Transforming America's Energy Future

Kentucky Energy Statistics

Developed by DEDI
Summary

The first edition of Kentucky Energy Statistics is offered by the National Association for State Energy Officials (NASEO) to function as a quick reference for energy information particular to the Commonwealth of Kentucky. Assembled from a variety of sources such as the Energy Information Administration (EIA), the U.S. Environmental Protection Agency (EPA), the Bureau for Economic Analysis (BEA), the Bureau of Labor Statistics (BLS), and the U.S. Census, this document provides data on the dynamics of energy expenditures, energy consumption, energy production, and electricity generation that define the economy of Kentucky. Collating these numerous sources of data, this document seeks to relay summary statistics for a state in aggregate, as well as for specific sectors of the economy. Overall, Kentucky enjoys some of the lowest electricity rates in the nation, maintains an Industrial Sector that consumes the majority of energy resources relative to the rest of the economy, and stands as a net exporter of energy due to its production of coal, natural gas, and crude oil.
# Table of Contents

- Kentucky Energy Expenditures ................................................................. 7
- Kentucky Gross Domestic Product & Population ......................................... 8
- Kentucky Energy Consumption ................................................................... 9
  - Industrial Sector & Commercial Sector ...................................................... 10
  - Residential Sector & Transportation Sector .............................................. 11
- Kentucky Energy Intensity per Capita ......................................................... 12
- Kentucky Energy Intensity per Real GDP Dollar .......................................... 13
- Kentucky Electricity .................................................................................... 14
- Kentucky Electricity Intensity per Capita ..................................................... 15
- Kentucky Electricity Intensity per Real GDP Dollar ...................................... 16
- Kentucky Renewable Energy ...................................................................... 17
- Kentucky Natural Gas .................................................................................. 18
- Kentucky Power Plant Emissions ................................................................ 19
- Kentucky Electricity Prices ......................................................................... 20
In 2009, total energy expenditures in Kentucky reached 17 billion dollars, a decrease of -24% from 2008. Dividing these costs by economic sector, the transportation sector accounted for the largest amount of energy expenditures in 2009.

Analyzing energy expenditures by fuel type, the purchase of electricity was the highest concentration of expenditures in Kentucky in 2009. Compared with 2008, total electricity expenditures displayed a decrease of -1% in 2009.
In 2009, citizens, institutions, and firms in Kentucky on average spent $0.11 on energy commodities and/or energy consumption to produce $1 of state gross domestic product. This energy expenditure level per dollar of economic output fell by -24% compared with 2008.

The state gross domestic product of Kentucky was $163.3 billion in 2010. Over a year, the state GDP of Kentucky rose by 3% in inflation-adjusted 2010 dollars. Since the year 2000, the state gross domestic product of Kentucky has risen by 14%.

In 2010, the population of Kentucky was estimated to be around 4.34 million. Displaying a trend of increasing urbanization, the population of Kentucky has risen by 7% since the year 2000.

The state gross domestic product per capita of Kentucky in 2010 was $36,884. Compared with 2009, state gross domestic product per capita fell by -1%. This statistic utilizes nominal income data adjusted for inflation to 2010 dollars.
In 2009, total energy consumption in Kentucky reached 1.88 quadrillion Btu, a decrease of -5% from 2008. Dividing this consumption by economic sector, the industrial sector accounted for the largest amount of energy consumption in 2009.

Characterizing energy consumption by fuel type or commodity, the use of coal was the highest concentration of energy consumption in Kentucky in 2009. Compared with 2008, the consumption of coal displayed a decrease of -9% in 2009. Additionally, net electricity imports are included in energy consumption, and can explain the difference in the summed value and stated value for total energy consumption.
In 2009, industrial energy consumption in Kentucky reached 498,100 billion Btu, a decrease of -9% from 2008. Accounting for energy use across fuels or resources, petroleum represented the largest amount of industrial energy consumption in 2009.

Commercial energy consumption in Kentucky fell by -5% in 2009 to over 108,091 billion Btu. During 2009, electricity constituted the largest portion of commercial energy consumption and displayed a decrease of -5% compared with 2008.
Residential sector energy consumption reached 167,606 billion Btu in Kentucky in 2009. This amount was a decrease of -4% compared with 2008. Overall, residential energy consumption was led by electricity consumption in 2009.

In 2009, the transportation sector of Kentucky consumed 465,189 billion Btu of energy commodities. This total reflected an increase of 1% in transportation energy consumption compared with the previous year. Unsurprisingly, gasoline was the largest source of transportation sector energy consumption in 2009.
Kentucky ranked 34th lowest nationally for commercial energy consumption per capita in 2009. This commercial measurement fell by -7% compared with 2008.

Kentucky’s residential sector consumed 83 MMBtu of energy per capita in 2009. Displaying a decrease of -5% this amount ranked Kentucky 9th highest by state.

Industrial energy consumption per capita in Kentucky was 7th highest in the country in 2009. Compared with 2008, industrial energy use per capita fell by -9%.

Transportation energy consumption per capita in Kentucky rose by less than 1% in 2009. Overall, Kentucky ranked 10th highest in the country for this metric.
Kentucky Energy Intensity

### Total Energy Consumption per State GDP Dollar, 1963-2009

<table>
<thead>
<tr>
<th>State</th>
<th>MMBtu per Capita</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Louisiana</td>
<td>15,894</td>
<td>1st</td>
</tr>
<tr>
<td>Kentucky</td>
<td>11,794</td>
<td>5th</td>
</tr>
</tbody>
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Kentucky ranked 5th highest for energy consumption used to produce one dollar of state GDP in 2009. This measurement fell by less than 1% compared with 2008.

### Industrial Energy Consumption per State GDP Dollar, 1963-2009

<table>
<thead>
<tr>
<th>State</th>
<th>MMBtu per Capita</th>
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<td>Alaska</td>
<td>4,103</td>
<td>1st</td>
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<tr>
<td>Kentucky</td>
<td>2,923</td>
<td>5th</td>
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### Commercial Energy Consumption per State GDP Dollar, 1963-2009

<table>
<thead>
<tr>
<th>State</th>
<th>MMBtu per Capita</th>
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<tr>
<td>Montana</td>
<td>2,124</td>
<td>1st</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1,523</td>
<td>17th</td>
</tr>
</tbody>
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Kentucky’s commercial sector ranked 17th highest for the ratio of energy use to state GDP dollar in 2009. Against 2008, this ratio fell by -6%.

### Transportation Energy Consumption per State GDP Dollar, 1963-2009

<table>
<thead>
<tr>
<th>State</th>
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Transportation sector energy intensity per state GDP dollar in Kentucky rose by 1% in 2009. Overall, Kentucky ranked 5th highest in the country for this metric.
In 2010, citizens, institutions, and firms in Kentucky consumed 93,608 gigawatt-hours of electricity. Compared with 2009, total electricity consumption rose by 5%. Dividing electricity consumption by economic sector, industrial customers were the largest consumers of electricity in Kentucky in 2010.

Electric power facilities in Kentucky generated over 98,218 gigawatt-hours of electricity in 2010. The use of coal represented the largest portion of this electricity, accounting for 91,054 gigawatt-hours. Overall, electricity generation rose by 8% versus the previous year.
Kentucky Electricity Intensity

Kentucky ranked 2nd highest nationally for total electricity consumption per capita in 2010. This amount rose by 5% to 21.6 MWh per citizen for the year.

Residents of Kentucky used on average 6.7 MWh of electricity in 2010. Representing an increase of 8%, this amount ranked Kentucky 6th highest by state.

Industrial electricity consumption per capita in Kentucky was 2nd highest in 2010. Versus 2009, industrial electricity consumption per capita rose by 3%.

Kentucky’s commercial electricity consumption per capita rose by 3% in 2010 to 4.5 MWh. Overall, Kentucky ranked 24th highest in the country for this metric.
Kentucky ranked the highest nationally for total electricity consumption per state GDP dollar in 2010. This amount rose by 3% to 0.57 kWh per dollar for the year.

In 2010, Kentucky ranked 6th highest for residential electricity use relative to one dollar of state GDP. This metric rose by 6% compared to 2009.

Industrial electricity consumption per state GDP dollar in Kentucky was the highest in the country 2010. Versus 2009, industrial electricity intensity rose by 1%.

Kentucky’s commercial sector used 0.12 kWh of electricity to generate one dollar of economic output. An increase of 1%, this ratio ranked the state 11th highest.
In 2009, renewable energy production in Kentucky reached 66,193 billion Btu, an increase of 15% from 2008. Dividing this production by fuel type, hydroelectric resources accounted for the largest amount of energy production in 2009.

Describing renewable electricity generation by fuel type or commodity, the production of hydroelectric facilities was the largest portion of renewable electricity generation in Kentucky in 2010. Compared with 2009, the electrical output of hydroelectric facilities displayed a decrease of -22% in 2010.
Kentucky registered 113.3 billion cubic feet of marketed natural gas production in 2009. Against 2008, natural gas production in the state fell by -1% through 2009. Comparing in-state production levels with in-state consumption levels, Kentucky was a net importer of natural gas for the year.

In 2009, natural gas consumption in Kentucky reached 206,534 million cubic feet. Compared with 2008, total natural gas consumption fell by -8% on the year. Dividing natural gas use by economic sector, the industrial sector was the largest consumer of natural gas in Kentucky in 2009.

The average city gate price of natural gas in Kentucky was $8.32 per thousand cubic feet in 2009. Versus the previous year, this average annual price fell by -28%. The city gate price of natural gas is typically reported at the connection where a natural gas distribution company or utility takes control of natural gas delivered by a pipeline or transmission company.
The last major amendments to the Clean Air Act were implemented in 1990. These amendments focused on National Ambient Air Quality Standards and the mechanisms which would ensure attainment and compliance with emission reduction targets. Subsequently, the emission of Sulfur Dioxide (SO$_2$) and Nitrogen Oxides (NO$_x$) from electric generating plants were regulated and scheduled for reduction. The dual display of electricity generation and regulated emissions indicates that over time, though electricity demand and generation have increased, the release of targeted pollutants has actually decreased. Therefore, both the aggregate emission as well as intensity of emission per gigawatt-hour of criteria pollutants, such as Sulfur Dioxide and Nitrogen Oxides, have been decreasing nationally since 1990. The reductions have been made by a combination of fuel switching and the installation of pollution mitigation systems at power plants.

<table>
<thead>
<tr>
<th>Emission</th>
<th>Metric Tons</th>
<th>Since 1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide</td>
<td>86,155,115</td>
<td>29%</td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>232,401</td>
<td>-72%</td>
</tr>
<tr>
<td>Nitrogen Oxides</td>
<td>73,900</td>
<td>-75%</td>
</tr>
</tbody>
</table>

Sulfur Dioxide is a highly reactive gas and major pollutant that is monitored and regulated at the State and Federal level. In 2009, the electric power sector of Kentucky emitted 232,401 metric tons of sulfur dioxide, representing a decrease of -27% compared with 2008. Overall, the electric power sector of Kentucky has decreased sulfur dioxide emissions by -72% since 1990.

Nitrogen Oxides are a group of highly reactive gases that are monitored and regulated at the State and Federal level. In 2009, the electric power sector of Kentucky emitted 73,900 metric tons of nitrogen oxides, representing a decrease of -49% compared with 2008. Overall, the electric power sector of Kentucky has decreased sulfur dioxide emissions by -75% since 1990.

Carbon Dioxide emissions from fossil fuel power plants have been monitored over time at the State and Federal level. In 2009, the electric power sector of Kentucky emitted 86,155,115 metric tons of carbon dioxide, representing a decrease of -8% compared with 2008.
Electricity usage in Kentucky is billed in terms of cents per kilowatt-hour of electricity consumed. Due to the variations between economic sectors, electric utilities, and electric power producers, the price of electricity is not uniform across Kentucky. As a result, each economic sector in Kentucky encounters a different average price for the consumption of electricity.

In 2010, the average price of electricity across economic sectors in Kentucky was 6.75¢ per kilowatt-hour. With an increase of 4% versus 2009, this overall, weighted-average price ranked Kentucky 47th lowest in the country in terms of electricity. Since 2000, the average price of electricity in Kentucky has risen by 61%.

Adjusting for inflation over time, the trends in the real cost of electricity in Kentucky between 1970 and 2010 can be placed in context to the adjacent, nominal graphic. Resetting historical price data to inflation-adjusted 2010 values, the price of electricity in real economic terms in Kentucky has risen by 27% since the year 2000. Additionally, in 2010 Kentucky ranked 47th lowest in the nation for the real price of electricity.

Since 1990, the two most influential factors explaining the changes in both nominal and real electricity prices have been the type of generation portfolio developed within a state, and the price of fossil fuel inputs for the electric power sector. Specifically, these factors involve the type of generation technology (i.e. coal, gas, nuclear) used within a state, the share of each technology in supplying baseload electricity, and the price of the primary fossil fuels.