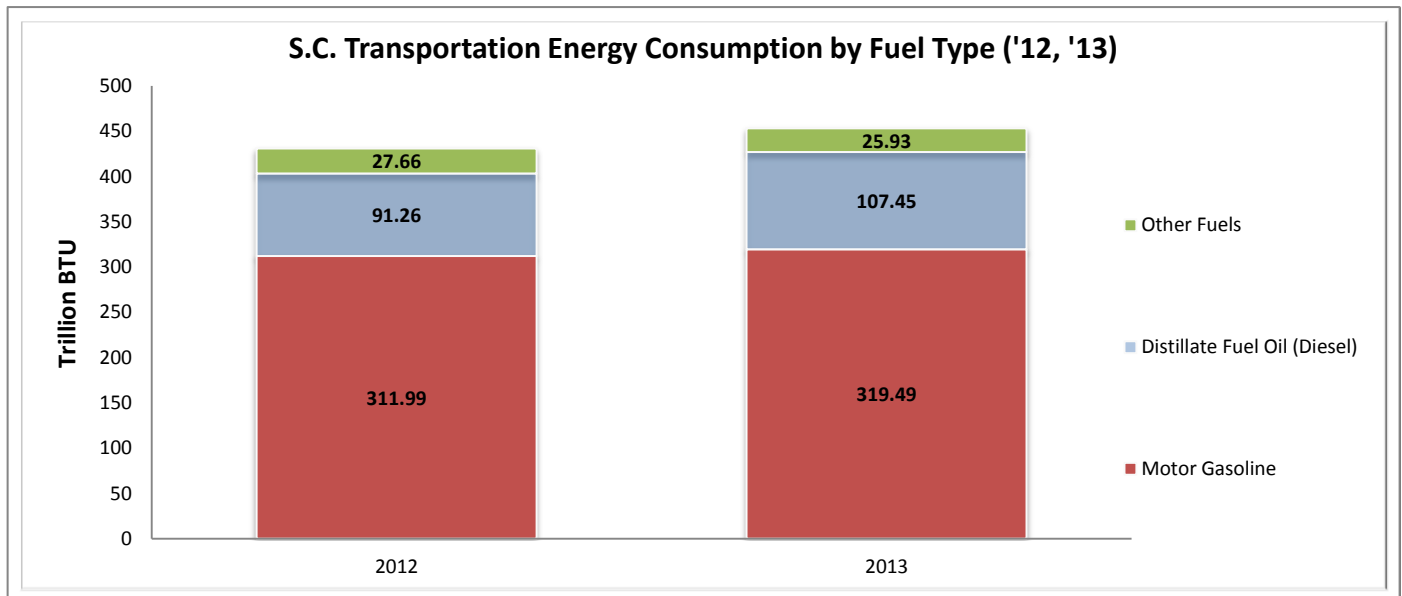


3. Transportation Sector

South Carolina's transportation sector was responsible for the second largest share of end-use energy consumption in 2013 and accounted for 28.46% of the State's energy usage at the point of consumption. "Transportation" includes energy usage in all air and ground-based vehicles fueling in the State.



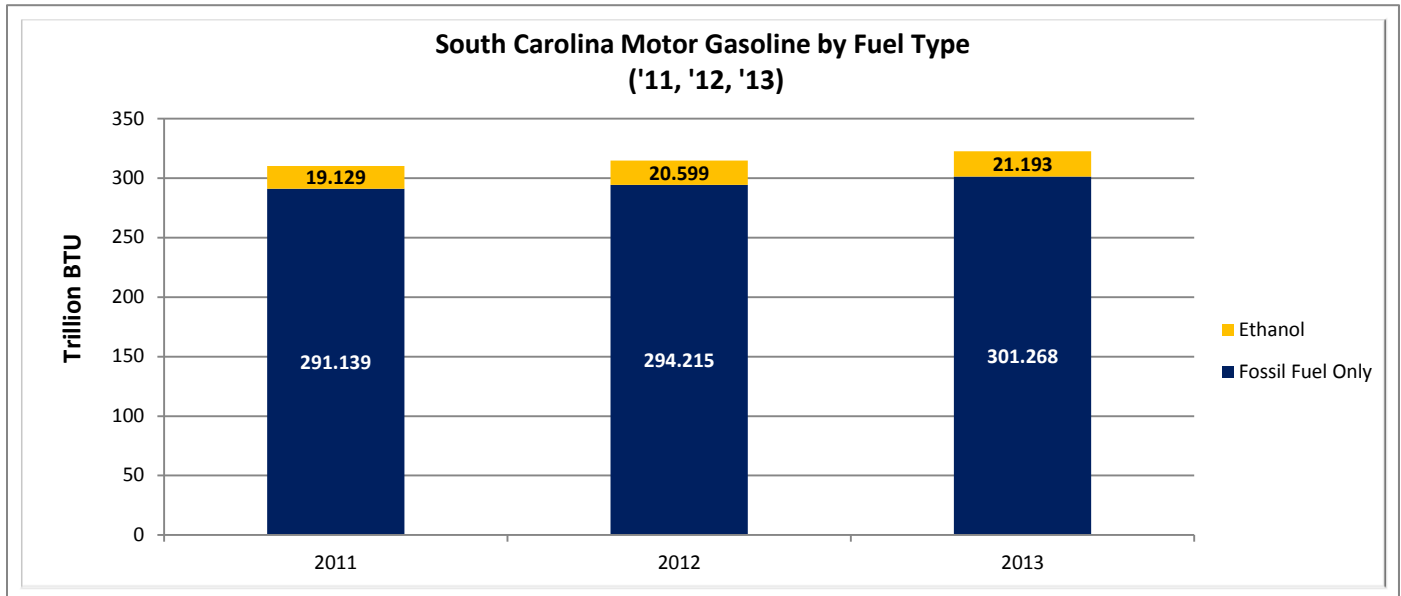
Total transportation energy use increased in 2013 by 5.1% as consumption of both diesel fuels and motor gasoline increased.



Automobiles are responsible for the majority of energy consumption in South Carolina's transportation sector. Total motor gasoline consumption increased by 2.4% in 2013. Some of the additional consumption was of fuel ethanol, which

3. Transportation Sector

Increased by 2.9% (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 6.6% of the total motor gasoline mix in 2013. (South Carolina does not mandate blended gasoline.)

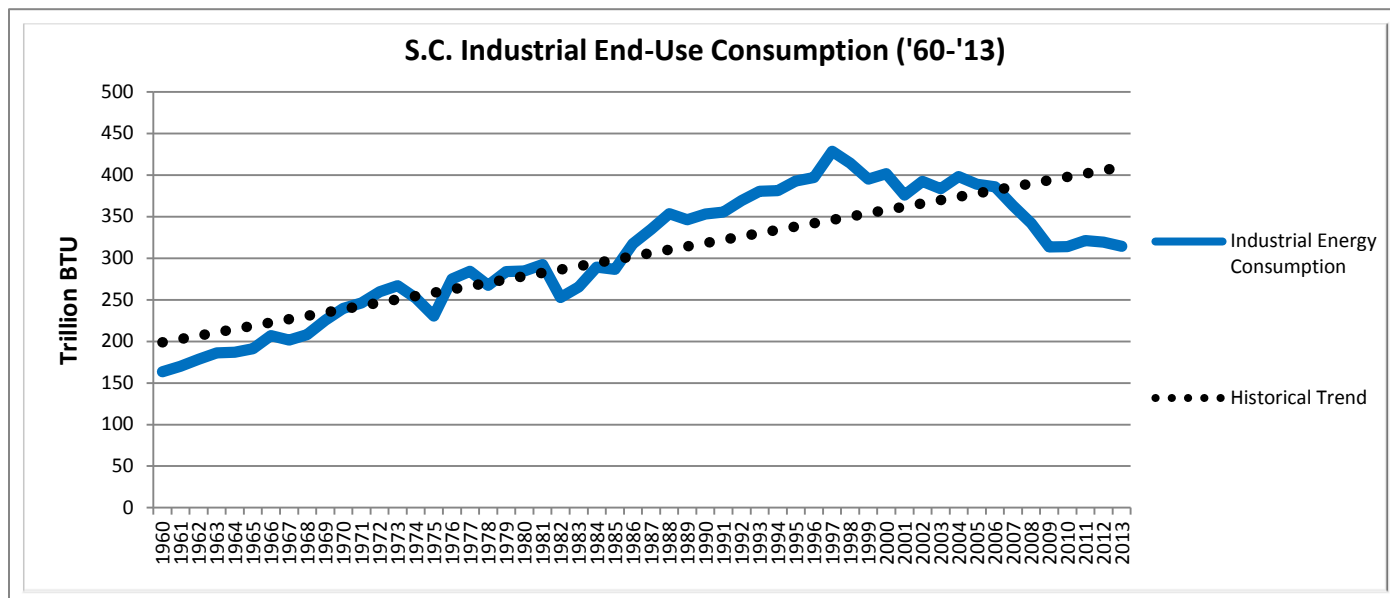


It should be noted that state-level data on transportation energy consumption includes purchases made by out-of-state consumers – for example, cars and trucks traveling on interstate highways. Given that South Carolina has the lowest tax-inclusive gas prices on the southeastern portion of the I-95 corridor, 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.²

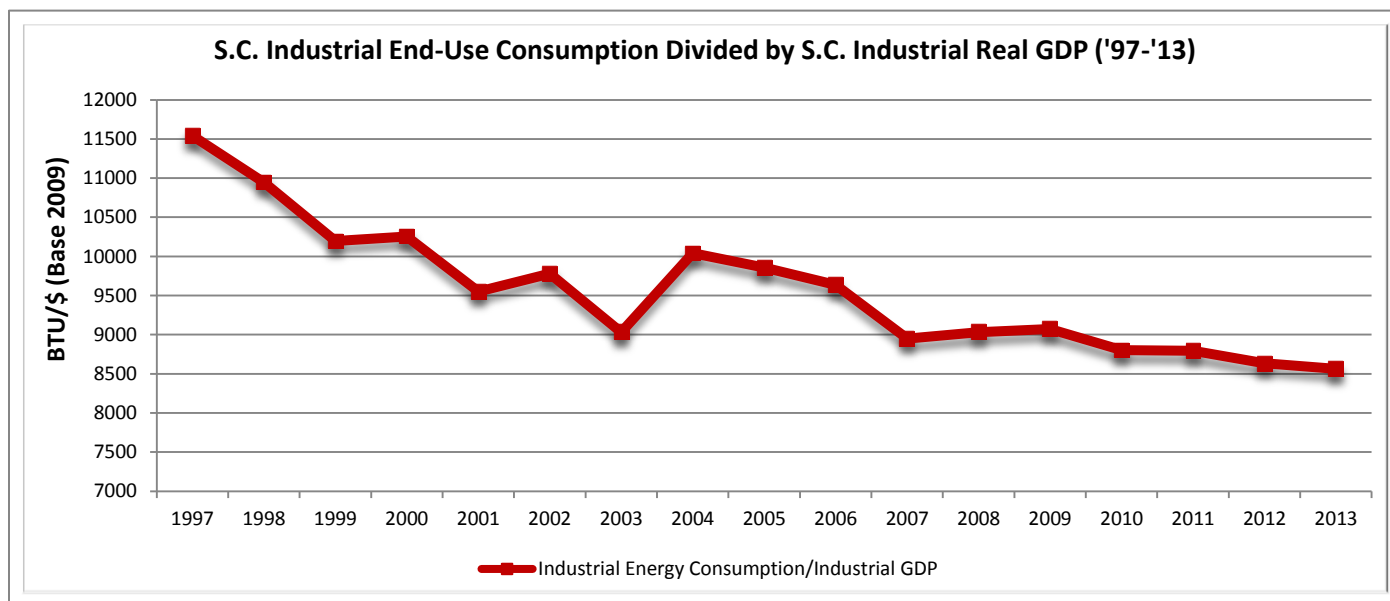
² AAA: <http://fuelgaugereport.aaa.com/>

4. Industrial Sector

Accounting for 33.14% of energy expended, the industrial sector was responsible for the largest share of end-use energy consumption in 2013. However, total industrial energy usage fell 1.6% in 2013. With the exception of a slight increase in 2011, industrial energy consumption has been following a multi-year trend of historically anomalous declines beginning around 2007. Industrial energy consumption continues to be below historically predicted levels.



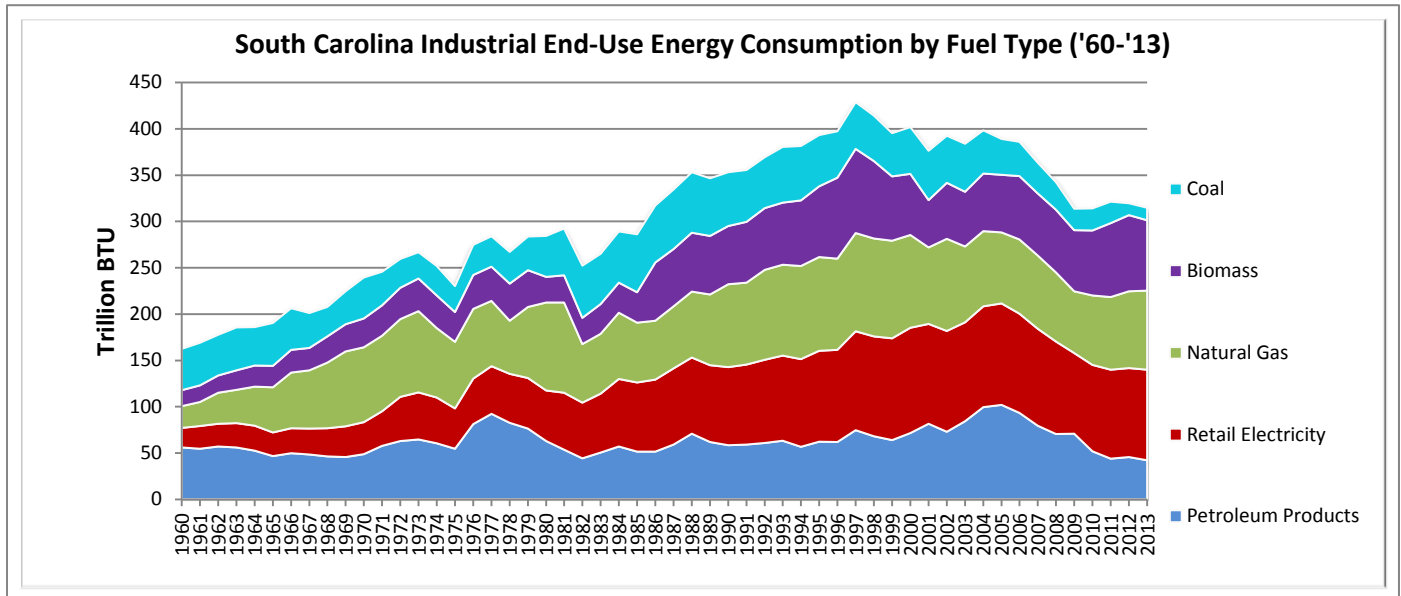
The recent trend of energy consumption decreases can be partially attributed to the effects of declining industrial activity during and following the economic recession. However, the fact that industrial energy consumption per dollar of industrial output has also decreased — through periods of both expansion and contraction — suggests that other factors, such as increased energy efficiency, may be responsible.³



³ United States Bureau of Economic Analysis (BEA): <http://www.bea.gov/regional/index.htm> (GDP data)

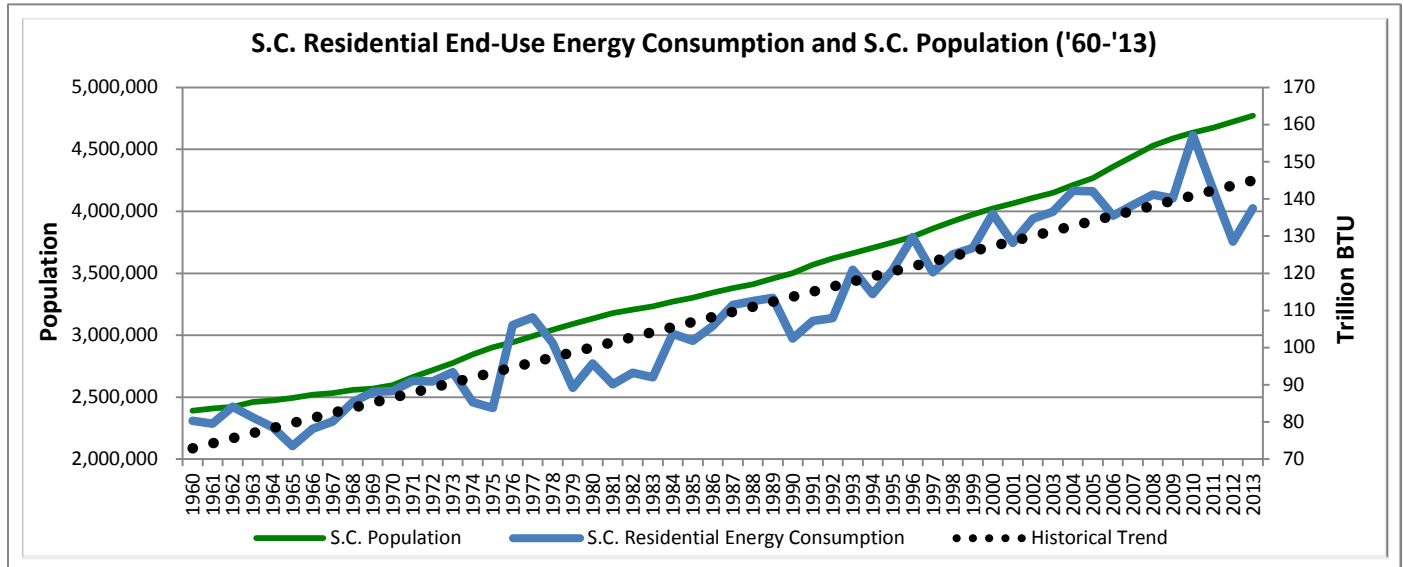
4. Industrial Sector

Growing by almost 3% after a sharp decrease in 2012 industrial reliance on coal increased slightly in 2013. This increase was accompanied by increases in natural gas (3%) and purchased electricity (1.8%) and decreases in petroleum (-7.8%), and biomass (-7.4%). While overall energy use in the industrial sector has been decreasing, general reliance on natural gas, biomass, and electricity has increased as use of petroleum and coal has declined over a multi-year period.

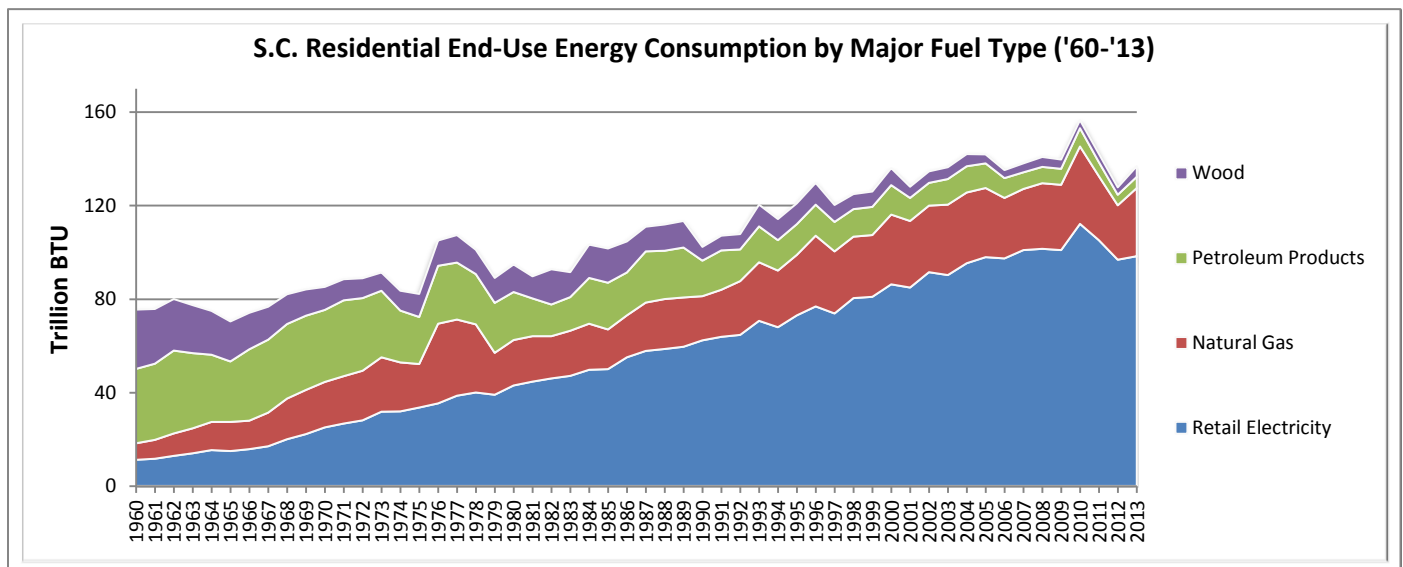


5. Residential Sector

End-use energy consumption in the residential sector increased by 6.9% in 2013. This increase breaks with the recent anomalous trend in which residential energy consumption has continued to decrease as population has increased. In the past, residential energy use correlated closely with population growth and remained relatively constant on a per-capita basis. Despite the increase in 2013, residential energy use remains below the historical trend compared to the population.

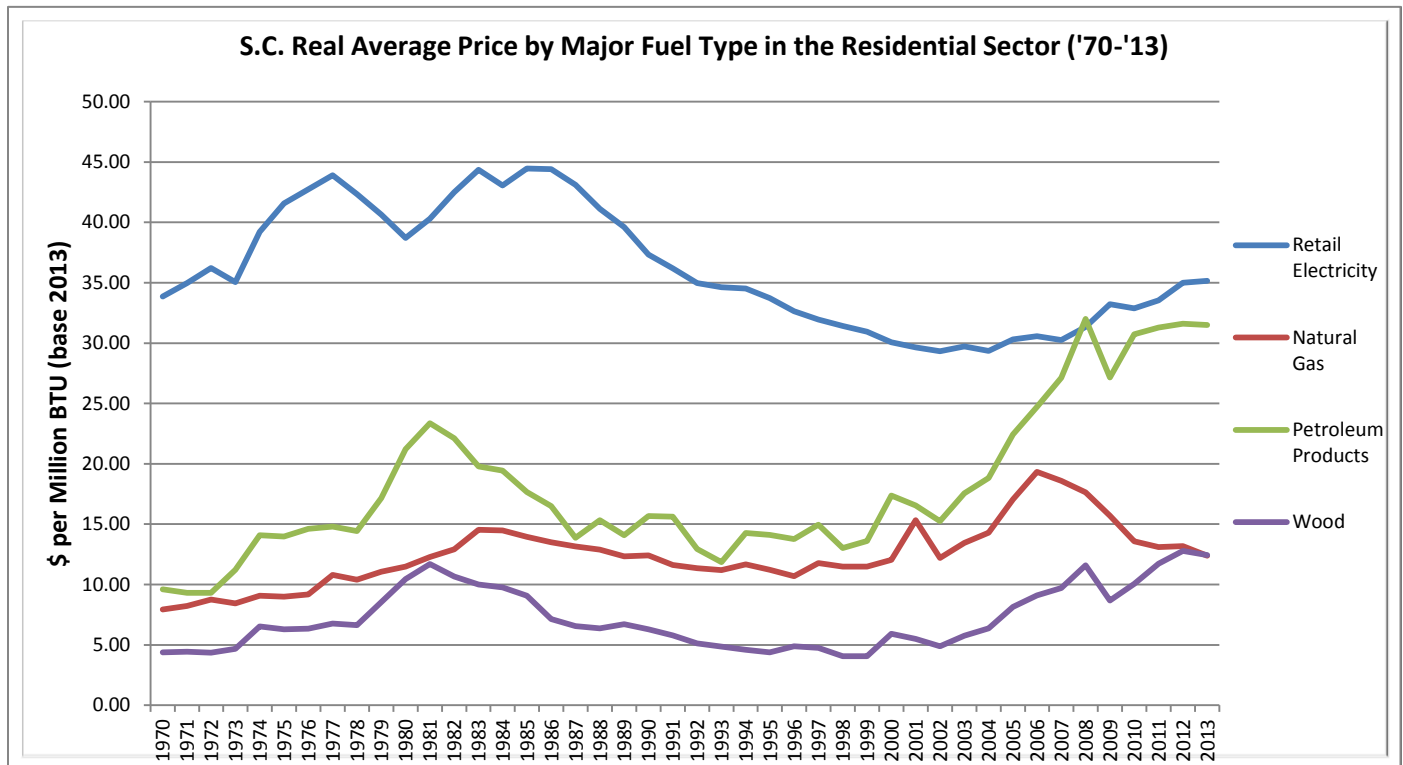


The increase in residential end-use consumption is associated with increases in the fuels that are primarily consumed by homes. Petroleum reversed its recent downward trend, with residential use rising 6%. Natural gas, which has been replacing petroleum in recent years, increased by 25%. Electricity continues to be the predominant energy source for heating, cooling, and providing power to South Carolina homes. Consumption of retail electricity increased by 1.6%. Additionally, while wood continues to make up a very small portion of residential end-use energy consumption, use of wood for heating increased substantially (38%) in 2013, a year with a particularly cool winter.



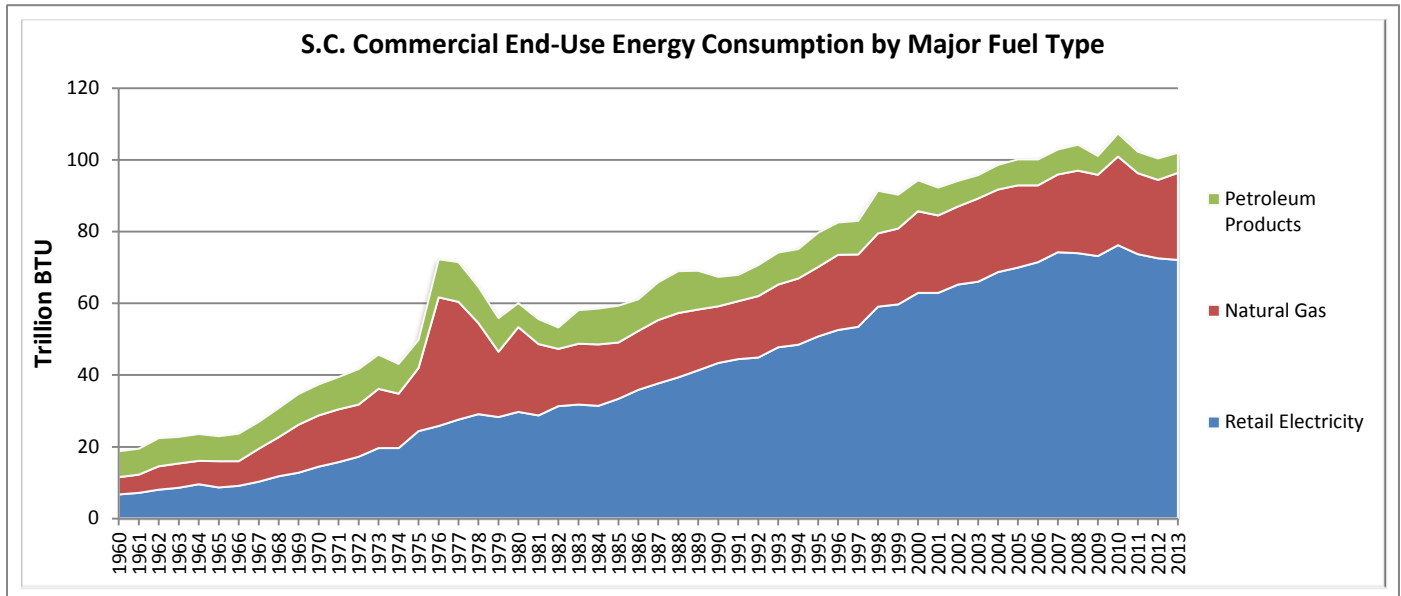
5. Residential Sector

The average price of all of the most utilized fuels in the residential sector fell between 2012 and 2013, with the exception of retail electricity. Natural gas decreased by 6%, petroleum products by 0.3%, and wood by 2.7%. The price of retail electricity remained relatively flat with an increase of 0.44% in 2013.

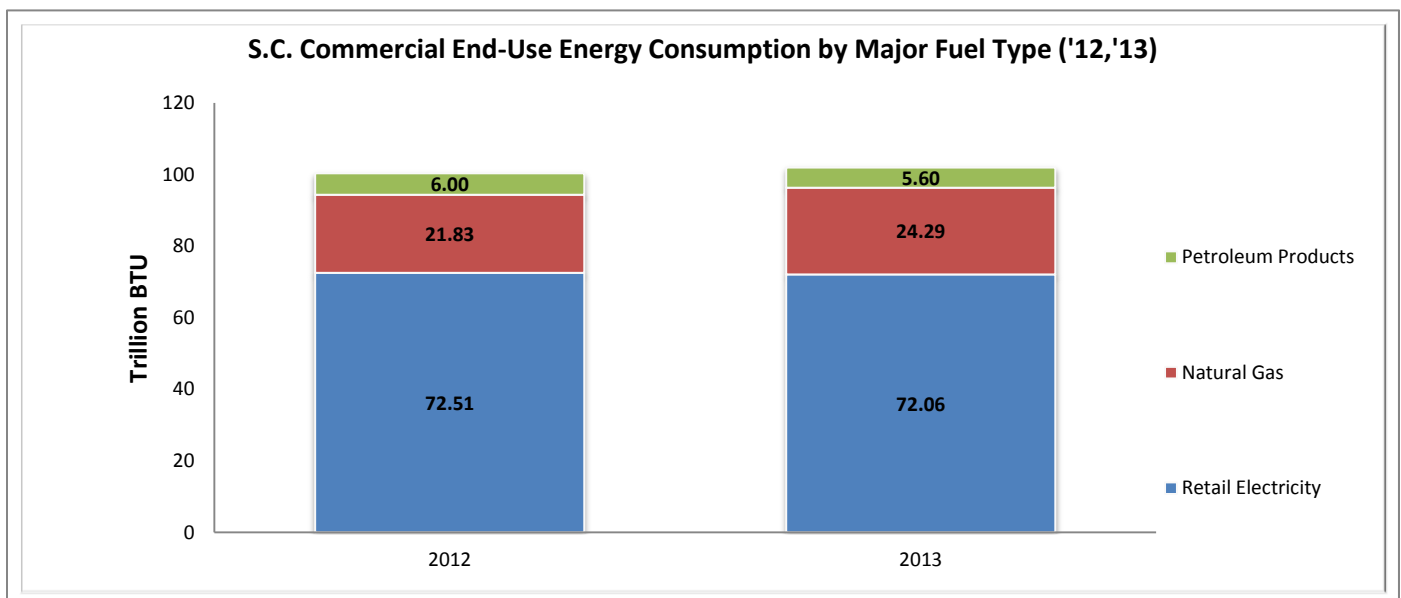


6. Commercial Sector

Commercial end-use energy consumption decreased by 1.6% in 2013. The commercial sector continues to be heavily reliant on electricity purchases, from which it derived 70.3% of total energy needs at the point of consumption in 2013. The commercial demand for natural gas and fuel oil spiked between 1976 and 1978 during a period of unusually cold winters.⁴



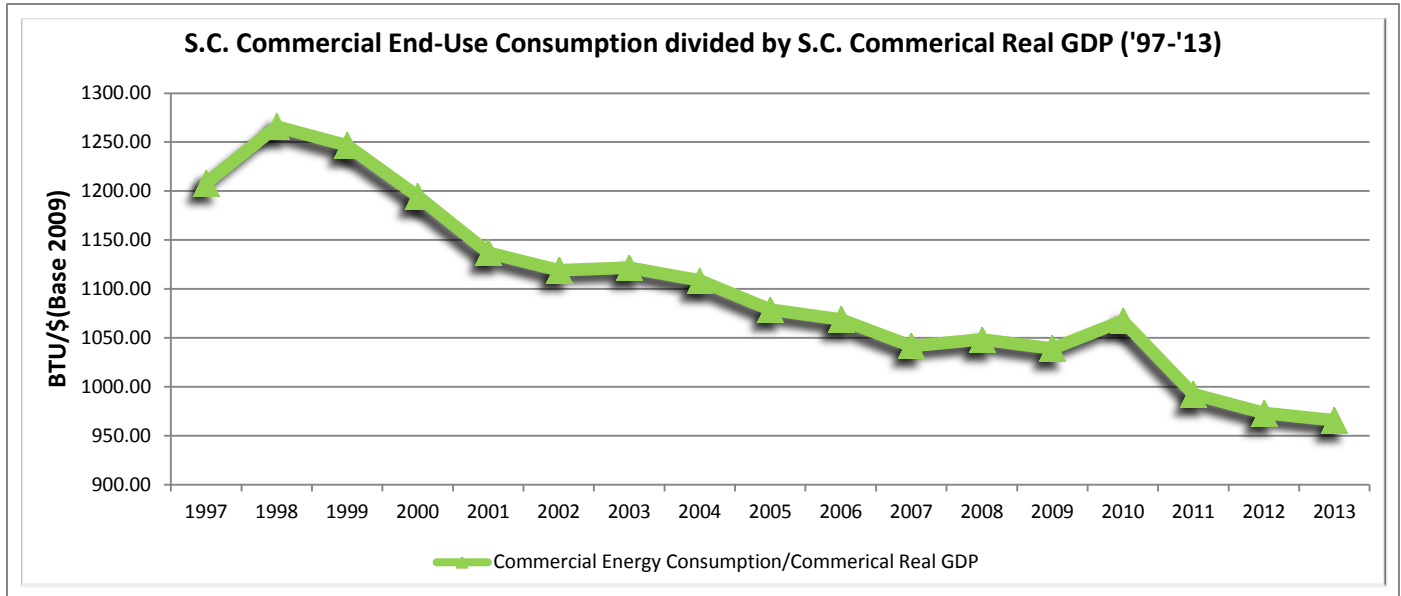
Commercial electricity purchases decreased by 0.6% in 2013, while natural gas increased 11.3%. Petroleum consumption decreased 6.7%. While retail electricity purchases have continued to provide the vast majority of energy needs for the commercial sector, natural gas has made modest gains as part of the fuel mix.



⁴ SCDNR: <http://www.dnr.sc.gov/>

6. Commercial Sector

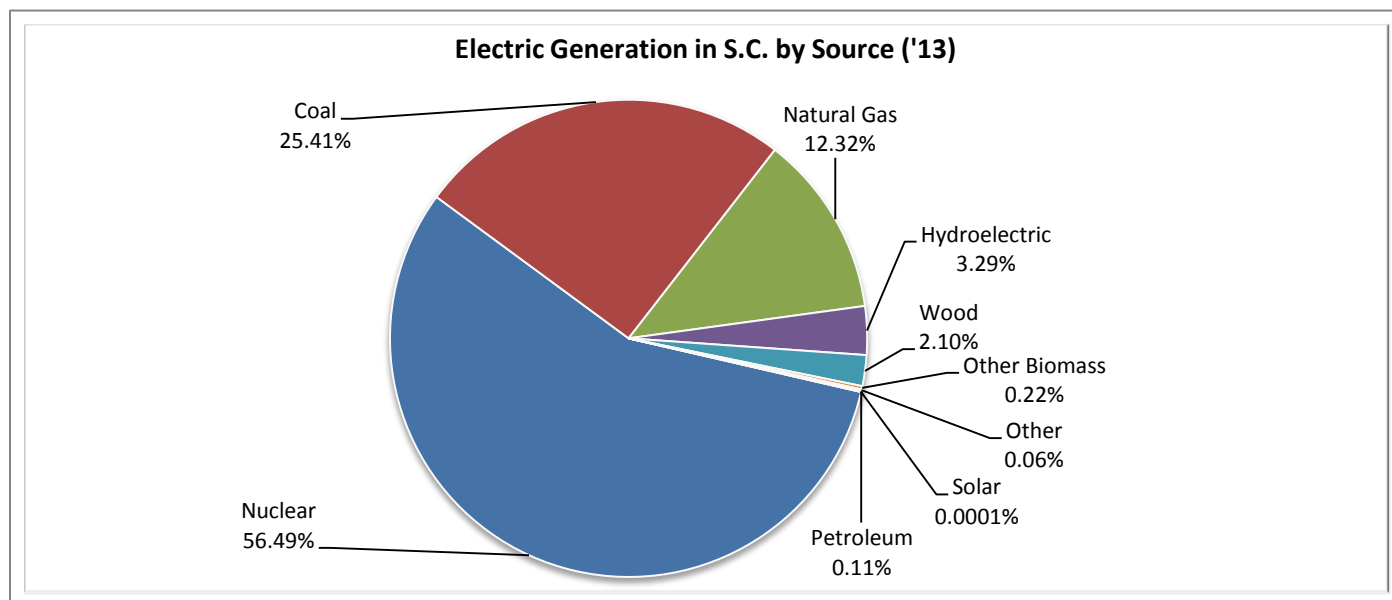
Total commercial end-use energy consumption has moved up and down with commercial output in recent years. However, energy use per dollar of commercial GDP has decreased by 23.7% since 1997, thus suggesting greater efficiency.⁵



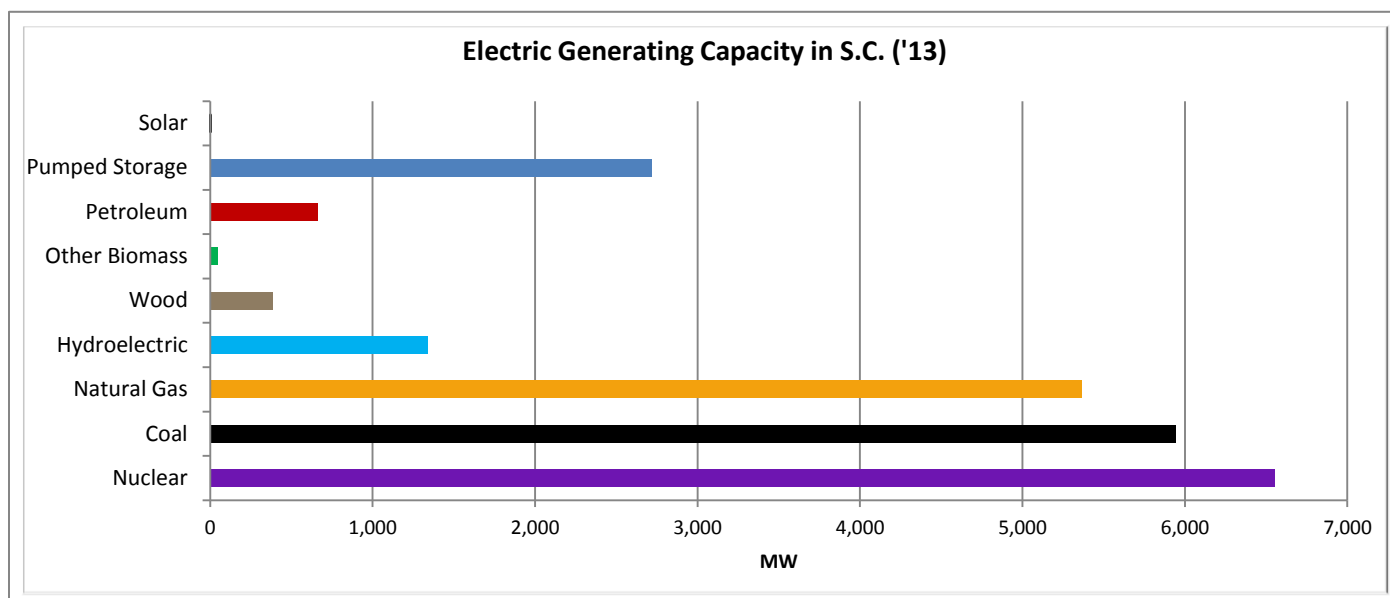
⁵ BEA: <http://www.bea.gov/regional/index.htm> (GDP data)

7. Electricity

More than half of the electricity generated in South Carolina comes from nuclear power. Coal and natural gas make up the bulk of the remaining generation. Hydroelectric and biomass are the largest renewable electricity generation resources in the State. However, it is important to note that electricity generated in South Carolina is not necessarily consumed in the State. South Carolina has two multi-state utilities that generate electricity for their North and South Carolina customers in South Carolina. This situation means that the generation fuel mix does not solely represent the consumption by South Carolina customers because much of that electricity is sent across the border.

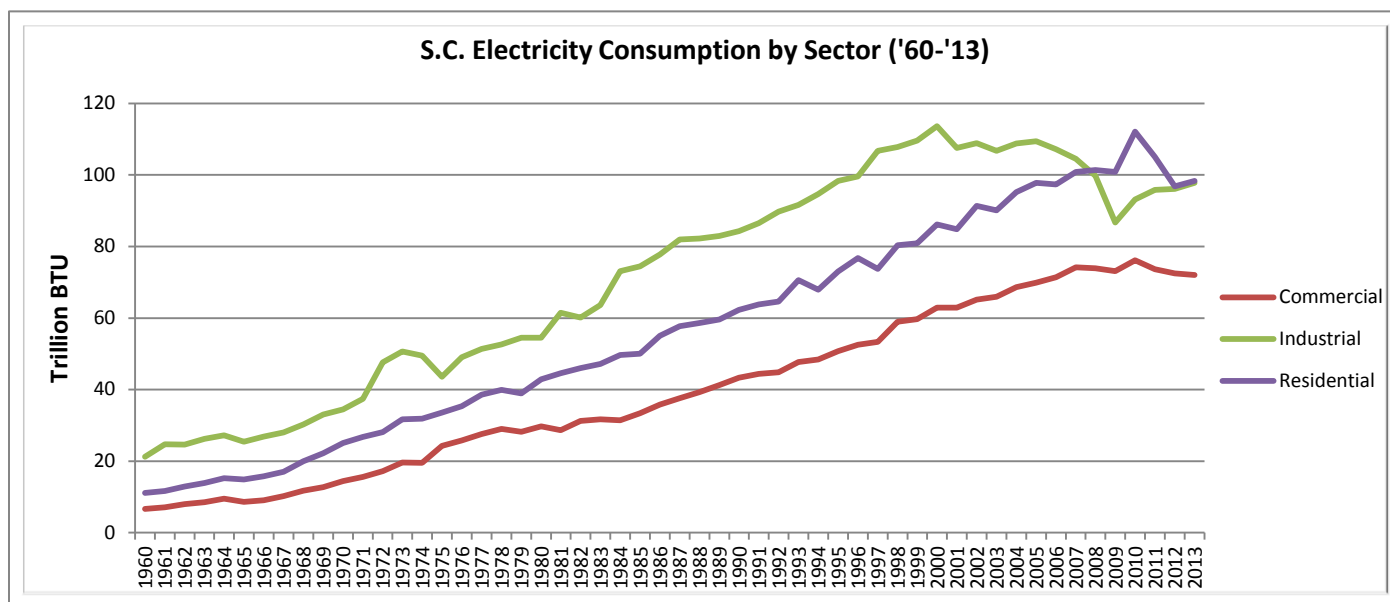


South Carolina has the third largest nuclear generating capacity in the United States. While coal continues to be the second largest resource by capacity, a dramatic increase in natural gas has occurred since 2000. In the electric power sector, natural gas capacity increased from less than 700 MW in 1999 to over 5,300 MW in 2013.

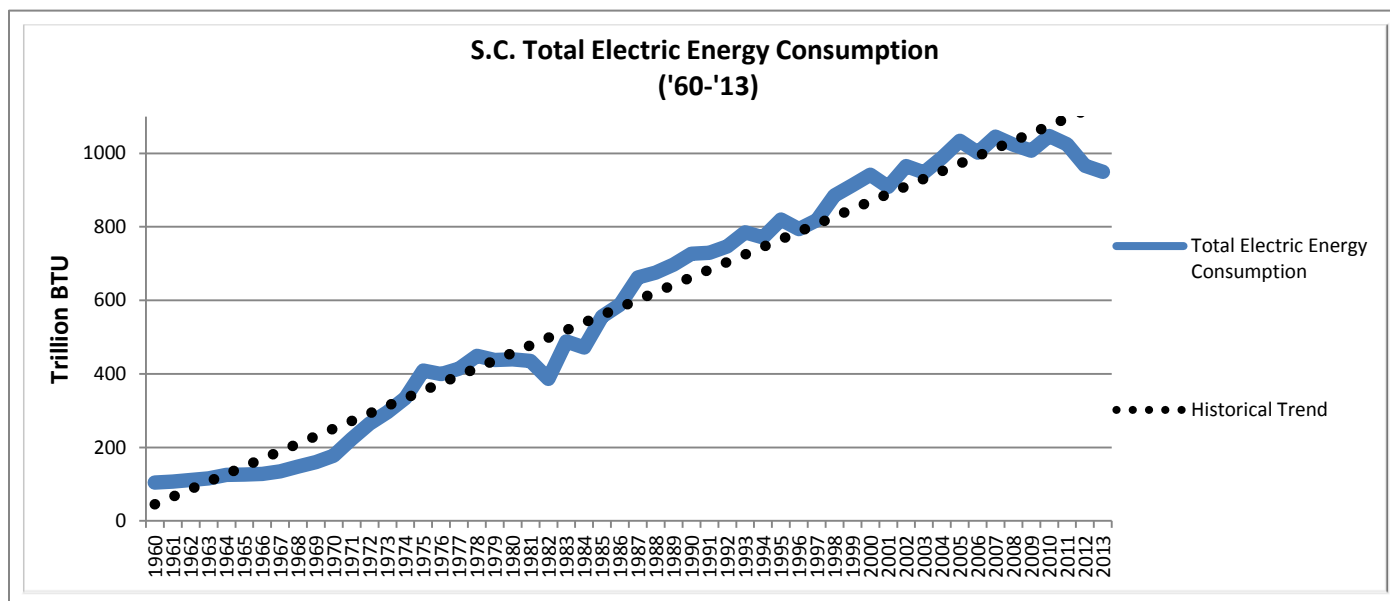


7. Electricity

In general, commercial, residential, and industrial end-use sectors in South Carolina have significantly increased their consumption of electricity over the last 40 years. In 2013 there was an increase of 1.6% in electricity consumption in the residential sector and a decrease of 0.6% in the commercial sector. The industrial sector increased its consumption by 1.8% in 2013. This increase marked the fourth straight year of increased usage after a sharp decrease in the period directly following the start of the economic recession.

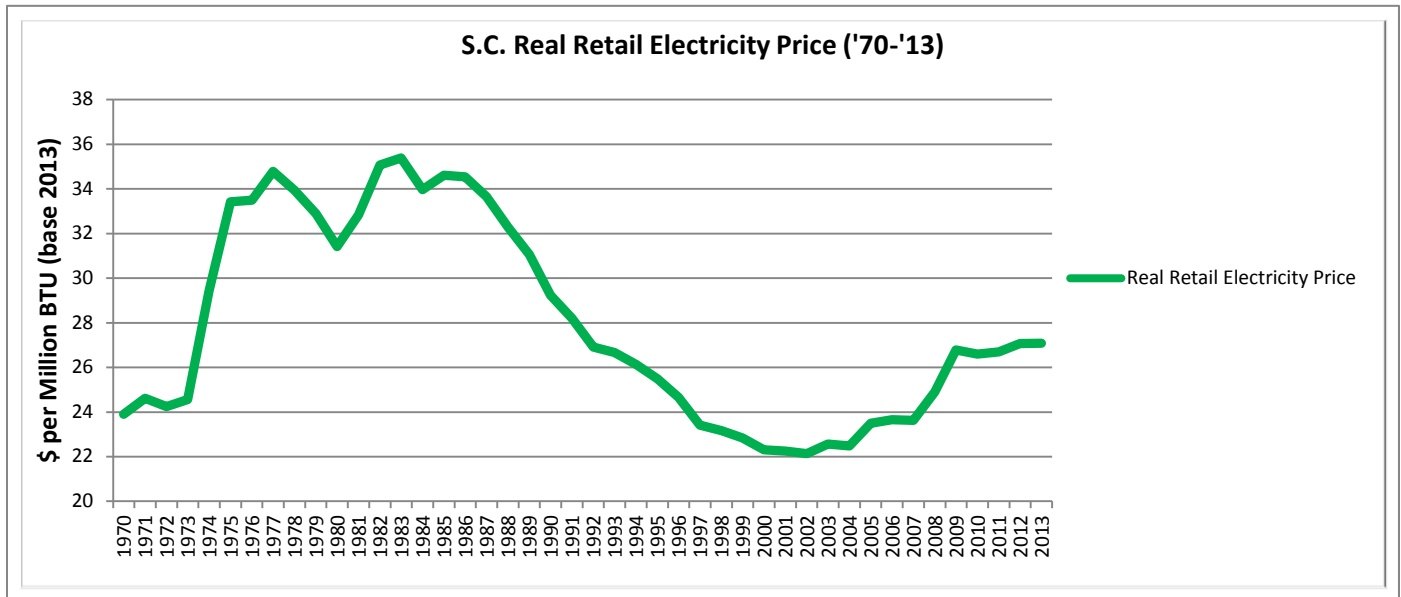


Total South Carolina electricity consumption fell by 1.7% in 2013. Electricity consumption plateaued in 2010 and began to decrease in the past few years after almost forty years of generally steady increases. Based on the historical trend, these recent decreases put consumption below expected consumption.



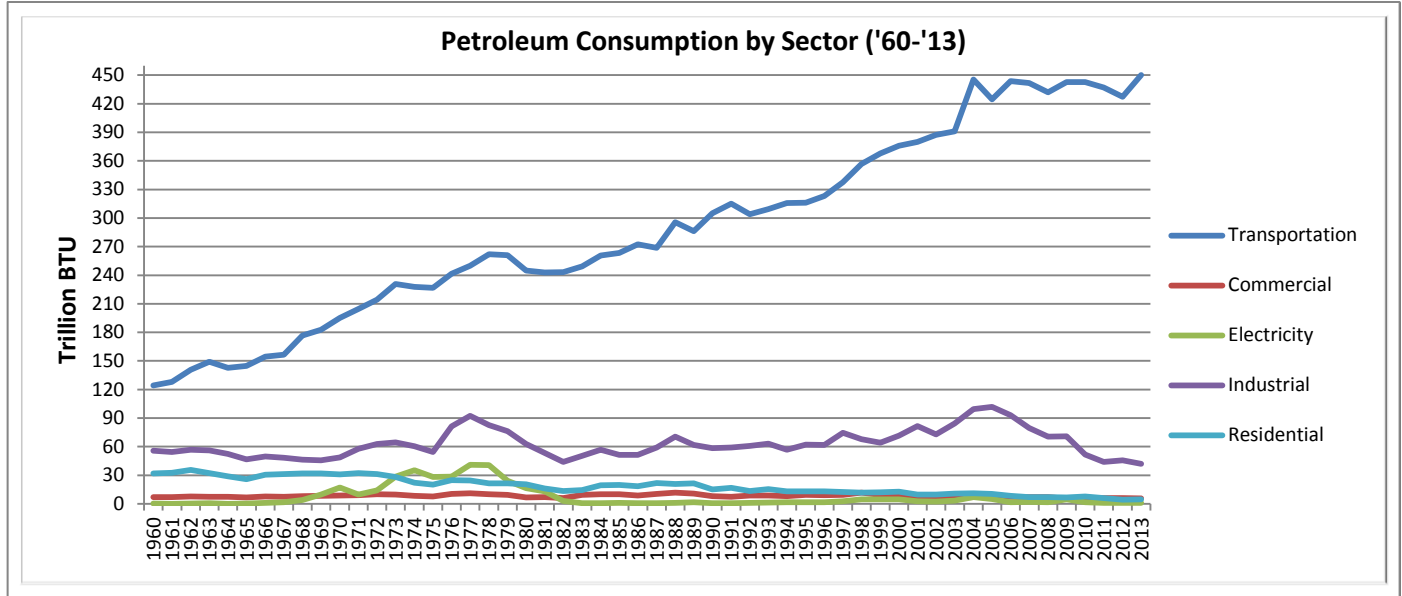
7. Electricity

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.

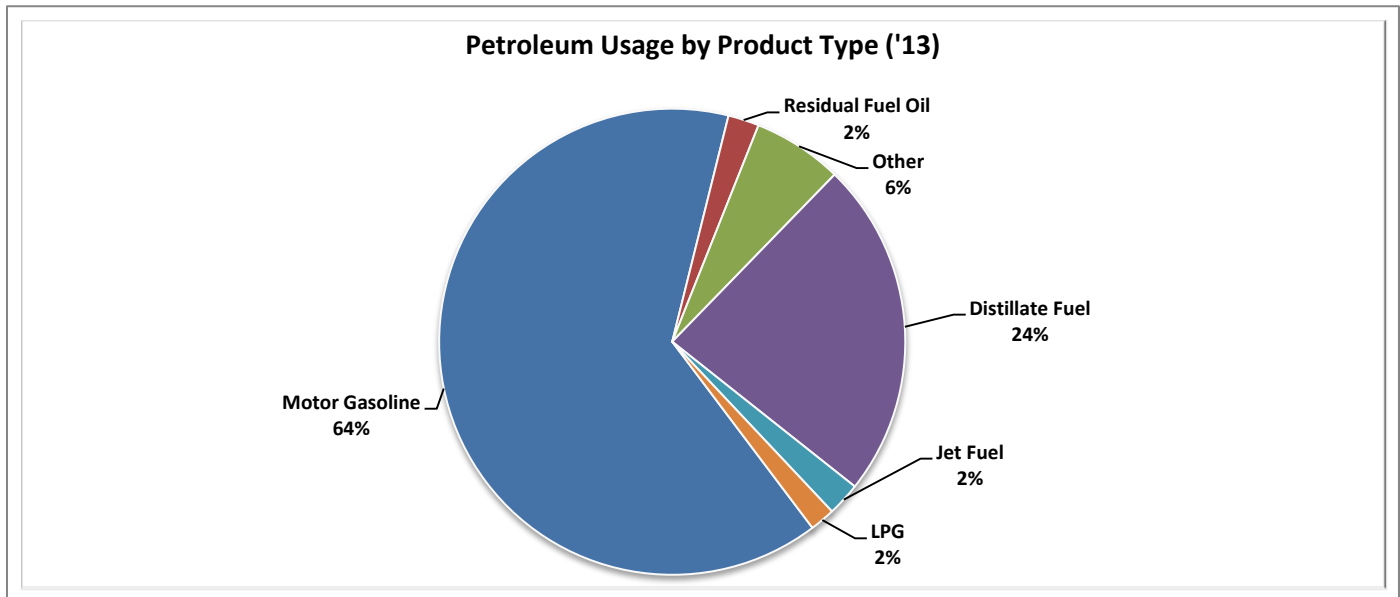


8. Petroleum

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

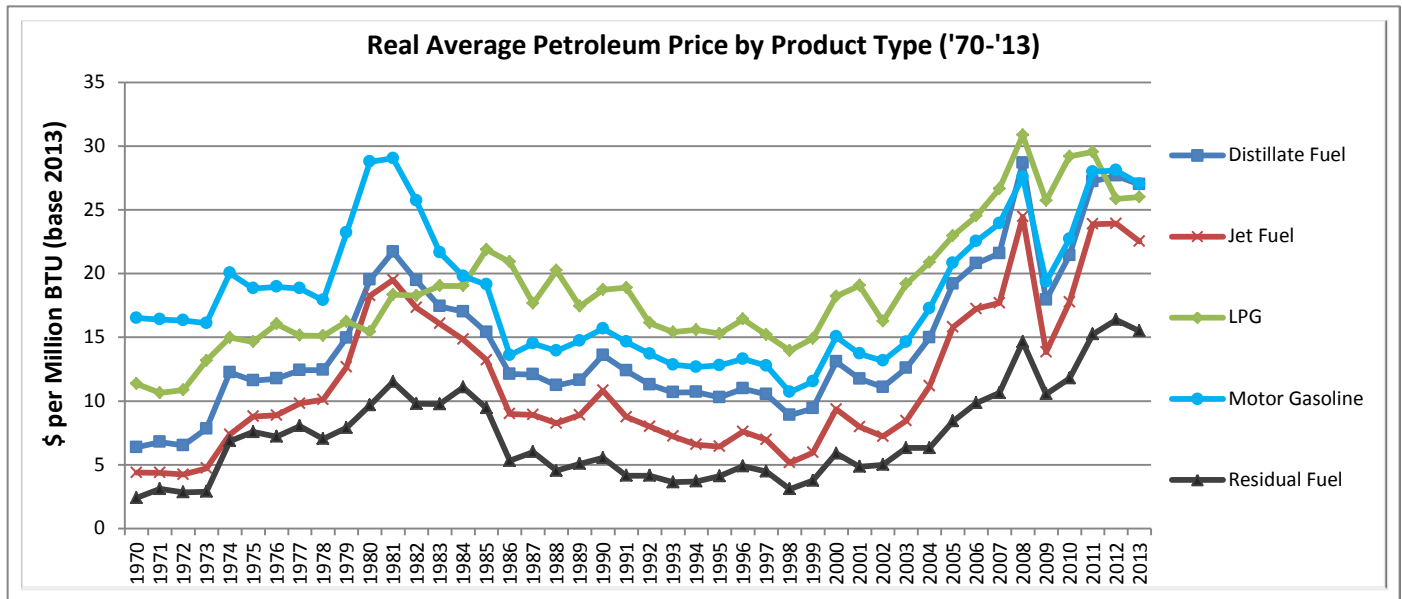


With transportation being the largest petroleum consuming sector, motor gasoline is by far the most consumed petroleum product. The two petroleum products most regularly used in ground transportation (diesel and motor gasoline) account for 88% of the petroleum used in the State.



8. Petroleum

The real average price of all major petroleum products has increased since 1998. Motor gasoline prices increased 153% and distillate fuel increased by 204%. However, there was a decrease in the price of both of these fuels between 2012 and 2013. While there have been significant price increases over the last fourteen years, consumption of petroleum products has continued to grow. This trend is consistent with academic findings that demand for transportation fuels is highly inelastic, and has become even more so in recent years.⁶



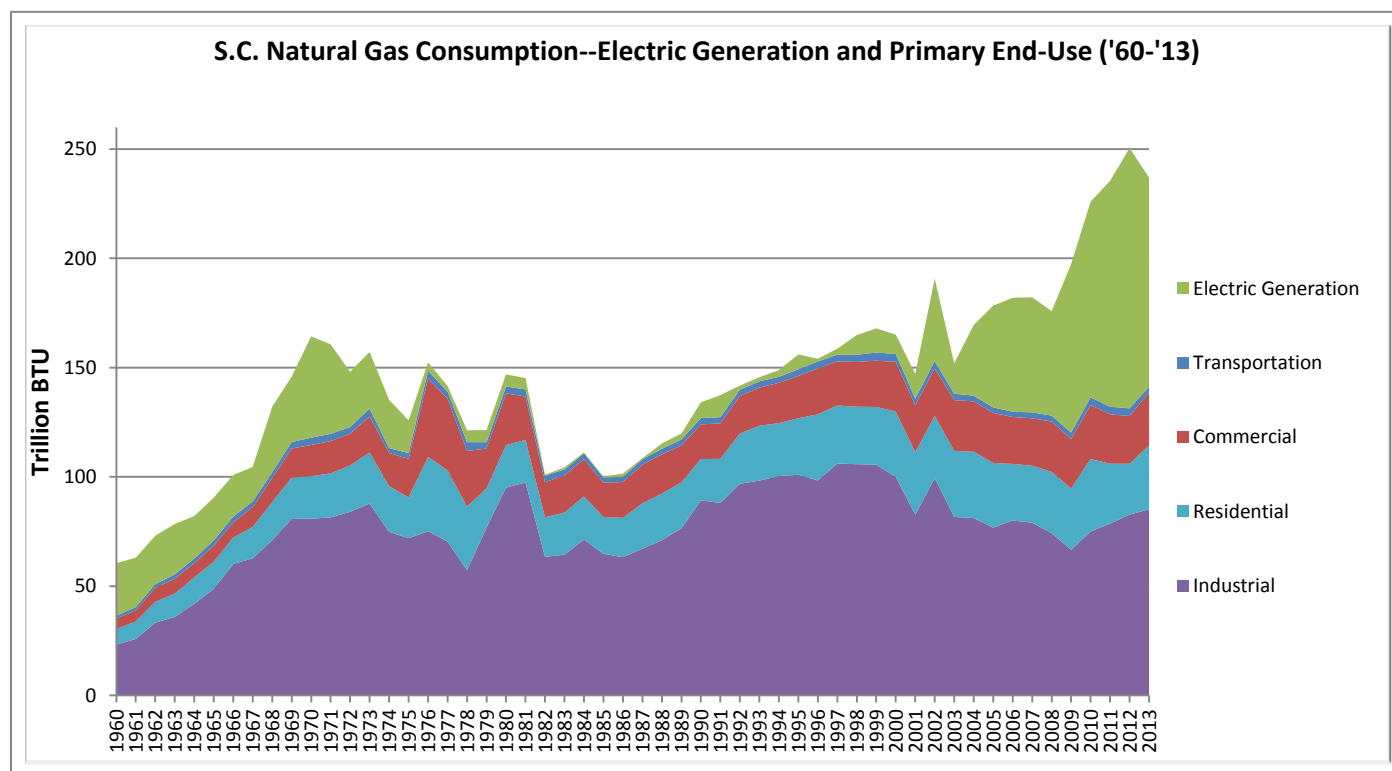
⁶ See Hughes, J., Knittel, C. and Sperling, D. "Evidence of a Shift in the Short-Run Price Elasticity of Gasoline Demand". National Bureau of Economic Research (2006).

9. Nuclear, Coal and Natural Gas

Nuclear power is a 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 7.9% in 2013. A major barrier to new nuclear construction is the large upfront capital costs.

South Carolina has no coal mines. 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 decreased by 5.53% in 2013.

Natural gas met 14.9% of South Carolina's total energy needs in 2013, through both direct on-site consumption for building heating, industrial production, and electric power generation. Between 2008 and 2013, 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, almost a quarter of households in South Carolina use natural gas for heating. However, the residential sector lags behind in consumption due to the prevalence of electric home heating and relatively mild winters. Greater use of this resource has occurred as prices have decreased nearly fifty percent since 2008. However, the demand for — and cost of — natural gas has historically been very volatile. They shift in response both to supply-side factors, such as refinery disruptions and changing availability of fuels for which natural gas is a substitute, and to demand-side factors, such as fluctuations in temperature and peak demand for electric power.⁷

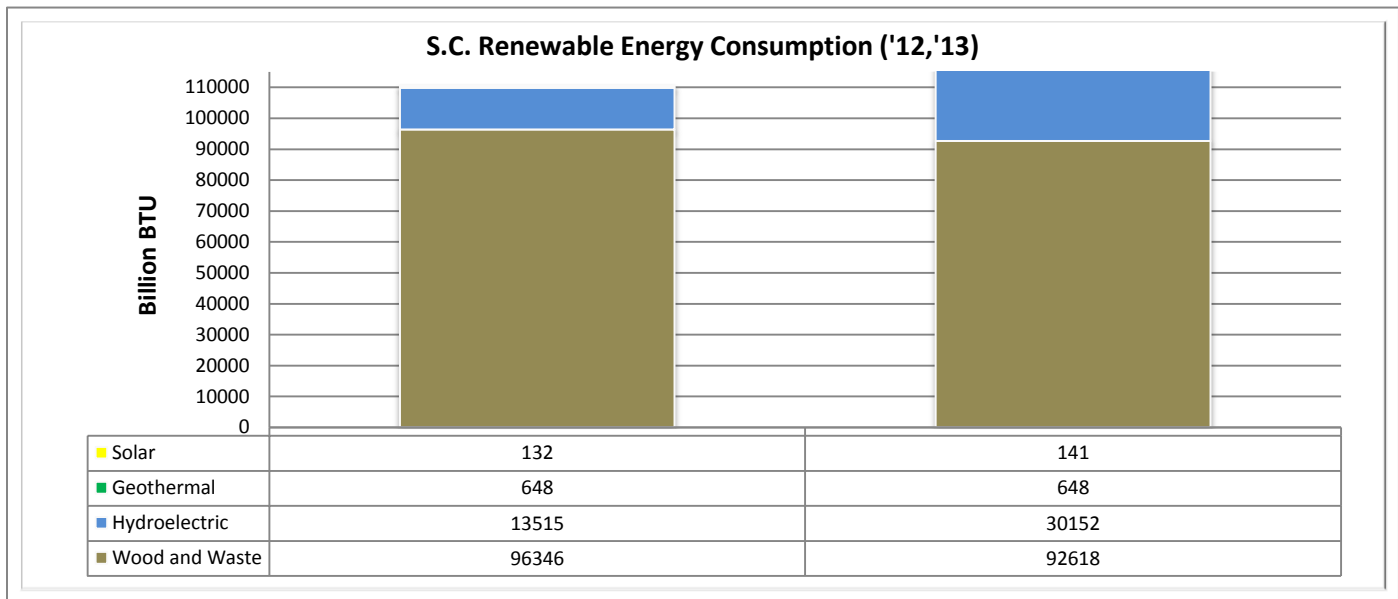


⁷ See EIA, "An Analysis of Price Volatility in Natural Gas Markets.":

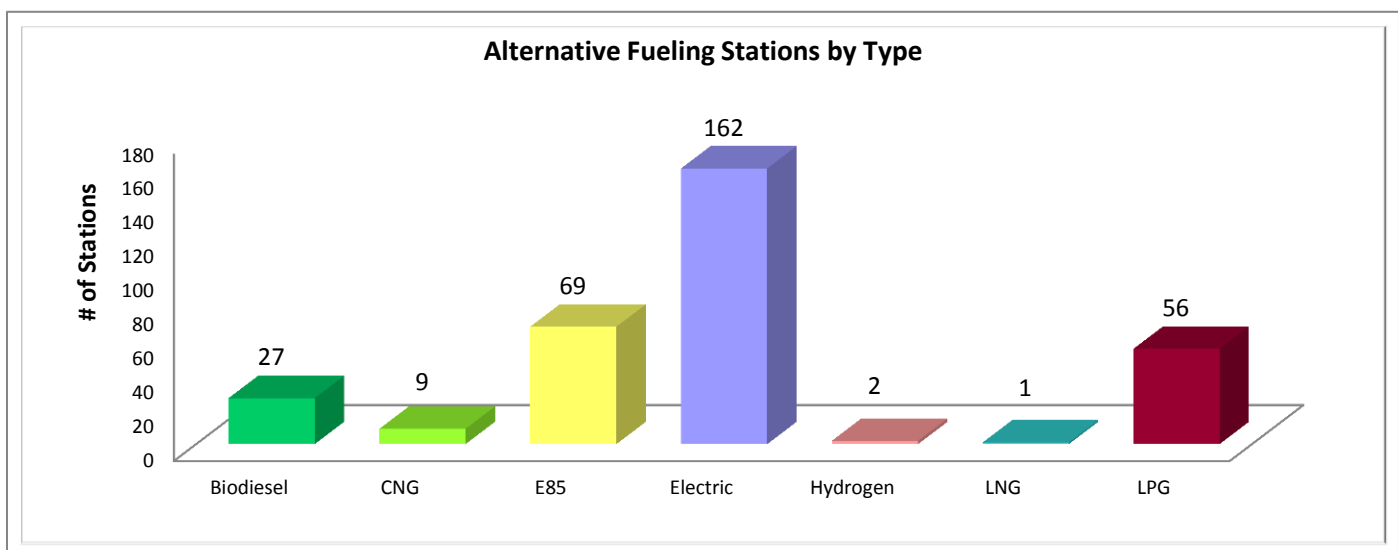
http://www.eia.gov/pub/oil_gas/natural_gas/feature_articles/2007/ngprivolatility/ngprivolatility.pdf

10. Renewables and Alternative Fuels

Renewable energy consumption in South Carolina grew 11.6% in 2013, with solar increasing 6.8% and geothermal use flat. 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 decreased slightly by 3.9%, while hydroelectric increased by 123% in 2013. The significant rebound in hydroelectric generation coincided with a period of recovery from drought conditions in much of the State.⁸ Renewable sources continued to meet only a small fraction of the consumption needs of the State in 2013.



As mentioned in Section 3 (Transportation Sector), consumption of ethanol and other alternative vehicle fuels increased in 2013. As the number of alternatively fueled vehicles grows, there will also be an increase in fueling stations offering those fuels will also occur. The current availability of alternative fuel stations is presented in the chart below.⁹



⁸ SC DNR: http://www.dnr.sc.gov/climate/sco/Drought/drought_current_info.php

⁹ U.S. Department of Energy: http://www.afdc.energy.gov/fuels/stations_counts.html

10. Renewables and Alternative Fuels

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 1100 kW.

