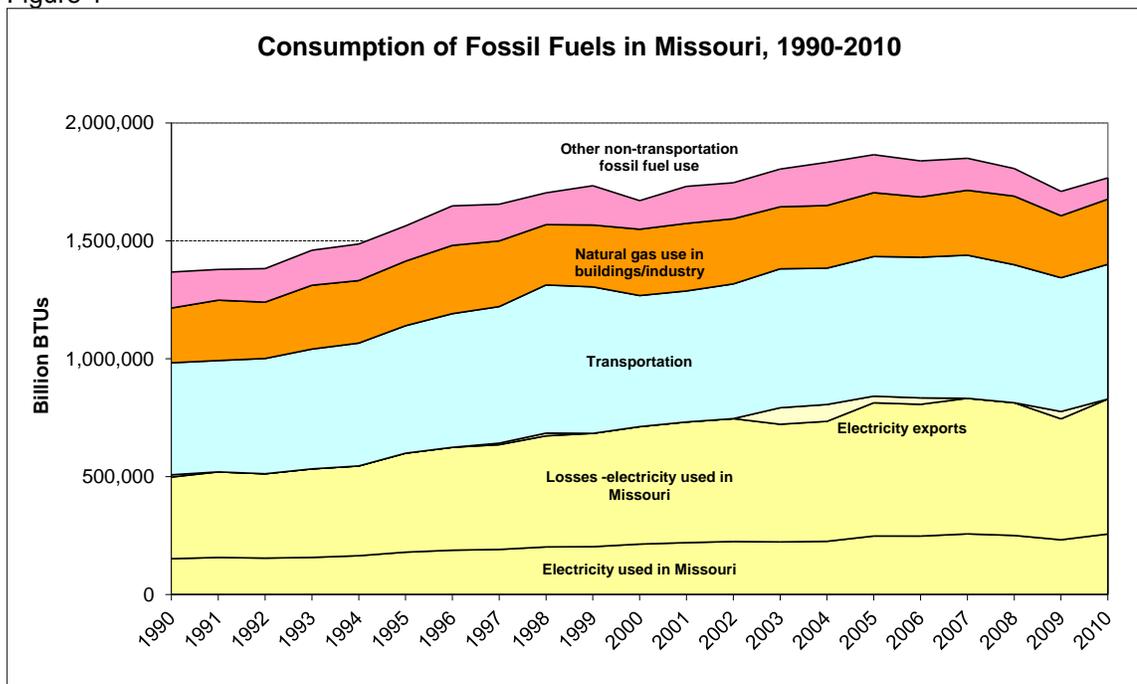




Division of Energy

## Missouri Fossil Fuel Use at a Glance

Figure 1



Source: State Energy Data System, Revised Electricity Statistics, 1960-2010 <http://www.eia.doe.gov/emeu/states>

### Consumption of Fossil Fuels in Missouri, 1990-2010.

All types of energy consumption fell between 2008 and 2009 due to both the cooler summer and the effects of the 2008-2009 recession. Then in 2010, with a rebound in the state economy, Missourians used overall about 3 percent more fossil fuel than in 2009. Figure 1 shows the general rate of increase in energy use from fossil fuels along with the general rate of increase in energy use.

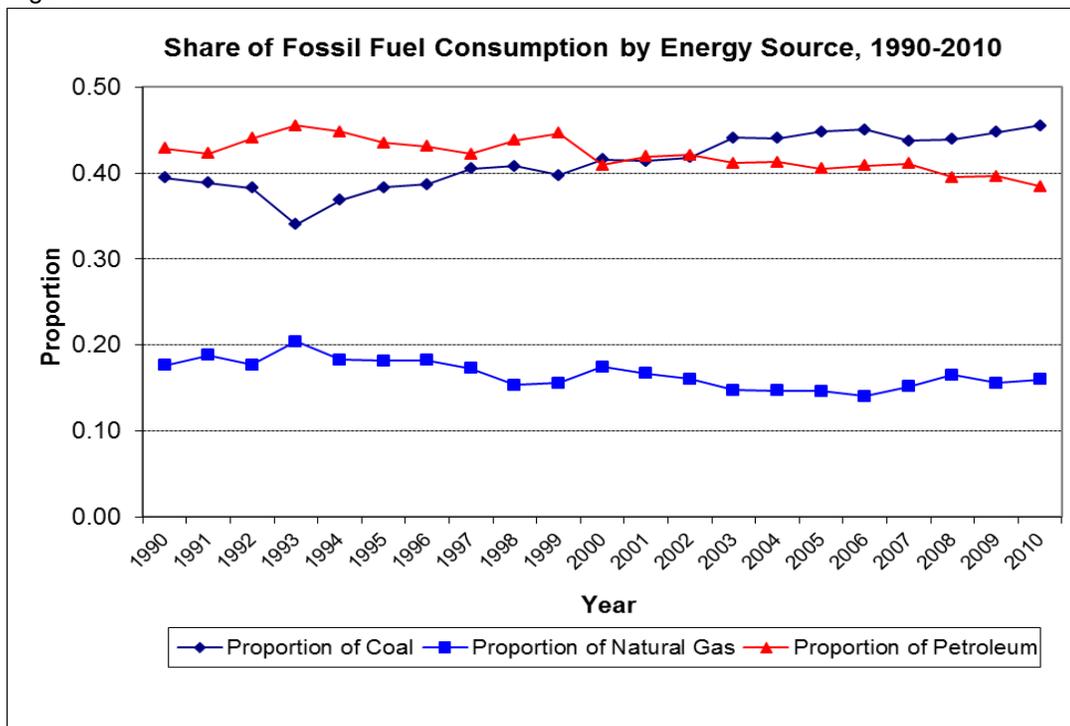
In 2010, Missourians continued to rely heavily on fossil fuels – coal, petroleum and natural gas – for energy use. Of the 1,928 trillion British Thermal Units (BTUs) of energy consumed in Missouri during 2010, about 91 percent came from fossil fuels (see Figure 1). Between 1990 and 2010, the overall total fossil fuel BTU per capita energy consumption by Missourians increased by 9.8 percent, from 266.7 million BTUs per person in 1990 to 293 million BTUs per person in 2010. Nearly all the coal, petroleum and natural gas used in Missouri is imported from out of state.

In addition to a rebound in the state economy from the recession of 2008-2009, another reason for the energy consumption increase from 2009 to 2010 was a 10.5 percent increase in electrical usage. A contributing factor to the increase in electrical energy use was the summer of 2010, with its

increased demand for cooling. The summer of 2010 had unusually high dew point temperatures, resulting in extended periods of above-normal minimum temperatures. These air temperatures, in combination with high dew point levels, led to extended periods of high heat indices that had not been seen in more than a decade. Months of above normal temperatures resulted in the 2010 summer being the ninth hottest in the past 116 years and the hottest since 1980.<sup>1</sup>

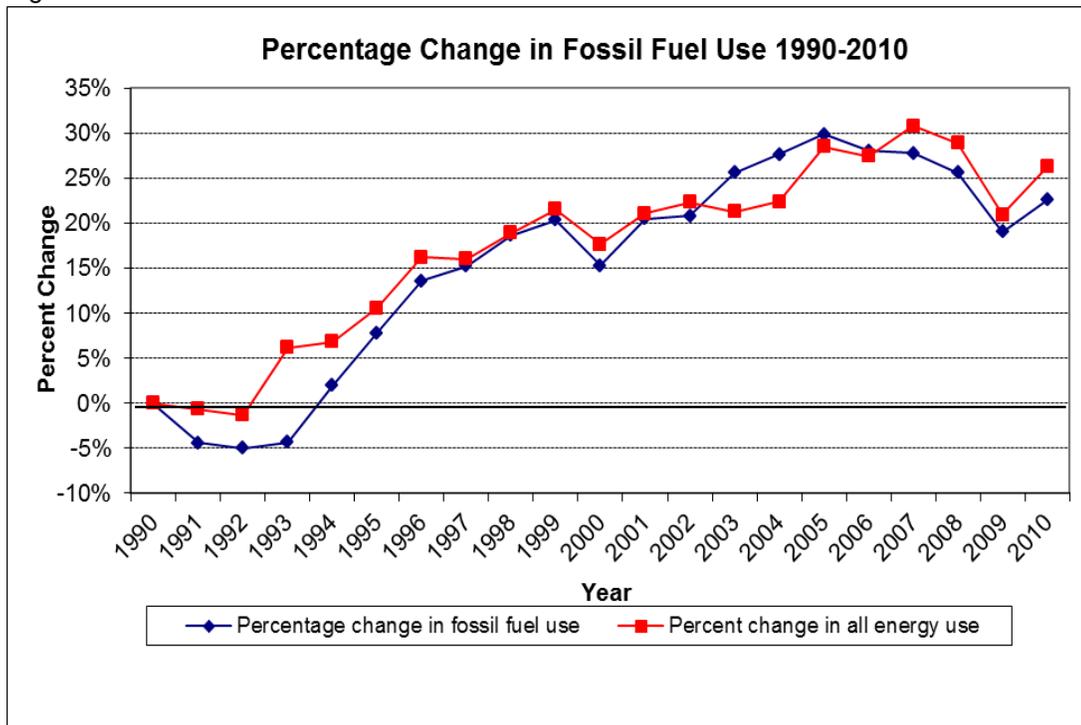
From 1990 through 2010, the average growth usage rate for natural gas consumption increased at an annual rate of 0.71 percent, and petroleum consumption increased at an annual rate of 0.45 percent, while coal use increased at an average annual rate of 1.96 percent. Prior to 2000, petroleum use accounted for the highest proportion of fossil fuel use. After 2000, coal became the highest proportion of fossil fuel used in the state (see Figure 2).

Figure 2



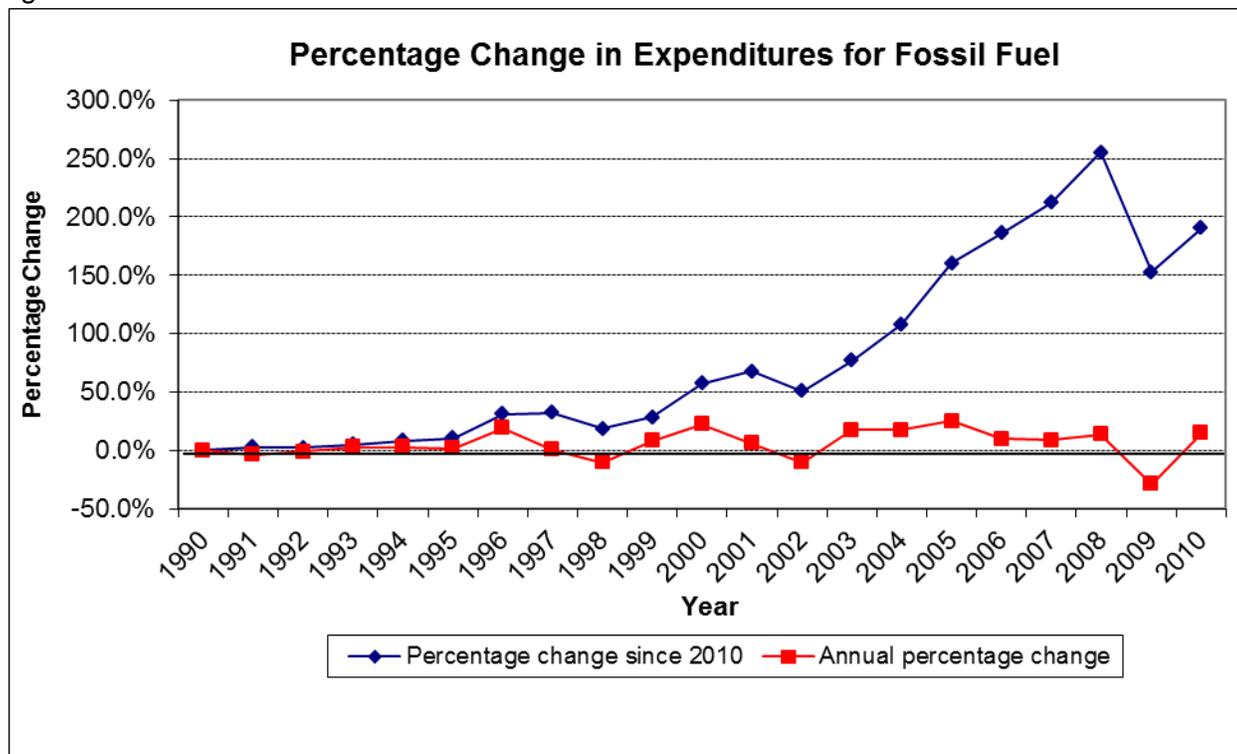
U.S. Energy Information Administration - EIA - Independent Statistics and Analysis

Figure 3



U.S. Energy Information Administration - EIA - Independent Statistics and Analysis

Figure 4



U.S. Energy Information Administration - EIA - Independent Statistics and Analysis

The compound average growth rate expenditures for fossil fuels increased about 5.1 percent between 1990 and 2010, from \$6.5 billion to \$17.5 billion. Between 2009 and 2010, expenditures on fossil fuels increased by 14.9 percent. The trend lines in Figures 3 and 4 show these differences. During these years, fossil fuel consumption showed a compound annual growth rate of 1.21 percent.

Coal consumption increased at a compound average annual growth rate of 2.0 percent, followed by natural gas at 0.75 percent compound annual growth rate and petroleum at 0.68 percent.

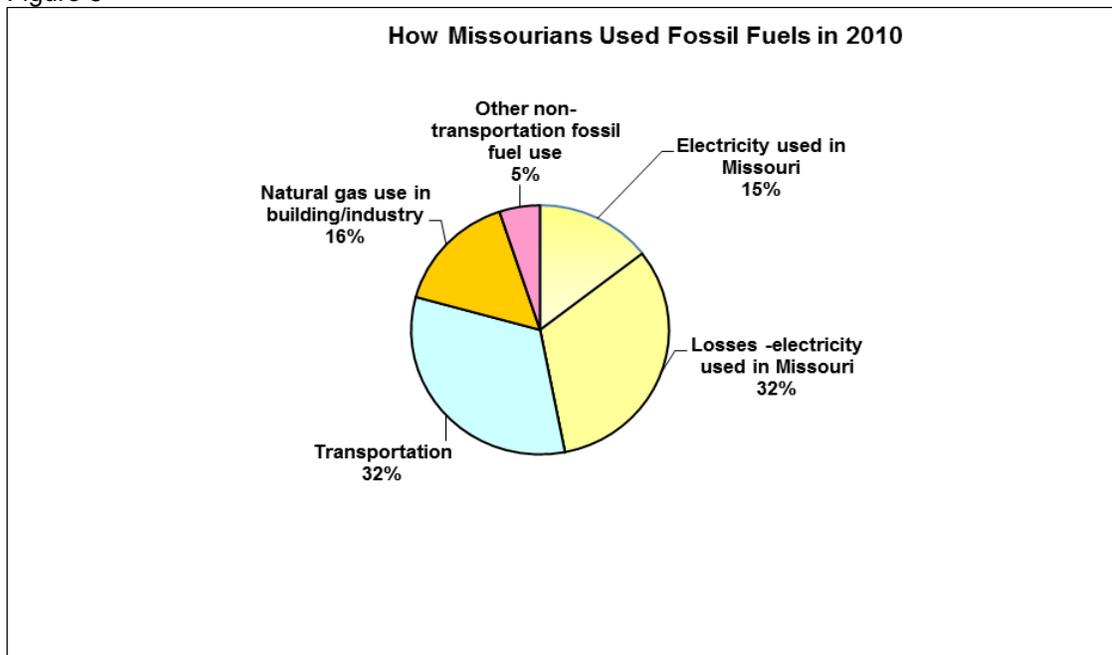
### What are BTUs?

A BTU, or British Thermal Unit, is the amount of heat required to raise the temperature of one pound of water (at or near 39.2 degrees Fahrenheit) by one degree Fahrenheit. One BTU is approximately equal to the energy released in the burning of a wood match.

A BTU is a unit of measure that allows us to compare the energy content of different fuels. It is possible to compare the energy in a gallon of gasoline, a cubic foot of natural gas and a quarter ton of coal by converting each to BTUs.

### How Missourians Used Fossil Fuels in 2010.

Figure 5



[U.S. Energy Information Administration - EIA - Independent Statistics and Analysis](#)

### Pie Chart Segment Descriptions

Figure 5 shows how Missourians used fossil fuels in 2010.

#### Transportation Usage - Blue segment

The blue segment on the pie chart indicates 32 percent of Missouri’s fossil fuels were used for transportation. Petroleum fuels such as gasoline, diesel fuel and jet fuel accounted for 565 trillion BTU, or 99 percent, of energy used for transportation.

#### Natural Gas Usage - Orange segment

Sixteen percent of Missouri’s fossil fuels were from natural gas. Of that 16 percent, approximately 60 percent was consumed in residential and commercial sectors for applications such as space and water heating. Industry accounted for about 23 percent of natural gas use in Missouri. The percent

of natural gas used for electric power generation was 14.5% and for transportation 2.5% was consumed.

### **Other Usage - Red segment**

The red segment indicates other categories of fossil fuel use, primarily petroleum, that are described in the Energy Information Administration's [State Energy Data Report 2010](#).  
<http://www.eia.gov/state/?sid=MO>

### **Electricity Usage - Yellow segment**

The yellow segment on the pie chart indicates fossil fuels used to generate electricity. In 2010, Missouri power plants burned about 1,761,084 trillion BTU of coal and other fossil fuels, which produced about 91 percent of the electricity generated in the state. Coal alone accounted for about 87 percent of the fossil fuels used to generate electricity.

### **More about generation from coal**

Coal-fired power plants are major sources of Missouri's sulfur dioxide, nitrogen oxide and particulate emissions. They are also the source of a substantial share of the state's carbon dioxide and mercury emissions. For more information about emissions from fossil-fired plants, visit our [Energy Statistics](#) page.

When coal is burned to generate electricity, about a third of the coal's energy is captured as electricity. The remaining two-thirds are lost as waste heat. By comparison, combined cycle natural gas-fired facilities can achieve about 50 percent efficiency in converting fossil fuel energy into electricity. Capturing the waste heat from generation as usable steam in a combined heat and power, or CHP, operation can drive these efficiencies higher. The [U.S. Combined Heat and Power Association](#) provides links to web-based sources of information about CHP.

### **More about generation from natural gas**

Natural gas has become an increasingly important source for electricity generation in Missouri. Missouri's electric utilities used about 40,900 billion BTUs of natural gas in 2010. In 1990, natural gas supplied only 3,597 billion BTUs. The growth of natural gas electrical use from 1990 to 2010 increased by more than a factor of 10!

### **Missouri's non-fossil generation**

The yellow segment does not include Missouri's main sources for non-fossil generation - nuclear and hydroelectric plants - and other renewable energy generation sources. The combination of all of Missouri's renewable energy sources (hydroelectric, solar, wind, and wood and waste) provided approximately 2.6 percent of the BTUs consumed by the electrical power sector. Hydroelectric produces most all of this power.

Another type of non-fossil fuel, Missouri's single nuclear plant, provided about 10 percent of total generation in 2010. Nuclear power relies on a non-renewable energy resource that must be imported into Missouri.

## Data sources

The primary sources for data used in this overview are the U.S. Department of Energy's Energy Information Administration, the [U.S. Environmental Protection Agency](#), and U.S. Census Bureau <http://www.census.gov/>.

<sup>1</sup> Missouri Summer 2010 Weather Summary, Pat Guinan, State Climatologist, Commercial Agriculture/University of Missouri Extension. <http://climate.missouri.edu/news/arc/sept2010.php>