Kentucky Coal Facts

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Kentucky Energy and Environment Cabinet

Department for Energy Development and Independence

In Partnership with the

Kentucky Coal Association

energy.ky.gov

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A Joint Industry/Government Project

Cover features H.L. Spurlock Generating Station. Photo Courtesy of Eastern Kentucky Power Cooperative.

Executive Summary

Overview

After more than two centuries of commercial mining operations, Kentucky's domestic supply of coal remains an important component of the Commonwealth's economy. In 2016, Kentucky ranked as the fourth-highest coal producer in the United States producing 42.9 million tons. Coal continued to supply a majority of energy in Kentucky and remained the largest source of domestic electricity production in the Commonwealth. On average, coal mines in Kentucky directly employed 6,612 people and mining directly contributed billions of dollars to the economy of Kentucky. Over 45 percent of the coal produced in Kentucky was consumed within the Commonwealth. The largest market for Kentucky coal remains the generation of electrical power across the United States, primarily in the southeast.

Production

Kentucky coal production decreased in 2016 by 29.9 percent from 2015, to 42.9 million tons, a level of production not seen since 1922. Eastern Kentucky coal production decreased in 2016 by 39 percent from 2015 to 17 million tons. Production slowed at both underground and surface mines. Eastern Kentucky production has declined by 87 percent since peak production at 131 million tons in 1990. Western Kentucky coal production decreased by 22.4 percent from 2015 to 25.9 million tons. Union County remained the largest coal-producing county in Kentucky in 2016, out-producing the second largest, Ohio County. However, Pike County still holds the record for greatest cumulative production at 1.5 billion tons. Total annual production in 2016 in Western Kentucky, where thicker, more productive coal seams yield cheaper coal, was greater than in Eastern Kentucky in 2016. Western Kentucky coal production first surpassed Eastern Kentucky in 2013, upending a century long historical trend.

Employment

On average, Kentucky coal mines employed 6,612 persons, 3,906 underground coal miners, 1,531 surface miners, 887 preparation plant workers, and 288 on-site office staff in 2016. Employment at Kentucky coal mines decreased by 30 percent from an average of 9,557 in 2015. Coal mining jobs, including preparation plant and office employees, made up 0.4 percent of the state's total employment and 2.1 percent of the population in both Eastern and Western Kentucky.

Markets

The markets and destinations for Kentucky coal during 2016 were concentrated in 18 states, with a small market for international exports. Approximately 45 percent of the coal mined in Kentucky during 2016 was consumed in the Commonwealth—primarily by electric utilities—making Kentucky the largest single market for Kentucky coal. The vast majority of Kentucky coal—35 million tons or 82 percent—was shipped to electric power plants in 18 different states, including Kentucky, principally located in the southeast. Following Kentucky, the states of Florida, South Carolina, Georgia, North Carolina, Virginia, and Ohio were the largest consumers of Kentucky coal during 2016. Coal-fired power plant closures in these states have significantly reduced domestic demand for Kentucky coal. However, Kentucky coal exports to foreign countries have increased in recent years.

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In order to provide the public with timely access to these data, this report uses the best-available estimate for each factor at the time of publication. However, as a result of data revisions, confidentiality, rounding, and reporting errors, the table values may not precisely equal the sum of the included components and certain indicators may be subject to change. Please direct all data-related inquiries to Greg Bone (Greg.Bone@ky.gov) or by calling the Kentucky Department for Energy Development and Independence at 502-782-7246.

History of Coal in Kentucky

Coal has been commercially mined in Kentucky for over two centuries. In 1750, Dr. Thomas Walker was the first known person to discover and use coal in what would later become Kentucky. The earliest-known commercial coal production was 20 tons in 1790 in Lee County—two years before the Commonwealth of Kentucky became a state. Although small quantities of coal would continue to be mined across the state, it was not until 1855 that annual production would exceed one hundred thousand tons. The Civil War briefly diverted coal production from Kentucky to other coalfields in Pennsylvania, Maryland, Ohio, and Illinois. However, after a near-stoppage during the Civil War, coal mining resumed and production exceeded one million tons for the first time in 1879.

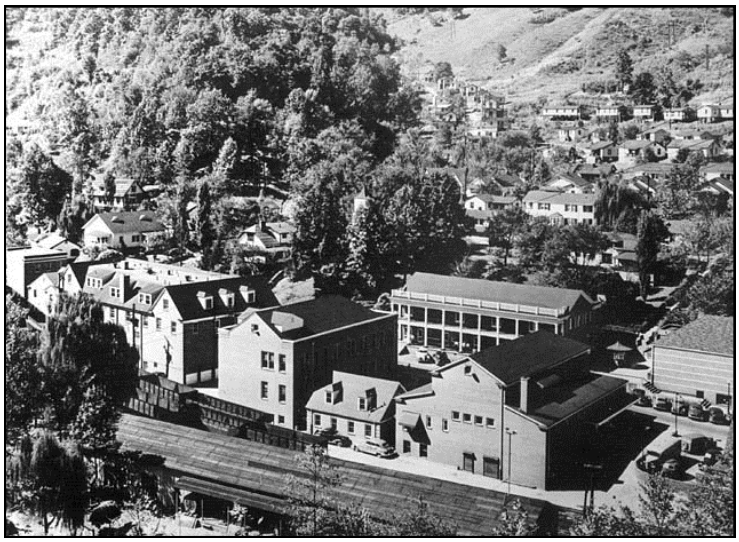


Photo: Aerial view of Wheelright, Floyd County, 1946. The town was established by the Elk Horn Coal Company in 1916. In view are the downtown business area and portions of the company housing. Russell Lee Photographic Collection, University of Kentucky Special Collections.

As the American economy grew in the late 19th and early 20th centuries, so too did demand for Kentucky coal. From the 1870s to the end of the century, railroads were built in both the Eastern and Western Kentucky coalfields, which significantly improved the efficiency of producers to deliver coal to urban and industrial consumers and opened up areas to development. The expansion of railroads across the United States also increased demand for coal; Kentucky's deposits of bituminous coal were used to power steam locomotive engines and used in iron and steel mills to produce the metals the railroads and other industries required. Coal's central role in the railroad industry would continue until the 1930s, when railroads were increasingly fueled by diesel.

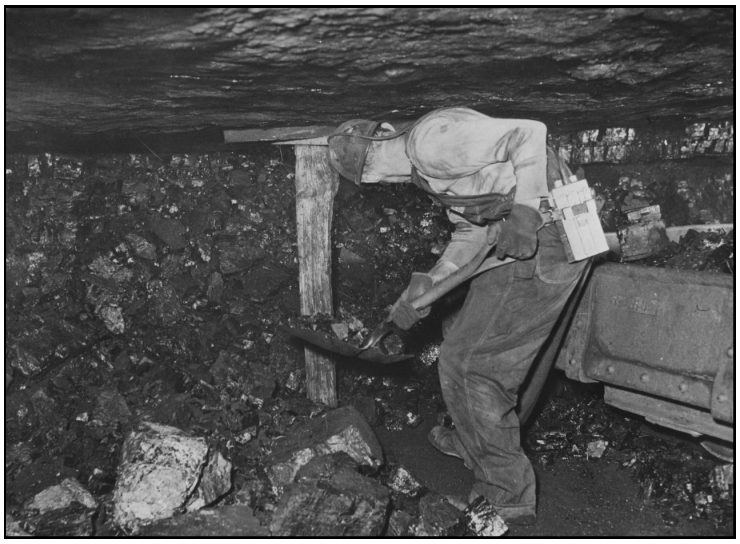


Photo: Miner Harry Fain loading coal that has just been blasted from the face of the mine into cart at mine in Wheelright, Floyd County, 1946. Russell Lee Photographic Collection, University of Kentucky Special Collections.

The industrialization of the early 20th Century brought the expansion of the Eastern Kentucky coal industry, as bituminous coal became the primary energy source for the continually-growing cities throughout the Midwest. The Appalachian Mountains divided the anthracite cities of New York, Philadelphia, and Boston, and bituminous-dependent cities west of the mountains, including Pittsburgh, Chicago, and Cincinnati. This industrialization resulted in the United States having the highest economic growth rate in the world during that period.

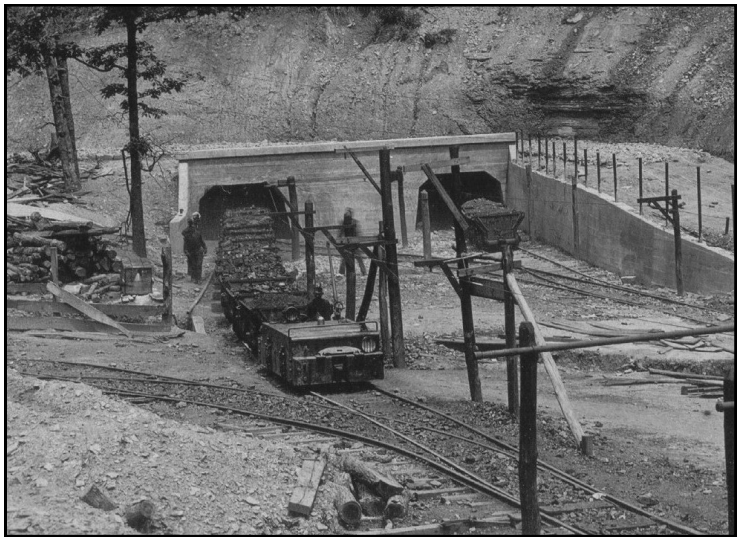


Photo: Loaded coal cart exiting mouth of Mine 207, Jenkins, Kentucky Photographic Collection, University of Kentucky Special Collections.

History of Coal in Kentucky

Photo: Main Street of coal company town Wheelright, Floyd County, 1946. Russell Lee Photographic Collection, University of Kentucky Special Collections.

Numerous towns and coal camps, such as those in Letcher and Harlan counties, grew along the railways that crisscrossed Eastern Kentucky. Many miners came from within the region, as subsistence farming gave way to the industrial age, but much of the growing population included immigrants searching for a better life from southern and Eastern Europe as well as African-Americans from the southern United States.[1]

1. Estep, Bill. 100 years of coal mining in Harlan County.

Photo: Large lump of coal being loaded for transport to the Panama-Pacific International Exposition, a world's fair held in San Francisco in 1915 to celebrate opening of the Panama Canal. Jenkins, Kentucky Photographic Collection, University of Kentucky Special Collections.

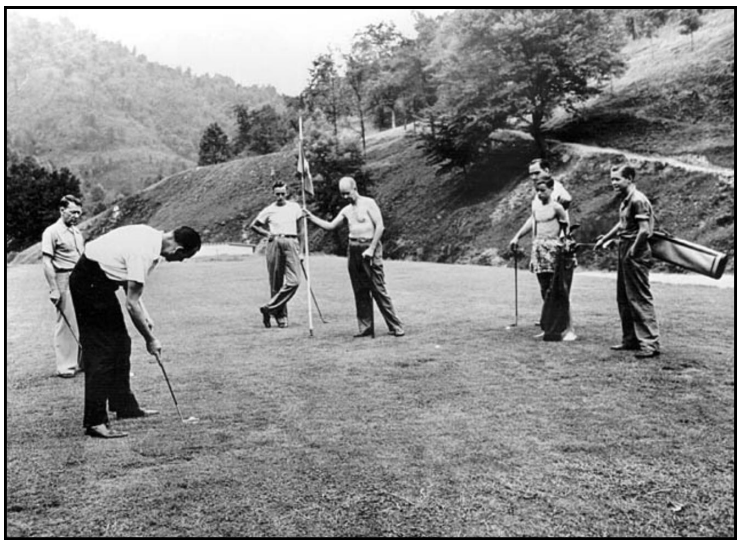


Photo: Coal miners play golf at the company golf course in Wheelright, Floyd County, 1946. Russell Lee Photographic Collection, University of Kentucky Special Collections.

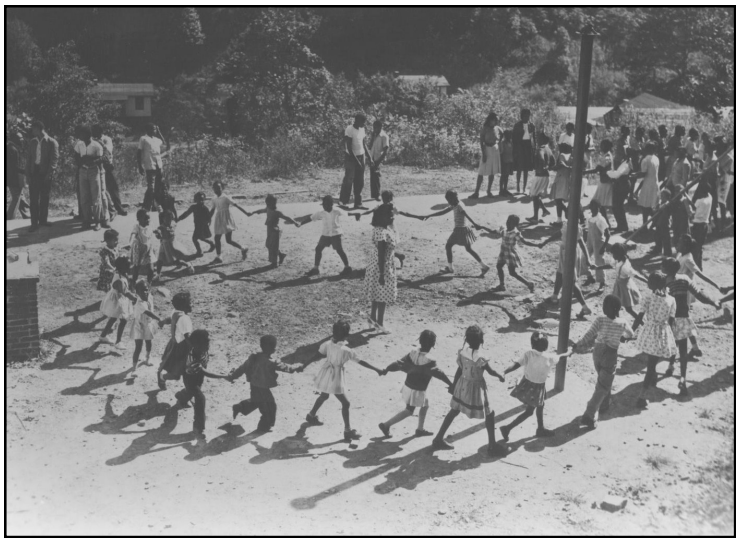
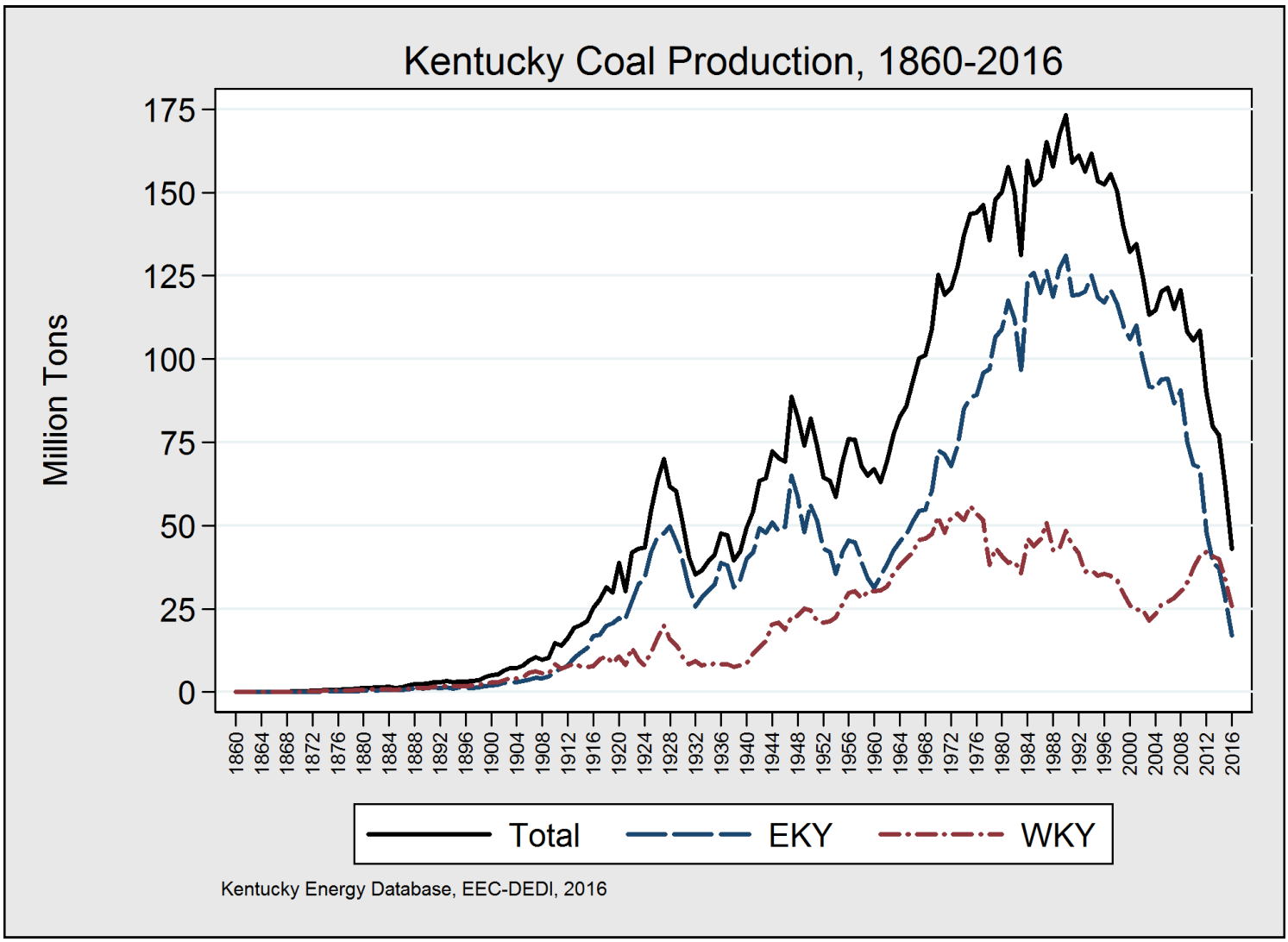


Photo: Children playing during recess at segregated school at coal camp in Wheelright, Floyd County, 1946. Russell Lee Photographic Collection, University of Kentucky Special Collections.

Segregation, backed by state law, was pervasive within the coal camps well into the early 20th Century, with some communities segregated between new immigrants, African-Americans, and whites. Other camps segregated the communities while integrating the mines.

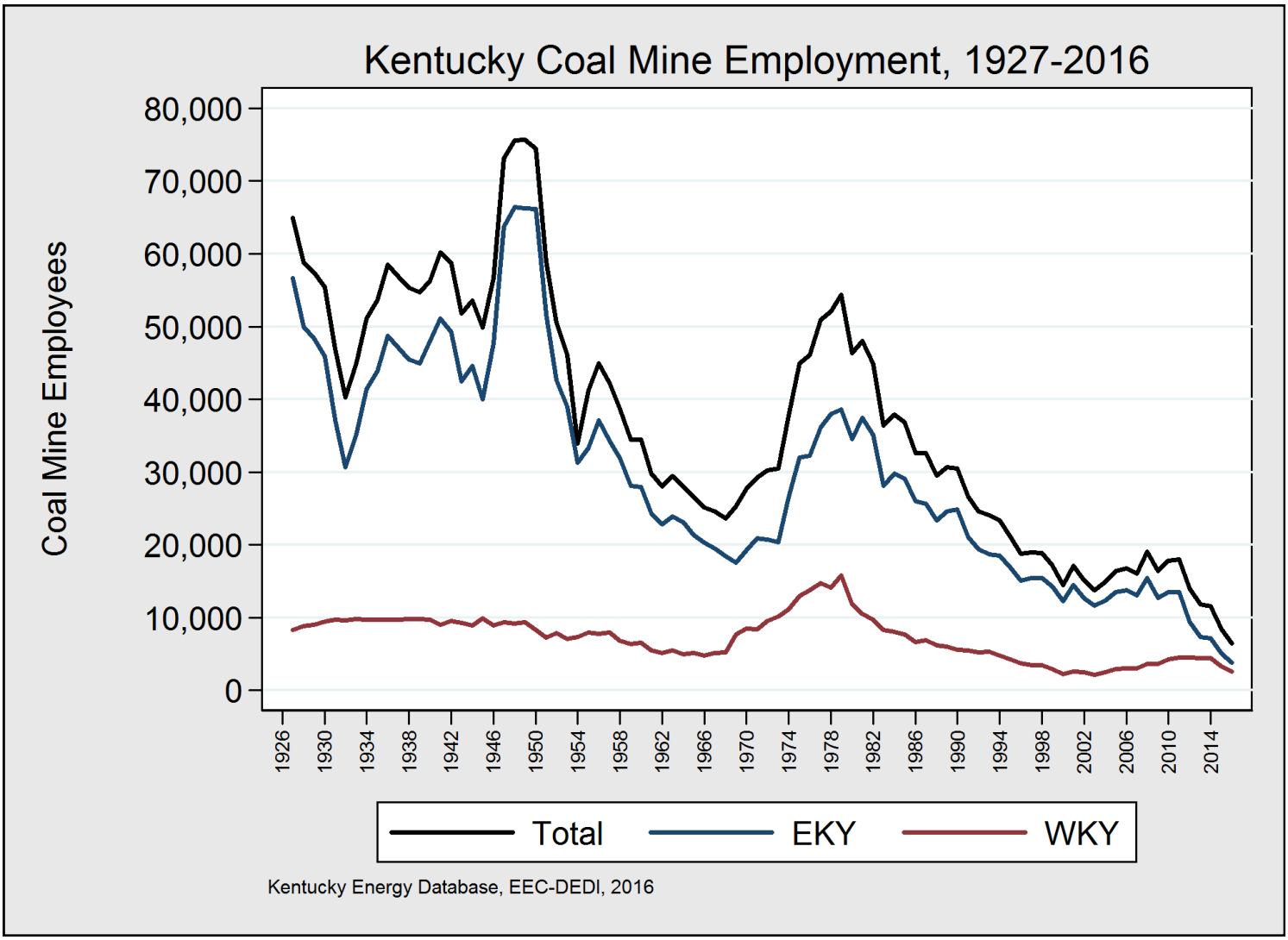
All photographs from the University of Kentucky Special Collections may be found at http://exploreuk.uky.edu/

History of Coal in Kentucky



In 1917, the United States formally declared war on Germany. After one of the coldest winters ever recorded, coal supplies were low, and more coal was desperately needed to continue production of guns, munitions, and ships for the war. President Woodrow Wilson created the United States Fuel Administration to encourage increased coal production. Kentucky coal production continued to rise with the economic growth of the post-World War I expansion until the Great Depression beginning in 1929. In the 1940s, coal production increased once again as the nation armed for war. In the 1940s through 1970s, bituminous coal began to be phased out of the railroad industry, but was increasingly utilized for electricity generation. To meet rising electricity demand, large-scale surface mining operations began in Western Kentucky that led to rapid expansion of production. In the 1970s, significant surface mining operations also began in the Appalachian Mountains of Eastern Kentucky, and accounted for half of the production. Wyoming, with thick seams of low sulfur Powder River Basin coal, displaced Kentucky as the United States' leading coal producer in 1988. Kentucky coal production peaked in 1990 at over 173 million tons and has declined thereafter. West Virginia overtook Kentucky as the second-largest coal producer in 1994.

History of Coal in Kentucky



The earliest official statistic on record for statewide coal mine employment is from 1927 when 64,969 "men" working at 622 mines produced 69.9 million tons. Known Kentucky coal mine employment peaked in 1948 after the Second World War at 75,633, with 66,410 in Eastern and 9,223 in Western Kentucky, respectively. Coal mine employment has declined over the past century due primarily to automation and mechanization of mining processes, which have improved mining productivity—the amount of coal produced per labor hour. Since the year 2000, however, diminishing reserves of thick and easily accessible coal seams in Eastern Kentucky have made coal more difficult, labor-intensive, and costly to mine, which has resulted in reductions in price competiveness of Kentucky coal vis-à-vis coal from other regions and alternative sources of energy. Kentucky coal has been under increased competition from cheaper Powder River Basin coal since the 1980s and from natural gas produced through advances in hydrologic fracturing technology since the 2010s. Federal environmental regulations targeting mercury, sulfur dioxide, nitrogen oxide, and recently carbon dioxide, have further impeded the market competiveness of coal for domestic electricity generation versus alternative energy sources.

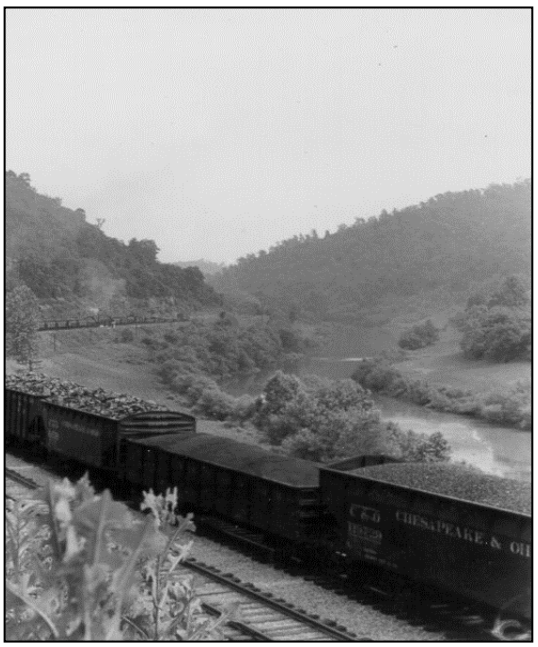


Photo: Miner in Lejunior, Harlan County. 9/13/1946
University of Kentucky Special Collections
http://exploreuk.uky.edu/

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kentuckycoal.com

History of Coal in Kentucky

1000 Although the first use of coal in Kentucky is unknown, Hopi Indians, living in what is now Arizona, are known to have used coal to bake pottery made from clay more than 1,000 years ago.

1673 Among the first known instances of European settlers finding coal in the United States – Louis Jolliet and Father Jacques Marquette encounter "charbon de terra" (coal) at a point on the Illinois River during their expedition on the Mississippi River.

1701 Coal is found near what is now Richmond, Virginia.

1748 First recorded United States coal production occurs near Richmond, Virginia.

1750 Dr. Thomas Walker was the first known person to discover and use coal in what would later become Kentucky.

1755 Lewis Evan's map is made; showing coal in what is now the Greenup County and Boyd County area of Kentucky.

1758 First known commercial U.S. coal shipment occurs.

1790 First recorded Kentucky commercial coal production begins in what would later become Lee County, with annual production of 20 tons, two years before the Commonwealth of Kentucky became a state.

1792 **The Commonwealth of Kentucky became the 15th state to join the United States.**

1800 **Kentucky produces over 100 tons for the first time.**

1813 **Kentucky produces over 1,000 tons for the first time.**

1825 First recorded Western Kentucky coal production begins in newly-founded Daviess County, Kentucky with annual production of 3,000 tons.

1828 **Kentucky produces over 10,000 tons for the first time.**

1838 At the request of the General Assembly, W. W. Mather conducts the first geological survey of Kentucky.

1848 First coal miner's union is formed in Schuylkill County, Pennsylvania.

1854 David Dale Owen establishes the Kentucky Geological Survey (KGS).

1855 **Kentucky produces over 100,000 tons for the first time.**

1861-1865 Kentucky coal production collapses with the onset of the Civil War.

1870 St. Louis & Southern Railroad is completed from Henderson to Earlington, Kentucky.

1872 **Hopkins County is the first Kentucky county to mine over 100,000 tons in a single year.**

First train off the Big Sandy Railroad.

1877 Coal is mined with a steam-powered shovel.

1879 **Kentucky produces over 1 million tons for the first time.**

1880 Mechanical stokers are introduced.

First coke ovens used in Western Kentucky.

First train from Williamson, West Virginia, to Pike County, Kentucky.

Coal mining machines come into general use to undercut coal beds.

1890 **Hopkins County in Western Kentucky is the leading coal producer in the state for 18 straight years.**

N&W Railroad's first mine at Goody in Pike County.

Miner Pay Law enacted.

United Mine Workers of America formed.

Machines developed to undercut coal beds.

5,000 kilowatt steam turbine generates electricity.

1891 First federal law regarding mine safety is enacted, establishing minimum ventilation requirements at underground mines and prohibiting the employment of children less than 12 years of age.

1899 **Hopkins County is the first Kentucky county to mine over 1 million tons of coal in a single year.**

1900 Edgewater Coal Company has its first production in Pike County.

First train off the Lexington and Eastern Railroad.

1907 **Kentucky produces over 10 million tons of coal for the first time.**

1910 United States Bureau of Mines is established, charged with conducting research to reduce coal mining accidents.

First train travels on the Cumberland Valley Railroad.

Pike-Floyd Coal Company has its first production at Betsy Layne.

History of Coal in Kentucky

1911 **Coal production in Eastern Kentucky exceeds 6.9 million tons, displacing Western Kentucky as Kentucky's leading coalfield.**

1914 World War I increases demand for coal; Kentucky produces 20.3 million tons.
Short-flame or "permissible" explosives developed.

1916 Child Labor Act is passed, prohibiting the interstate sale of goods produced by miners under the age of 16.

1918 First pulverized coal fired generator is used in electric power plants.

1920 Federal Mineral Leasing Act becomes law, creating a system of leasing and development for mining on federally owned land

1923 **All-time high U.S. employment of 704,793 bituminous coal and lignite miners is recorded.**
First dragline excavators built especially for surface mining are introduced.

1925 **Harlan County produces 11.8 million tons of coal, becoming the first Kentucky county to produce more than 10 million tons in a single year.**

1927 **Kentucky coal mines employ 64,969 miners, the earliest known official employment statistic.**
Kentucky coal production reaches 69.9 million tons

1931 Great Depression reduces demand for coal; Kentucky produces 40.4 million tons.

1932 Walking dragline excavators are developed.

1933 Congress creates the Tennessee Valley Authority (TVA).

1935 Congress passes the Rural Electrification Act to promote electricity distribution across the United States.

1940 Auger surface mining is introduced.

1941 United States Bureau of Mines is granted inspection authority.

1942 Republic Steel Company has its first production in Road Creek, Kentucky.
Kentucky Water Contamination Legislation is enacted.

1944 World War II increases demand for coal; Kentucky produces 72.4 million tons.

1947 Kentucky Coal Association is founded.
First federal regulation for mine safety is enacted.

1949 **Kentucky coal mines employ 75,707 miners—the highest number ever recorded.**

1950 Post-War Marshall Plan increases demand for coal; Kentucky produces 82.2 million tons.

1952 Federal Coal Mine Safety Act is passed, allowing annual inspections in underground mines and civil penalties against mine operators for noncompliance with withdrawal orders or refusing access to inspectors of mines.

1956 Fish and Wildlife Coordination Act becomes law, requiring federal agencies to determine how proposed mines could affect bodies of water.
Railroads begin converting from coal to diesel fuel.
Roof bolting introduced in underground mines.

1960 Railroads begin using unit coal trains, enabling transportation of larger volumes with increased efficiency.
First longwall mining with powered roof supports.
Kentucky Surface Mining Legislation is enacted.

1961 **Muhlenberg County replaces Hopkins County as the leading coal-producing county.**

1966 Congress extends coverage of 1952 Federal Coal Mine Safety Act to all underground mines.
National Historic Preservation Act becomes law, governing the preservation of historic properties.
C&O Railroad to John's Creek is constructed in Pike County.

1967 **Kentucky produces over 100 million tons for the first time.**

1969 Federal Coal Mine Health and Safety Act enacted, creating what would become the Mine Safety and Health Administration (MSHA). The law requires two annual inspections of every surface mine, four at every underground mine; establishes mandatory monetary fines for all violations and criminal penalties for "knowing and willful" violations; requires more stringent health and safety standards; and provides compensation for miners disabled as a result of pneumoconiosis, or black lung.

1970 Federal Clean Air Act is passed, which regulates the discharge of pollutants into the air.

History of Coal in Kentucky

1970 Federal Clean Air Act is passed, which regulates the discharge of pollutants into the air.

The Hurricane Creek Mine Disaster occurs, in which 38 miners are killed in Leslie County, following a mine explosion—the deadliest mine disaster since the implementation of the Coal Mine Health and Safety Act of 1969.

Surface mines in Muhlenberg County produce nearly 21.5 million tons of coal, more surface production than any county in Kentucky history.

1971 **Kentucky becomes the leading coal producer in the United States, with surface mines in Muhlenberg County leading the state.**

Surface production becomes Kentucky's primary means of coal production, led by large surface mines in Muhlenberg County in Western Kentucky.

1972 Kentucky Coal Severance Tax is established.

Clean Water Act is passed, regulating the discharge of pollutants into water sources.

1973 Endangered Species Act becomes law, which governs the protection of endangered species.

Brookside Strike occurs, during which 180 miners in Harlan County strike, demanding safer working conditions, higher wages, and amended labor practices.

OPEC (Oil Producing and Exporting Countries) oil embargo—coal production and prices rise.

1976 Federal Coal Leasing Amendments Act enacted, requiring all public lands available for coal leasing to be leased competitively.

15 coal miners and 11 rescue workers die in Scotia Mine accident in Letcher County.

1977 Federal Surface Mine Control and Reclamation Act is passed, regulating active mines and creating the Office of Surface Mining to oversee reclamation efforts for reclaiming closed mine lands.

Mine Safety and Health Act (Mine Act) is enacted, amending Coal Mine Safety and Health Act of 1969 to consolidate all coal and non-coal mine safety and health regulations into one regulatory body. The act amends miner protections and transferred authority for overseeing mine health and safety from the Department of Labor to the Mine Safety and Health Administration (MSHA).

Pike County in Eastern Kentucky replaces Muhlenberg County in Western Kentucky as the leading coal-producing county.

1978 **Underground mining again becomes Kentucky's primary means of coal production.**

1980 Congress enacts the National Acid Precipitation Assessment Program (NAPAP) Study, a 10-year research program, which invests $550 million for the study of acid rain.

Industries spend over $1 billion on air pollution control equipment during 1980.

1983 United States Clean Coal Technology Demonstration Program establishes $2.5 billion in federal matching funds committed to develop and demonstrate improved clean coal technologies.

1986 Clean Coal Technology Act is passed, intended to construct new coal generation technologies at scale.

1988 **Wyoming overtakes Kentucky as the leading coal producer in the United States.**

Kentucky Supreme Court rules that the unmined minerals tax on coal is subject to the same state and local property tax rates as other real estate.

1990 United States Clean Air Act Amendments of 1990 are passed, establishing emissions limits for sulfur dioxide and nitrous oxide from coal-fired power plants.

Kentucky coal production peaks at over 173 million tons. Eastern Kentucky production peaks at nearly 131 million tons.

United States coal production exceeds 1 billion tons.

1992 United States Energy Policy Act of 1992 is passed.

1994 **West Virginia overtakes Kentucky as the second-highest coal producer in the United States.**

Workers' Comp Reform Laws are passed in Kentucky.

1996 Energy Policy Act goes into effect, increasing competition in utility markets among fuel providers.

Coal production in Pike County peaks at nearly 36 million tons of coal in a single year, more than any county in Kentucky history.

History of Coal in Kentucky

1997 The Kentucky Fish and Wildlife Commission votes to reintroduce elk into 14 Eastern Kentucky counties on post-mined lands, citing mountaintop mining areas and old mine benches as good elk habitat.

1998 Federal synthetic fuel tax credit for use of coal fines begins.

2005 East Kentucky Power Cooperative's Gilbert coal-fueled fluidized-bed power plant begins operation.

Energy Policy Act of 2005 passed, which promotes the use of Clean Coal Technologies.

EPA adopts Clean Air Mercury Rule (CAMR) to reduce power plant mercury emissions to 15 tons by 2018.

2006 An explosion in Darby Mine No. 1 in Harlan County kills five miners—three from carbon monoxide poisoning and two from the initial blast.

Kentucky Energy Security National Leadership Act is passed, which calls for strategy for producing fuels from Kentucky coal.

Kentucky Coal Academy founded to train new coal miners.

Kentucky becomes the first state to adopt a drug-testing program for certification of coal miners.

Congress passes Mine Improvement & New Emergency Response Act (MINER Act), requiring mine-specific emergency response plans in underground mines, amending regulations for mine rescue, requiring rapid notification of mine accidents, and increasing civil penalties for mine violations.

2007 First year with no underground coal mining fatalities in Kentucky since records began.

Kentucky House Bill I is enacted, providing incentives for development in Kentucky of industries for producing transportation fuels and synthetic natural gas by gasification of coal.

United States Air Force flies aircraft on a blend of jet fuel containing gasified coal.

2010 Kentucky's most efficient coal-fired power plant, an Advanced Super Critical Pulverized Power Plant, begins operation in Trimble County.

2012 **Union County in Western Kentucky replaces Pike County as Kentucky's leading coal-producing county.**

2013 **Coal production in Western Kentucky exceeds coal production in Eastern Kentucky for the first time since 1911.**

2015 **American Electric Power shuts down Big Sandy's coal-fired Unit 2 which had been in operation since 1969. Additional closures of coal-fired units at Robert Reid, Green River, and Cane Run power plants.**

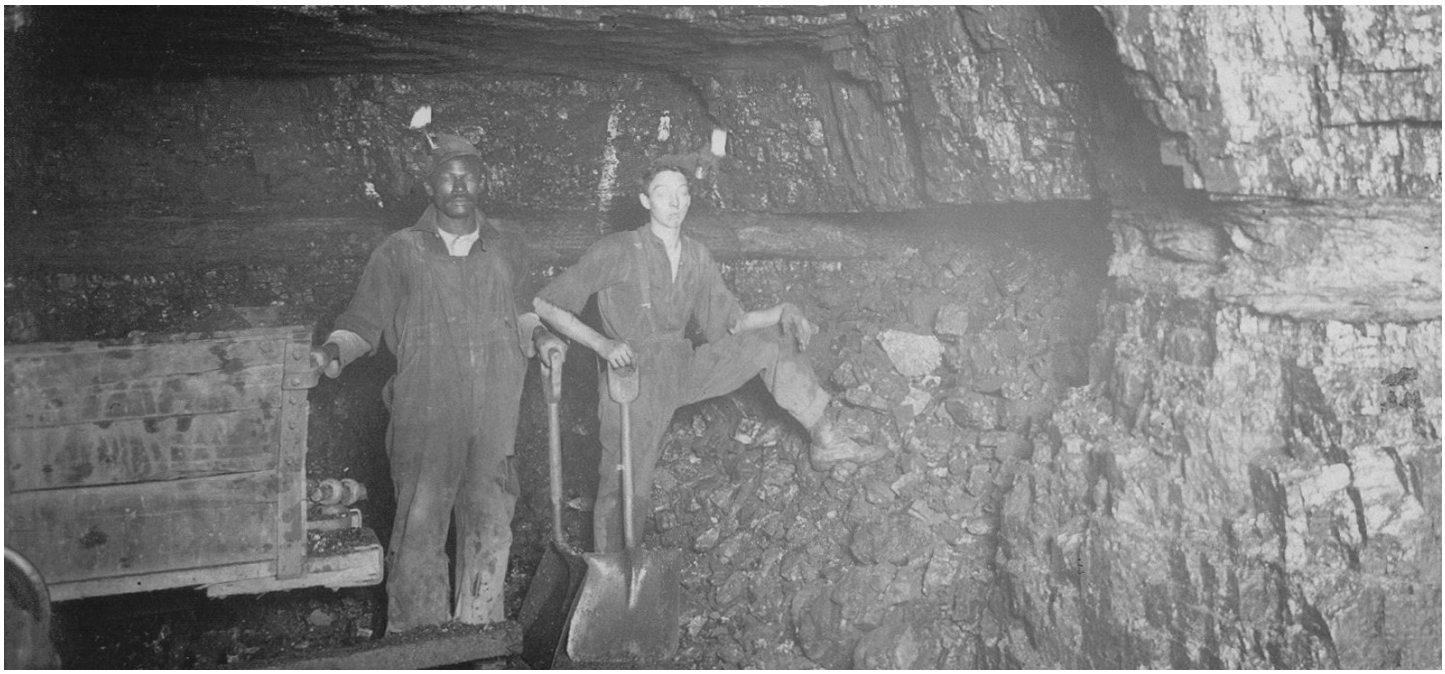
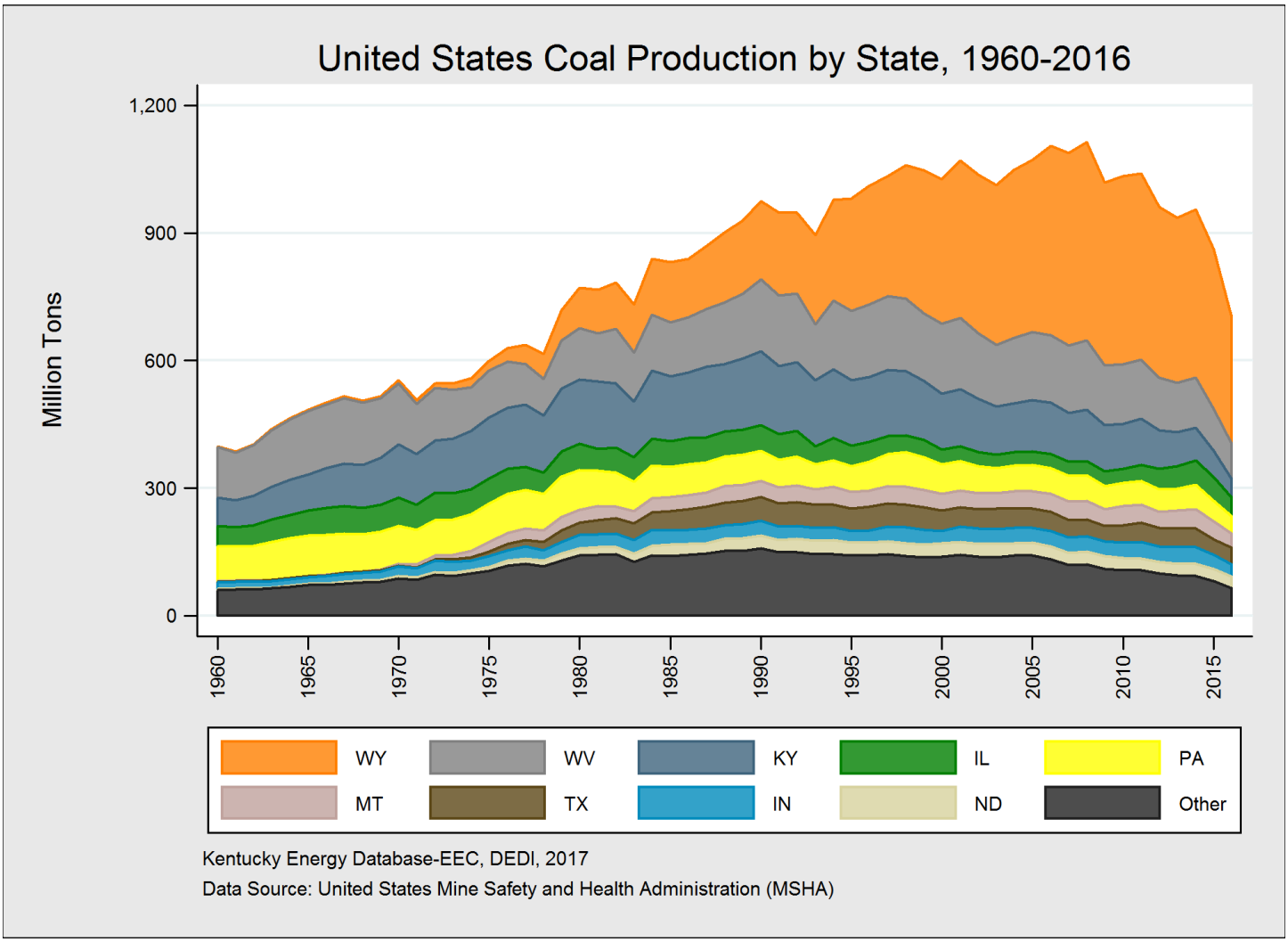


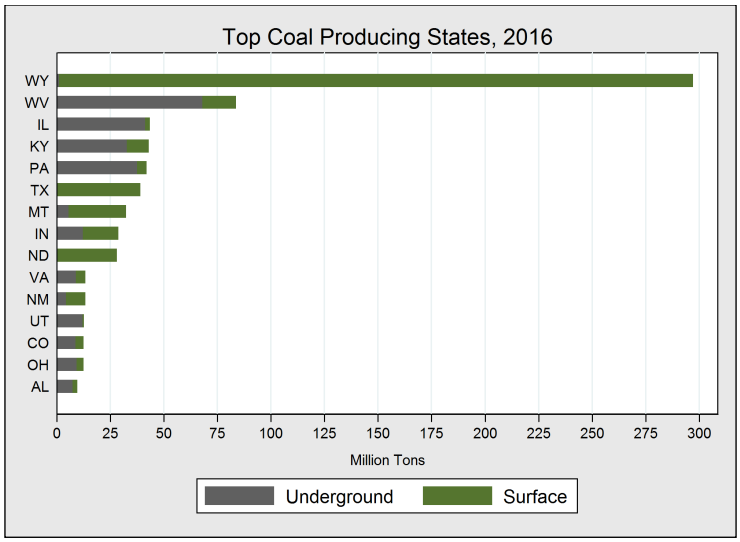
Photo: Coal miners in Mine 205, Jenkins, Kentucky Photographic Collection, University of Kentucky Special Collections.

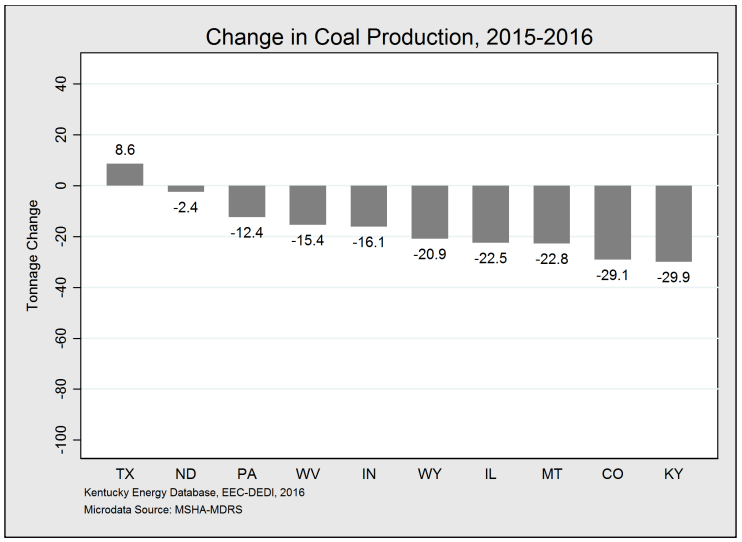
http://exploreuk.uky.edu/

United States Coal Production



United States Coal Production





U.S Coal Production by State, 2016			
State	Thousand Tons	1 Year Change	Percent
United States	727,015	-19.0%	100%
Wyoming	297,118	-20.9%	40.9%
West Virginia	83,684	-15.4%	11.5%
Illinois	43,575	-22.5%	6.0%
Kentucky	42,983	-29.9%	5.9%
Pennsylvania	41,964	-12.4%	5.8%
Texas	39,001	8.6%	5.4%
Montana	32,336	-22.8%	4.4%
Indiana	28,767	-16.1%	4.0%
North Dakota	28,121	-2.4%	3.9%
Virginia	13,359	-5.8%	1.8%
New Mexico	13,341	-32.2%	1.8%
Utah	12,679	-12.1%	1.7%
Colorado	12,634	-29.1%	1.7%
Ohio	12,564	-26.3%	1.7%
Alabama	9,643	-26.9%	1.3%
Arizona	5,423	-20.3%	0.7%
Mississippi	2,870	-8.7%	0.4%
Louisiana	2,798	-18.6%	0.4%
Maryland	1,616	-15.6%	0.2%
Alaska	932	-20.8%	0.1%
Oklahoma	654	-16.1%	0.1%
Tennessee	644	-21.6%	0.1%
Missouri	234	69.2%	0.0%
Arkansas	49	-95.7%	0.0%
Kansas	27	-86.6%	0.0%

Coal production in the United States decreased in 2016 by 19 percent compared to 2015 with more than 727 million tons mined. Since 2008—the year with the highest coal production in the United States—total coal production has declined by 276 million tons, or 40 percent.

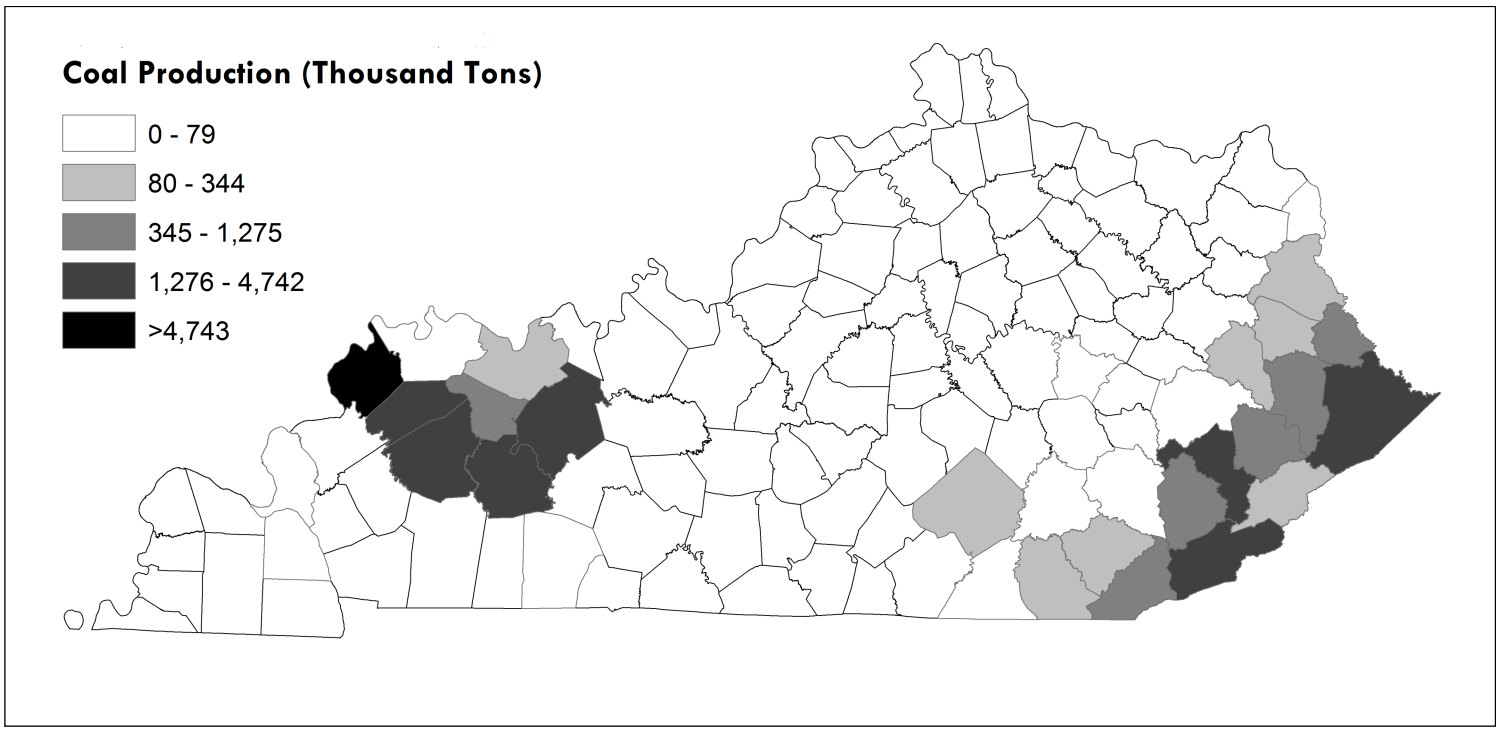
In 2016, coal mines in Wyoming mined approximately 40.9 percent of national production with 297 million tons of Powder River Basin coal. Wyoming has produced more coal annually than any other state since overtaking the top producer at the time, Kentucky, in 1988.

The second-largest coal producer during 2016, West Virginia, accounted for 11.5 percent of national production and supplied consumers with 83.6 million tons of low-sulfur, Central Appalachian Basin coal. West Virginia overtook Kentucky as the second-largest producer in 1994.

Illinois was the third-largest coal producer in 2016 with 43 million tons of coal mined. Illinois coal production has decreased by 6 percent compared to 2015.

Kentucky, currently the fourth-largest producer, with almost 6 percent of national production in 2016, provided coal from deposits of the Central Appalachian Basin in the Eastern portion of the state and the Illinois Basin in the Western portion of the state. Coal production in Kentucky decreased by 29.9 percent in 2016 to 42.9 million tons. Peak coal production in Kentucky was reached in 1990 when the Commonwealth mined 173.3 million tons of coal, and has decreased by 75 percent since.

Kentucky Coal Production



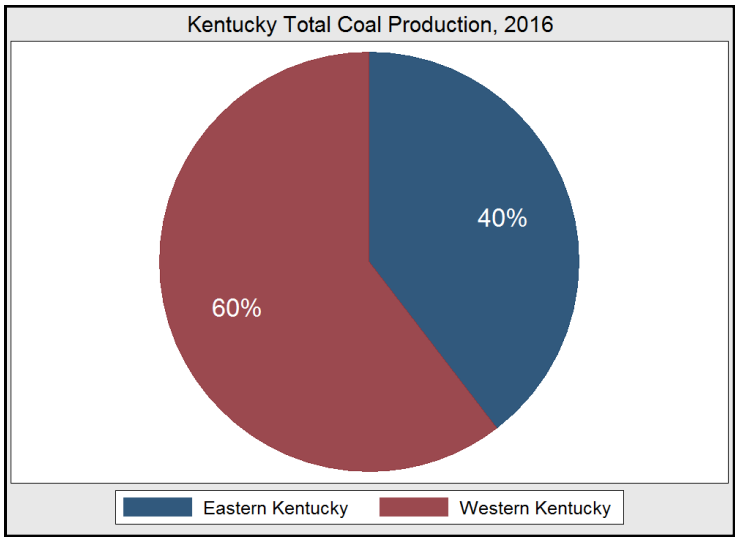
County	Tons	1 Year Change	Percentage
Total	42,982,692	-29.9%	100%
Union	8,607,528	-5.6%	20.0%
Ohio	4,742,266	-29.7%	11.0%
Hopkins	4,281,379	-37.5%	10.0%
Pike	4,136,454	-40.1%	9.6%
Webster	3,744,015	-36.2%	8.7%
Perry	3,591,754	-46.0%	8.4%
Harlan	3,457,164	-9.8%	8.0%
Muhlenberg	3,051,705	-14.5%	7.1%
McLean	1,274,873	+51.2%	3.0%
Bell	1,082,091	-21.7%	2.5%
Leslie	945,906	-30.5%	2.2%
Martin	945,048	-37.9%	2.2%
Knott	681,708	-67.0%	1.6%

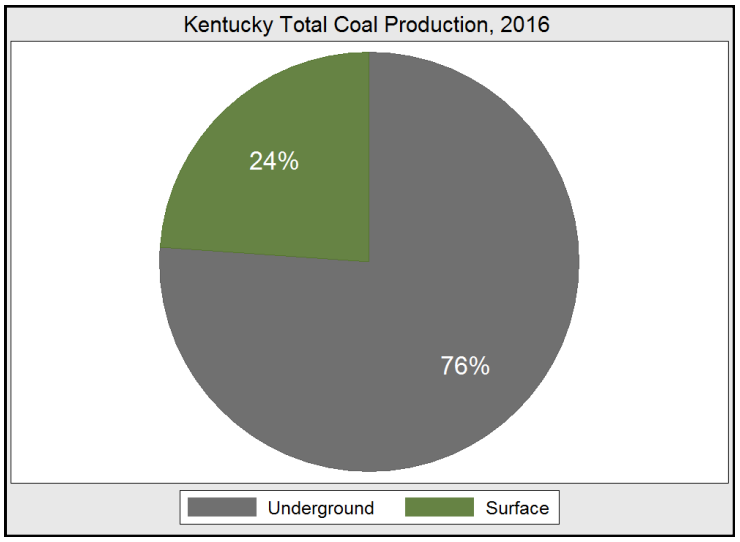
County	Tons	1 Year Change	Percentage
Floyd	640,971	-70.2%	1.5%
Magoffin	344,489	+33.3%	0.8%
Pulaski	212,367	+11,639.5%	0.5%
Whitley	210,838	-16.8%	0.5%
Johnson	204,438	+67.4%	0.5%
Daviess	194,922	-41.8%	0.5%
Letcher	184,786	-64.7%	0.4%
Knox	161,808	-14.3%	0.4%
Lawrence	131,221	-64.9%	0.3%
Breathitt	79,315	-68.4%	0.2%
Logan	72,354	-49.1%	0.2%
Laurel	3,292	-62.0%	<0.1%

During 2016, coal production in the Commonwealth decreased to 42.9 million tons. In 2016, Union County remained the top producer of coal in Kentucky throughout the entire year. Pike County, the largest producer from 1978 to 2011, mined the most in Eastern Kentucky.

In Kentucky, coal mining is divided between two different geologic basins—the Central Appalachian Basin of Eastern Kentucky and the Illinois Basin of Western Kentucky. Kentucky is the only major coal exporting state to span two geologic basins, and the chemical composition and accessibility of the coal from each is distinct. Eastern Kentucky has recorded coal mining since as early as 1790 and Western Kentucky is known to have had mining operations in 1820. The coalfield of Eastern Kentucky has coal with a relatively higher heat content and lower sulfur content than Western Kentucky. Eastern Kentucky coal is also more difficult to mine. As a result of differences regarding the extractability and quality of the coal, Eastern Kentucky is overall more expensive than Western Kentucky coal. The difference in the delivered price of coal between the two coalfields is a result of numerous factors that affect both the supply of and demand for coal, including transportation costs, the ease of accessing coal and the subsequent mining techniques employed, and the chemical properties and heat content of the coal.

Kentucky Coal Production



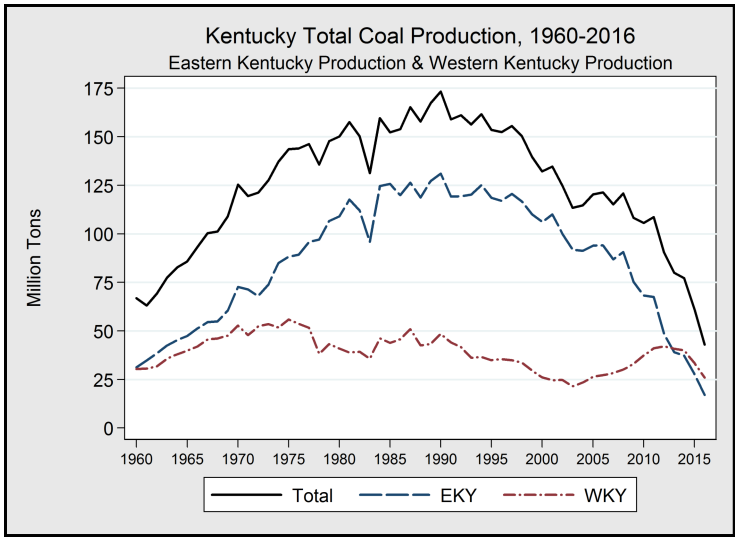


Region	2016 Tonnage	Annual Change
Total	42,982,692	-29.9%
Western Kentucky	25,969,042	-22.4%
Eastern Kentucky	17,013,650	-39.0%

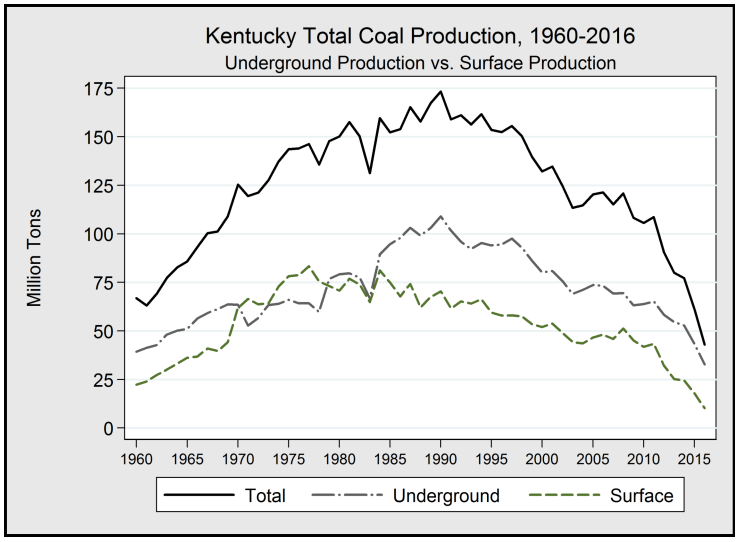
Kentucky coal mines produced 42.9 million tons in 2016, a decrease of 29.9 percent from 2015. Production declined in both the Eastern and Western coalfields in 2016.

Mine Type	2016 Tonnage	Annual Change
Total	42,982,692	-29.9%
Underground	32,711,308	-24.6%
Surface	10,271,384	-42.8%

The majority of Kentucky coal production has been from underground operations since 1979, following the passage of the Surface Mine Control and Reclamation Act of 1977.

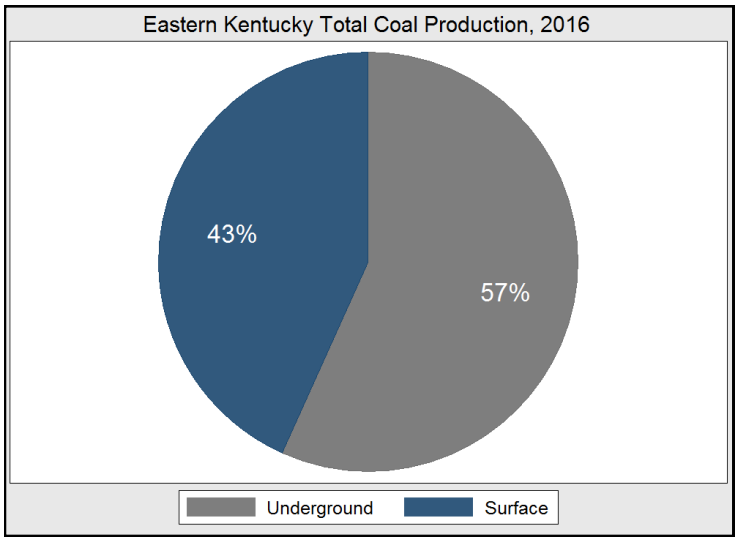


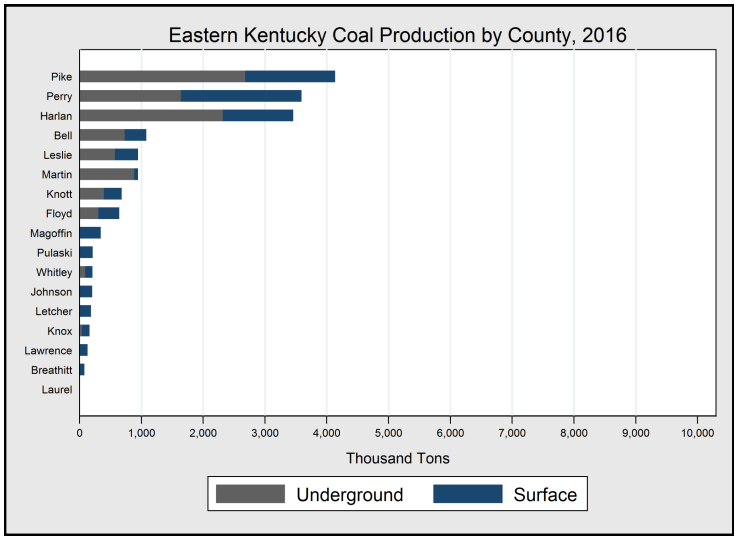
Eastern Kentucky has been the top-producing region in Kentucky since 1912, when Eastern Kentucky overtook Western Kentucky. Western Kentucky coal mines have produced the majority of coal in the Commonwealth since the third quarter of 2013 and were the main source of Kentucky coal from 1886 to 1911.



Underground coal mines produced 32.7 million tons of coal, or 76 percent of total Kentucky production in 2016, a decrease of 24.6 percent from 2015. Surface mining operations, which mined 10.2 million tons of coal, decreased production by 42.8 percent since 2015. Production declines in both surface and underground mining since 1990 have been concentrated in the Eastern coalfield.

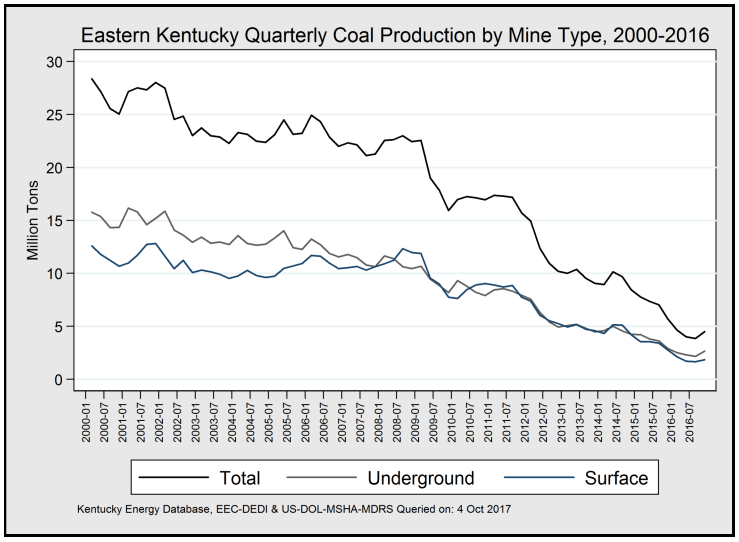
Eastern Kentucky Coal Production





Mine Type	2016 Tonnage	Annual Change
Total	17,013,650	-39.0%
Surface	7,359,606	-44.6%
Underground	9,654,044	-33.9%

Eastern Kentucky coal production decreased in 2016 by 39 percent to 17 million tons of coal, 57 percent from underground mines and 43 percent from surface mines.

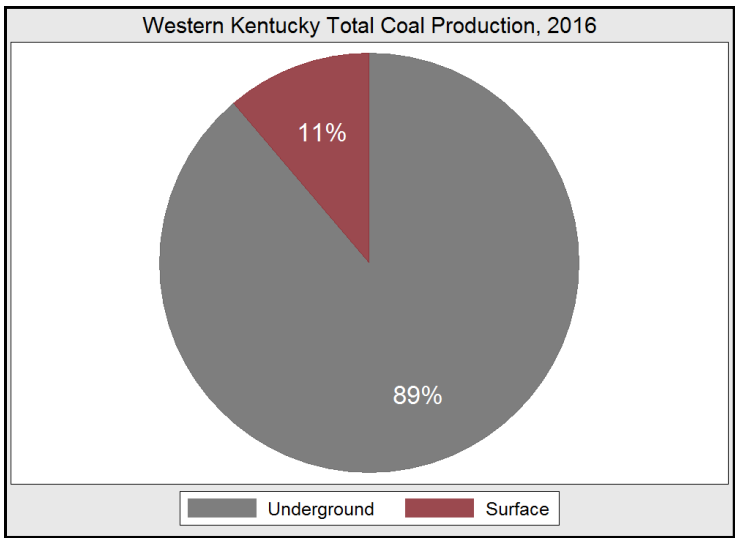


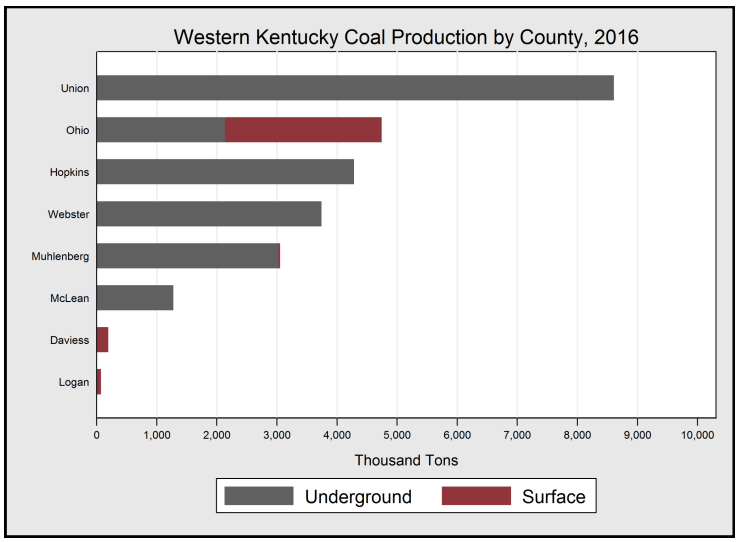
Eastern County	2016 Tonnage	Annual Change
Pike	4,136,454	-40.1%
Perry	3,591,754	-46.0%
Harlan	3,457,164	-9.8%
Bell	1,082,091	-21.7%
Leslie	945,906	-30.5%
Martin	945,048	-37.9%
Knott	681,708	-67.0%
Floyd	640,971	-70.2%
Magoffin	344,489	+33.3%
Pulaski	212,367	+11,639%
Whitley	210,838	-16.8%
Johnson	204,438	+67.4%
Letcher	184,786	-64.7%
Knox	161,808	-14.3%
Lawrence	131,221	-64.9%
Breathitt	79,315	-68.4%
Laurel	3,292	-62.0%

Production decreased at both surface and underground mining operations in 2016 by 44.6 percent and 33.9 percent, respectively.

With the exception of Magoffin, Johnson and Pulaski counties, Eastern Kentucky counties experienced decreases in coal production during 2016. Pike County reduced coal production by 40.1 percent. Pike County still remained the highest coal-producing county in Eastern Kentucky and fourth highest coal producing county in Kentucky. Pulaski experienced the largest increase in coal production.

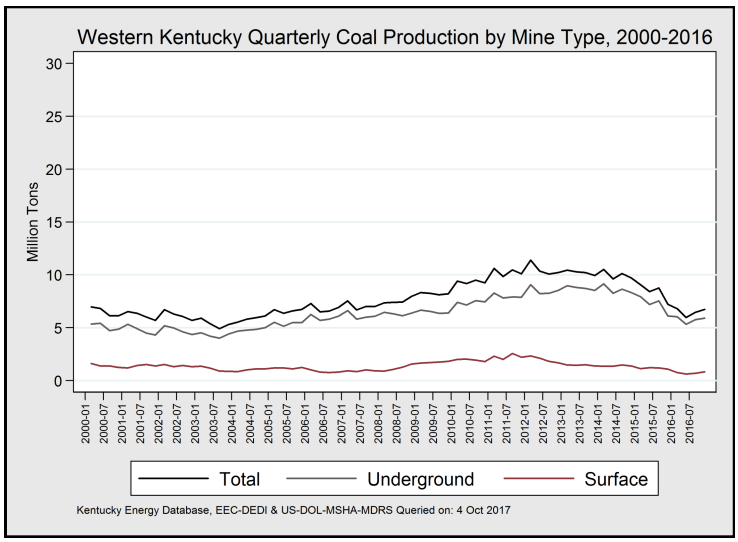
Western Kentucky Coal Production





Mine Type	2016 Tonnage	Annual Change
Total	25,896,688	-22.2%
Underground	23,057,264	-20.0%
Surface	2,839,424	-37.5%

Western Kentucky mined 25.9 million tons of coal in 2016, a decrease of 22.2 percent from 2015. Underground mines accounted for 89 percent of regional production in 2016.



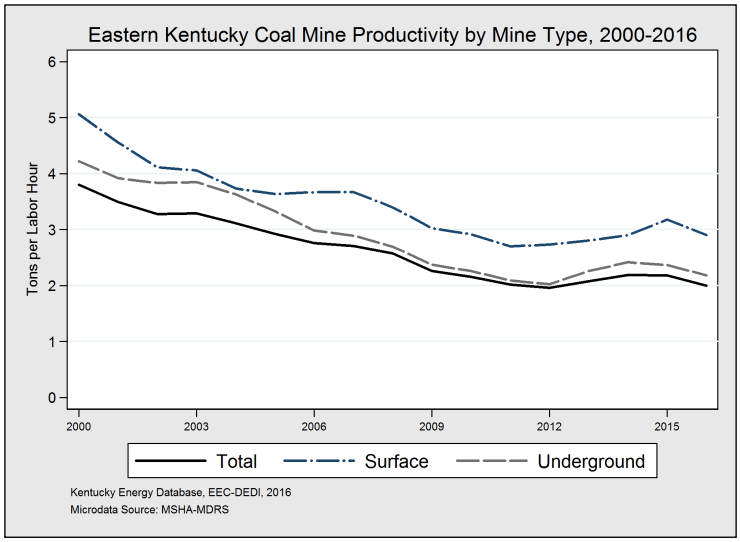
Surface mining made up 11 percent of coal production in Western Kentucky. The majority of Western Kentucky coal production was excavated by surface mining until 1985. In fact, Muhlenberg County was the Commonwealth's leading coal producer from 1961 to 1978, predominantly through the utilization of surface mining techniques.

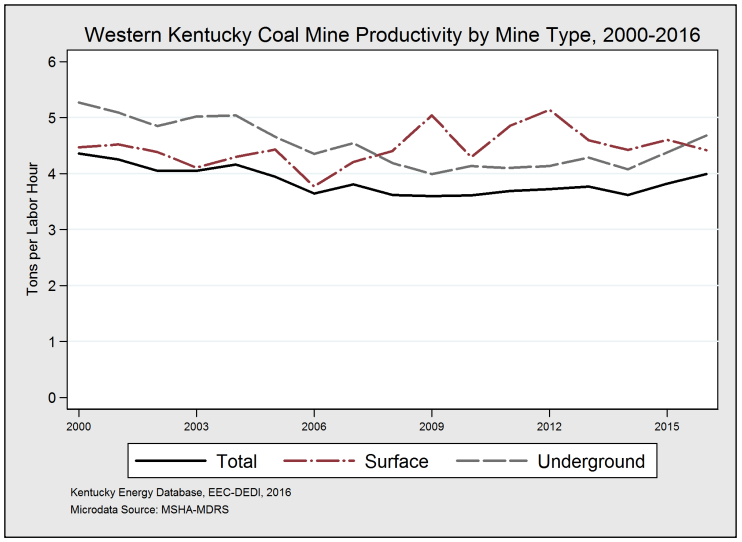
Western County	2016 Tonnage	Annual Change
Union	8,607,528	-5.6%
Ohio	4,742,266	-29.7%
Hopkins	4,281,379	-37.5%
Webster	3,744,015	-36.2%
Muhlenberg	3,051,705	-14.5%
McLean	1,274,873	+51.2%
Daviess	194,922	-41.8%
Logan	72,354	-49.1%

Union County remained Kentucky's leading coal producing county, mining 8.6 million tons during 2016, though production in the county decreased by 5.6 percent from the year prior.

Most Western Kentucky mining since 1985 has been underground. As a result of the topography and basinal structure of the Illinois Basin, surface coal production is relatively more accessible on the edges of the coalfield, further from the Ohio River, where much of the economically viable coal has been extracted in years past. The topography, in part, explains the relative increase in underground mining in the region since 1983 and the relative decrease in surface mining since peak regional surface production in 1972.

Coal Mine Productivity





Region	Mine Type	Tons/Hour
Eastern Kentucky	All*	1.99
	Underground	2.19
	Surface	2.90

Region	Mine Type	Tons/Hour
Western Kentucky	All*	3.99
	Underground	4.68
	Surface	4.42

Total Labor Hours	Underground	Surface
8,512,394	4,418,210	2,533,565

Total Labor Hours	Underground	Surface
6,501,025	4,923,429	658,660

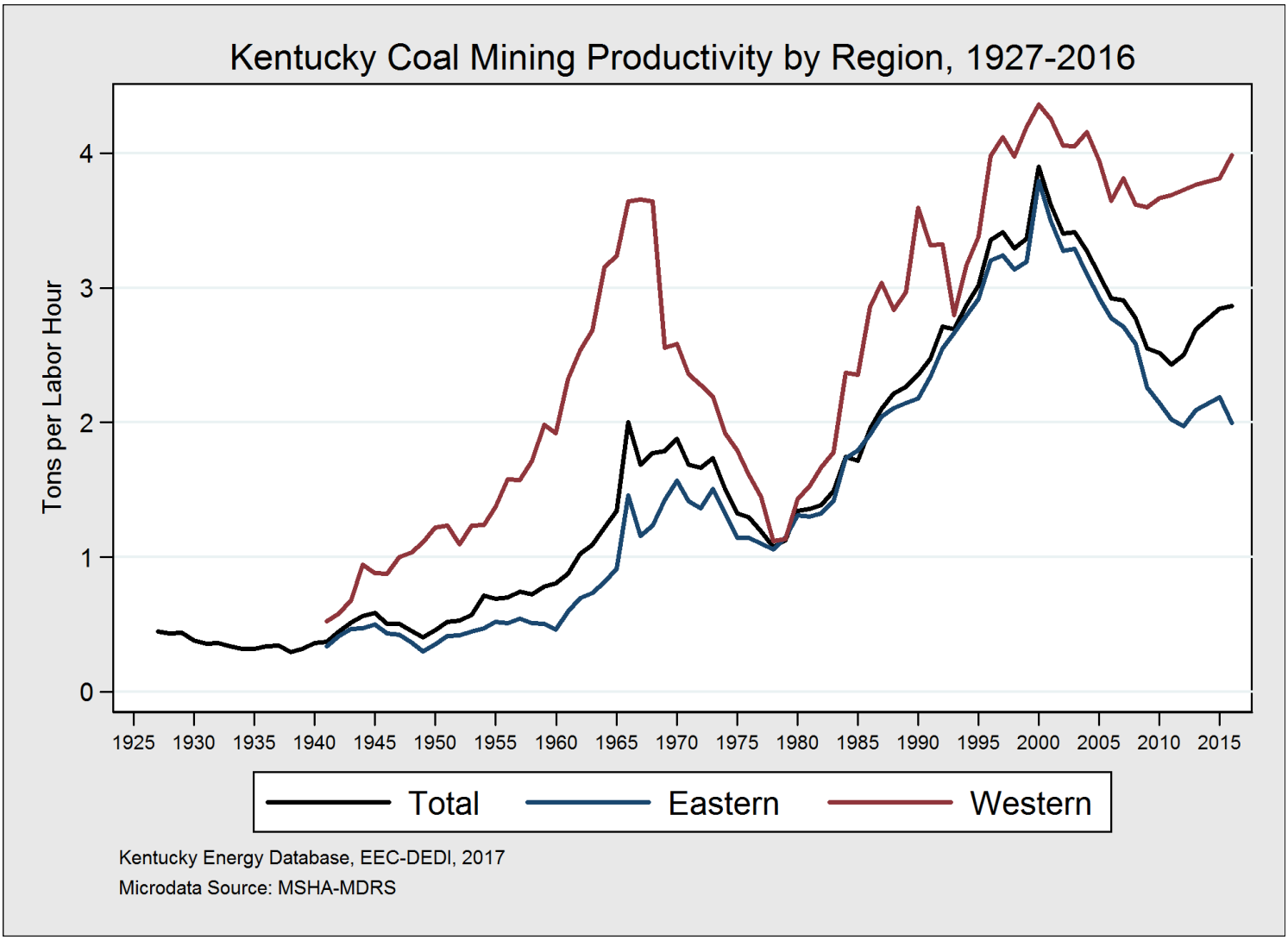
Source: U.S. Department of Labor, Mine Safety and Health Administration, "Quarterly Mine Employment and Coal Production Report" (MSHA Form 7000-02). ***Coal mine productivity is defined as total coal production (tons) divided by total employee labor hours. Total labor hours include the combination by mine site of direct miner hours, preparation plant hours, and on-site office employee hours.** Historical and current reporting on mine productivity statewide and nationwide indicates a trend of declining productivity across all coalfields in the United States since the year 2000.

Coal mining productivity throughout Kentucky has decreased since 2000, but Western Kentucky productivity levels have remained relatively consistent while Eastern Kentucky productivity has dropped more considerably. These productivity differences arise largely as a result of different geologic and hydraulic conditions as well as the methods of coal production employed.

At an average of 1.99 tons per labor hour in 2016, productivity in the Eastern coalfield was relatively unchanged. However, productivity is down 47.6 percent from the year 2000, when production was 3.8 tons per labor hour. Productivity for both surface mines and underground mines in Eastern Kentucky fell consistently from 2000 to 2012, but overall rose by 5.3 percent in 2013 and by 5.5 percent in 2014. Despite those recent increases, productivity fell from 2.19 tons per hour to 1.99 in 2016.

At 3.99 tons per labor hour in 2016, average coal mining productivity in Western Kentucky was 50 percent higher than Eastern Kentucky. While surface mines produced at a rate of 4.42 tons per hour in 2016, surface mine production accounted for only 11 percent of regional production. Therefore, Western Kentucky productivity was most influenced by underground operations. Surface productivity in Western Kentucky increased by 3.9 percent in 2016 and underground productivity increased by 4.5 percent since 2015. Total coal mine productivity in Western Kentucky has fallen by 8.5 percent since 2000. Increases in preparation plant and office employment since 2000 have decreased total productivity numbers in the region.

Coal Mine Productivity



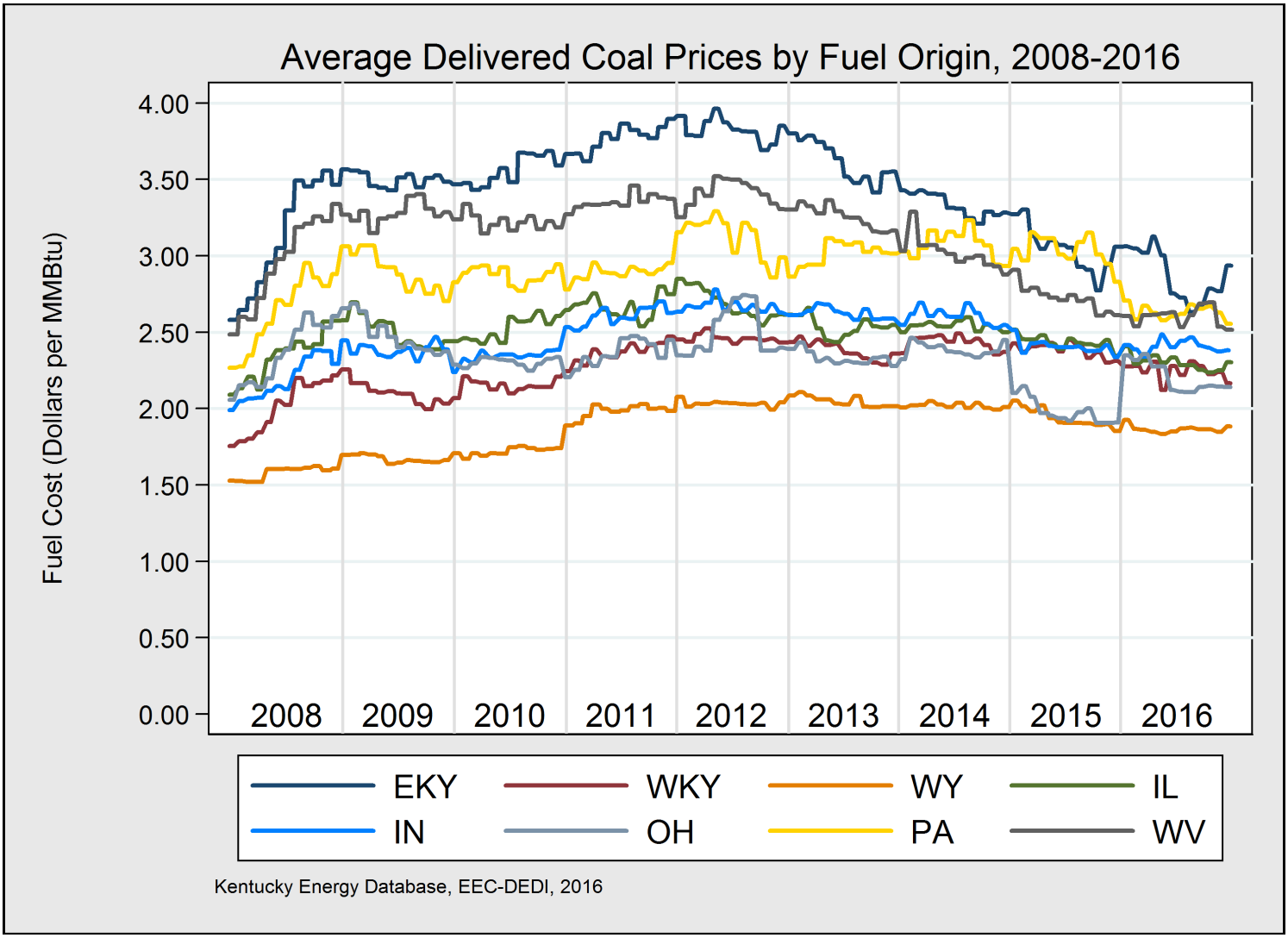
Coal mining productivity increased alongside greater adoption of mechanization from the 1940s to 2000, and have declined thereafter as coal resources have become more scarce. Recent increases in productivity in Eastern Kentucky result as adverse economic conditions have forced less productive mines to close.

The initial rise in Western Kentucky productivity between 1940 and 1966 resulted from the two highest-producing counties in the region—Hopkins and Muhlenberg. The region's increasing productivity began in Hopkins County in the 1940s, but increased in tandem with surface mining production in Muhlenberg County through the 1950s and 1960s. As coal production in Muhlenberg County began to decline in the late 1960s and early 1970s, regional productivity also decreased. Western Kentucky's increased coal mining productivity after 1980 resulted from increased production and decreased employment in both surface and underground mining operations throughout the region.

In Eastern Kentucky, historical productivity has risen and fallen alongside underground mining production. Though surface mining operations took longer to take hold in Eastern Kentucky relative to Western Kentucky, by 1977 surface operations were widespread and kept a steady rate of production until 2008. Underground mining operations increased in production and productivity from the 1970s to 1990 and declined until 2012, when productivity increased again.

Historical productivity, shown above, were determined by dividing regional coal production by the estimated number of labor hours. From 2000-2016, miner hours are known, and before 2000, they have been estimated. In the years prior to 2000, hours are the equivalent of coal mine employment times 2,415, which was the average number of hours worked annually by coal miners in Kentucky from 2000 to 2016.

Coal Price by Producer State



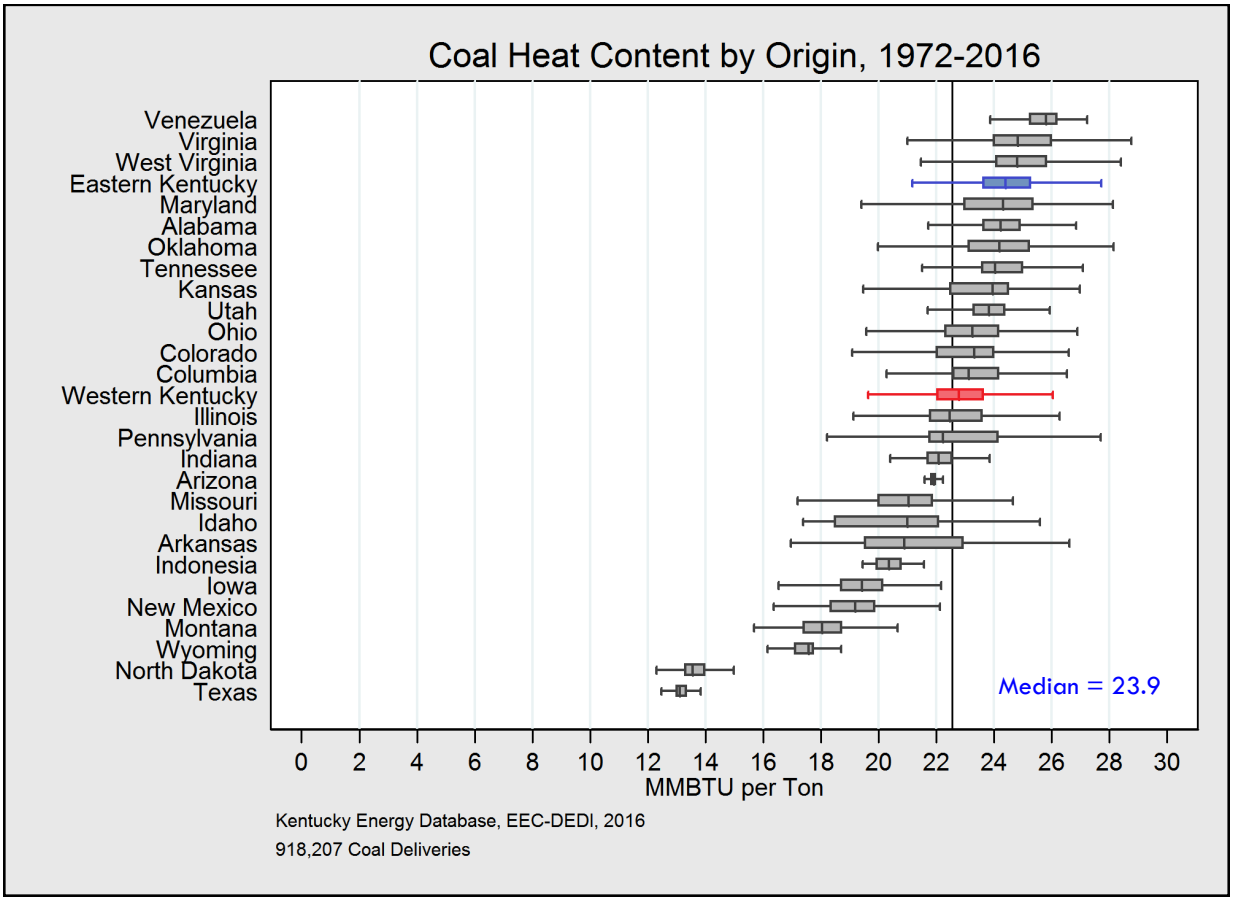
Origin	2016 $ per MMBtu	5 Year Change
Eastern Kentucky	2.88	-24%
Pennsylvania	2.63	-9%
West Virginia	2.60	-22%
Illinois	2.30	-14%
Western Kentucky	2.25	-5%
Wyoming	1.87	-5%
Ohio	2.21	-6%
Indiana	2.41	-7%

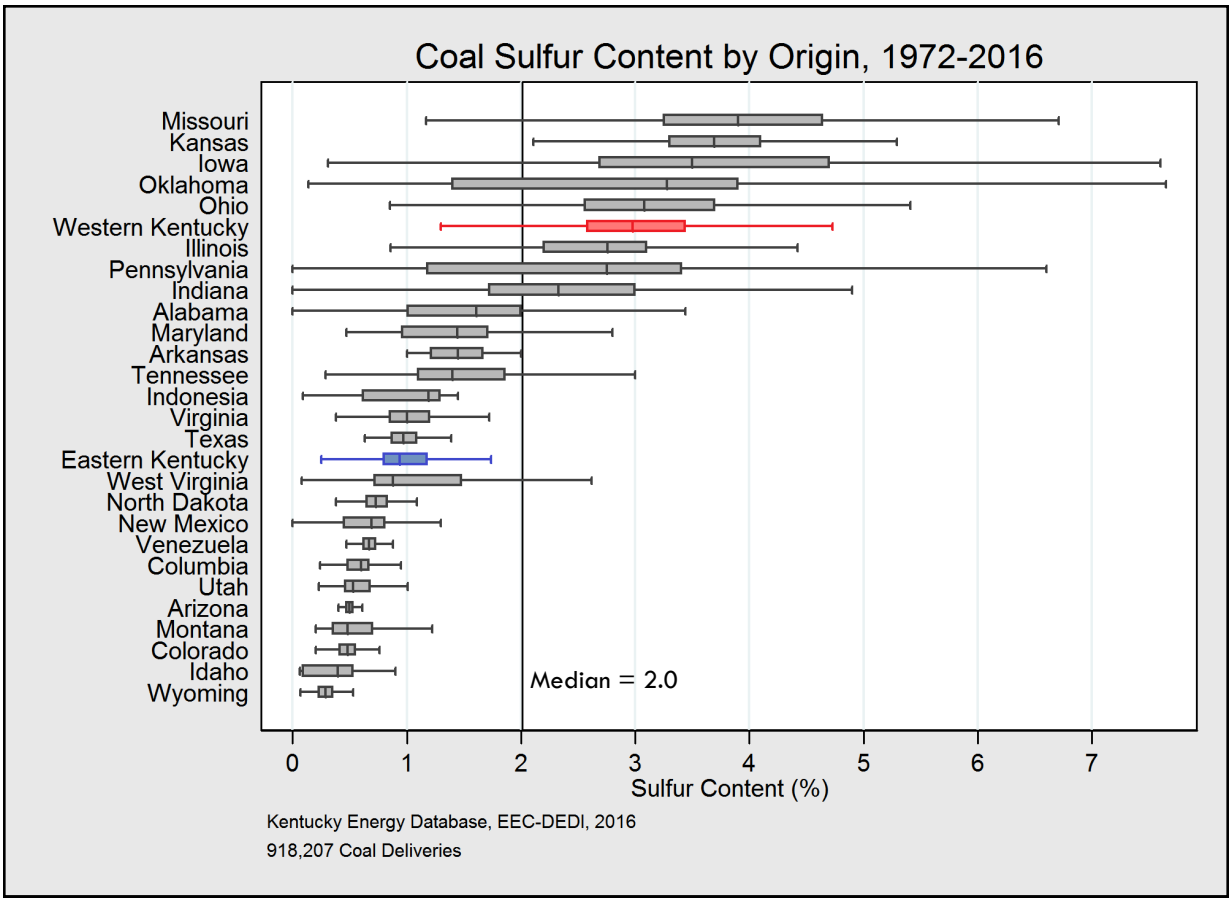
In 2016, Wyoming, West Virginia, Kentucky, Pennsylvania, and Illinois produced 70 percent of coal mined in the United States. A group of 20 states accounted for the remaining 30 percent of coal production; yet, no single state within this group represented more than five percent of national production.

Of the five largest coal-producing states in 2016, coal mined in Eastern Kentucky was, on average, the most expensive coal delivered to electric utilities in the United States. Pennsylvania and West Virginia, which produce bituminous coal from the Central Appalachian Basin, supplied the second and third-most expensive coal to electric power facilities. Wyoming, which was the nation's largest producer of coal in 2016 and mines sub-bituminous coal in the Powder River Basin, offered the least expensive coal among major producers, on average, to power plants during the year.

Factors such as market demand, coal mine productivity, heat content, sulfur content, spot pricing, and transportation costs all combine to affect the delivered cost of any shipment of coal.

Coal Properties by Producer State





Coal Properties by Producer State

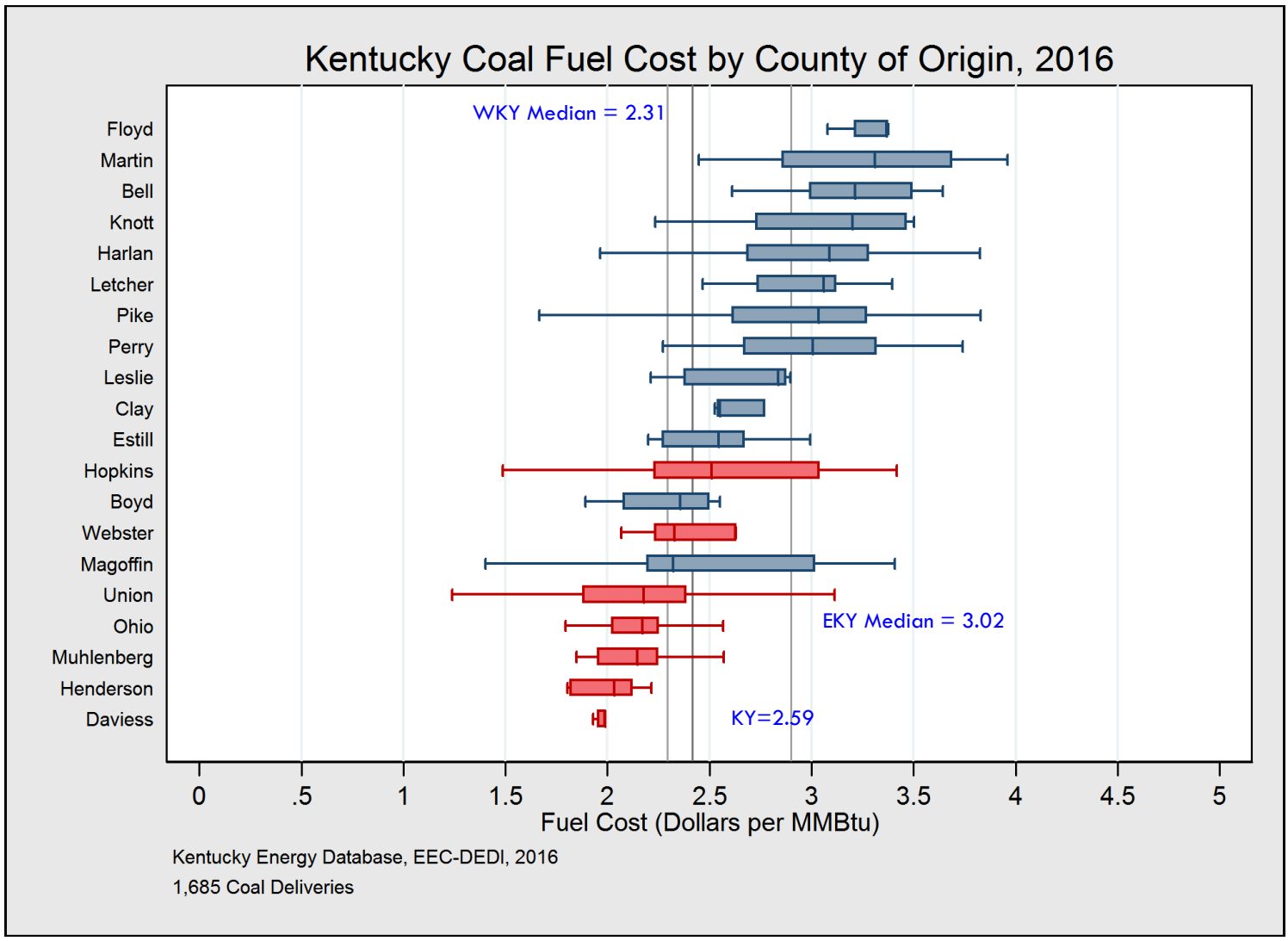
State	Mean Heat Content (MMBtu per Ton)	Median Sulfur Content (%)	Median Ash Content (%)	2016 Mean Delivered Price ($ per MMBtu)	2016 Median Delivered Price ($ per Ton)
AK	16.02	0.16	8.8	2.82	40.57
AL	24.12	1.36	12.8	3.58	89.01
AR	20.74	1.4	24.7	—	—
AZ	21.86	0.51	9.9	2.17	46.24
CO	22.26	0.47	9	2.63	54.05
EKY	24.53	0.98	10.27	2.90	74.10
IL	22.50	2.75	9.1	2.29	51.86
IN	22.18	2.52	9.2	2.35	51.80
KS	23.31	3.67	12.9	2.02	56.73
LA	13.80	0.69	13.5	3.60	47.51
MD	23.70	1.62	14.73	2.33	51.52
MO	21.02	3.89	13.3	1.61	57.83
MS	10.38	0.48	15	—	—
MT	17.97	0.46	6.4	2.05	37.21
ND	13.48	0.74	8.4	1.72	19.22
NM	19.44	0.68	15.58	2.12	38.09
OH	23.22	3.13	11.8	2.12	44.91
OK	23.92	3.1	11.74	—	—
PA	23.95	1.86	12.3	2.61	68.71
TN	24.15	1.48	12.3	3.00	92.94
TX	12.70	1.00	16.2	2.79	33.98
UT	23.43	0.52	9.7	1.95	43.86
VA	24.94	0.99	11.1	2.81	64.60
WA	16.43	0.72	14.95	—	—
WKY	22.95	2.99	10.9	2.20	50.95
WV	24.60	0.88	11.5	2.60	63.39
WY	17.52	0.3	5.1	1.88	32.43

Steam Coal Properties

Coal from different states and coalfields across the country have distinct characteristics. For example, Eastern Kentucky coal has one of the highest average heat contents in the United States. This table and previous graphics show the average chemical and cost properties for Kentucky coal, separated by region, relative to all other major sources of coal consumed in the United States. The properties were calculated from federal fuel shipment receipts as reported by electric utilities across the United States in EIA Form 923 and FERC Form 423.

The preceding and subsequent box and whisker plots summarize the range of heat content or sulfur content of coal by state. The box represents the range of observations within the 25th and 75th percentiles, or 50 percent of the data. The median value is marked in the center of the box with a vertical line. The whiskers, the horizontal lines extending from each box, illustrate the range of approximately 99.7 percent of the data, or ± 2.698 standard deviations from the median.

Coal Price by Kentucky County

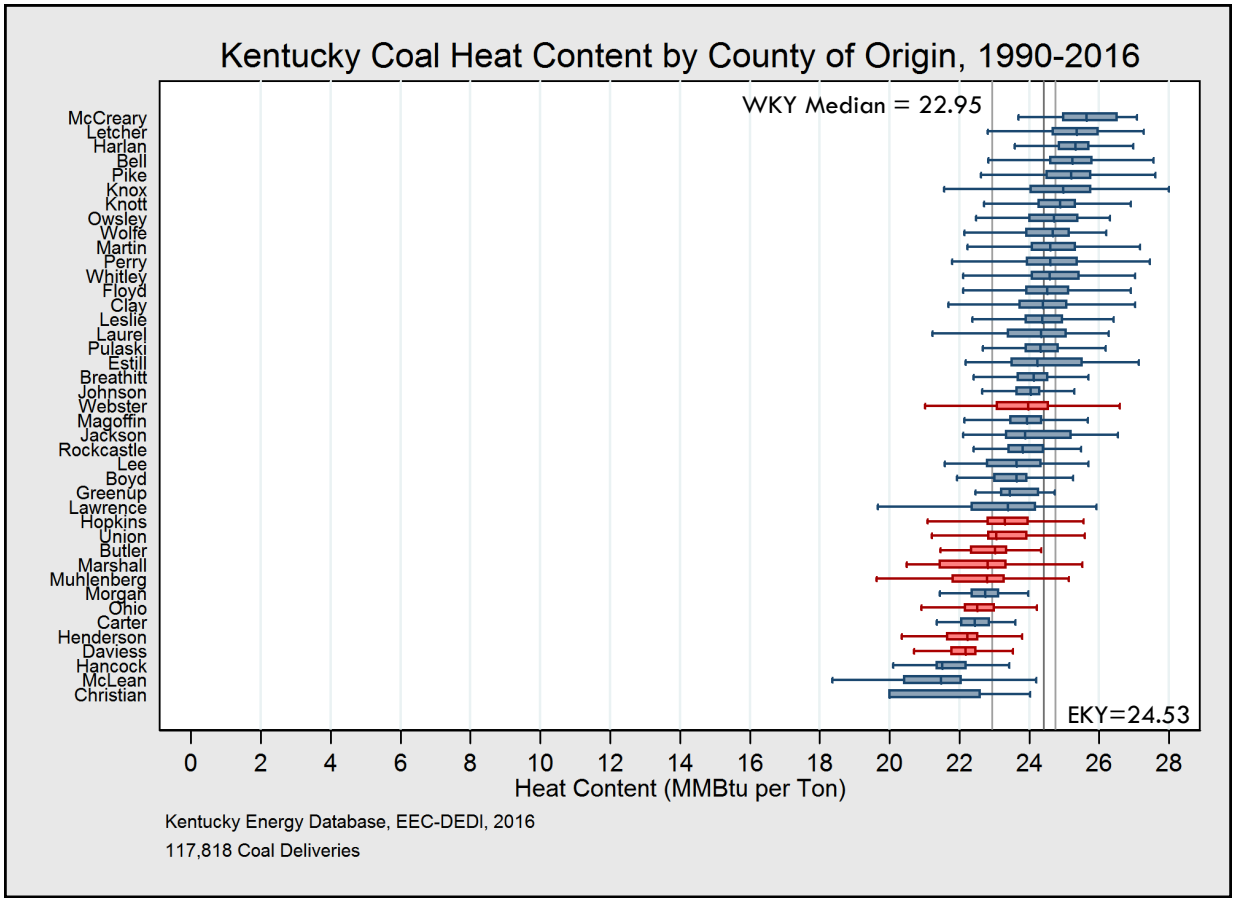


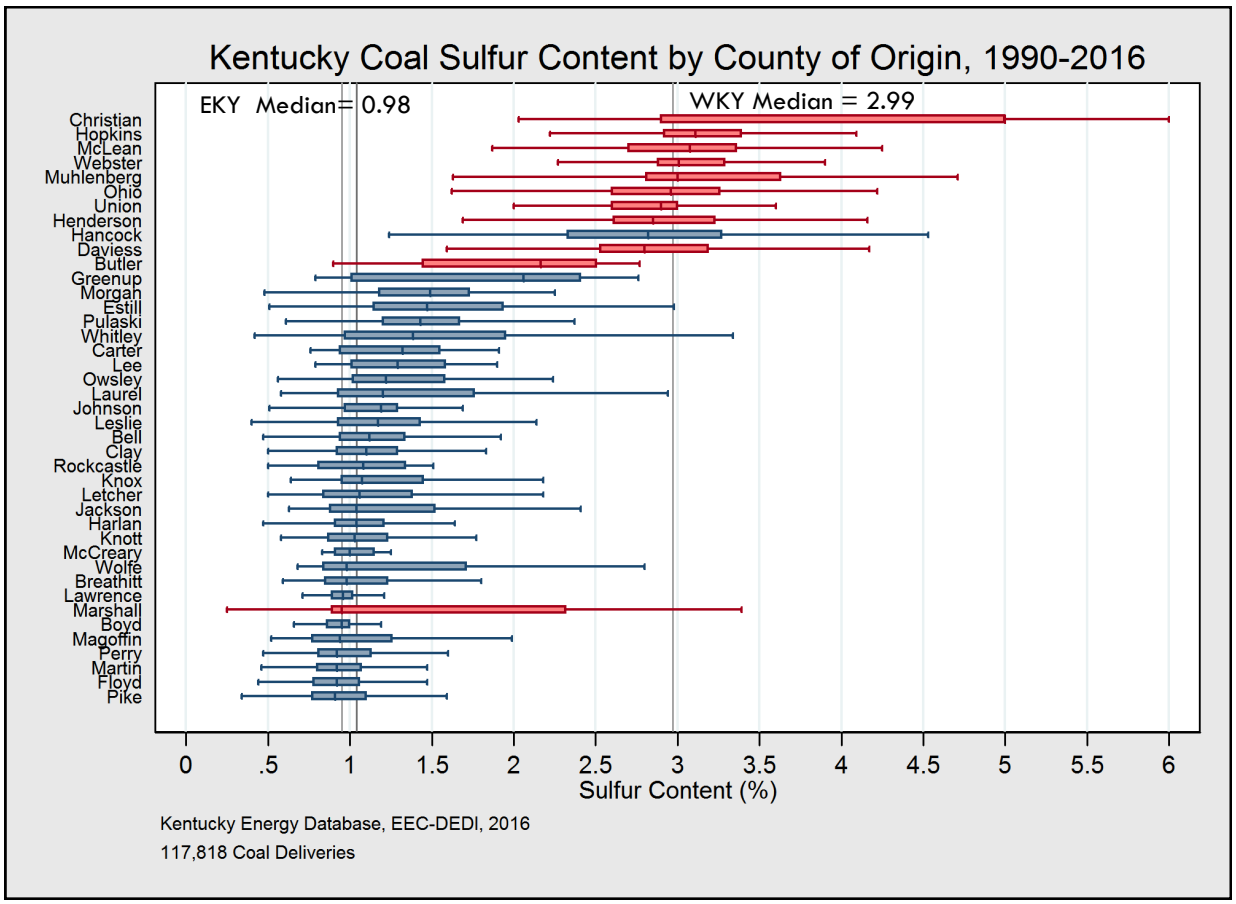
The above chart summarizes the range of delivered prices for coal by coal mining county. The whiskers (horizontal lines) on each plot denote the minimum and maximum prices for each county, while the box component represents the 25th percentile through the 75th percentile of price values (or 50 percent of the data). The vertical line within the box component marks the median delivered price.

Eastern Kentucky Coal Prices, 2016			Western Kentucky Coal Prices, 2016		
Range	County	Median (Dollars per MMBtu)	Range	County	Median (Dollars per MMBtu)
Max	Floyd	3.36	Max	Hopkins	2.45
Average	All	2.93	Average	All	2.19
Min	Boyd	2.08	Min	Daviess	1.96

Overall, the median delivery price of coal mined in Eastern Kentucky counties is higher than that of coal mined in Western Kentucky counties. The range of prices within a county as well as the difference in prices between counties are a function of several factors such as mine productivity, coal sulfur content, coal heat content (Btu content), coal ash content, terms of a delivery contract, and the transportation costs connected to delivery. Ultimately, the interaction of all these major variables affects the delivery price of any coal available on the market.

Kentucky Steam Coal Properties





Kentucky Steam Coal Properties

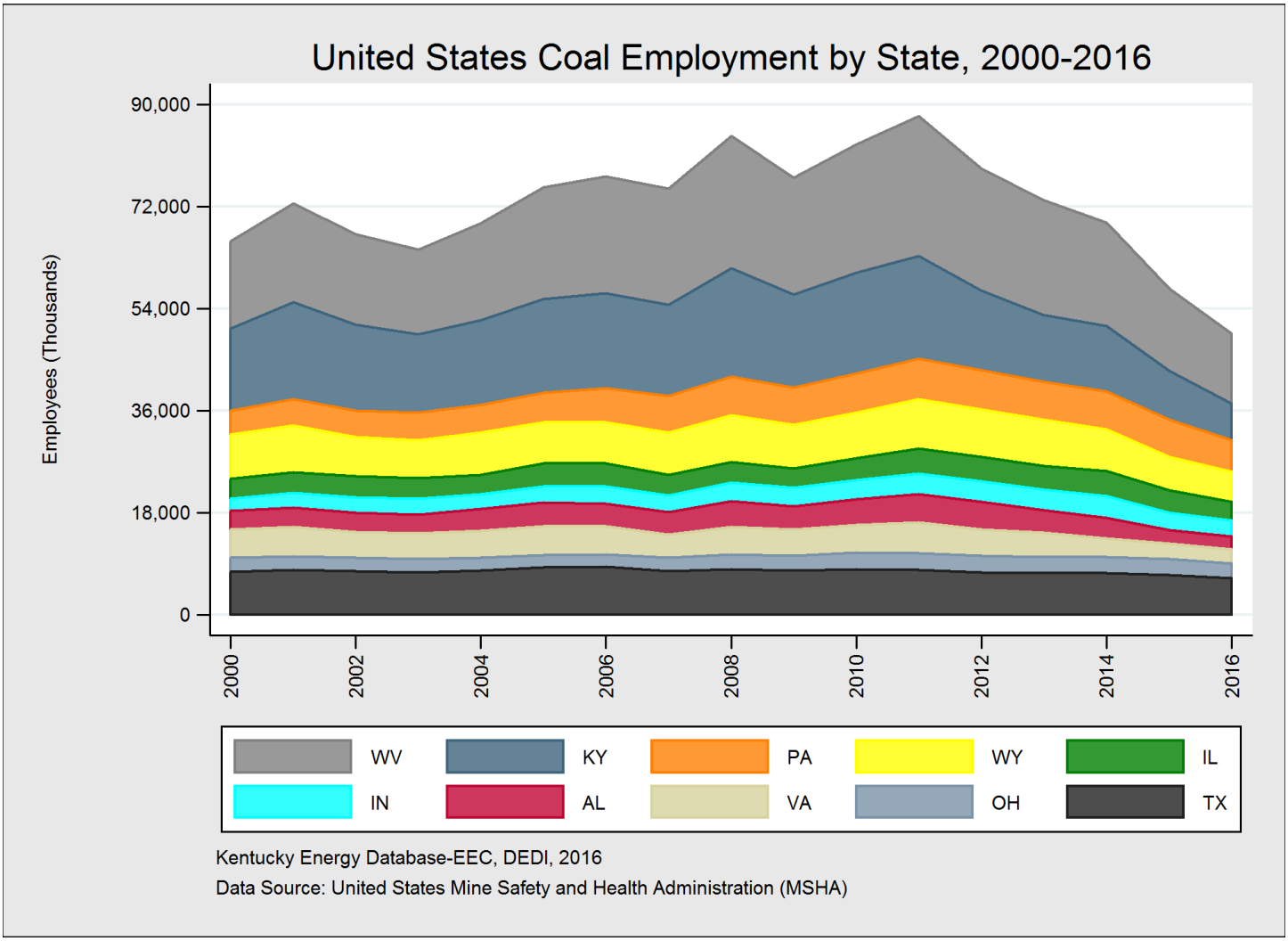
Region	Median Heat Content (MMBtu per Ton)	Median Sulfur Content (%)	Median Ash Content (%)	2016 Median Delivered Price ($ per MMBtu)	2016 Median Delivered Price ($ per Ton)
Kentucky	**24.36**	**1.10**	**10.40**	**2.38**	**55.63**
Eastern Kentucky	**24.53**	**0.98**	**10.27**	**2.90**	**74.10**
Bell	25.27	1.13	8.83	3.15	80.66
Boyd	23.86	0.92	11.40	2.09	48.15
Breathitt	24.26	1.01	10.30	—	—
Clay	24.55	1.14	10.60	2.86	73.27
Estill	24.48	1.46	10.20	2.50	53.56
Floyd	24.51	0.92	10.50	3.37	87.90
Harlan	25.33	1.03	9.20	3.09	77.38
Johnson	24.02	1.17	10.60	—	—
Knott	24.94	1.07	10.00	2.82	67.43
Knox	24.98	1.06	9.60	—	—
Laurel	24.30	1.20	10.70	—	—
Lawrence	23.64	0.94	11.90	—	—
Leslie	24.90	1.20	9.83	2.84	68.73
Letcher	25.54	1.12	8.70	3.15	75.51
Magoffin	23.96	0.98	11.50	—	—
Martin	24.69	0.92	9.70	3.26	74.02
McCreary	26.09	1.00	5.59	—	—
Perry	24.75	0.94	10.10	3.02	83.48
Pike	25.23	0.93	9.55	2.96	76.20
Rockcastle	23.81	1.08	10.80	—	—
Whitley	25.12	1.17	7.90	—	—
Western Kentucky	**22.95**	**2.99**	**10.9**	**2.20**	**50.95**
Daviess	22.23	2.87	9.70	1.96	43.32
Henderson	22.21	2.89	9.50	—	—
Hopkins	23.38	3.12	10.20	2.45	63.11
McLean	22.00	3.04	11.90	—	—
Muhlenberg	22.77	3.04	10.40	2.15	50.73
Ohio	22.64	2.97	9.70	2.16	44.17
Union	23.10	2.90	8.60	2.14	51.74
Webster	24.00	2.95	10.00	2.33	59.32

Kentucky Steam Coal Chemical Properties

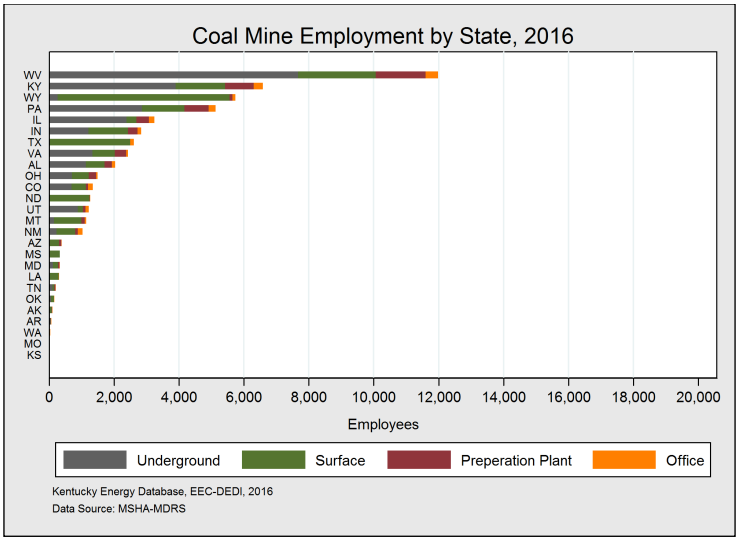
In Kentucky, coal mining is divided between two distinct geologic basins: The Central Appalachian Basin of Eastern Kentucky, and the Illinois Basin of Western Kentucky. This table and previous graphics display the median chemical and cost properties for Kentucky steam coal by county as reported by electric generating stations across the United States. Relative to Western Kentucky, coal mined in Eastern Kentucky between 2008 and 2016 had a 7 percent higher heat content per ton, 67 percent less sulfur, and in 2016, nominal delivered costs that were 32 percent higher per MMBtu. Since the Clean Air Act Amendments of 1990, demand for Eastern Kentucky coal has been, in part, driven by demand for lower sulfur coal that reduces the emission of sulfur dioxides. However, in order to comply with increasingly stringent sulfur dioxide limits, many coal-fired power plants have elected to install desulfurization equipment that enables them to burn higher sulfur and lower cost coal such as the coal mined in Western Kentucky.

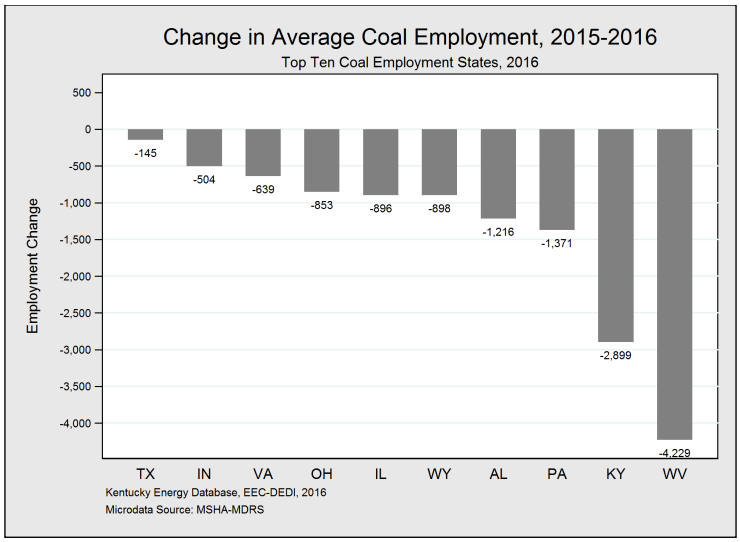
The preceding box and whisker plots summarize the range of heat or sulfur content of coal by county. The whiskers denote the minimum and maximum values for each county, while the box component represents the 25th percentile through the 75th percentile of values (or 50 percent of the data). The vertical line within the box component marks the median value.

United States Coal Employment



Coal Mine Employment by State





U.S Coal Employment by State, 2016				
State	Rank	Employment	1 Year Change	Percent
US	—	52,110	-21.8%	100%
WV	1	11,981	-26.1%	23.0%
KY	2	6,612	-30.8%	12.7%
WY	3	5,744	-13.5%	11.0%
PA	4	5,129	-21.1%	9.8%
IL	5	3,240	-21.7%	6.2%
IN	6	2,843	-15.1%	5.5%
TX	7	2,618	-5.2%	5.0%
VA	8	2,436	-20.8%	4.7%
AL	9	2,047	-37.3%	3.9%
OH	10	1,504	-36.2%	2.9%
CO	11	1,339	-18.5%	2.6%
ND	12	1,259	-4.1%	2.4%
UT	13	1,227	-4.2%	2.4%
MT	14	1,148	-13.6%	2.2%
NM	15	1,033	-8.6%	2.0%
AZ	16	384	-4.7%	0.7%
MS	17	338	+2.6%	0.6%
MD	18	337	-7.3%	0.6%
LA	19	304	-0.7%	0.6%
TN	20	196	-29.9%	0.4%
OK	21	154	-4.4%	0.3%
AK	22	112	-2.3%	0.2%
AR	23	70	-29.2%	0.1%
WA	24	31	-10.7%	0.1%
MO	25	18	+25.9%	<0.1%
KS	26	6	-47.0%	<0.1%

Coal employment in the United States decreased in 2016 by 21.8 percent compared to 2015, with 52,110 full-time workers employed. Since 2011 total coal employment has declined by 41,637 jobs, or 44 percent.

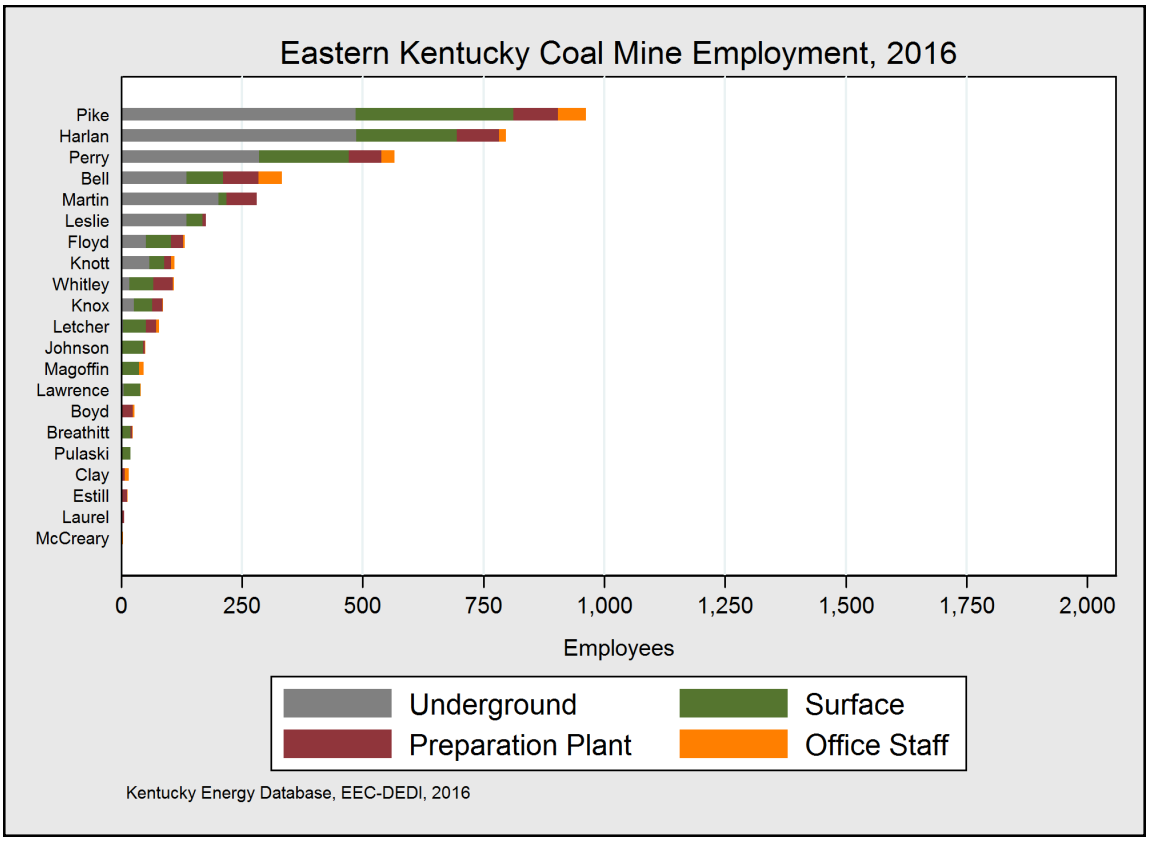
The largest coal employer during 2016, West Virginia, accounted for nearly a quarter of national direct-coal employment, with 11,981 workers.

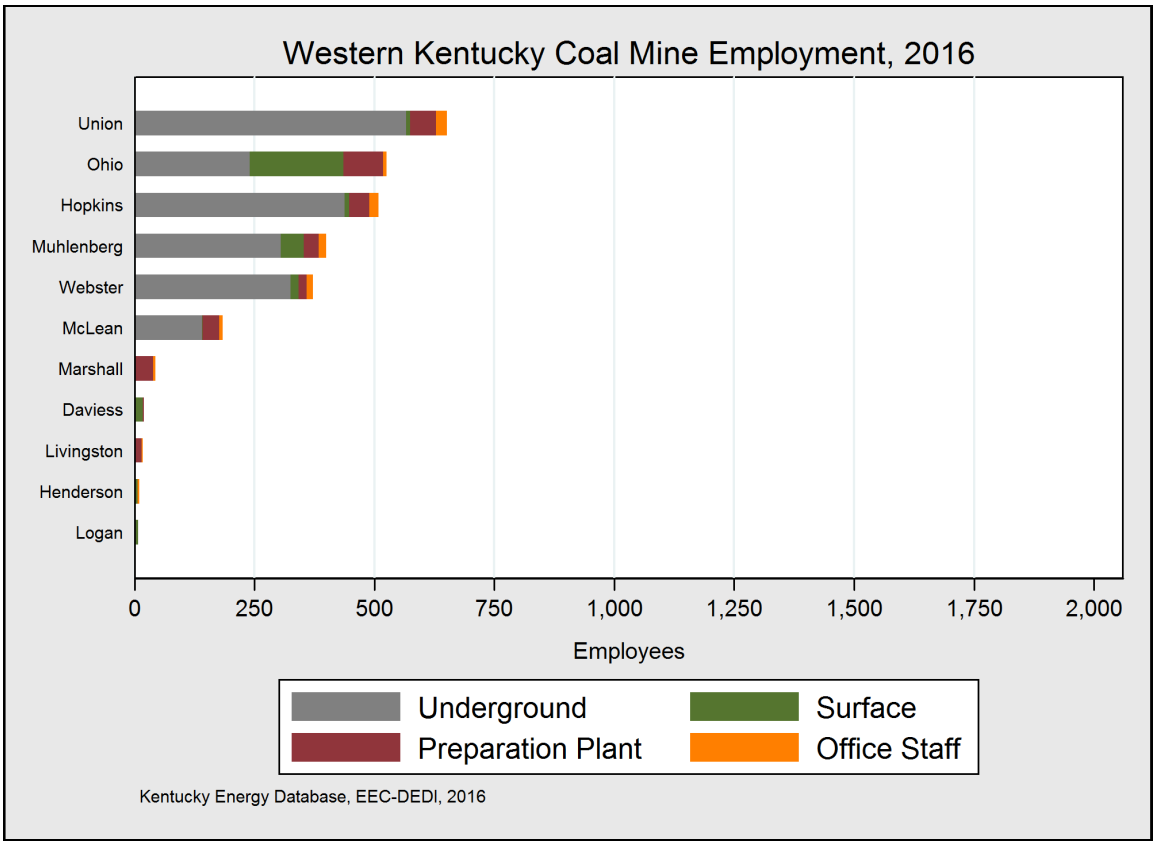
Kentucky has the second-highest number of coal workers, with 12.7 percent of national employment in 2016. Average coal employment in Kentucky decreased by 30.8 percent in 2016 to 6,612 workers.

Wyoming, the third-highest coal-employment state in 2016, had 5,744 direct coal employment jobs. Wyoming coal employment has decreased by 13.5 percent since 2015.

Pennsylvania hosted the fourth-most direct coal employees, with 5,129 working coal miners. Pennsylvania coal employment has decreased by 21.1 percent since 2015.

Kentucky Coal Mine Employment





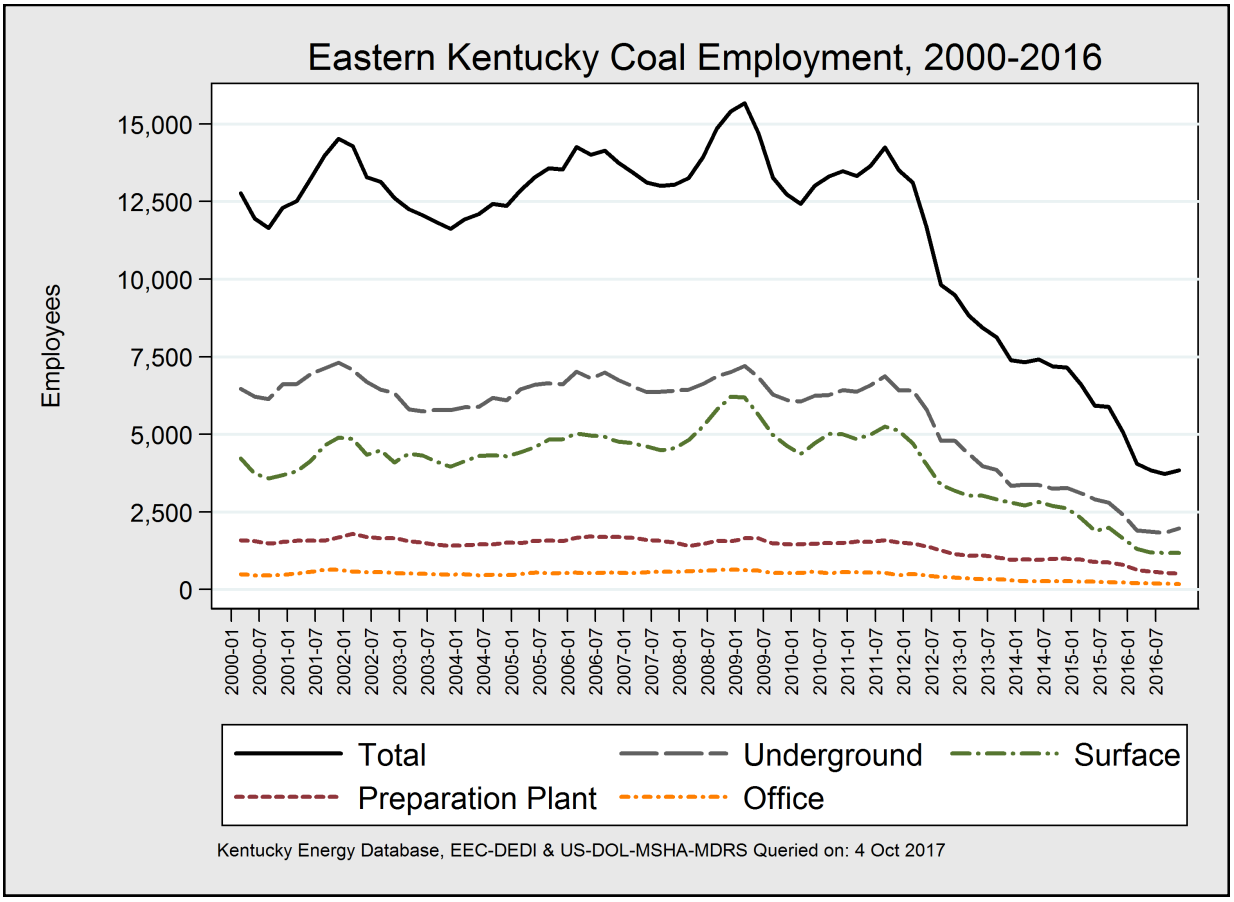
Kentucky Coal Mine Employment

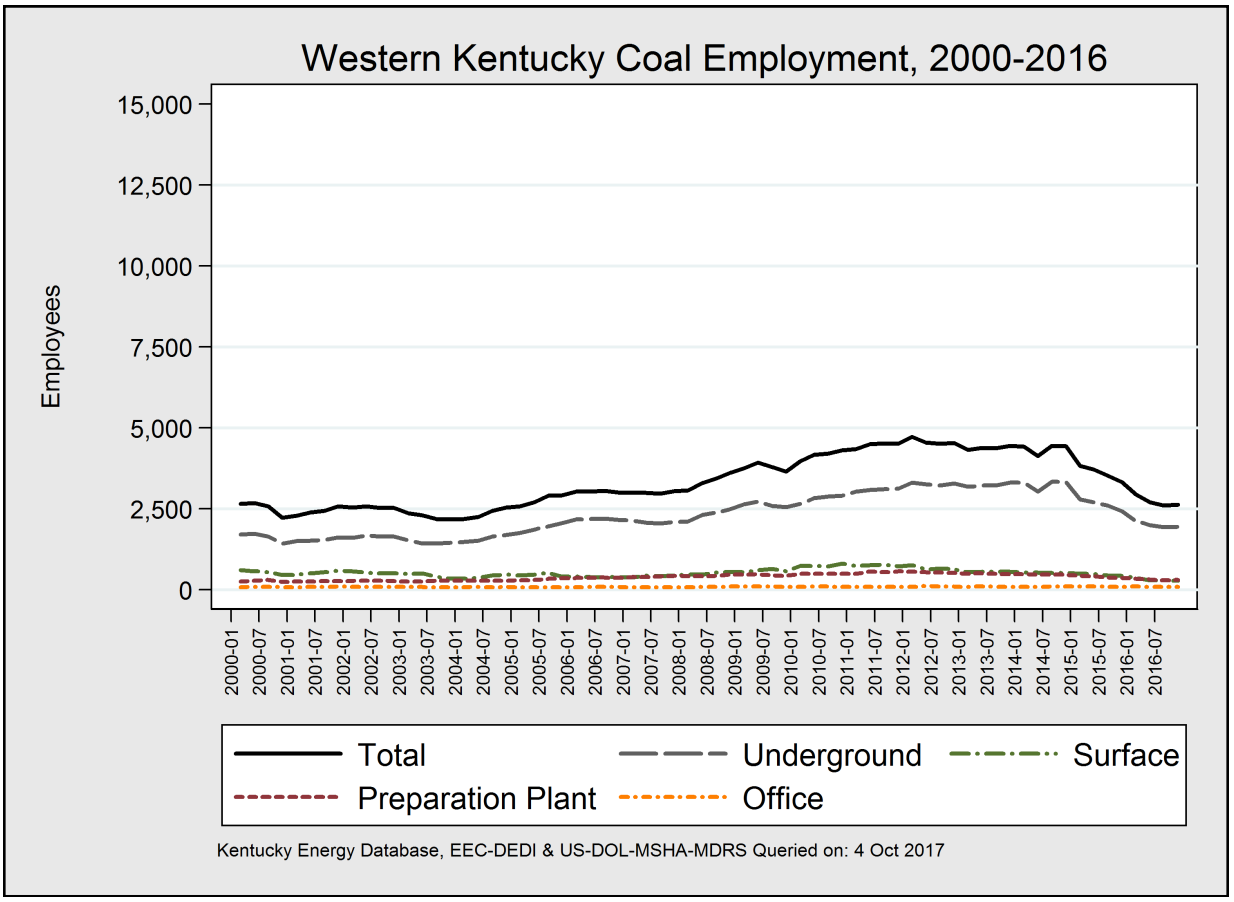
Region and County	Direct Employment at Coal Mines	Underground Miners	Surface Miners	Preparation Plant Workers	Mine Office Staff	Percent of Total Employment
Kentucky	**6,612**	**3,906**	**1,531**	**887**	**288**	**0.4%**
Eastern Kentucky	**3,875**	**1,892**	**1,221**	**569**	**193**	**2.1%**
Pike	962	485	327	92	58	4.7%
Harlan	796	487	207	87	15	13.4%
Perry	566	286	185	68	27	5.1%
Bell	332	135	76	73	48	4.0%
Martin	281	202	17	62	—	11.4%
Leslie	176	135	33	8	—	10.5%
Floyd	132	52	51	26	3	1.2%
Knott	111	59	31	14	7	4.8%
Whitley	109	17	50	40	2	0.9%
Knox	86	26	38	21	1	1.1%
Letcher	77	3	48	21	5	1.8%
Johnson	50	—	46	3	1	0.9%
Magoffin	46	—	37	—	9	2.8%
Lawrence	41	5	35	—	1	1.3%
Boyd	27	—	—	24	3	0.1%
Breathitt	24	—	19	4	1	0.8%
Pulaski	19	—	19	—	—	0.07%
Clay	16	—	—	8	8	0.4%
Estill	14	—	—	13	1	0.6%
Laurel	6	—	2	4	—	0.02%
McCreary	4	—	—	1	3	0.2%
Western Kentucky	**2,737**	**2,014**	**310**	**318**	**95**	**2.1%**
Union	651	566	8	54	23	13.0%
Ohio	526	240	196	83	7	7.1%
Hopkins	509	437	10	43	19	2.8%
Muhlenberg	400	305	49	31	15	4.5%
Webster	373	326	17	17	13	12.2%
McLean	183	140	2	34	7	8.8%
Marshall	44	—	—	39	5	0.4%
Daviess	20	—	18	2	—	0.04%
Livingston	17	—	—	15	2	0.7%
Henderson	10	—	6	—	4	0.05%
Logan	4	—	4	—	—	0.05%

†Sources: MSHA Mine Data Retrieval System (MSHA-MDRS) and Bureau of Labor Statistics (BLS) *Quarterly Census of Employment and Wages [Dec 2016 County Estimates]*.

Note: The direct mining employment classification includes persons employed at a Kentucky coal mine and/or registered MSHA permitted mine sites, but does not include direct employment involving coal transportation by trucks, trains, barges, nor the administrative and professional employees of coal companies located in Kentucky metropolitan areas such as Lexington and Louisville. These employment figures also do not include the many private services or indirect employment induced by the economic activity of coal extraction, preparation, and sales.

Kentucky Coal Mine Employment





Coal Mine Safety and Training

Basic Regulations and Overview

Safety and health standards are regulated by the federal Mine Safety and Health Administration (MSHA) and the Kentucky Division of Mine Safety.

All surface and underground mines are inspected. Larger mines may have inspectors at the mine site every day. All certifications and mining specialties, as established by the Kentucky Mining Board, must be signed by the Director (KDMS) verifying the holder has completed the requirements for certification. All coal miners must be drug tested prior to being issued any new certification.

Training for Surface Miners

New miners must have 24 hours of training and pass a written exam before being eligible for employment at a surface mine. Workers at prep plants, rail sidings, and river terminals must also meet these training requirements. The inexperienced miner must work a minimum of 45 days at a surface mine before becoming a certified experienced miner. After the initial training, each surface mine employee is required to receive eight hours of retraining annually.

To obtain a Surface Mine Foreman Certification, a miner must have three years of surface mining experience achieved after age 18. To obtain certification, a surface mine foreman must specialize in either coal extraction or post mining activities (coal preparation or coal handling). The applicant must have at least one year of practical experience in the specialty category. To become a blaster in a surface coal mine, the applicant must attend 30 hours of training and pass both a licensing and certification test. Two years of additional work experience under a licensed blaster is required.

Training for Underground Miners

New miners are required to have a minimum of 40 hours of training and pass a written exam prior to starting work as an inexperienced miner. A newly hired (inexperienced) underground miner must receive eight hours of mine site-specific training prior to working in an underground mine; for an experienced miner the mine-site specific training is as needed. An inexperienced miner must work a minimum of 45 days in an underground mine before becoming a certified experienced miner.

A minimum of 16 hours of annual retraining is required to maintain the miner certification and continue to work at an underground mine.

To receive an Underground Mine Foreman Certification, a miner must have five years of practical underground coal mining experience gained after age 18, with at least one year at the face of an active working section of a coal mine. An Assistant Mine Foreman Certification requires three years practical experience.

Each miner receives new work assignment training (Task Training) to become certified for each new job classification.

To maintain their certification, and qualifications, certified electrical workers must satisfactorily complete annual electrical retraining classes.

Only certified shot-firers can detonate explosives within a mine.

Underground Miner Classifications and Training	
Experience Required	Mining Position
5 Years	Electrical Inspector* Mine Inspector/Mine Safety Analyst* Mine Foreman* Electrical Instructor*
3 Years	Asst. Mine Foreman* Instructor
1 Year	Electrical Worker* Hoisting Engineer* Solid Blasting
45 days	Shot Firer* Certified Miners
Special Training	
MET	Mine Emergency Technician
EMT	Emergency Medical Technician

Source: Kentucky Division of Mine Safety (KDMS).

NOTE: More than 20,000 persons are trained or retrained annually for one or more surface and/or underground miner classification by the KDMS to maintain the current Kentucky miner workforce of 6,612 miners.

*Tests are required in addition to years of experience.

Economic Impact of KY Coal, 2014

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	11,586	$1,117,977,088	$2,172,141,000	$4,589,572,096
Indirect Effect	5,073	$340,745,408	$584,781,700	$1,177,433,216
Induced Effect	7,957	$308,925,312	$564,326,800	$977,695,616
Total Effect	**24,616**	**$1,767,647,808**	**$3,321,249,500**	**$6,744,700,928**

Direct Benefits

In 2014, the Kentucky coal industry provides direct benefits to the Commonwealth in terms of revenue, jobs, and wages to miners. Some of the direct economic benefits of Kentucky coal production are as follows:

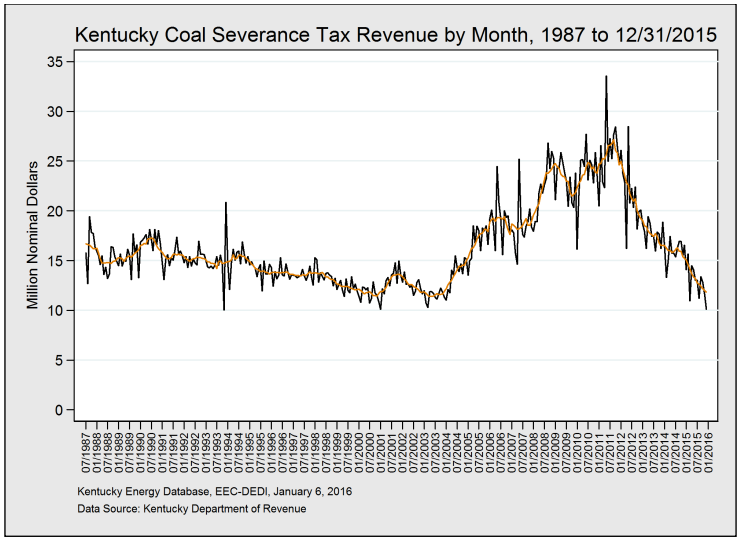
- Kentucky coal sold in 2014 for $4,589,572,000—$2,664,732,000 in the east and $1,924,840,000 in the west.
- Kentucky coal mines employed 11,586 miners in 2014, with 7,185 in Eastern Kentucky and 4,401 in Western Kentucky.
- Coal producers paid wages of $1,117,977,088 in 2014, which is an average of $96,493 per employee.
- Coal producers in Kentucky paid the state a total of $191,291,869 in severance taxes in calendar year 2014.
- A total of $61.3 million in coal severance tax receipts were returned to coal-producing counties for infrastructure improvements and economic development projects in FY2014.
- A total of $22.9 million in unmined mineral taxes were collected in FY2014.

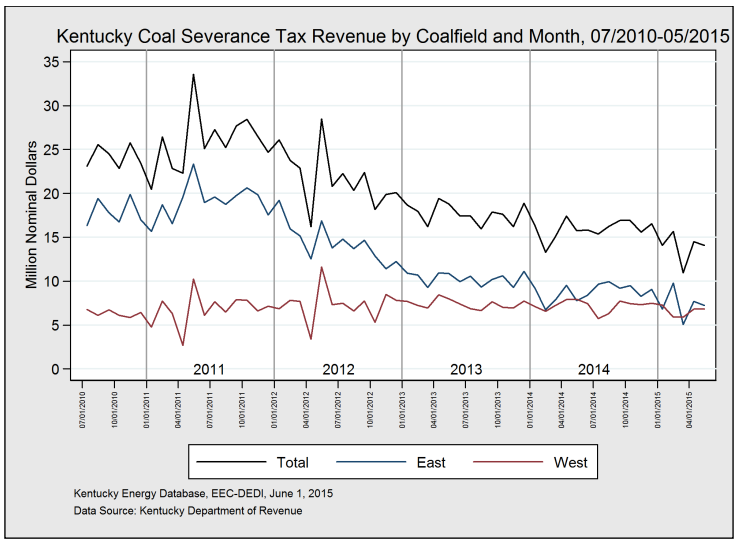
Induced and Indirect Benefits in 2014

The coal industry also provides other economic benefits to Kentucky in addition to the direct benefits mentioned above. Much of the $4.6 billion of new income flowing into the Kentucky coal industry from coal sales is re-spent in the local economy creating a multiplier effect of other induced and indirect benefits. We estimate that an additional $2.16 billion of spending was induced by coal production. In addition to the 11,586 employees working directly for the coal industry in Kentucky, a total of 13,030 other employment opportunities were created in Kentucky as a result of the money spent by coal companies and their employees including; 2,482 jobs in trade and retail stores; 1,336 in healthcare; 1,016 jobs in food services; 427 truck drivers; 377 teachers and child care workers; 304 engineers; 254 lawyers and legal assistants; 219 railroad workers; among others. In sum, the total number of jobs—including direct, indirect, and induced jobs—by the economic activity of the Kentucky coal industry was 24,616 in 2014. On average, we estimate that 1.13 other jobs were created for each employee working for the Kentucky coal industry.

This economic impact analysis was conducted by Kentucky Energy and Environment Cabinet staff using direct data from the Kentucky Energy and Environment Cabinet, Kentucky Department of Revenue, and Kentucky Department of Local Government. Induced and indirect effects were calculated using MIG Implan economic impact model.

Kentucky Coal Severance Receipts





Region	CY 2014 Receipts	1 Year Change
Total	$191,291,869.26	-10.0%
Eastern Kentucky	$104,544,086.10	-15.6%
Western Kentucky	$86,747,783.16	-2.1%

Slowing coal production in Eastern Kentucky drove down total 2014 Kentucky severance tax receipts to 191.3 million dollars, which is a decrease of 9.69 percent from 212 million dollars in 2013 and of 38.4 percent from 310.5 million dollars in 2011. Eastern Kentucky coal severance tax receipts decreased by 15.55 percent during 2014 while Western Kentucky receipts increased by a marginal 2.0 percent. The closure of coal-fired power plants across the southEastern United States has significantly reduced demand for Kentucky coal, which has lowered exports, created surplus coal stockpiles, and lowered the average price that Kentucky coal could be sold for. Coal-fired power plant closures are anticipated across the United States between calendar years 2014 to 2018 in response to changes in federal environmental regulation, energy policies in other states, low electricity demand growth, as well as lower cost alternatives, including natural gas and coal from other regions. These power plant closures can be expected to place additional downward pressure on coal demand, prices, and thus coal severance tax revenue.

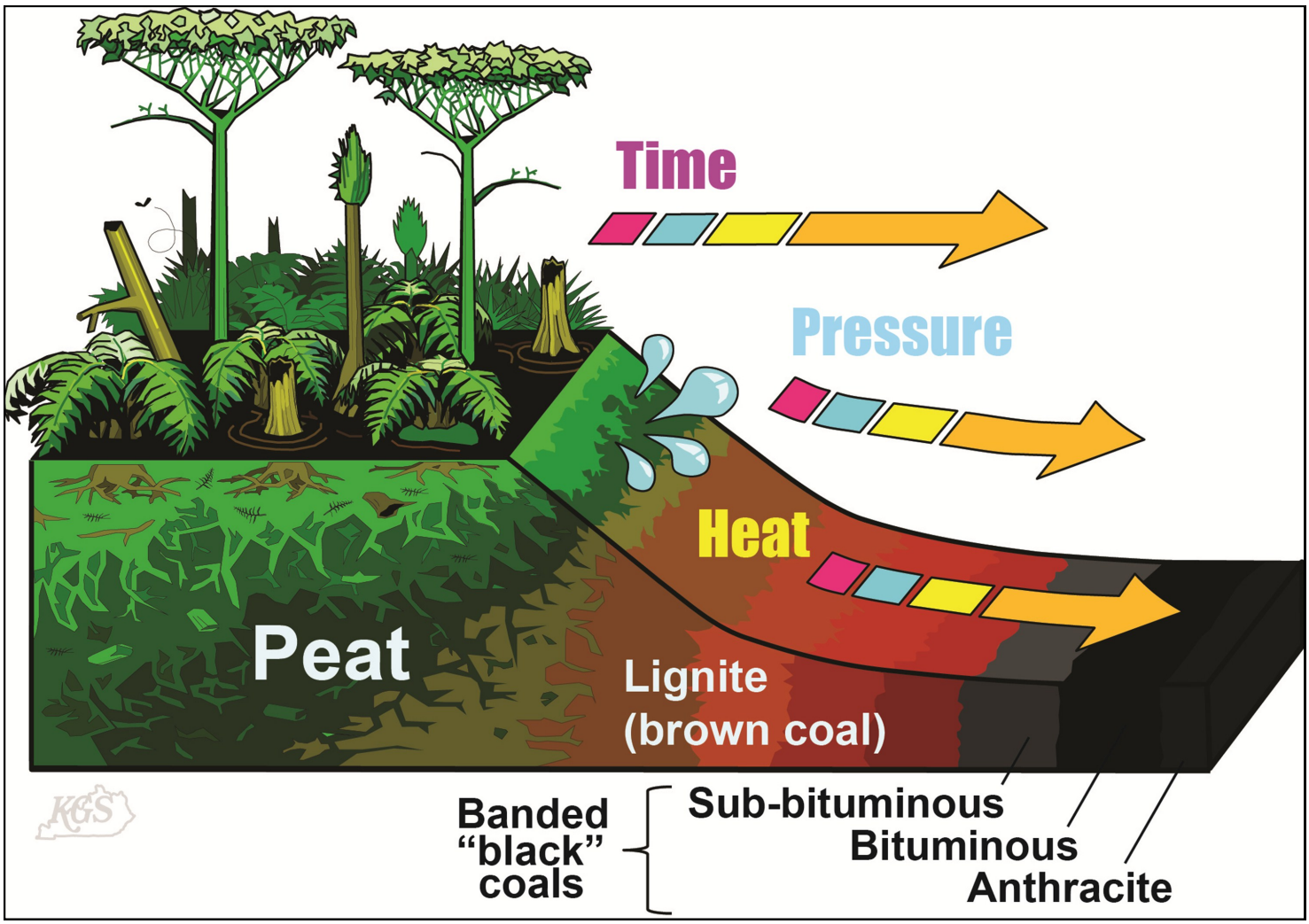
Coal Severance Tax Calculation

A tax of 4.5 percent is levied on the sale price of every ton of coal mined in Kentucky. For example, if a ton of coal mined in Kentucky sells for $50, then the coal severance tax revenue for the Commonwealth from this sale will be $2.25. (1 Ton X $50 X 0.045 = $2.25). Coal severance tax revenues varies from month to month with coal production and the value of the coal produced, as illustrated in the graphic above.

Coal Severance Tax Programs and Outlays

Severance tax revenue generated through the production of coal is distributed to several state budgetary programs including the Kentucky General Fund, the Local Government Economic Assistance Fund (LGEAF), and the Local Government Economic Development Fund (LGEDF).

Coal Formation and Properties



Formation of Coal

Coal forms from organic material that is buried and subsequently altered by a combination of time, pressure, and heat in a process called coalification. The process starts with peat that is formed from vegetation in waterlogged wetlands sometimes called mires. Stagnating water in mires creates anaerobic (low-oxygen) conditions that allow plant debris to be preserved. Coalification requires the peat to be buried by sediment, expelling the water and compacting what remains. Continual pressure and heat over time change the chemical composition and increase the rank, or energy potential, of the coal.

Coal in Kentucky

Significant coal deposits are located in 57 of Kentucky's 120 counties—20 counties in the Western coalfield and 37 in the Eastern coalfield. Coal may be extracted from approximately 45 different seams of varying thickness in Eastern Kentucky and from about 10 seams in Western Kentucky. Coal resources, the amounts of coal estimated to be in the ground, are classified by rank, the thickness of rock overlying the coal, and the thickness of the coal bed. All of the mineable coal in Kentucky is bituminous in rank and contains less than 15 percent ash content after processing. Eastern Kentucky coal is typically lower in sulfur (less than two percent), than Western Kentucky coal (greater than two percent). The economically important coal beds found in Kentucky formed from plants living during the Pennsylvanian period, which lasted between 320 and 280 million years ago. During this period, Kentucky existed near the equator and possessed large forests that were intermittently covered by shallow seas, slowly generating the peat that became coal. Lignites occur in the Jackson Purchase area, but these are not economic to mine. Kentucky lignites formed during the Eocene Epoch, between 60 and 50 million years ago.

Coal Formation and Properties

Coal Rank and Grade

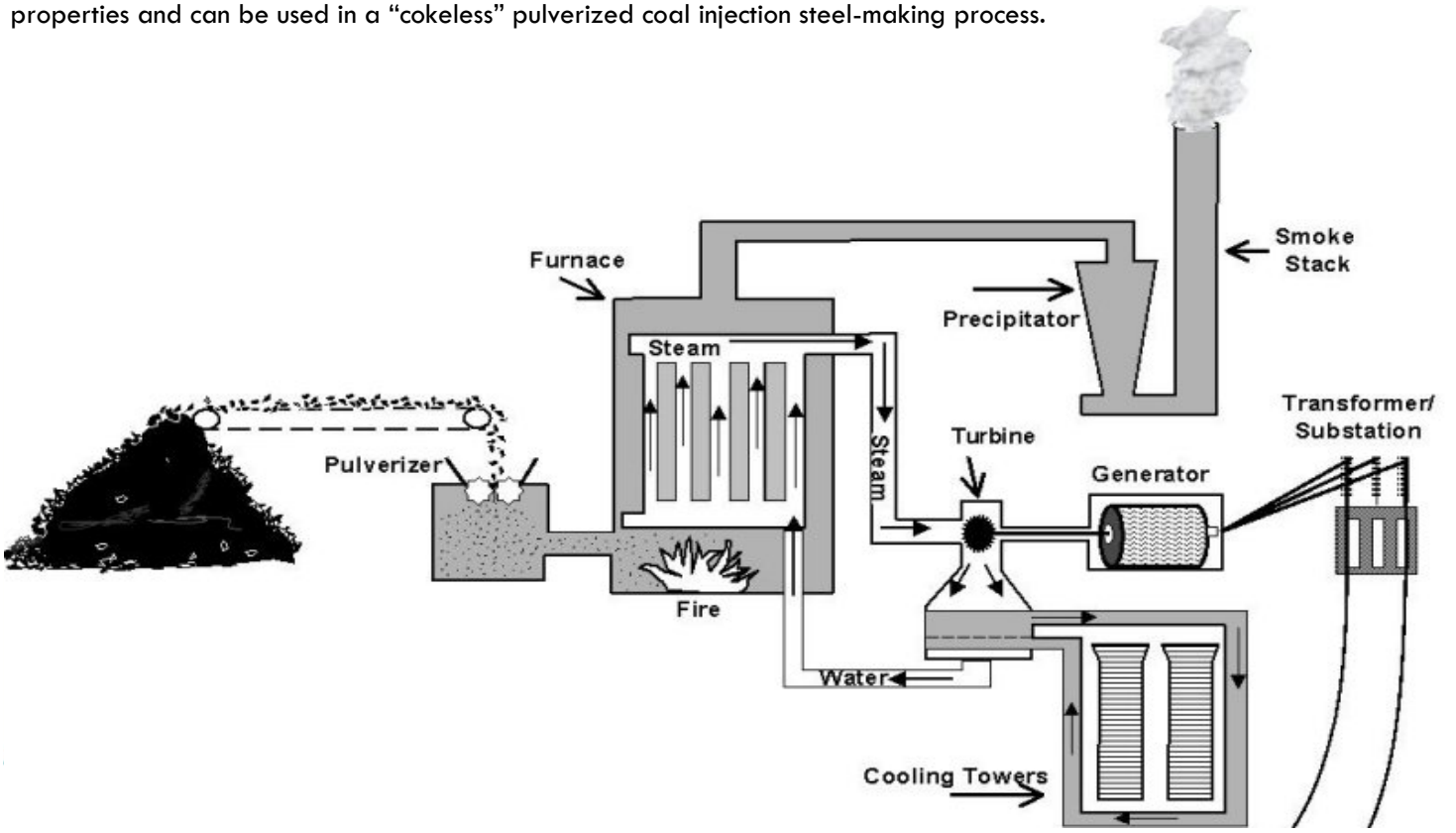
Coal is generally classified in terms of rank and grade. While no two coal deposits are the same in terms of chemical composition, coal generally consists of varying levels of carbon, oxygen, hydrogen, nitrogen, sulfur, ash, moisture content, and mineral material (silicon, aluminum, iron, calcium, and others). Rank refers to the level of metamorphism, or alteration, the organic material in the original peat was subjected to after burial. Rank increases alongside increased levels of fixed carbon and heat content and decreased levels of moisture and volatile matter. Low-rank coal is called lignite. Higher rank coal is classified as either sub-bituminous, bituminous, or anthracite, depending on their calorific value (Btu content) and (in higher rank coal) fixed carbon and volatile matter contents. Grade refers to the amount and type of impurities in coal, specifically ash and sulfur. The rank and grade of a coal deposit partly determine its potential uses and marketability.

Steam Coal

Steam coal, or thermal coal, is coal used by electric utilities to burn in large furnaces and generate electricity. Typically, coal is pulverized, (to ensure carbon molecules are able to react with oxygen during combustion) blown into a boiler unit, and combusted at high temperatures. The heat produced by the combustion of the coal yields very high temperature/high pressure steam that drives generators with turbines to produce electricity. The vast majority of the coal mined in Kentucky is sold as steam coal.

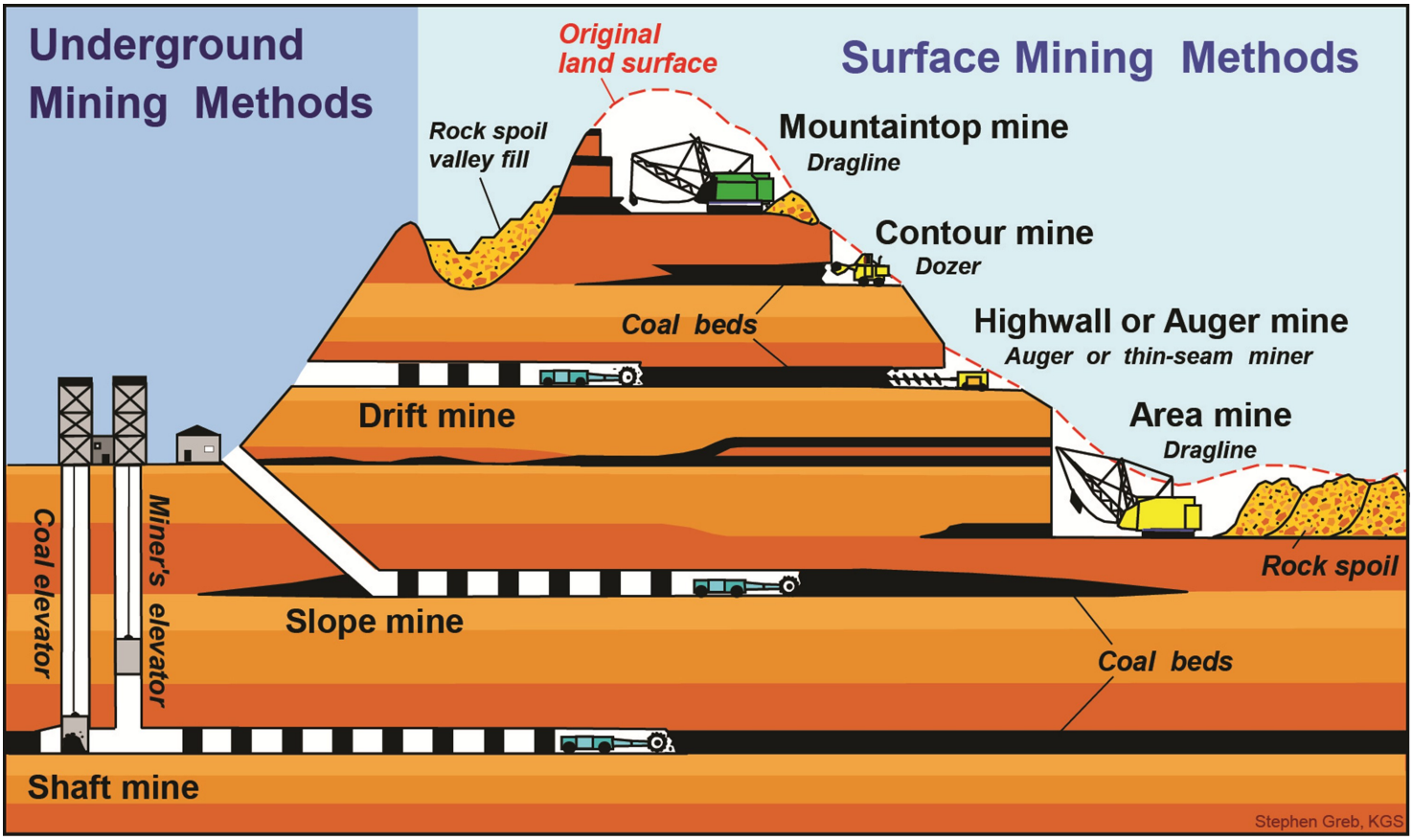
Metallurgical Coal

Metallurgical coal is used by the steel industry to produce "coke", a necessary component of steel production. Coke is a carbon-rich material produced by heating coal to very high temperatures in an oxygen deprived furnace. In this process, volatile components of the coal are driven off, concentrating the carbon portion of the coal. Metallurgical coal must contain very low amounts of both ash (less than 10 percent) and sulfur (less than one percent), and have acceptable amounts of both "reactive" and "inert" organic components. A small proportion of Kentucky coal has hybrid steam and metallurgical properties and can be used in a "cokeless" pulverized coal injection steel-making process.



Kentucky Geological Survey. Coal Information. Retrieved from KGS website: www.uky.edu/KGS/coal/coal_information.htm

Types of Coal Mining



Several different mining methods are used in the Commonwealth to access coal deposits in the Central Appalachian Basin of Eastern Kentucky and the Illinois Basin of Western Kentucky. The chosen mining approach, or combination of mining approaches, at a given mine site largely results from local geography, hydrology, and the amount of soil and rock overburden above a coal seam. Coal mines are generally divided between surface operations and underground operations, though there are several sub-categories that describe exact mining approaches and mine permitting conditions. Mining techniques continue to change as a result of technological changes in order to ensure improved productivity, health and safety, and to reduce the environmental impact.

Underground mine operations accounted for 76 percent of coal production in Kentucky in 2016, with room and pillar systems being the most common mining method. Surface mines accounted for 24 percent of statewide production. Whereas drift, contour, and auger mining are more common in Eastern Kentucky, slope and shaft mining are more common in the Western Kentucky coalfield. Throughout most of history, underground mines have provided the majority of employment and coal production in the Commonwealth. During 2016, combined coal production from underground operations and surface operations was more than 42 million tons with a slight majority of production in Western Kentucky.

Kentucky Coal Production by Mining Method, 2016*

Mine Type	Auger	Refuse Pile	Dredge	Strip/Quarry/Open Pit	Underground	Total
State	807,312	13,043	276	9,450,753	32,711,308	42,982,692
WKY	98,272	13,043	—	2,800,463	23,057,264	25,969,042
EKY	709,040	—	276	6,650,290	9,654,044	17,013,650

*Source: U.S. Department of Labor, Mine Safety and Health Administration, "Quarterly Mine Employment and Coal Production Report" (MSHA Form 7000-02). The above table summarizes the five types of mining methods—as categorized by MSHA—that registered coal production in Kentucky during 2016.

Types of Coal Mining

A continuous-mining machine

An excavator loading coal into a haul truck

Underground Mining: Underground mining techniques differ in terms of the mode of access and the mining method. Drifts, slopes, and shafts are among the modes of accessing a coal bed at depth. Once accessed, the coal is removed in underground mines by either room and pillar mining or longwall mining.

Room and pillar mining is the most common underground mining method in Kentucky. "Rooms" refer to the areas where coal is mined and the "pillars" are the coal left behind to support the roof. The coal can be extracted by either a continuous miner (shown above) or by conventional means in which the coal is cut, drilled, blasted, and loaded onto shuttle cars. Room and pillar mining reduces the amount of recoverable coal, since much of the coal is left underground to serve as the pillars.

Longwall mining utilizes a longwall mining machine to cut parallel to the face of the coal in long tunnels without the need for pillars. During mining, temporary roof supports allow the mining to take place and the unsupported roof behind the longwall machine is then allowed to collapse naturally, leaving large cavities in the working mine.

Surface Mining: Surface mining occurs when the earth above the coal seam (called overburden) is removed to access the coal bed. Surface mining operations include "strip mines", like area and contour mines, auger, and excavations like quarries or open pits.

Area mining is a mining method where miners remove shallow coal over a broad area typically where the land is fairly flat. Dragline shovels are often utilized to remove the materials overlying the coal and place the materials in previously mined pits. Often, area mines access multiple coal seams within the same pit.

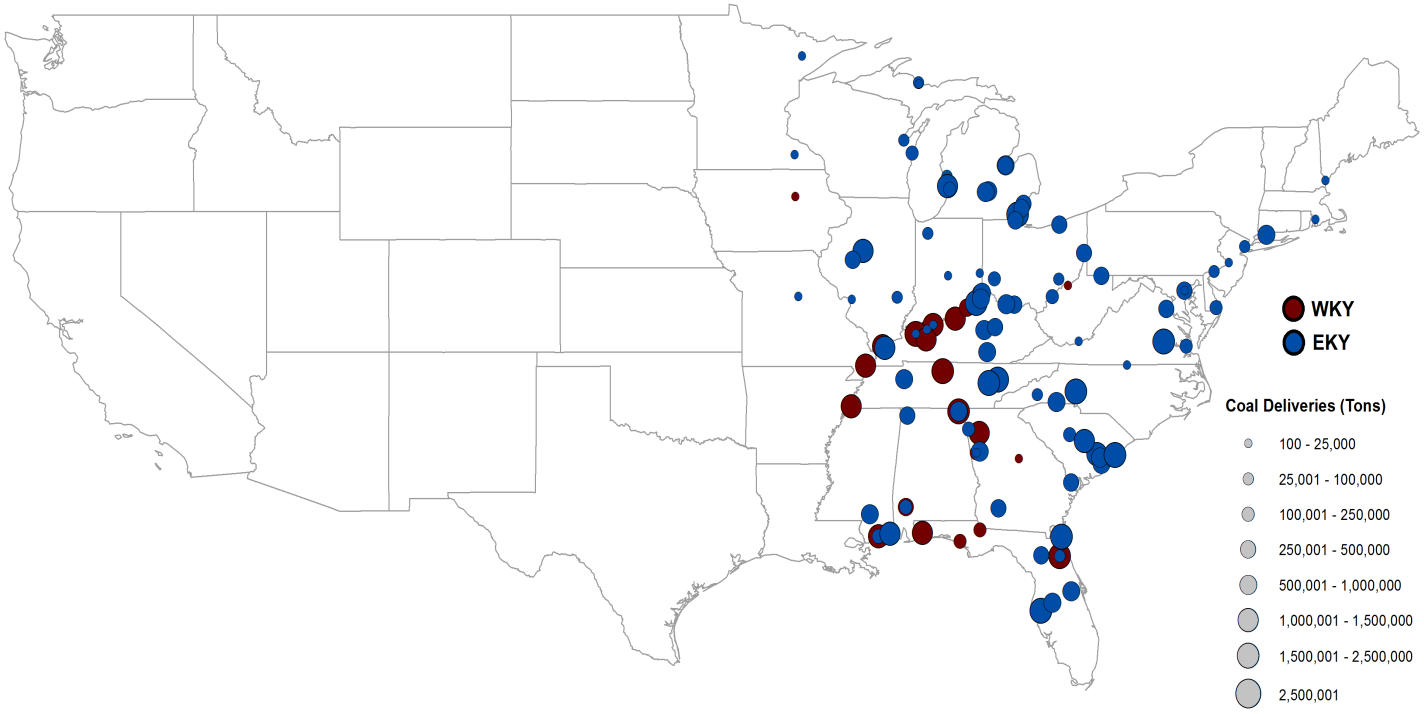
Contour mining occurs on hillsides. A wedge of overburden is removed along the coal outcrop on the side of a hill, forming a shelf, or bench, at the level of the coal. Contour mining is often followed by auger or highwall mining to extract coal from further within the coal seam without needing to remove the overburden—a hybrid mining technique.

Auger mining operates on surface-mine benches, before they are covered up by previously removed overburden. Auger mining targets the coal in the hillside that can't be reached by contour mining because of the overburden thickness and uses a large drill to cut horizontally into the hillside and remove coal. Similarly, highwall mining is a remote, unmanned method of underground coal extraction where a mining machine is advanced from the surface up to 1,000 feet underground in cuts that are 10 to12 feet wide.

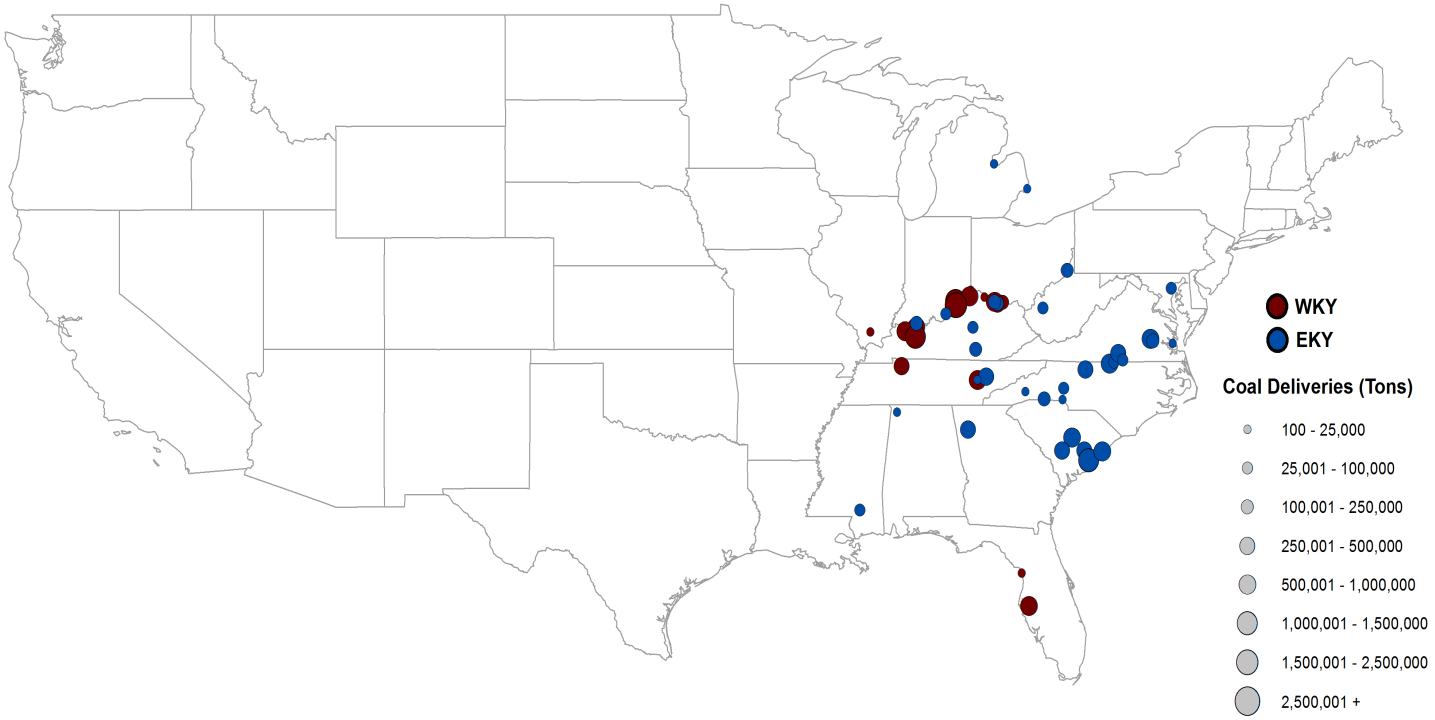
Other Types of Mining: Coal is sometimes recovered from the wastes of other mining operations. Culm banks are refuse piles of fine coal material accumulated at coal preparation plants. In Kentucky, coal is washed, or "prepped," to remove ash and sulfur. These wastes are stored in settling ponds and can be reprocessed for energy products. Waste coal fines can also be recovered from rivers or streams by dredging.

Kentucky Coal Deliveries, 1990-2016

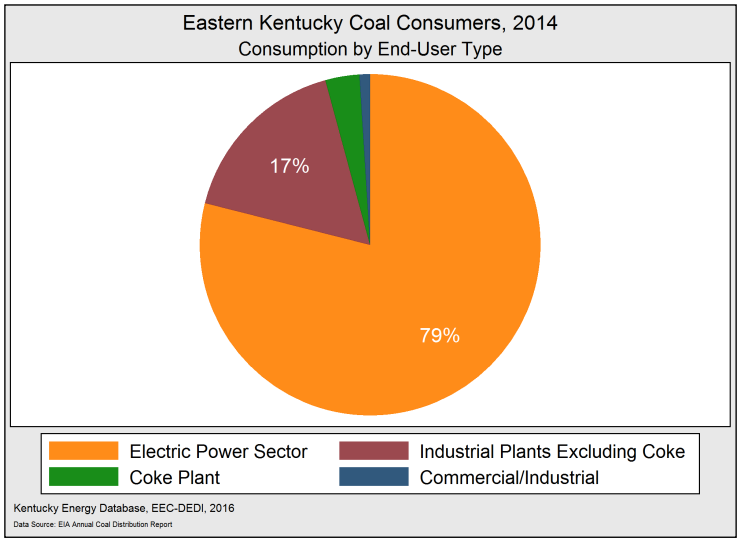
Coal Deliveries, 1990

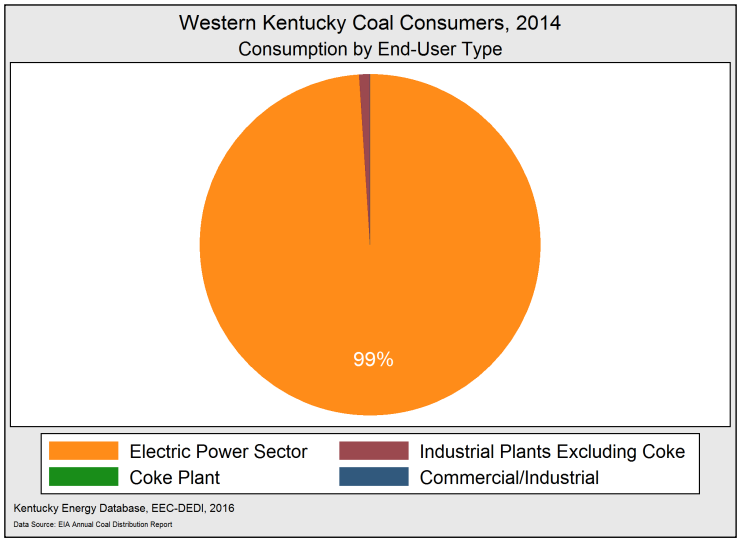


Coal Deliveries, 2016



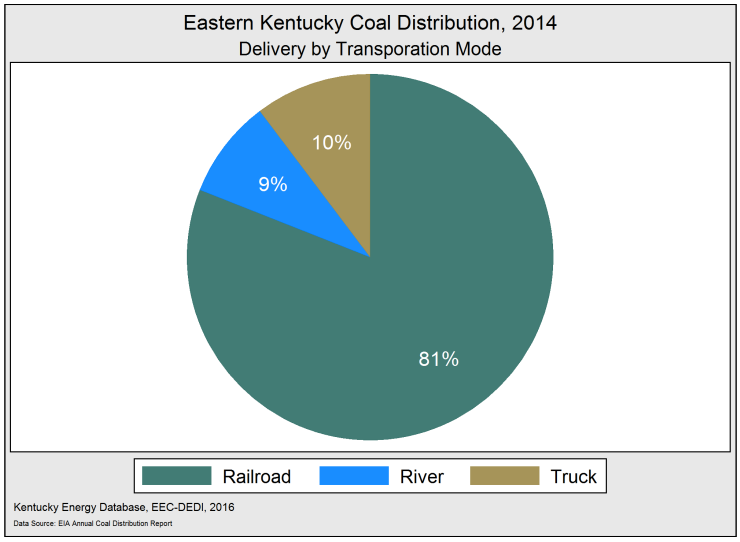
Kentucky Coal Distribution, 2015

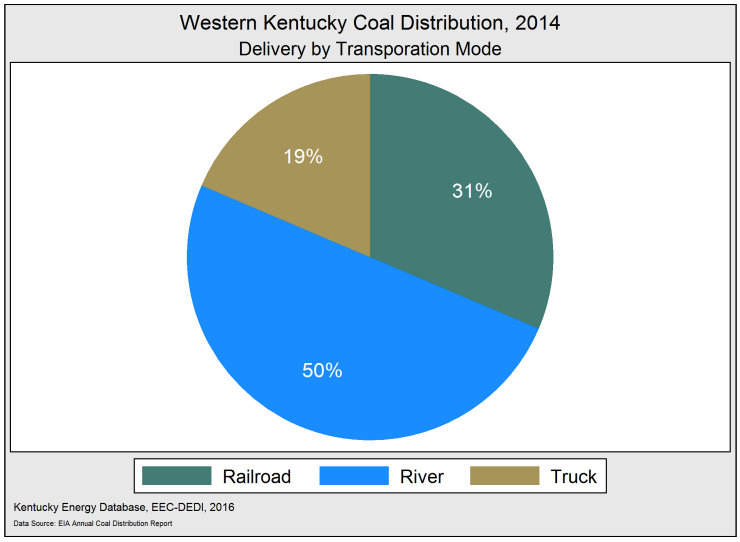




End-User	Tons	Percentage
Total	21,922,807	100%
Electric Power	16,578,765	75.6%
Industrial	4,039,955	18.4%
Coke	1,087,926	5.0%
Commercial	216,161	1.0%

End-User	Tons	Percentage
Total	32,711,944	100%
Electric Power	32,539,368	99.5%
Industrial	161,556	0.5%
Coke	0	0.0%
Commercial	11,020	<0.1%

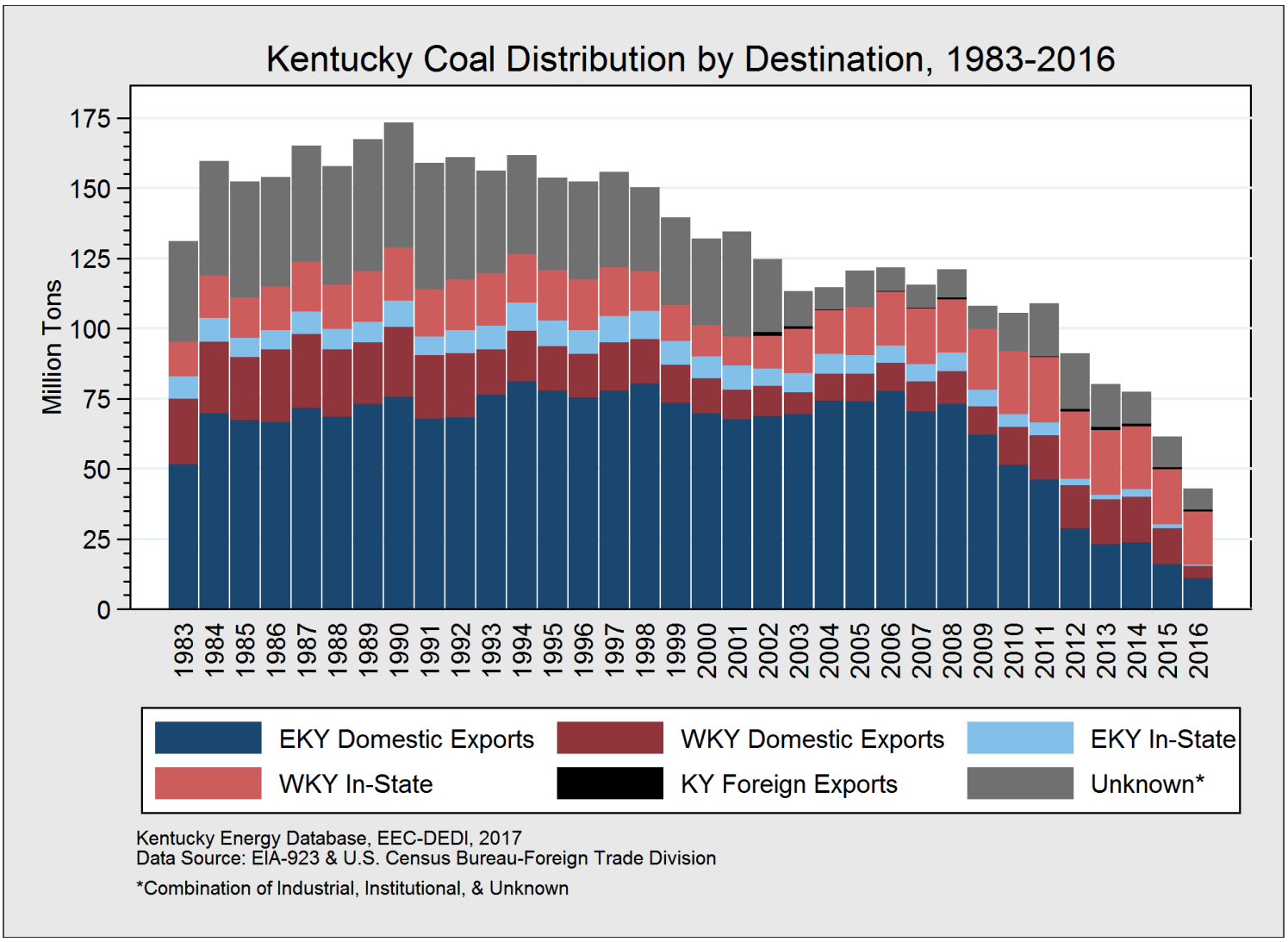




The vast majority of coal shipped from Eastern Kentucky in 2015 was loaded onto rail cars and delivered to electric power plants in the United States. Industrial facilities were the next largest consumer of Eastern Kentucky coal—18 percent of demand for the commodity. Coke plant deliveries have increased by 25 percent since 2011, from 870 thousand tons of coal shipped to coke plants in 2011. Demand from commercial consumers accounted for approximately 1 percent of Eastern Kentucky coal distribution during the year.

Due to geography and the accessibility of river ports, 48 percent of Western Kentucky coal was loaded onto barges, though slightly less than a third of Western Kentucky coal was transported by rail during the same year, and 20 percent was delivered by truck. In 2015, electric power plants represented 99 percent of the demand for Western Kentucky coal.

Kentucky Coal Distribution, 2016



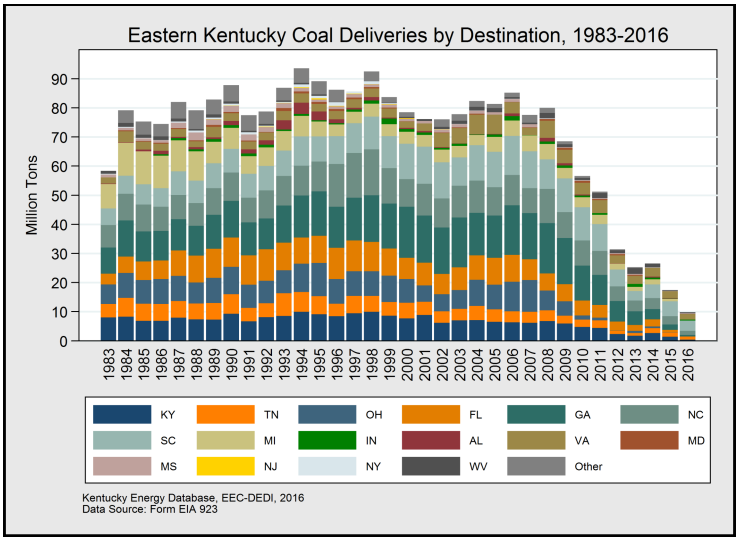
Coal Distribution by Destination, 2016		
Coal and Destination	Thousand Tons	Percentage
Total Production	42,983	100%
WKY In-State	18,905	44%
EKY Out-of-State†	11,035	26%
Industrial/Unknown	6,912	17%
WKY Out-of-State†	4,827	11%
Foreign Exports	728	2%
EKY In-State	576	1%

†Totals labeled "Out-of-State" represent shipments of coal to consumers within the United States, and may also be considered domestic exports. A difference of approximately 6.9 million tons exists between total production and total distribution in the table above—a product of coal stockpiling, lags in data reporting, calendar year parameters, comparison of statistics across multiple data sources, and reporting errors.

The annual distribution of coal mined in Kentucky is a combination of in-state consumers, out-of-state power plants, factories, and foreign exports. Demand from out-of-state consumers has consistently been the largest component of Kentucky coal deliveries since 1990.

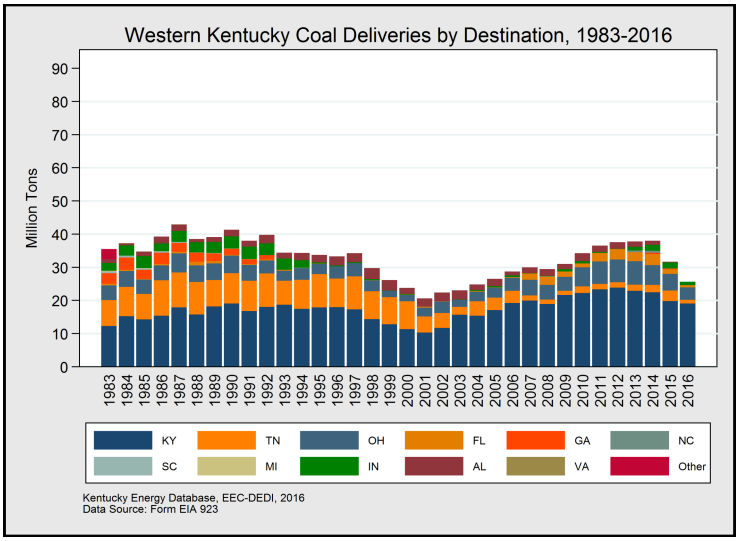
Eastern Kentucky coal has predominantly been sold to states in the southeastern United States. Conversely, Western Kentucky coal has mostly been mined for in-state consumption. Kentucky remains the single-largest consumer of Kentucky coal, increasing its consumption as other states have decreased their consumption of coal from Kentucky. Known foreign exports in 2016 reached 728 thousand tons, or 2 percent of known coal deliveries, and increased by 20 percent from the year prior.

Kentucky Coal Deliveries



Known shipments of steam coal from Eastern Kentucky to power plants within the United States decreased by 44 percent in 2016, from 17.4 to 9.7 million tons. The largest markets for Eastern Kentucky coal are traditionally located in the southeast, and were led by South Carolina, North Carolina, and Virginia during the year. Overall, coal mined in the region was shipped to 16 different states in 2016.

Eastern Kentucky Coal Deliveries, 2016		
Destination	Thousand Tons	Percentage
Total	9,739	100%
South Carolina	3,498	35.9%
Virginia	1,965	20.2%
North Carolina	1,417	14.6%
Tennessee	921	9.5%
Kentucky	387	4.0%
Georgia	485	5.0%
West Virginia	296	3.0%
Indiana	295	3.0%
Florida	114	1.2%
Ohio	105	1.1%
New York	80	0.8%
Maryland	76	0.8%
Mississippi	48	0.5%
Michigan	38	0.4%
New Jersey	11	0.1%
Alabama	3	<0.1%



Known shipments of steam coal from Western Kentucky to power plants within the United States decreased by 20.7 percent in 2016, from 32.5 to 25.8 million tons. The largest market for Western Kentucky coal is consistently Kentucky, which represented 73.8 percent of Western Kentucky coal deliveries during the year. Overall, coal mined in Western Kentucky was shipped to 8 different states in 2016.

Western Kentucky Coal Deliveries, 2016		
Destination	Thousand Tons	Percentage
Total	25,813	100%
Kentucky	19,051	73.8%
Florida	3,705	14.4%
Tennessee	1,134	4.4%
Indiana	1,034	4.0%
Ohio	680	2.6%
Mississippi	165	0.6%
West Virginia	30	0.1%
Illinois	14	0.1%

Kentucky Coal Deliveries, 2016		
Origin	Thousand Tons	1 Year Change
Total	35,551	-28.7%
WKY	25,813	-20.7%
EKY	9,739	-44.0%

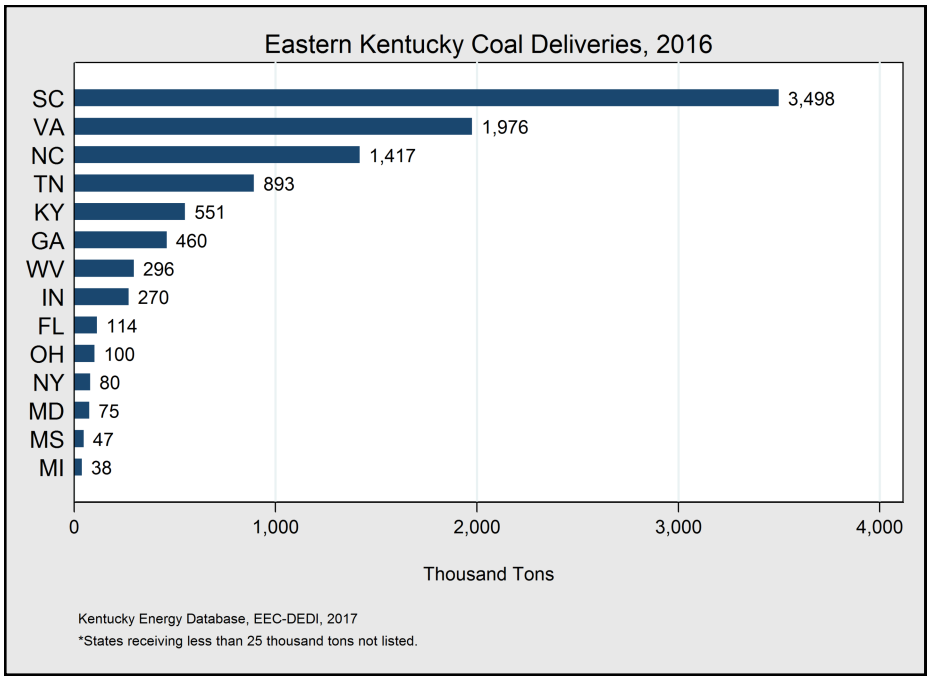
Total Kentucky coal deliveries have decreased by an average of 8.9 million tons, or by 14 percent every year since 2005, primarily because of reduced shipments from Eastern Kentucky.

Eastern Kentucky Coal Deliveries

Eastern Kentucky Coal Deliveries to Electric Power Plants, 2016					
Rank	Plant ID	Power Plant Name	State	Annual Deliveries (Tons)	1 Year Change
1	3298	Williams	SC	1,043,204	+30.2%
2	3797	Chesterfield	VA	980,036	+26.0%
3	3297	Wateree	SC	701,688	+27.7%
4	2712	Roxboro	NC	641,482	-19.3%
5	50481	Tennessee Eastman Operations	TN	634,370	-18.9%
6	6249	Winyah	SC	583,723	-70.0%
7	7210	Cope	SC	490,329	-14.0%
8	130	Cross	SC	456,850	-48.6%
9	8042	Belews Creek	NC	380,704	+11.5%
10	703	Bowen	GA	334,023	-79.8%
11	7213	Clover	VA	318,311	-64.7%
12	50900	Covington Facility	VA	278,783	-12.4%
13	3396	Bull Run	TN	263,274	-50.1%
14	6166	Rockport	IN	241,836	+433.5%
15	3948	Mitchell (WV)	WV	211,717	+9.1%
16	1384	Cooper	KY	201,900	-24.3%
17	7737	Kapstone	SC	182,885	-5.1%
18	54081	Spruance Genco LLC	VA	155,693	-33.0%
19	10377	James River Genco LLC	VA	151,457	+301.8%
20	2721	James E. Rogers Energy Complex	NC	141,911	-83.3%
21	8809	Bent Mountain	KY	129,625	—
22	54101	Georgia-Pacific Cedar Springs	GA	125,064	+95.8%
23	50976	Indiantown Cogeneration LP	FL	113,537	+16.5%
24	2850	J M Stuart	OH	105,003	-82.0%
25	2727	Marshall (NC)	NC	92,224	-71.2%
26	3935	John E Amos	WV	84,470	-8.5%
27	10025	RED-Rochester, LLC	NY	80,124	+388.9%
28	1554	Herbert A Wagner	MD	75,484	+496.6%
29	10384	Edgecombe Genco LLC	NC	74,148	-45.2%
30	52007	Mecklenburg Power Station	VA	68,301	+636.6%
31	1008	R Gallagher	IN	53,233	+39.7%
32	6250	Mayo	NC	51,383	-78.7%
33	6061	R D Morrow	MS	47,456	-20.4%
34	52151	International Paper Eastover Facility	SC	39,270	-56.9%
35	3407	Kingston	TN	23,658	-45.3%
36	2718	G G Allen	NC	23,638	-92.8%
37	1355	E W Brown	KY	23,590	-79.2%
38	1743	St Clair	MI	23,360	-88.0%
39	10361	Savannah River Mill	GA	22,438	-26.0%
40	6041	H L Spurlock	KY	17,284	-82.6%
41	10208	Escanaba Mill	MI	13,114	22.4%
42	6018	East Bend	KY	13,104	-89.7%
43	3809	Yorktown	VA	11,899	-85.7%
44	2706	Asheville	NC	11,725	-50.1%

Eastern Kentucky Coal Deliveries

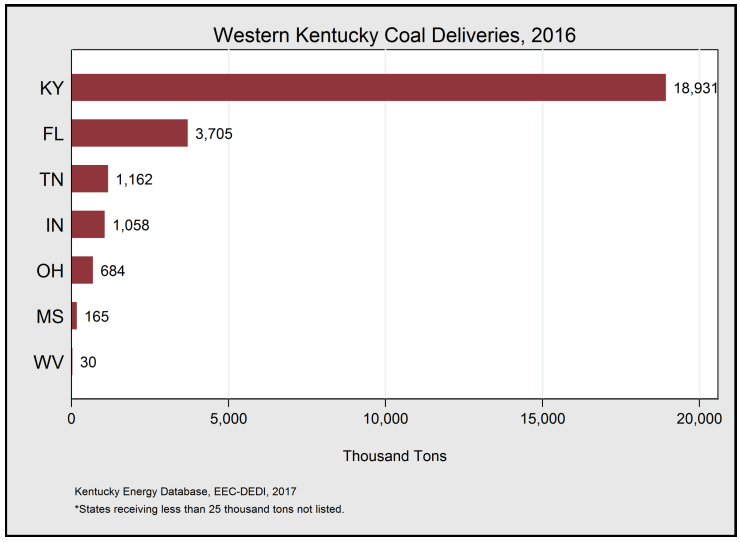
Eastern Kentucky Coal Deliveries to Electric Power Plants, 2016					
Rank	Plant ID	Power Plant Name	State	Annual Deliveries (Tons)	1 Year Change
45	10043	Logan Generating Company LP	NJ	10,996	—
46	47	Colbert	AL	3,166	-97.9%
47	54358	International Paper Augusta Mill	GA	3,034	-51.8%
48	8834	GRT Terminal	KY	1,736	—
49	1720	J C Weadock	MI	1,155	-91.9%
50	1702	Dan E Karn	MI	387	-99.9%



Western Kentucky Coal Deliveries

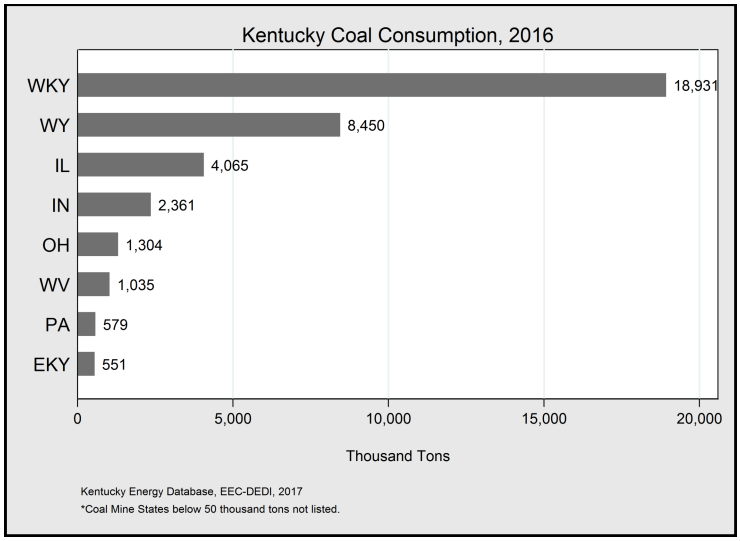
Western Kentucky Coal Deliveries to Electric Power Plants, 2016					
Rank	Plant ID	Power Plant Name	State	Annual Deliveries (Tons)	1 Year Change
1	1378	Paradise	KY	3,454,091	-26.1%
2	1356	Ghent	KY	3,337,685	+6.2%
3	1364	Mill Creek (KY)	KY	3,212,895	-4.2%
4	136	Seminole (FL)	FL	2,503,676	-14.8%
5	6071	Trimble County	KY	2,322,830	-5.5%
6	8837	Calvert City	KY	1,917,882	-4.6%
7	6823	D B Wilson	KY	1,124,082	-15.5%
8	983	Clifty Creek	IN	1,033,758	-39.5%
9	6018	East Bend	KY	815,223	-35.1%
10	6041	H L Spurlock	KY	806,496	+67.7%
11	1382	HMP&L Station Two Henderson	KY	739,302	-10.8%
12	1374	Elmer Smith	KY	727,307	-23.1%
13	3407	Kingston	TN	635,316	-21.1%
14	645	Big Bend	FL	518,092	+139.0%
15	6639	R D Green	KY	505,614	-39.5%
16	3399	Cumberland (TN)	TN	498,313	49.5%
17	2850	J M Stuart	OH	421,909	-1.6%
18	8816	Davant Transfer	FL	337,259	-51.3%
19	8827	IMT Transfer	FL	334,569	-61.6%
20	6031	Killen Station	OH	224,480	-23.5%
21	8851	Associated Terminals	MS	165,010	-6.5%
22	8834	GRT Terminal	KY	59,735	+72.1%
23	8848	Ceredo	WV	30,448	-95.5%
24	1355	E W Brown	KY	27,320	-87.0%
25	2832	Miami Fort	OH	17,749	-95.8%
26	6019	W H Zimmer	OH	15,580	-92.7%
27	976	Marion	IL	14,388	+422.6%
28	628	Crystal River	FL	11,822	-95.0%

International Exports



Known shipments of bituminous coal from the United States decreased by 17 percent in 2016, but have increased from 35 thousand tons in 2002. The federally available data are complicated by the confusion of export terminals and mining areas. For example, California is ranked twelfth above in bituminous coal exports, yet produces no coal.

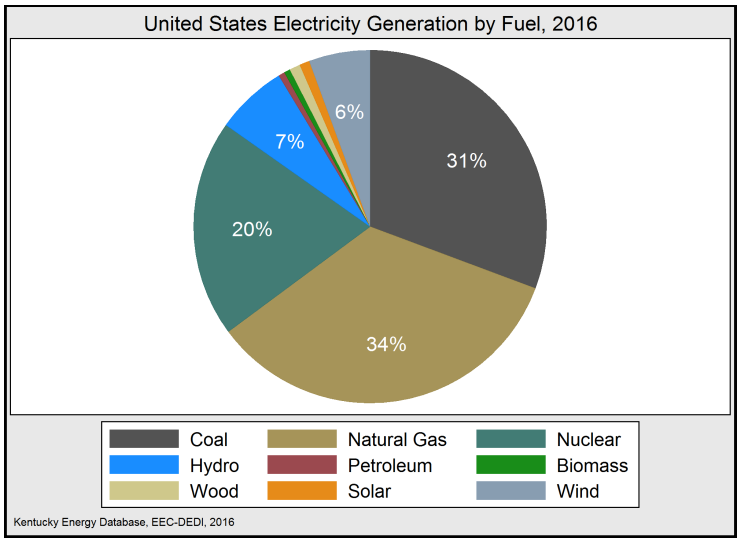
United States Coal Exports, 2016		
Export State	Thousand Tons	Percentage
Total	55,629	100%
West Virginia	15,467	27.8%
Pennsylvania	15,448	27.8%
Virginia	6,371	11.5%
Alabama	5,914	10.6%
Louisiana	3,201	5.8%
Illinois	2,678	4.8%
Maryland	1,867	3.4%
Utah	1,242	2.2%
Ohio	985	1.8%
Missouri	894	1.6%
Kentucky	728	1.3%
California	345	0.6%
Mississippi	300	0.5%
Texas	115	0.2%
Wisconsin	64	0.1%
New York	9	<0.1%

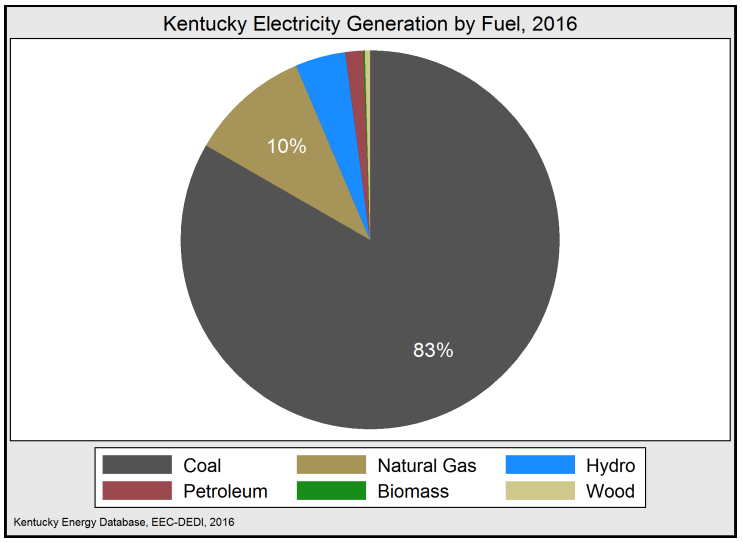


The United States exported coal to 48 countries in 2016, with the 15 countries displayed accounting for 90 percent of the total. In 2002, U.S. coal exports were predominantly sent to Canada. Today, United States coal export destinations are much more diverse, though most countries have decreased purchases of coal in recent years. Whereas the United States received the most dollar value for coal exports in 2011, it exported the most in 2012, reflecting a decrease in the unit price of coal internationally.

United States Coal Exports, 2016		
Destination Country	Thousand Dollars	Percentage
Total	3,721,786	100%
Brazil	557,176	15.0%
Netherlands	532,458	14.3%
Japan	394,568	10.6%
Canada	329,411	8.9%
India	324,123	8.7%
South Korea	287,142	7.7%
Germany	226,805	6.1%
Ukraine	209,279	5.6%
Italy	194,416	5.2%
China	124,449	3.3%
Turkey	119,856	3.2%
France	114,080	3.1%
Croatia	112,812	3.0%
Belgium	106,641	2.9%
Spain	88,571	2.4%

Electricity Generation



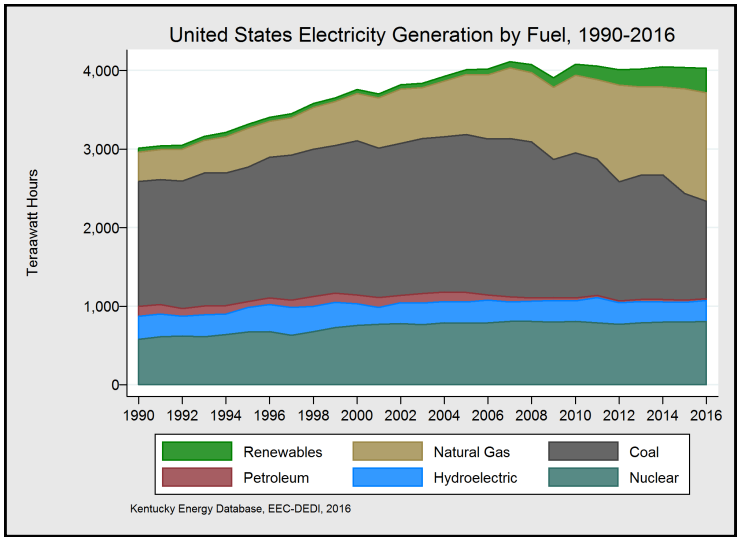


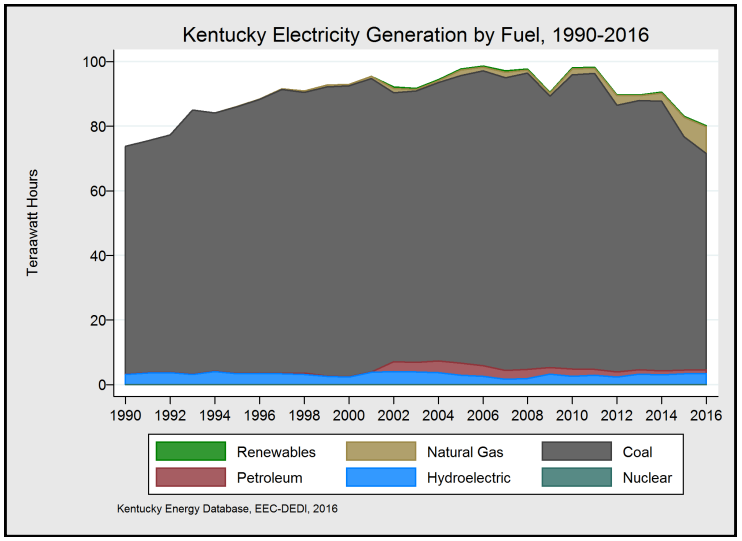
Fuel Type*	Gigawatt Hours	1 Year Change
Total	4,078,670	-0.2%
Coal	1,240,089	-8.5%
Natural Gas	1,380,293	+3.4%
Nuclear	805,327	+1.0%
Hydro	265,829	+5.8%
Wind	226,484	+18%

*Only top five sources listed

Fuel Type*	Gigawatt Hours	Annual Change
Total	80,344	-3.5%
Coal	66,889	-7.4%
Natural Gas	3,450	+0.8%
Hydro	8,255	+38%
Petroleum	1,236	+13%
Wood	357	+4%

*Only top five sources listed

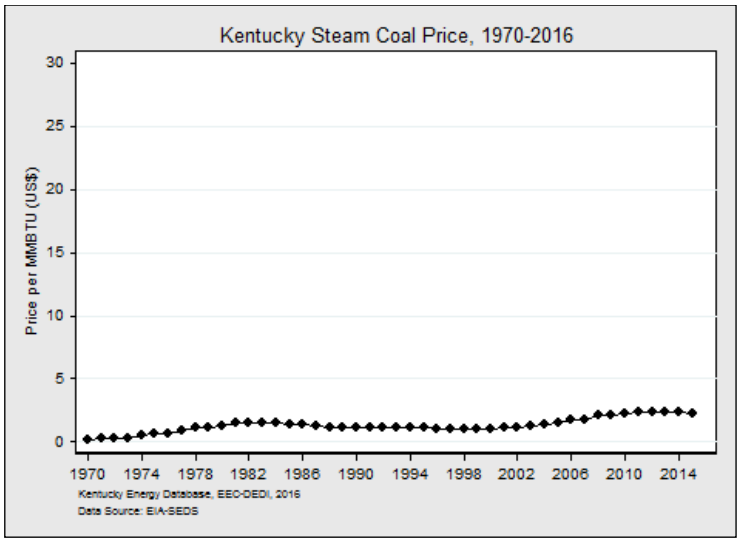




Natural gas became the largest fuel source for electricity in the United States in 2016, followed by coal, and nuclear power. These three largest generation types are 85 percent of the United States' electricity portfolio. For the last six years, renewables and natural gas facilities have been the fastest growing sources of electricity generation in the United States while coal-fired generation has decreased, from 45 percent of total United States electricity generation to 31 percent of the total portfolio.

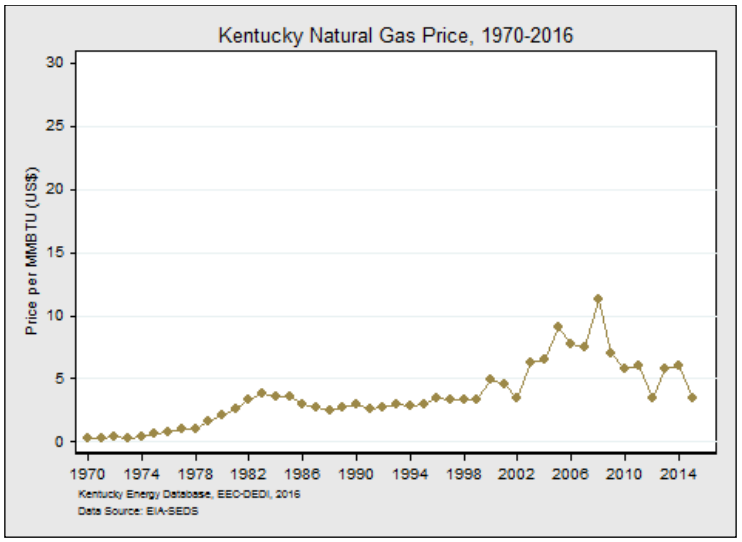
Of the electricity generated in Kentucky in 2016, 83 percent was derived from coal. Coal-fired generation decreased from the year before and remained the main electricity generating fuel. Natural gas facilities became the second-largest source of electricity. Hydroelectric power produced the third most of all fuels. Due to existing coal resources and power plant infrastructure Kentucky has consistently used coal to meet the vast majority of electricity demand within the Commonwealth.

Why Kentucky Uses Coal



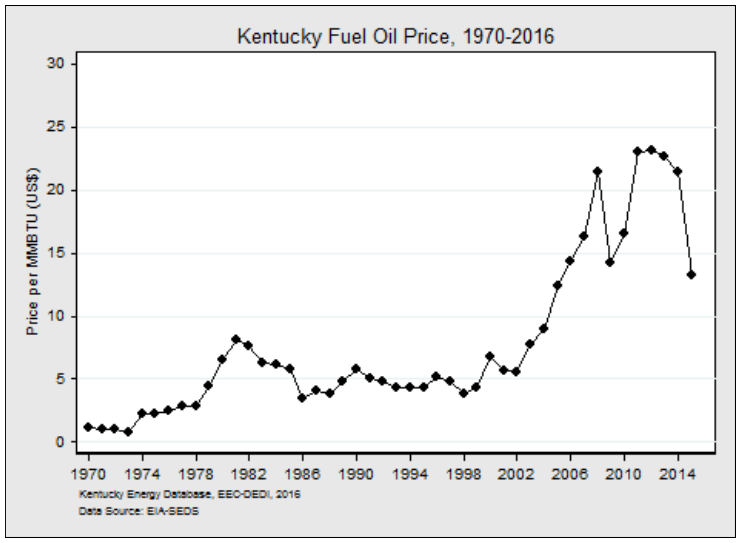
Fuel Type	($US)/MMBtu	% Change
Coal	2.22	-4.7

The price of coal has remained low and stable for decades. The price of coal in 2015 was $2.22 per MMBtu—a 4.7 percent decrease from the year prior. Coal is beneficial because of its ability to be stockpiled and used at any time while natural gas and renewables cannot.



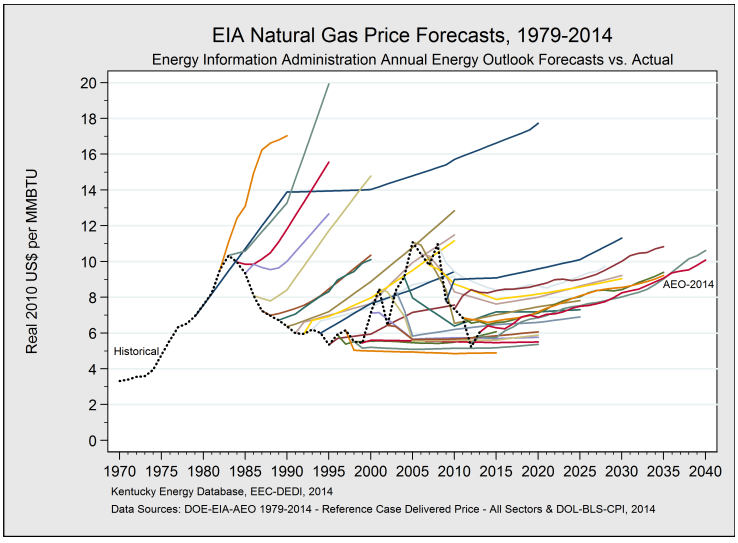
Fuel Type	($US)/MMBtu	($US)/Mcf
Natural Gas	3.52	-41.5

The average price of natural gas in Kentucky in 2015 was $3.52 per million Btu, a 41.5 percent decrease from 2014. Natural gas prices have decreased substantially in recent years following the spread of horizontal hydraulic fracturing, but remain more expensive than coal on a unit of heat basis.



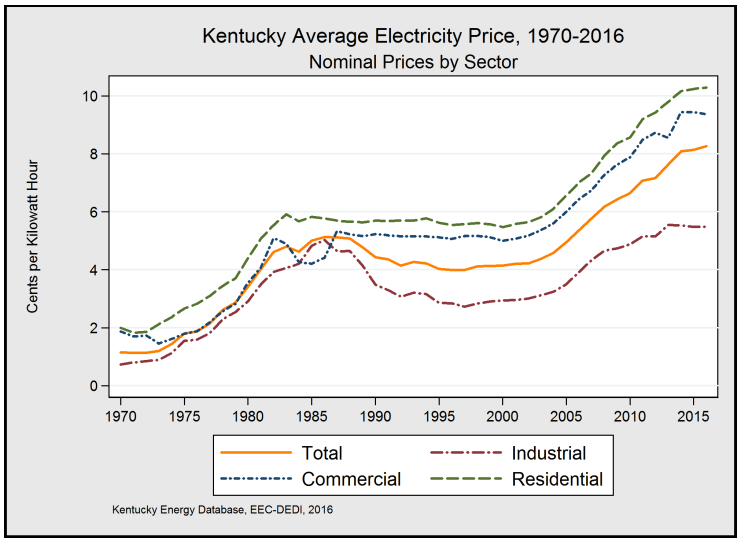
Fuel Type	($US)/MMBtu
Diesel	19.02

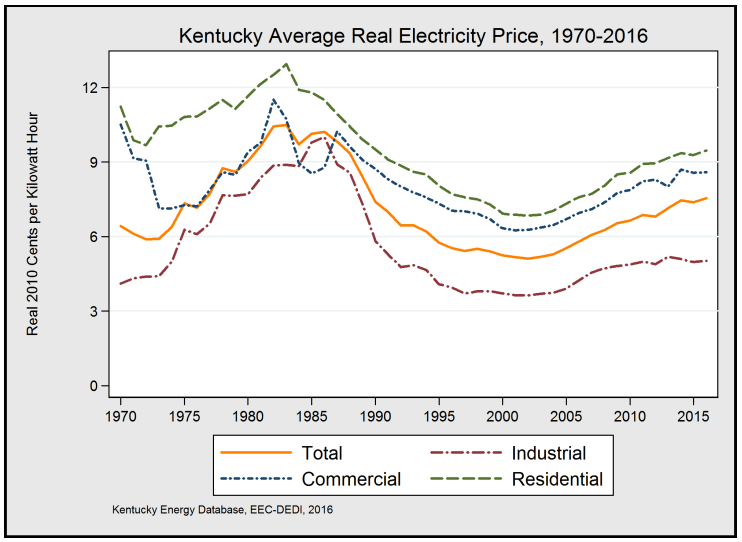
The average price of fuel oil, used in electricity generation, in 2015 was $19.02 per MMBtu in Kentucky, a 30.6 percent decrease from 2014. Petroleum generators in Kentucky are used primarily for peak-load generation, but are a relatively small source of electricity generation, overall—averaging 1.5 percent of generation since 1990.



Natural gas prices have proven difficult to predict historically. The above graph displays the historical natural gas price (in black) and the yearly natural gas price forecast by the Energy Information Administration.

Kentucky Electricity Prices





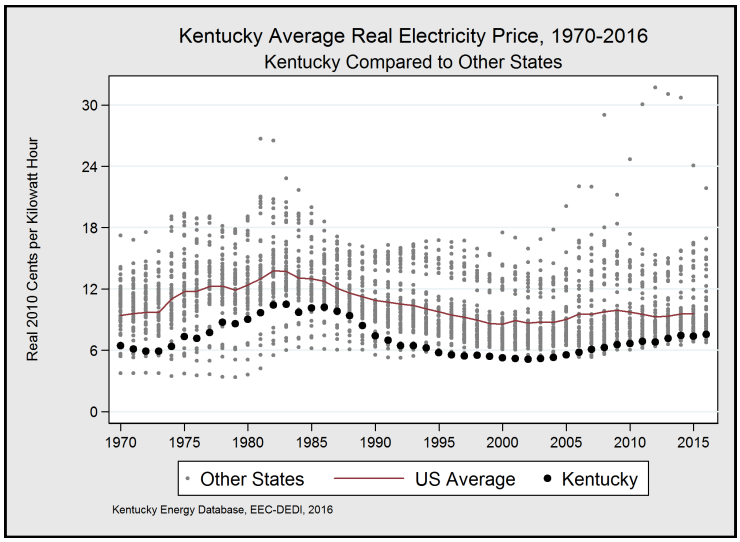
Sector	Nominal Cents/kWh	Since 2010
Average	8.26¢	+97%
Residential	10.29¢	+88%
Commercial	9.37¢	+83%
Industrial	5.49¢	+83%

Sector	Real* Cents/kWh	Since 2010*
Average	7.55¢	+43%
Residential	9.46¢	+50%
Commercial	8.59¢	+36%
Industrial	5.02¢	+35%

*Real 2010 $US

In 2016, the average price of electricity across economic sectors in Kentucky was 8.26¢ per kilowatt-hour, making Kentucky's electricity rates the seventh lowest in the country and the lowest east of the Mississippi River. The residential sector paid the highest price for electricity at 10.29¢ per kilowatt-hour, followed by the commercial sector at 9.37¢ per kilowatt-hour, and the industrial sector at 5.49¢ per kilowatt-hour, sixth lowest in the country.

After, adjusting for inflation, the trends of electricity prices in Kentucky between 1970 and 2016 are notably different from the adjacent, nominal graphic. In inflation-adjusted dollars, the price of electricity in Kentucky actually decreased from 1980 through 2002. However, the real price of electricity in Kentucky in inflation-adjusted dollars has been increasing since 2002. This period of 14 consecutive years of real price increases is contrary to the trend of the 20 years between 1982 and 2002. A major factor driving real electricity prices in Kentucky up since 2002 has been the rising price of steam coal used by electric utilities.

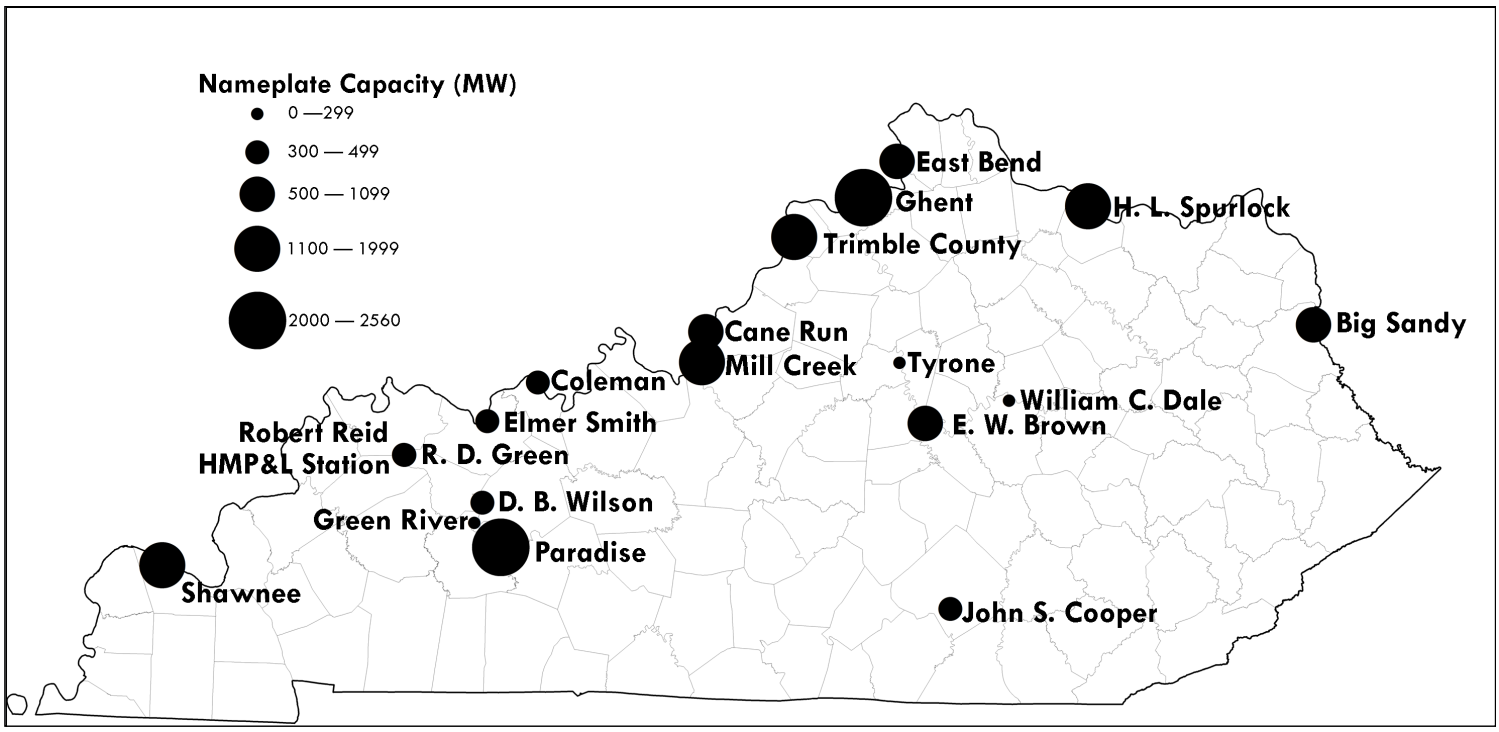


Retail electricity rates are set by either the PSC, the owner or board governing a municipal utility, or TVA. Rates are generally established to cover the operating expenses and the capital costs of the utilities to maintain generation infrastructure and supply electricity. Operating expenses typically include personnel costs, fuel costs, generation costs, and maintenance costs. Capital costs typically include the costs to construct facilities, environmental equipment, and transmission lines, service the outstanding interest on debt, and earn a scheduled return on equity.

Price of Electricity by State, 2016

Rank	State	Primary Generation Source	Percentage Coal	2015 Average Price (Cents per kWh)	2015 Industrial Price (Cents per kWh)	Inflation Adjusted 5 Year Change
1	Louisiana	Natural Gas	5.03	7.41	-3.7%	-6.1%
2	Washington	Hydroelectric	4.53	7.70	+3.4%	+8.3%
3	Oklahoma	Natural Gas	4.85	7.72	-2.6%	-6.6%
4	Arkansas	Natural Gas	5.93	8.05	-2.2%	+5.2%
5	Idaho	Hydroelectric	6.58	8.13	-0.7%	+18.9%
6	Wyoming	Coal	6.92	8.19	+2.6%	+20.7%
7	Kentucky	Coal	5.49	8.26	+2.2%	+10.0%
8	Texas	Natural Gas	5.22	8.28	-4.8%	-11.4%
9	Nevada	Natural Gas	5.86	8.40	-12.9%	-11.2%
10	Mississippi	Natural Gas	5.91	8.72	-9.2%	-3.4%
11	Iowa	Coal	6.14	8.74	+2.0%	+8.5%
12	Utah	Coal	6.31	8.77	+0.8%	+16.9%
13	Montana	Coal	4.97	8.89	-0.8%	+3.1%
14	West Virginia	Coal	6.57	8.89	+9.0%	+7.9%
15	Oregon	Hydroelectric	6.16	8.90	+0.4%	+4.5%
16	North Dakota	Coal	8.22	9.05	+2.2%	+15.5%
17	Nebraska	Coal	7.64	9.09	-0.4%	+8.5%
18	Indiana	Coal	7.02	9.14	+3.6%	+9.3%
19	Virginia	Natural Gas	6.67	9.16	-2.2%	-2.3%
20	New Mexico	Coal	5.73	9.17	-1.8%	-2.8%
21	Illinois	Nuclear	6.37	9.17	-6.3%	+1.0%
22	North Carolina	Nuclear	6.23	9.25	-1.9%	+0.8%
23	Tennessee	Coal	5.82	9.26	-1.7%	-5.2%
24	Georgia	Natural Gas	5.64	9.46	-1.9%	-7.8%
25	Missouri	Natural Gas	6.81	9.53	+1.0%	+7.2%
26	Alabama	Natural Gas	6.08	9.59	+2.2%	+3.0%
27	South Carolina	Nuclear	6.00	9.64	+0.7%	+3.0%
28	Ohio	Coal	6.78	9.74	-2.2%	+2.6%
29	Colorado	Coal	7.13	9.76	-0.9%	-1.0%
30	South Dakota	Hydroelectric	7.55	9.79	+4.7%	+15.0%
31	Minnesota	Coal	7.27	10.02	+2.9%	+10.3%
32	Florida	Natural Gas	7.81	10.13	-5.3%	-9.8%
33	Pennsylvania	Nuclear	6.92	10.26	-2.0%	-6.4%
	United States	Natural Gas	6.75	10.28	+3.3%	+12.2%
34	Arizona	Natural Gas	6.07	10.40	-1.8%	-0.2%
35	Kansas	Coal	7.40	10.40	+2.6%	+10.9%
36	Wisconsin	Coal	7.74	10.92	-0.7%	+1.8%
37	Delaware	Natural Gas	7.98	11.15	-0.8%	-7.4%
38	Michigan	Coal	7.04	11.16	+2.2%	+1.9%
	District of Columbia	Natural Gas	8.96	11.87	-2.1%	-12.4%
39	Maryland	Natural Gas	7.84	12.21	+0.1%	-3.3%
40	Maine	Natural Gas	9.03	12.84	-1.5%	-3.6%
41	New Jersey	Natural Gas	10.14	13.49	-4.3%	-11.2%
42	Vermont	Natural Gas	10.06	14.41	-0.1%	-1.3%
43	New York	Natural Gas	6.04	14.53	-5.8%	-14.1%
44	California	Natural Gas	12.07	15.31	-2.5%	+10.8%
45	New Hampshire	Nuclear	12.35	15.68	-2.6%	+0.5%
46	Rhode Island	Natural Gas	13.54	16.24	-5.1%	+17.7%
47	Massachusetts	Natural Gas	13.11	16.47	-2.8%	+10.2%
48	Connecticut	Natural Gas	13.02	17.27	-3.1%	+0.0%
49	Alaska	Natural Gas	15.56	18.40	+2.7%	+10.0%
50	Hawaii	Petroleum	20.70	23.87	-9.3%	-27.4%

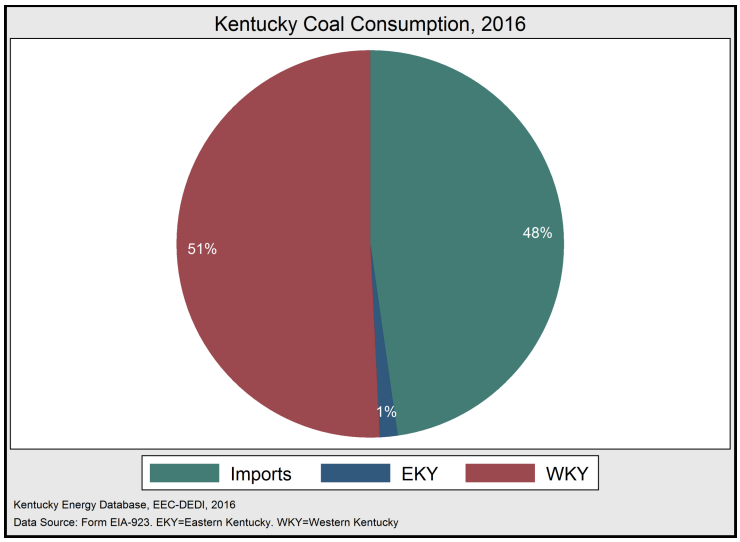
Coal-fired Power Plants in Kentucky

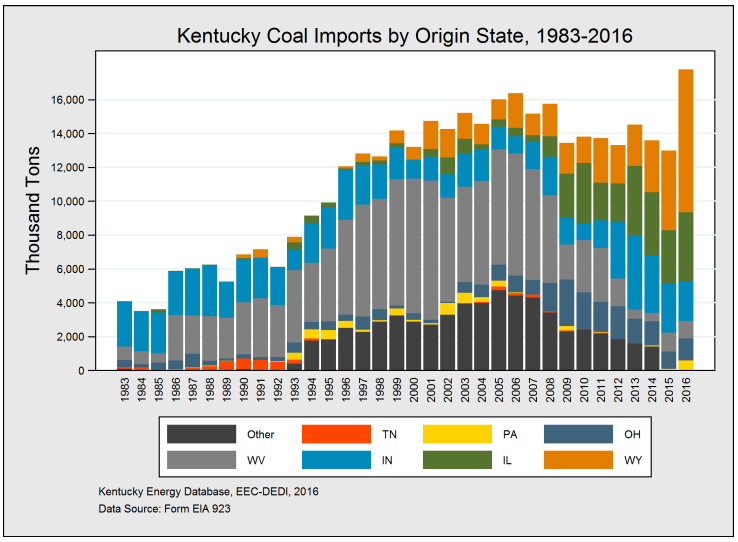


Power Plant	Nameplate Capacity (MW)	Years of Operation	Electric Utility/Operator	County	Phone
Coleman†	455	1969-2014	Big Rivers Electric Corp.	Hancock	(270) 844-6153
D. B. Wilson	420	1984-Present	Big Rivers Electric Corp.	Ohio	(270) 844-6154
R. D. Green†	464	1979-Present	Big Rivers Electric Corp.	Webster	(270) 844-6155
Robert Reid†	65	1966-2015	Big Rivers Electric Corp.	Webster	(270) 844-6157
East Bend	669	1981-Present	Duke Energy	Boone	(513) 467-4830
H. L. Spurlock	1,609	1977-Present	East Kentucky Power Co-op	Mason	(859) 745-9452
John S. Cooper	344	1965-Present	East Kentucky Power Co-op	Pulaski	(859) 745-9450
William C. Dale†	216	1954-2015	East Kentucky Power Co-op	Clark	(859) 745-9451
HMP&L Station	312	1973-Present	Henderson Municipal	Webster	(270) 844-6156
Big Sandy†	1,076	1963-2015	Kentucky Power Company (AEP)	Lawrence	(606) 686-1403
E. W. Brown	739	1957-Present	Kentucky Utilities Company	Mercer	(859) 367-1105
Ghent	2,226	1974-Present	Kentucky Utilities Company	Carroll	(859) 367-1106
Green River†	114	1950-2015	Kentucky Utilities Company	Muhlenberg	(859) 367-1107
Tyrone†	71	1953-2012	Kentucky Utilities Company	Woodford	(859) 367-1109
Cane Run†	645	1962-2015	Louisville Gas & Electric Co.	Jefferson	(502) 627-2713
Mill Creek	1,717	1972-Present	Louisville Gas & Electric Co.	Jefferson	(502) 627-2714
Trimble County	1,243	1990-Present	Louisville Gas & Electric Co.	Trimble	(502) 627-2715
Elmer Smith	445	1964-Present	Owensboro Municipal	Henderson	(270) 926-3200
Paradise	1,150	1970-Present	Tennessee Valley Authority	Muhlenberg	(270) 476-3301
Shawnee	1,400	1953-Present	Tennessee Valley Authority	McCracken	(270) 575-8162

† Facility has been retired, partially retired, is idled, or is in the process of conversion to natural gas-fueled units.

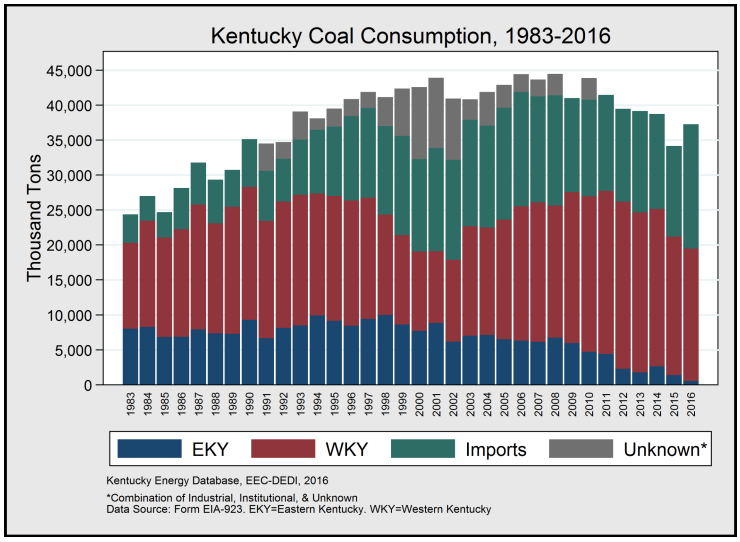
Kentucky In-State Coal Consumption





Origin of Coal	Tons	1 Year Change
Total	37,275,330	+9.1%
Western Kentucky	18,855,850	-4.8%
Imports	17,793,578	+37.0%
Eastern Kentucky	625,902	-54.5%

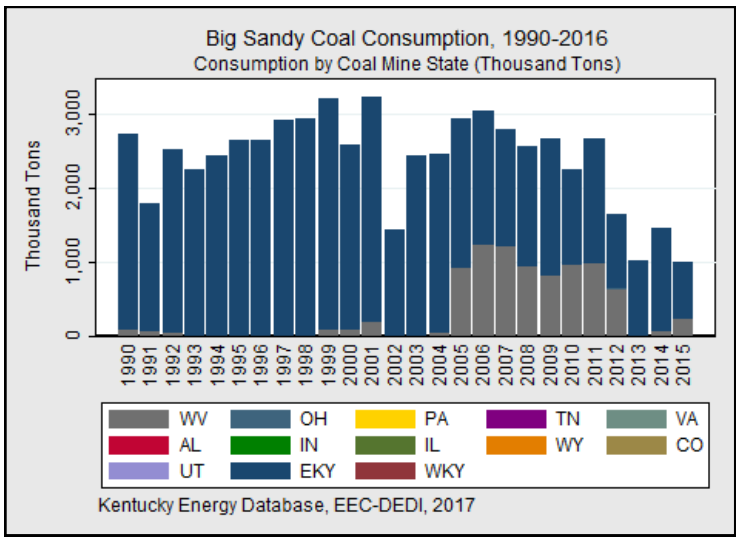
Imported Coal	Thousand Tons	Percentage
Total Imports	17,794	100%
Wyoming	8,450	47.5%
Illinois	4,065	22.8%
Indiana	2,361	13.3%
West Virginia	1,035	5.8%
Ohio	1,304	7.3%
Pennsylvania	579	3.3%

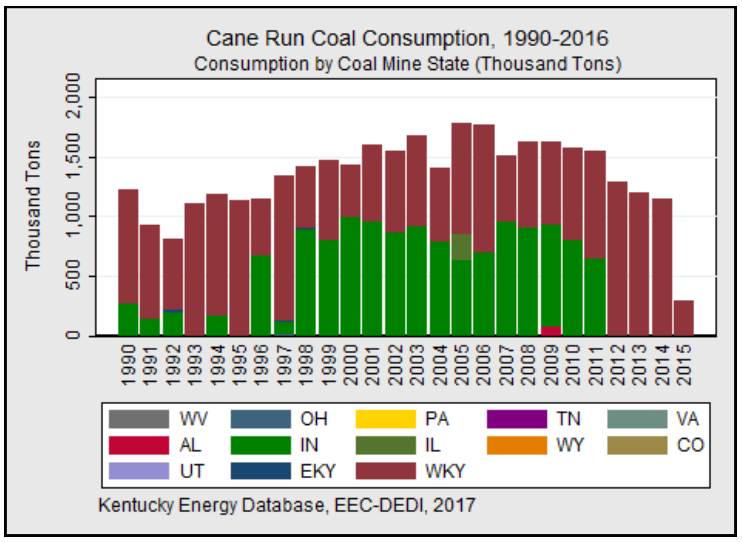


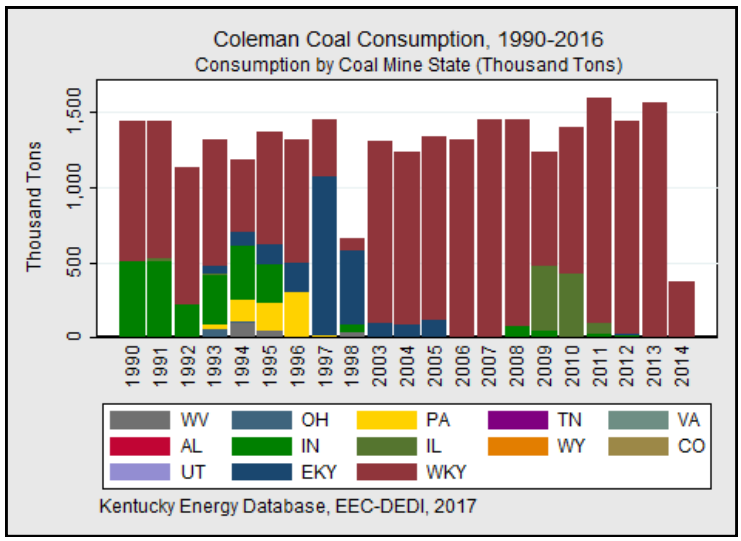
Coal consumption in Kentucky increased by 9.1 percent in 2016 to 37.2 million tons. Coal mined in Western Kentucky was the largest source of coal used within the Commonwealth, representing 50.6 percent of coal consumption. Conversely, coal from Eastern Kentucky accounted for 1.7 percent of the coal consumed in Kentucky in 2016. Kentucky imported coal from 6 different states during 2016, totaling 17.7 million tons, or 47.7 percent of coal consumption.

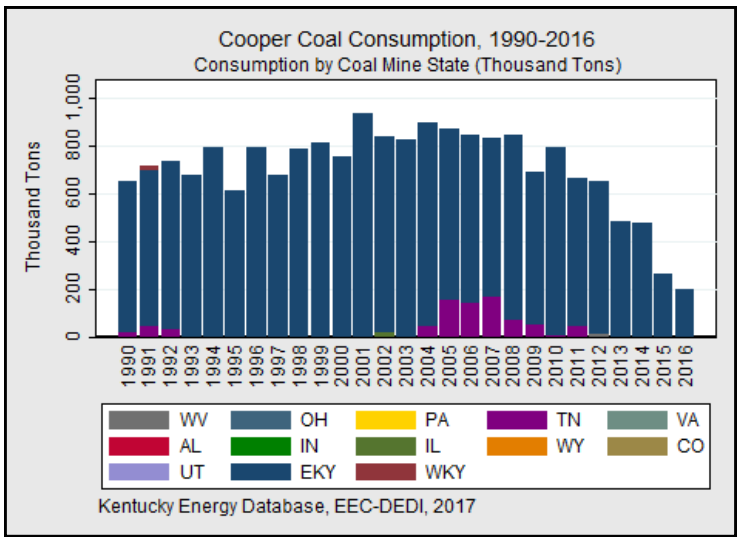
Several factors affect the use of imported coal in Kentucky including the price, delivery cost, heat content, and the sulfur content of a particular coal. For electrical power generation, utilities must balance the economic and environmental costs of these factors when purchasing coal. As a result, electric utilities, municipalities, and power producers often blend coal from a variety of sources to maintain a diversified cost-effective fuel resource while complying with environmental regulations. Since 1990, electric utilities in Kentucky have increasingly used coal containing relatively higher sulfur content, a trend accelerated through the installation of sulfur dioxide scrubbers on many coal-fired generators throughout the state. Nationally, many other electric utilities have elected to install similar environmental control systems, thereby altering traditional coal sourcing requirements. The net result of these recent decisions in Kentucky has meant an increasing reliance on Western Kentucky coal supplies, and a diminishing demand for Eastern Kentucky coal. The relatively low price of coal from several Western states has also increased imports for electric power generation.

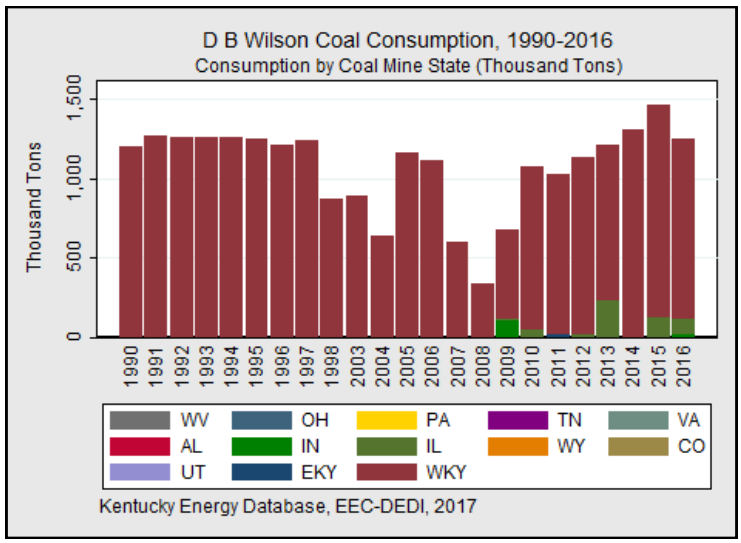
Kentucky In-State Coal Consumption

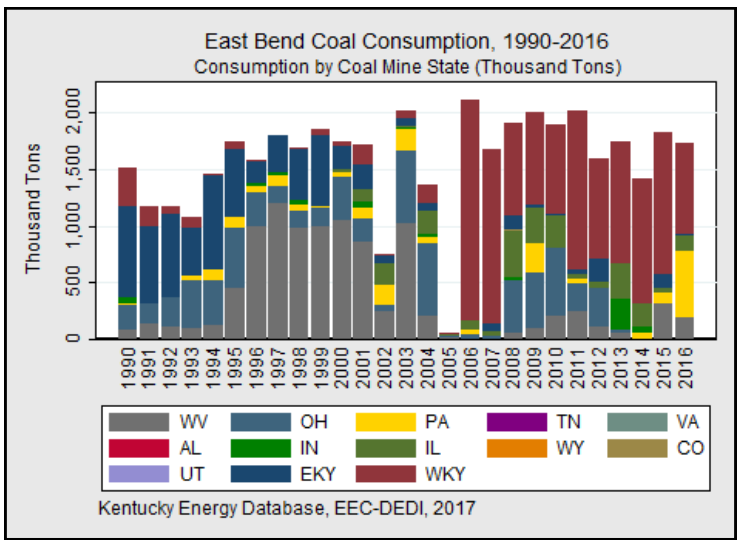




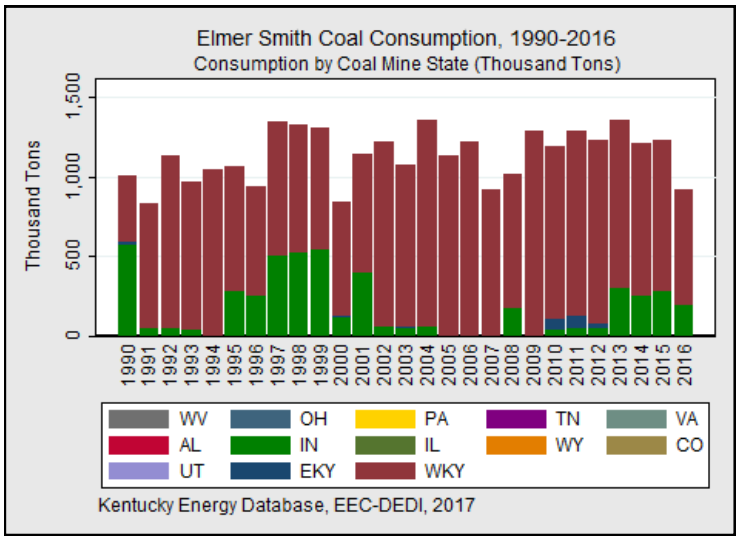


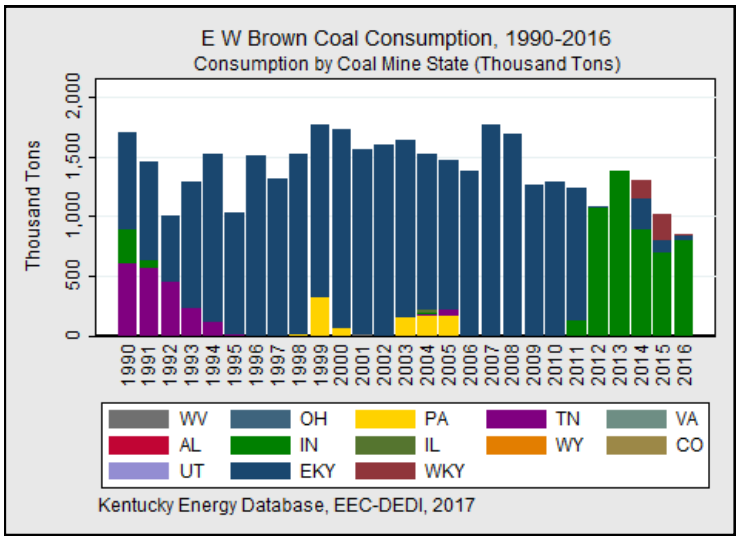


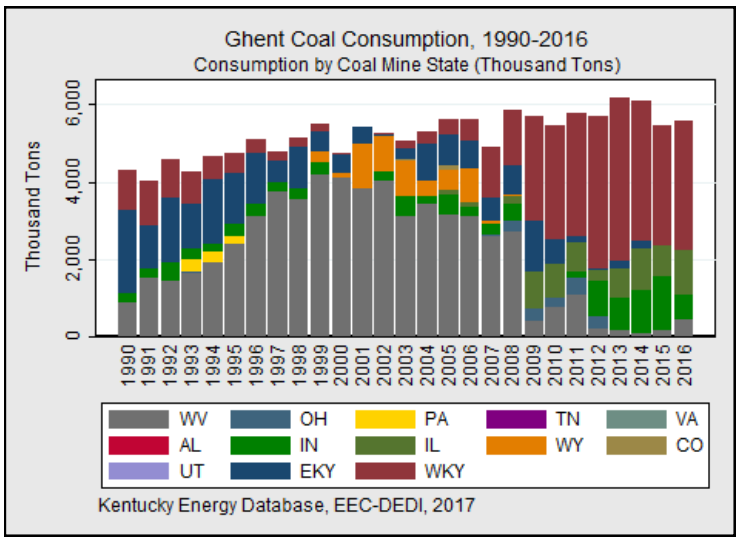


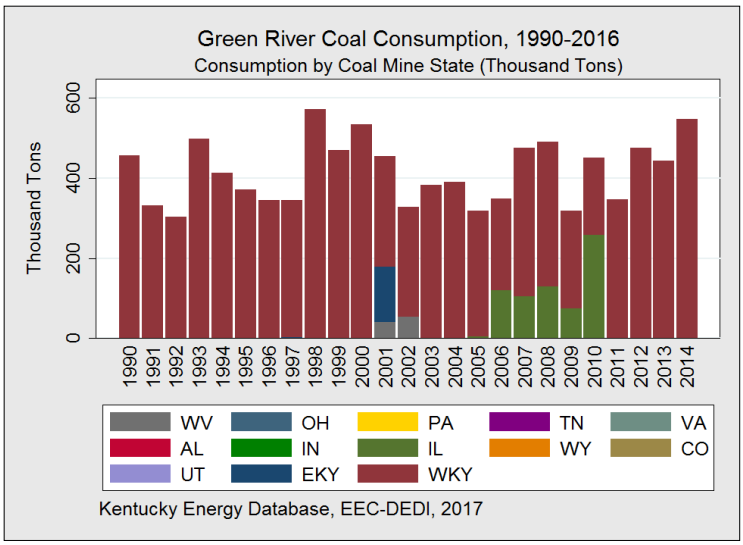


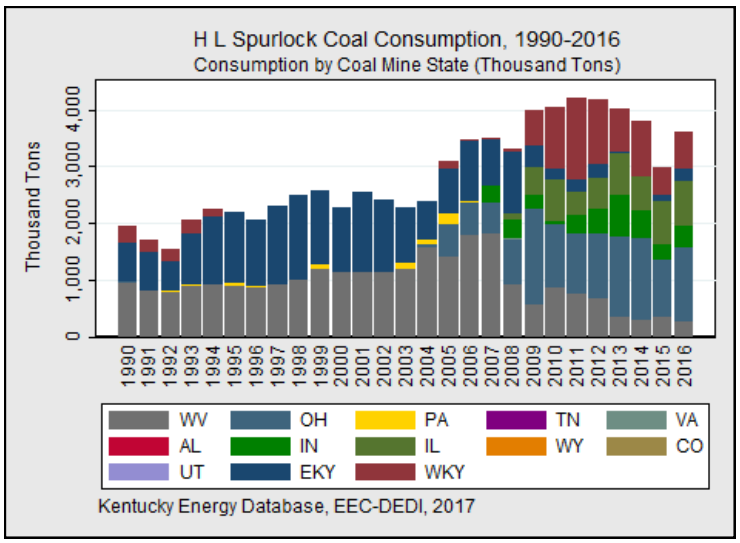
Kentucky In-State Coal Consumption

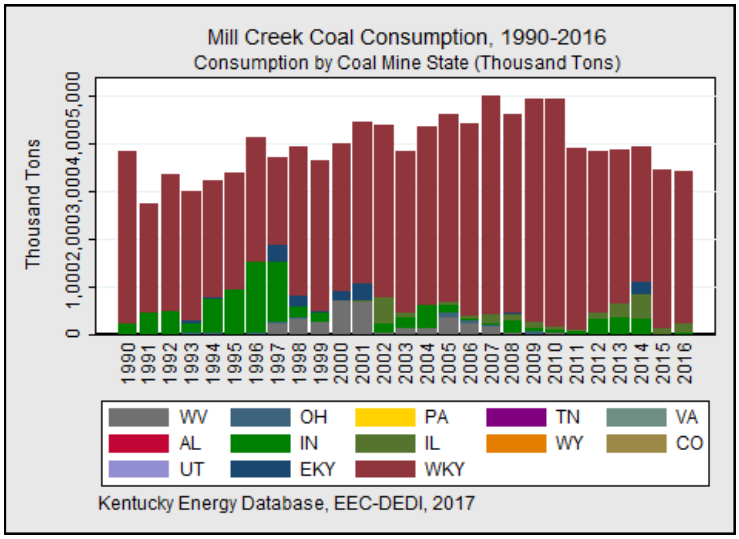




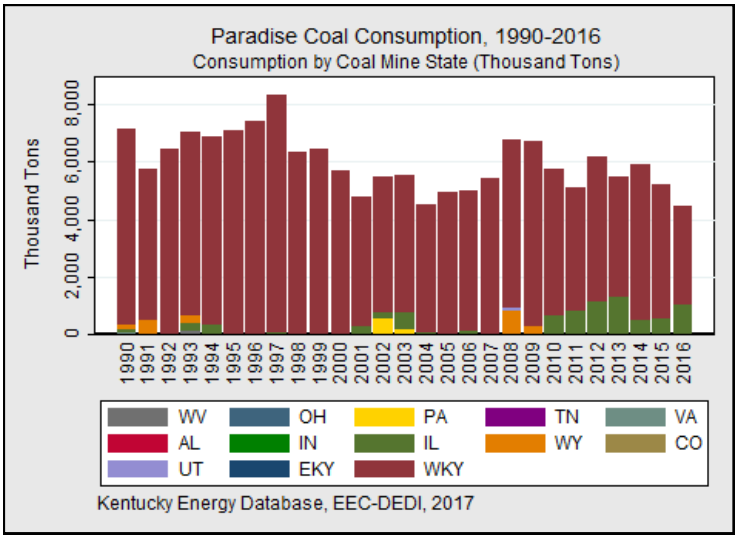


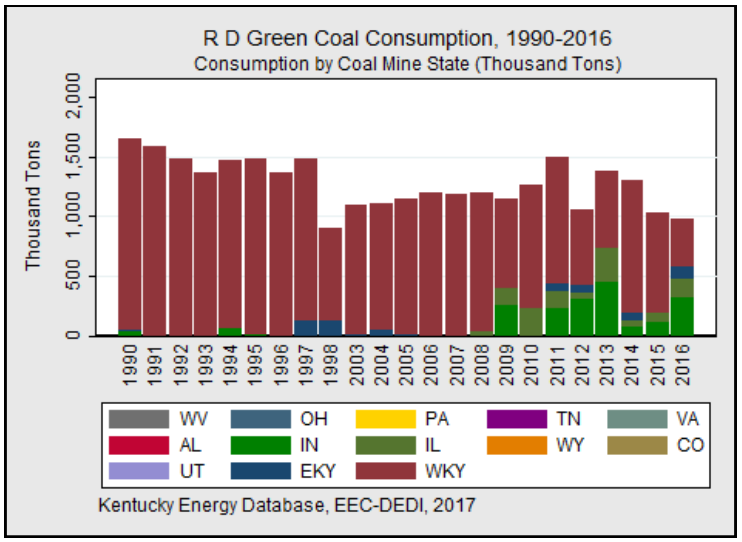


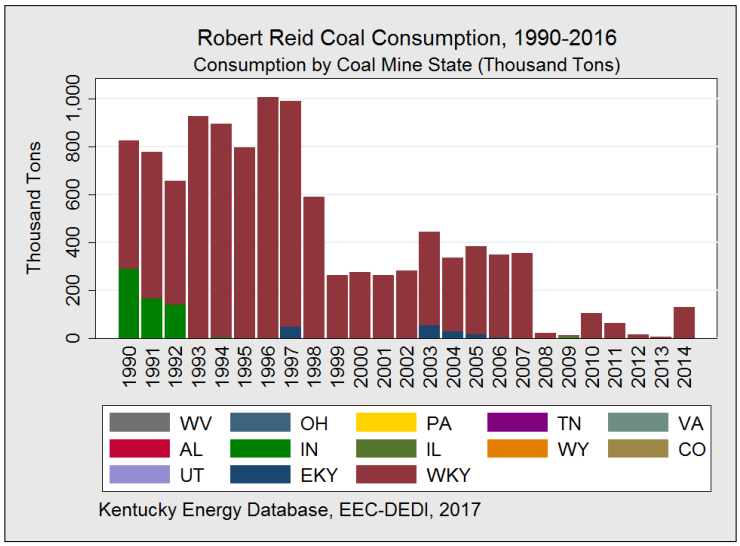


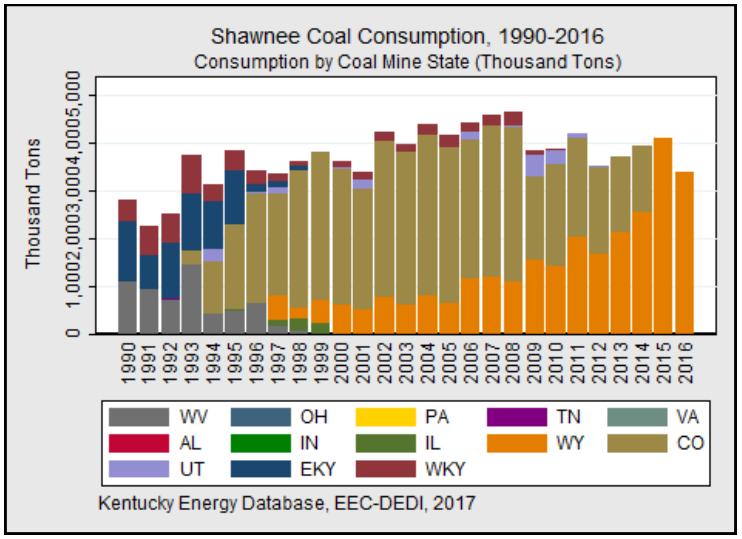


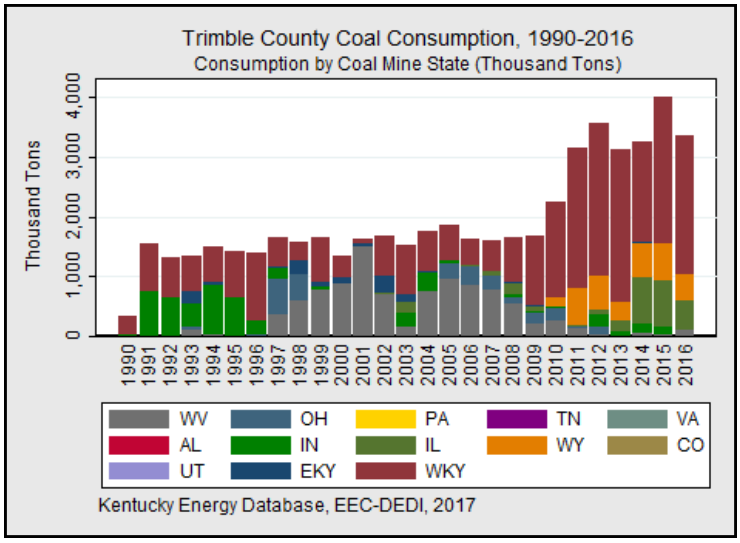
Kentucky In-State Coal Consumption

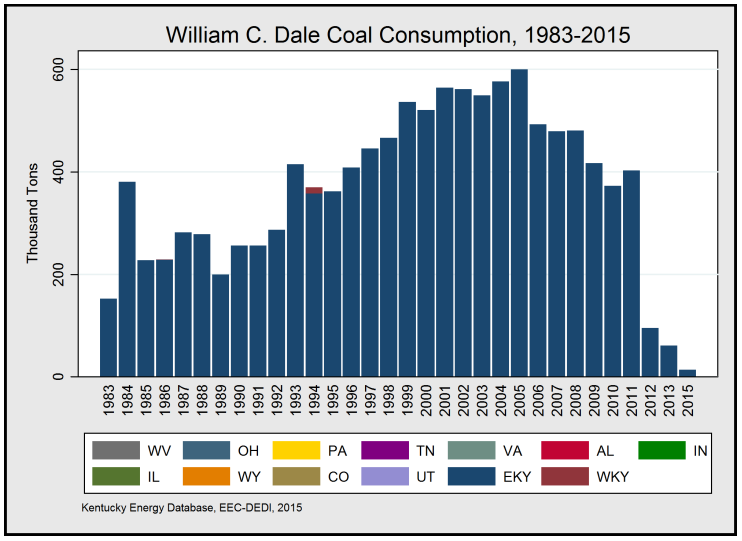




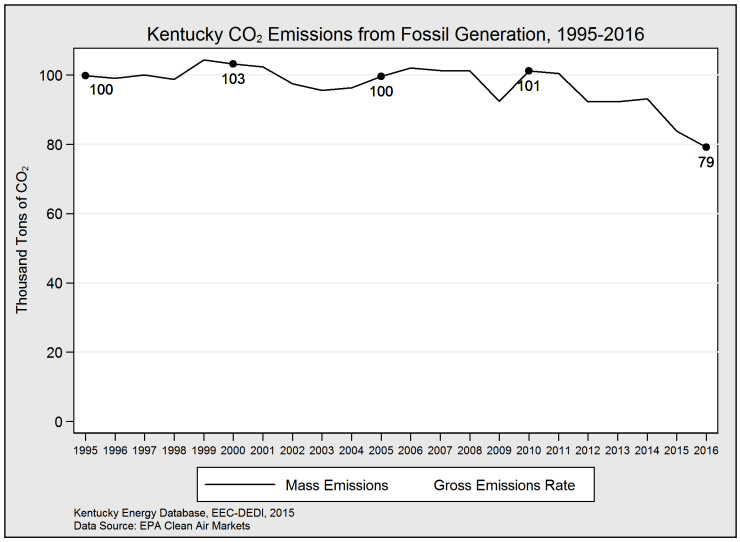


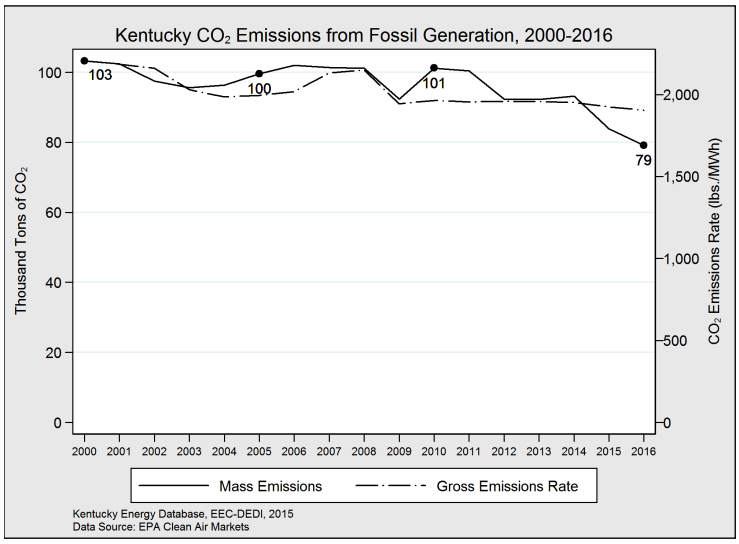






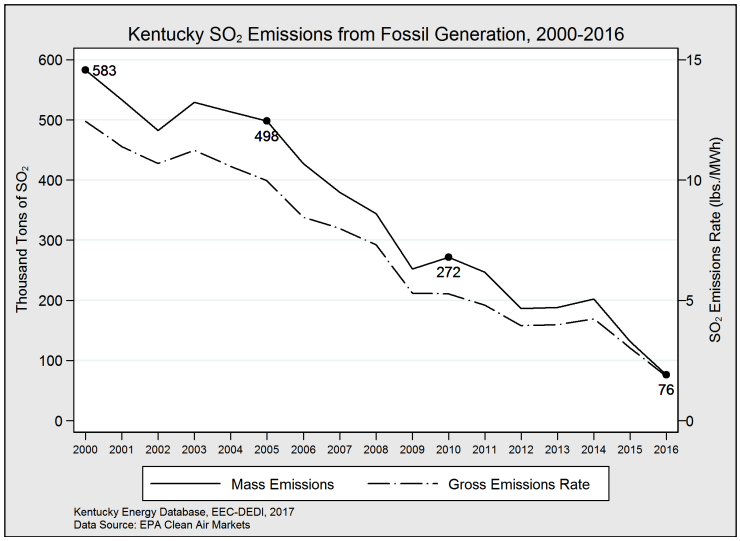
Kentucky Electric Power Emissions



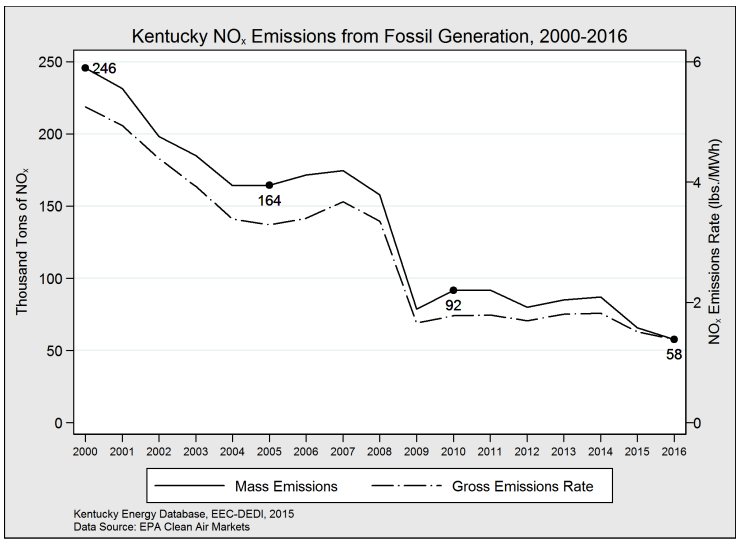


Emission	Tons	Since 1995
Carbon Dioxide	79,172,720	-20.7%
Sulfur Dioxide	76,421	-88.7%
Nitrogen Oxides	57,658	-76.5%

In 2016, power plants in Kentucky emitted 79.1 million tons of carbon dioxide, a decrease of 6 percent compared with 2015. In terms of emissions rate, power plants emit almost 20 percent less carbon dioxide as they did in 1995.

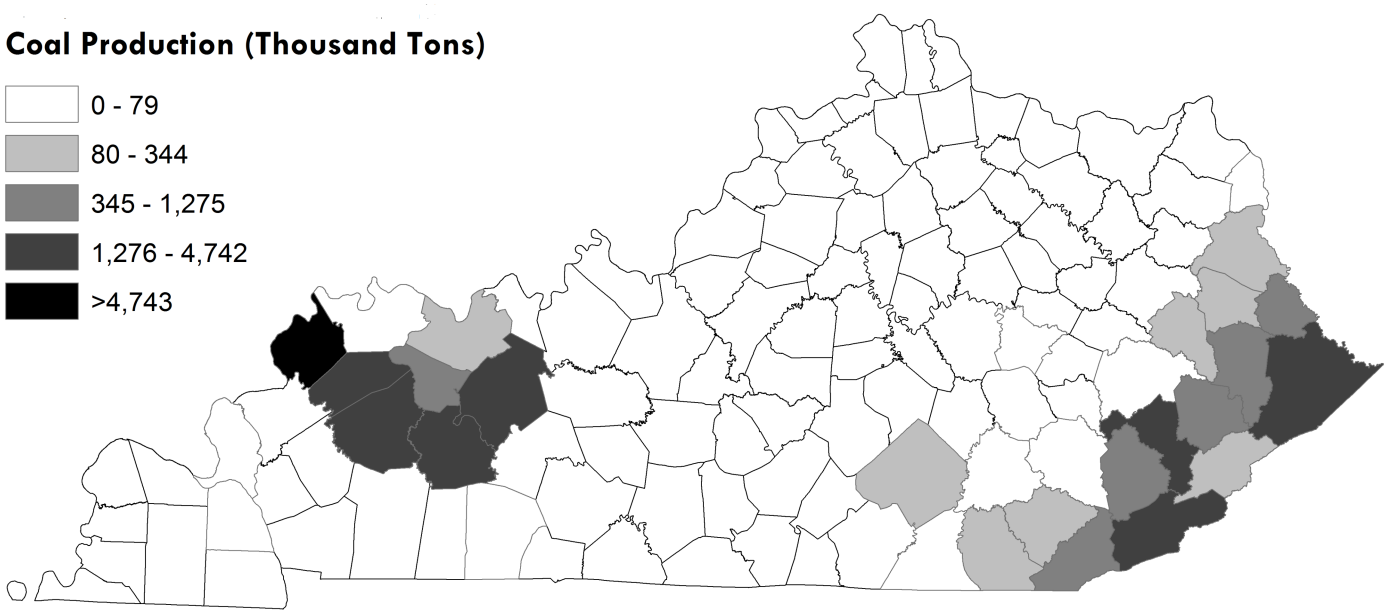


Sulfur dioxide (SO_2) is a highly reactive gas and major pollutant that is monitored and regulated by the state and federal government due to its connection to acid rain, incidence of asthma, and other respiratory problems. In 2016, the electric power sector of Kentucky emitted 76,421 tons of sulfur dioxide, a 88.7 percent decrease from 1995 and a 42 percent decrease from 2015.



Nitrogen oxides (NO_x) are a group of highly reactive regulated pollutants: Nitric Oxide (NO), Nitrogen Dioxide (NO_2), and Nitrous oxide (N_2O). Nitrogen oxide, which is displayed here, has been shown to cause acid rain and exacerbate respiratory disease, while nitrous oxide, or laughing gas, is a greenhouse gas 312 times more potent than carbon dioxide. In 2016, the electric power sector of Kentucky emitted 57,658 tons of nitrogen oxides, a decrease of 84.2 percent from 1995 and a decrease of 12.3 percent from 2015.

Coal Producing Counties, 2016



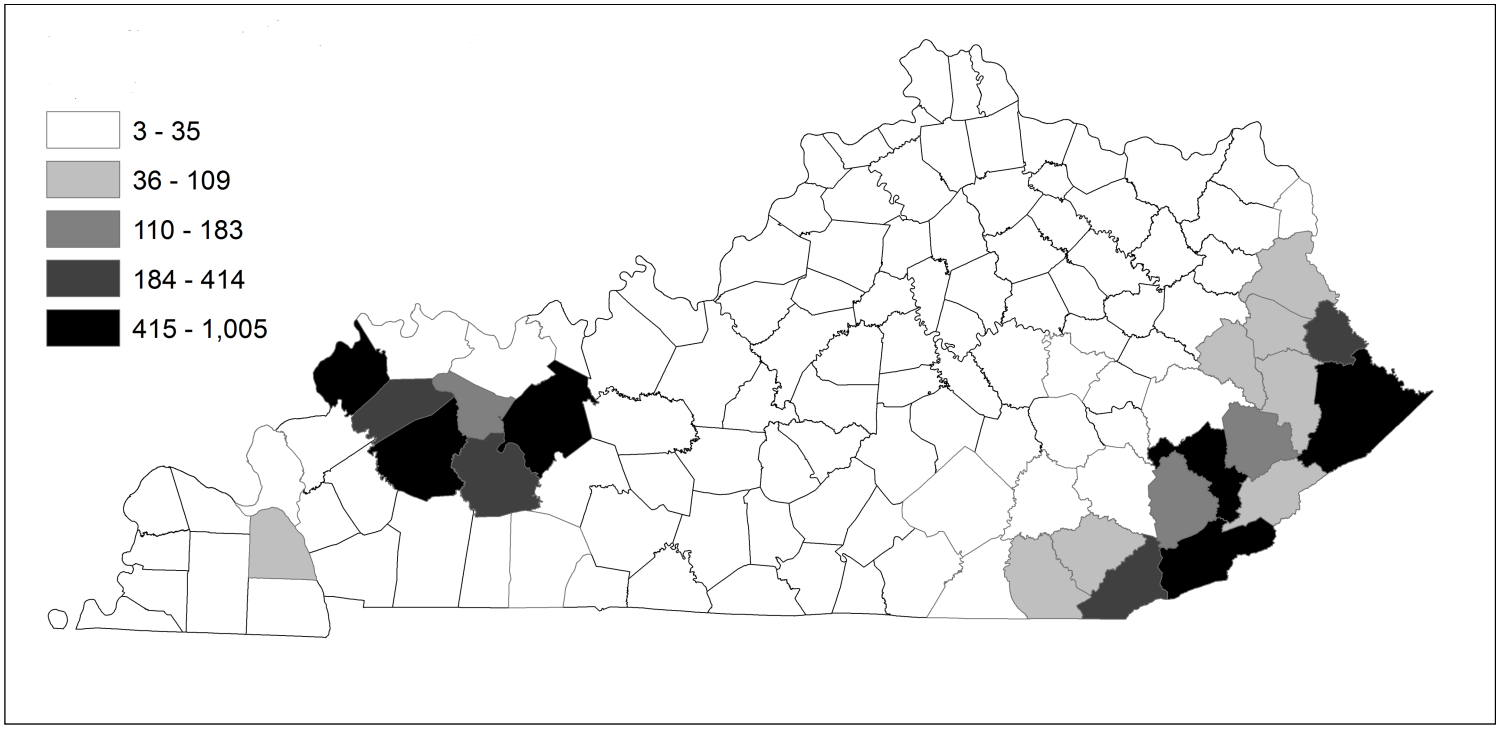
Western Kentucky Coal Producing Counties, 2016			
Rank	County	Production (Tons)	1 Year Change
1	Union	8,607,528	-5.60%
2	Ohio	4,742,266	-29.70%
3	Hopkins	4,281,379	-37.50%
5	Webster	3,744,015	-36.20%
8	Muhlenberg	3,051,705	-14.50%
9	McLean	1,274,873	+51.20%
19	Daviess	194,922	-41.80%

During 2016, there were 25 counties in Kentucky that registered coal production—seven in the Western coalfield and 18 in the Eastern coalfield.

56 of Kentucky's 120 counties have at some time registered some coal production since coal mining records began tracking coal mining in 1790, but within the past five years, just 35 counties have had coal mining operations.

Eastern Kentucky Coal Producing Counties, 2016			
Rank	County	Production (Tons)	1 Year Change
4	Pike	4,136,454	-40.10%
6	Perry	3,591,754	-46.00%
7	Harlan	3,457,164	-9.80%
10	Bell	1,082,091	-21.70%
11	Leslie	945,906	-30.50%
12	Martin	945,048	-37.90%
13	Knott	681,708	-67.00%
14	Floyd	640,971	-70.20%
15	Magoffin	344,489	+33.30%
16	Pulaski	212,367	+11,640%
17	Whitley	210,838	-16.80%
18	Johnson	204,438	+67.40%
20	Letcher	184,786	-64.70%
21	Knox	161,808	-14.30%
22	Lawrence	131,221	-64.90%
23	Breathitt	79,315	-68.40%
24	Logan	72,354	-49.10%
25	Laurel	3,292	-62.00%

Coal Employment, 2016



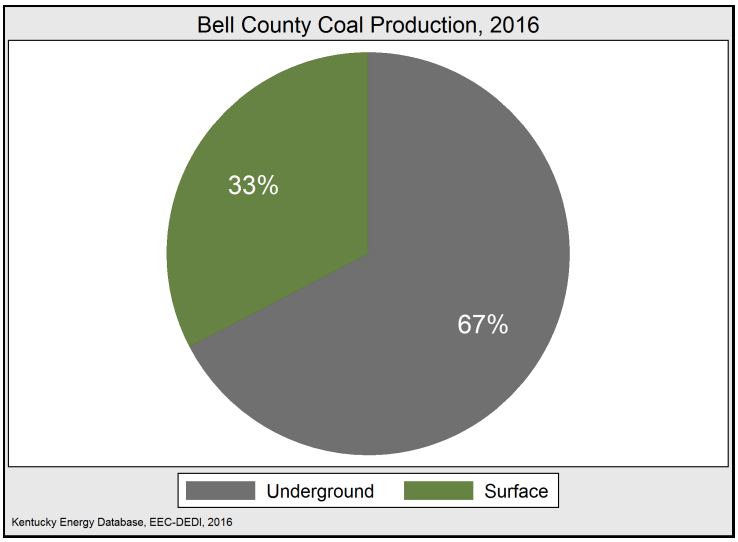
Western Kentucky Coal Producing Counties, 2016			
Rank	County	Employment	1 Year Change
3	Union	651	-5.5%
5	Ohio	526	-23.3%
6	Hopkins	509	-41.3%
7	Muhlenberg	400	-14.7%
8	Webster	373	-42.6%
11	McLean	183	30.7%
20	Marshall	44	+0.0%
24	Daviess	20	-25.9%
26	Livingston	17	-26.1%
29	Henderson	10	+66.7%
31	Logan	4	-20.0%

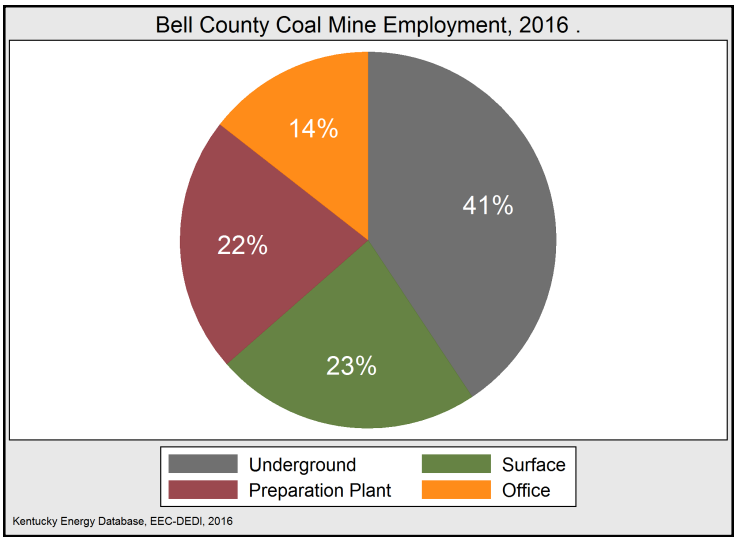
32 counties registered coal employment over 2016 with 11 counties registering in Western Kentucky and 21 in the east. The discrepancy in counties with coal employment and production results from 6 counties with preparation plants but no active mining.

Historically, 56 of the 120 counties in Kentucky have recorded direct coal employment. In the past five years 36 counties recorded direct coal employment.

Eastern Kentucky Coal Producing Counties, 2016			
Rank	County	Employment	1 Year Change
1	Pike	962	-39.5%
2	Harlan	796	-8.1%
4	Perry	566	-41.4%
9	Bell	332	-11.2%
10	Martin	281	-27.4%
12	Leslie	176	-26.1%
13	Floyd	132	-69.4%
14	Knott	111	-54.9%
15	Whitley	109	-31.9%
16	Knox	86	-27.1%
17	Letcher	77	-58.4%
18	Johnson	50	+0.0%
19	Magoffin	46	-11.5%
21	Lawrence	41	-43.8%
22	Boyd	27	-38.6%
23	Breathitt	24	-48.9%
25	Pulaski	19	+58.35%
27	Clay	16	-33.3%
28	Estill	14	-61.1%
30	Laurel	6	-45.5%
32	McCreary	4	+0.0%

Bell County

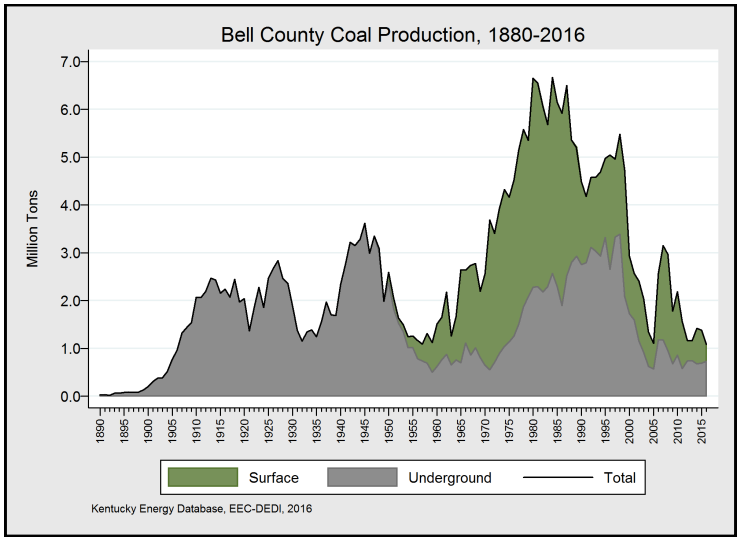


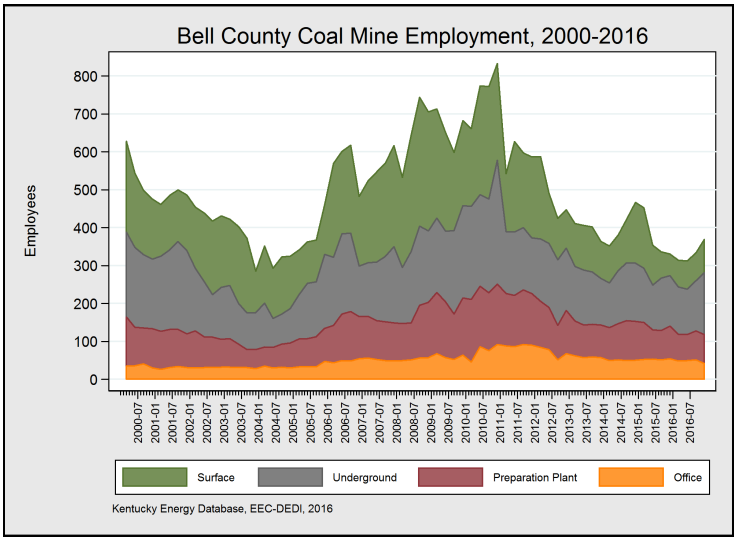


Production Method	Production	Annual Change
Total	1,082,091	-21.7%
Surface	353,294	-47.7%
Underground	728,797	+5.15%

On-Site Activity	Employment	Annual Change
Total	332	-11.3%
Surface	76	-26.4%
Underground	135	+1.7%
Preparation Plant	73	-14.9%
Office	48	-8.9%

In 2016, coal mines produced 1 million tons of coal in Bell County. One third of the coal mined in the county came from surface mining operations.

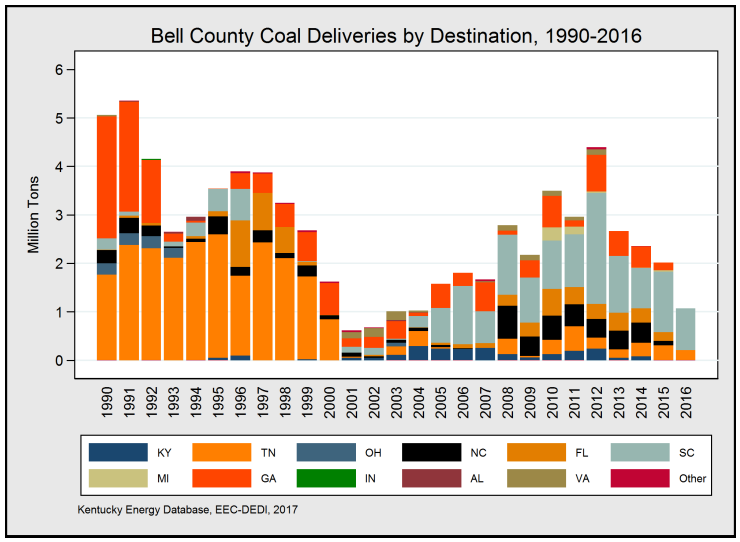


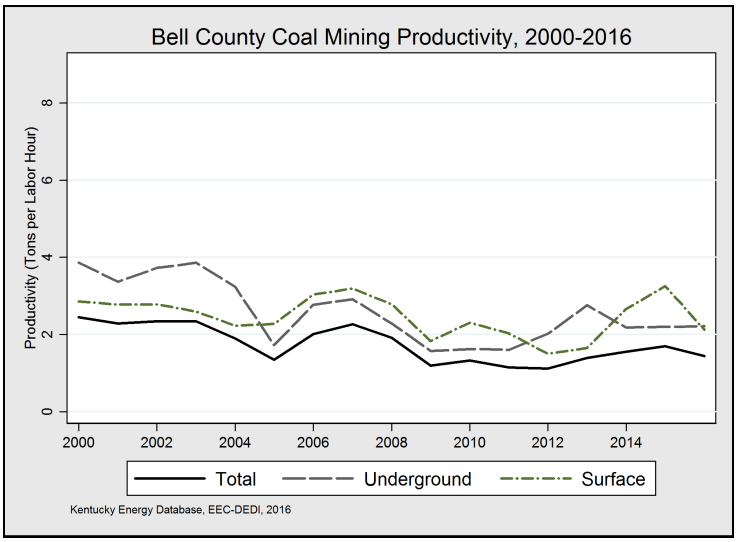


In 2016, Bell County decreased coal production by 21.7 percent. All of this decrease was from surface mining operations, where production fell by 47.7 percent. Underground operations increased production by 5.15 percent in 2016. Coal has been mined in Bell County since 1879 when the first 272 tons of coal were extracted. Between 1879 and 2016, more than 316 million tons of coal have been extracted in Bell County.

Coal mines and preparation plants in Bell County employed an average of 332 full-time employees at the end of 2016, a decrease of 11.3 percent from 2015. There were 135 underground miners in 2016, an increase of 1.7 percent from 2015, and 76 surface miners, an increase of 26.4 percent from 2015. Coal mine employment in Bell County peaked in 1948 at 4,806 employees, which was more than ten times the number of coal mine employees in 2016.

Bell County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**1,071,397**	**100%**
South Carolina	**861,157**	**80.4%**
Cope	38,609	3.6%
Wateree	143,571	13.4%
Winyah	232,947	21.7%
Cross	224,557	21.0%
Williams	221,473	20.7%
Tennessee	**210,240**	**19.6%**
Tennessee Eastman	210,240	19.6%

Chemical Composition and Cost

Coal mined in Bell County had a median sulfur content of 1.13 percent, a median ash content of 8.83 percent, and a median heat content of 25.27 MMBtu per ton. The average delivered price per ton was $80.66. The average delivered price per MMBtu of Bell County coal was $3.79.

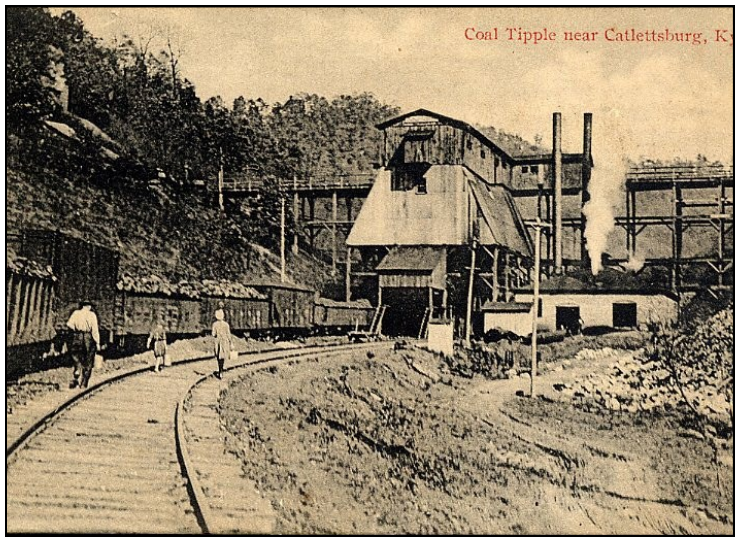
Bell County Coal Market

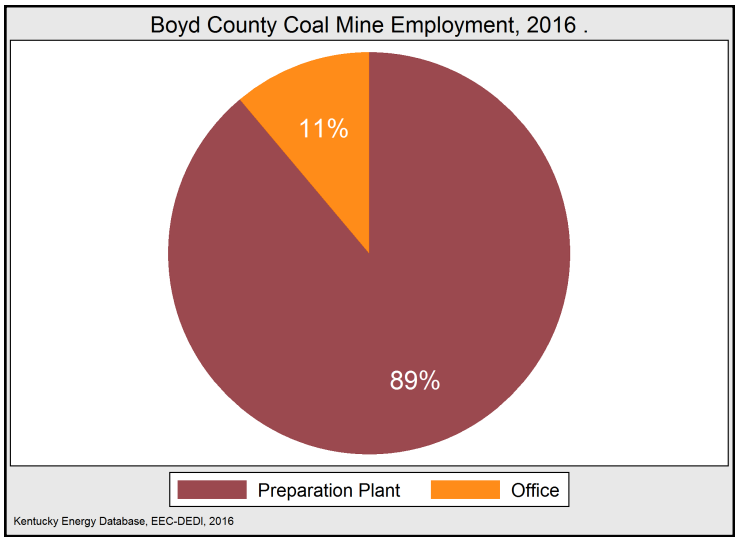
The largest market for coal mined or processed in Bell County for the last twelve years has been South Carolina, where five power plants received nearly 861 thousand tons in 2016, or 80 percent of total Bell County shipments. This is a significant decrease from 2012, when Bell County sent 2.2 million tons to nine plants in South Carolina.

Bell County Coal Mining Productivity

Bell County productivity, the amount of coal produced per labor hour, has steadily increased since from 2012-2014 as the less competitive and more costly coal mines in the county have closed. This trend reversed in 2016 where productivity fell from 1.69 to 1.43.

Boyd County

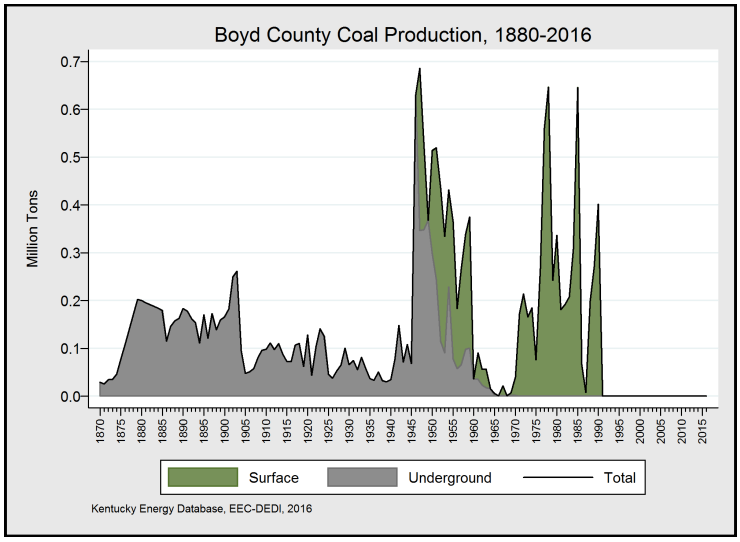


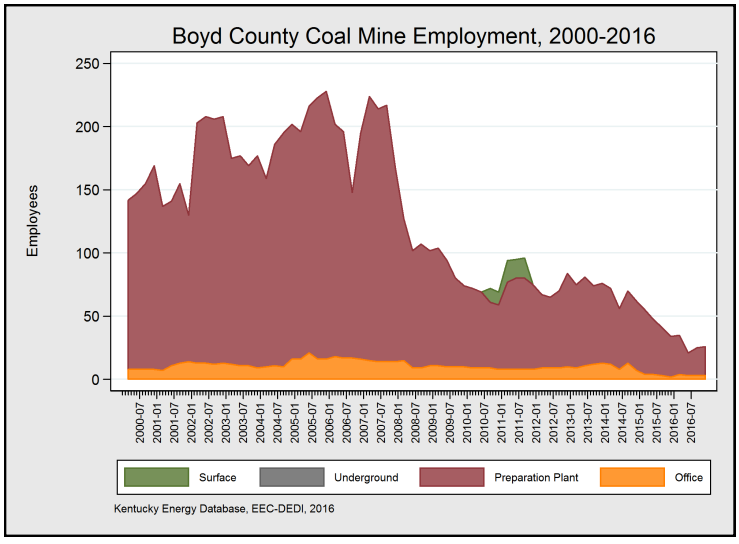


The motto of Boyd County is "Where Coal Meets Iron." The area that would become Boyd County was ideally located for both coal and iron production to begin in the 1830's with access to the Eastern coalfield, the Ohio River, and major railroads. *Pictured above: a postcard of a coal tipple in Boyd County near Catlettsburg. Tipples are used to load extracted coal from the mines onto train cars. Mine cars literally tip their coal into railroad hopper cars.*

On-Site Activity	Employment	Annual Change
Total	27	-39.5%
Preparation Plant	24	-43.1%
Office	3	-0.9%

Since 1990, preparation plants and terminals have been the largest source of direct coal industry employment in Boyd County as the county no-longer produces coal.

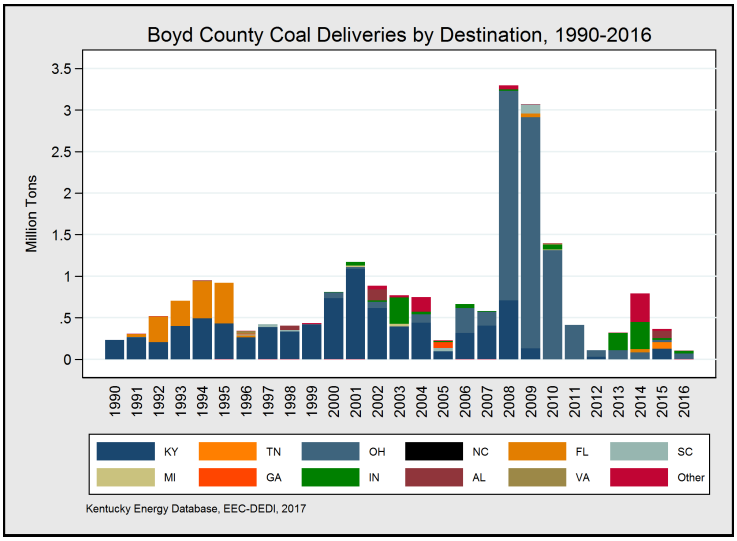




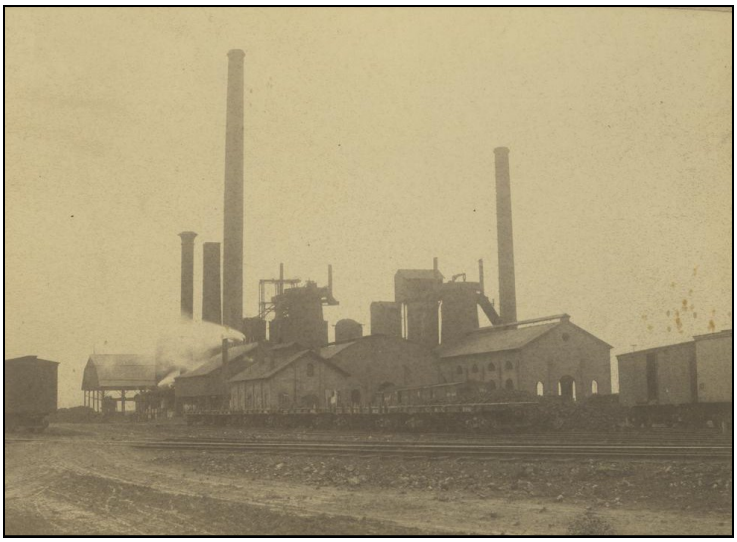
Although Boyd County has not mined coal since 1990, more than 19.9 million tons have been mined since 1838. Prior to becoming a county, the area that would become Boyd County produced roughly 1,000 tons a year from 1838 to 1860, which was used to power local iron furnaces. After stopping during the Civil War, coal production increased to 200,000 tons annually by 1879. Production peaked after World War II in 1947 at 686,145 tons. Large scale surface production began in 1970 and peaked in 1985 at 645,885 tons.

To this day, Boyd County continues to process and export coal, although significantly less than a decade ago. Several coal transportation terminals remain active in Boyd County in 2016 and employed 27 individuals full-time, a decrease of 39.5 percent from 2015. There were 24 employees operating coal preparation plants, a decrease of 43.1 percent from 2015.

Boyd County



State and Power Plant	Deliveries (Tons)	Percentage
Total	**101,944**	**100%**
Ohio	**68,503**	**67.2%**
W H Zimmer	15,580	15.3%
J M Stuart	7,384	7.2%
Killen Station	45,539	44.7%
Indiana	**28,539**	**28.0%**
R Gallagher	28,539	28.0%
Alabama	**3,166**	**3.1%**
Colbert	3,166	3.1%
Kentucky	**1,736**	**1.7%**
GRT Terminal	1,736	1.7%



Picture: Ashland Coal and Iron Company's Furnace circa late 19th Century.

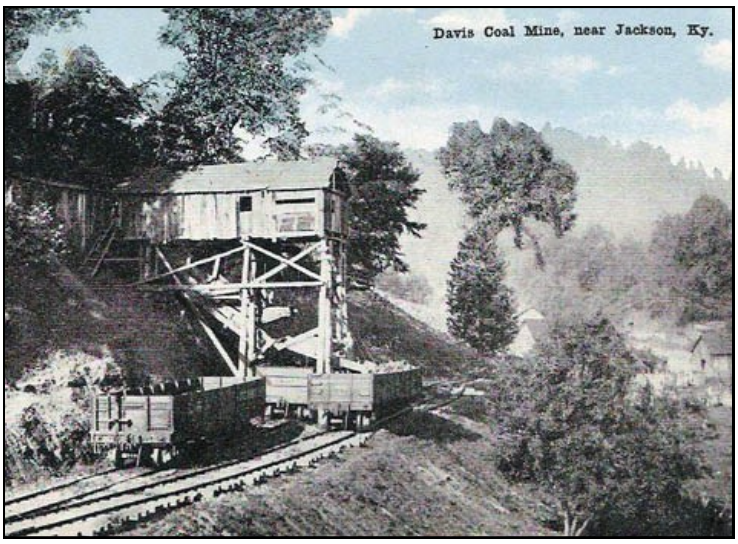
Boyd County Coal Market

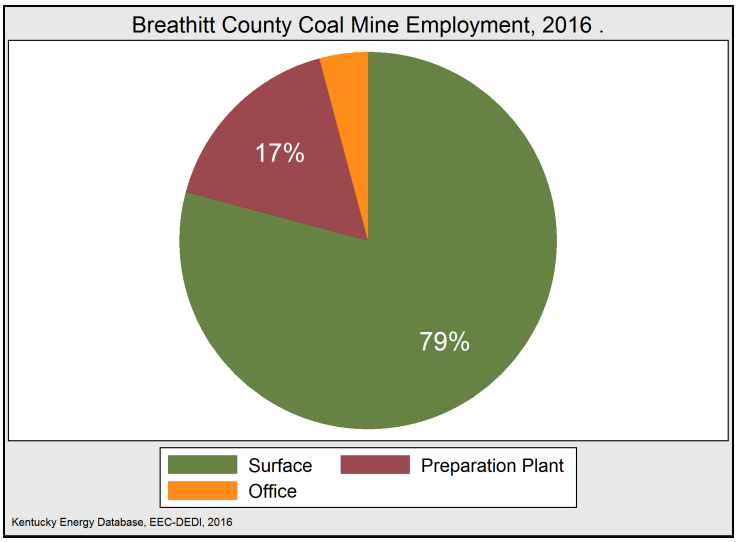
Though Boyd County no-longer mines coal, it did prepare and ship coal from surrounding counties to customers outside of Kentucky. Coal shipments from the county more than doubled since 2013 to 769 thousand tons in 2014. Deliveries have dropped to just over 100,00 tons in 2016. This growth in coal exports results from more coal being shipped on the Ohio River to Indiana, from no shipments in 2012. Of the coal shipped from Boyd County during 2016, 67 percent was delivered to Zimmer, Stuart and Killen stations in Ohio.

Chemical Composition and Cost

On average, coal exported from Boyd County had a median sulfur content of 0.92 percent, a median ash content of 11.4 percent, and a median heat content of 23.86 MMBtu per ton. The average delivered price per ton for Boyd County coal in 2016 was $48.15. The average price per MMBtu of Boyd County coal was $2.09 per MMBtu.

Breathitt County

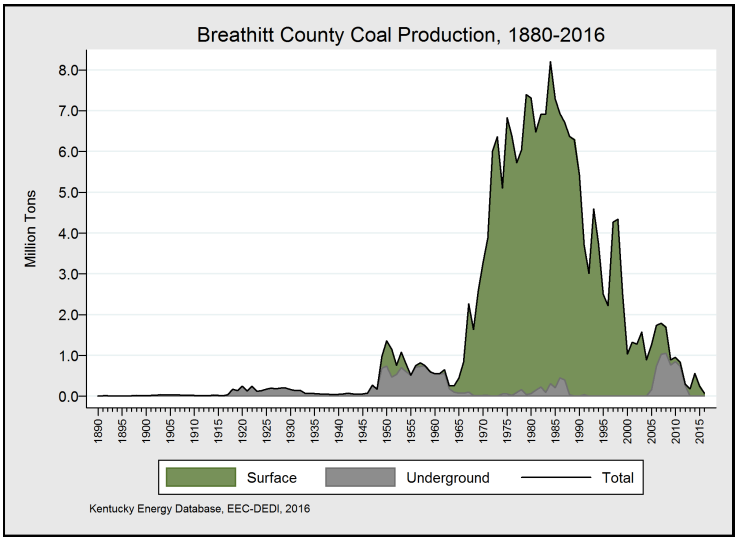


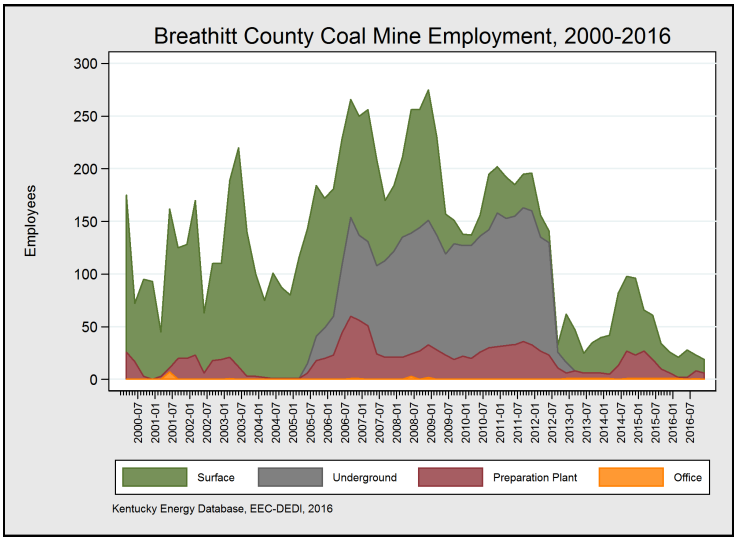


Production Method	Production	Annual Change
Total	79,315	-68.4%
Surface	79,315	-68.4%
Underground	0	—

On-Site Activity	Employment	Annual Change
Total	24	-51.0%
Surface	19	-39.6%
Preparation Plant	4	-73.8%
Office	1	+0.0%

Mines in Breathitt County produced 79,315 tons of coal in 2016 valued at $108 million. *Pictured above: Davis Coal Mine tipple near Jackson in Breathitt County.*

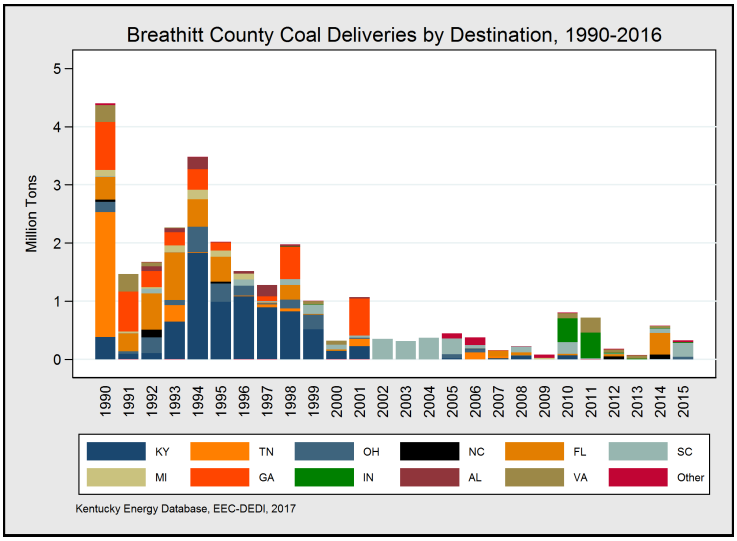


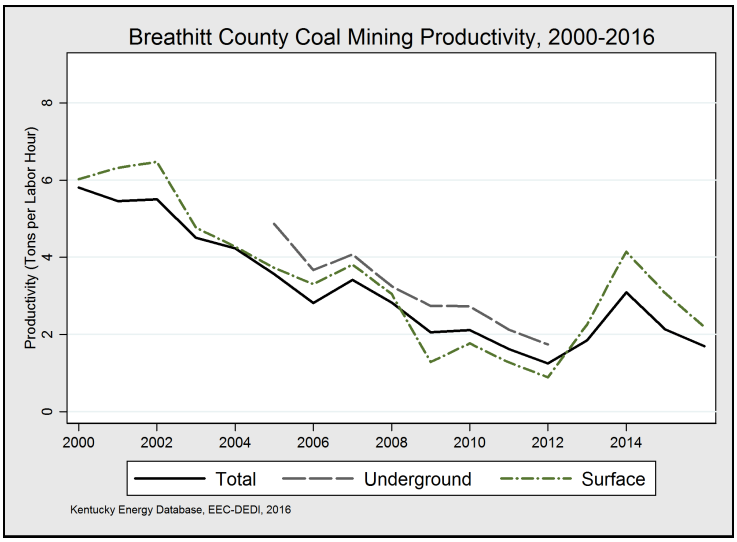


The first recorded coal production in Breathitt County was 200 tons in 1837. During 177 years of coal mining, more than 203 million tons of coal were extracted from the county. Surface operations excavated most of the coal from the county from 1964 to 2007. Coal production peaked at 8.2 million tons in 1984 and has declined by 93 percent thereafter.

Breathitt County coal mines and preparation plants employed an average of 24 on-site employees in 2016, a decrease of 51 percent from 2015. The majority of these jobs were held by 19 surface miners, followed by preparation plant operators and office staff. Underground mining in Breathitt County stopped in 2013. County level coal mine employment peaked at 1,163 in 1950 and has declined by 98 percent through 2016.

Breathitt County





Breathitt County Coal Market

In 2015, Breathitt County shipped 322 thousand tons of coal to ten power plants. The largest market for deliveries was South Carolina with 239 thousand tons of deliveries to the Winyah and Cross power plants. Breathitt County recorded no coal deliveries in 2016.

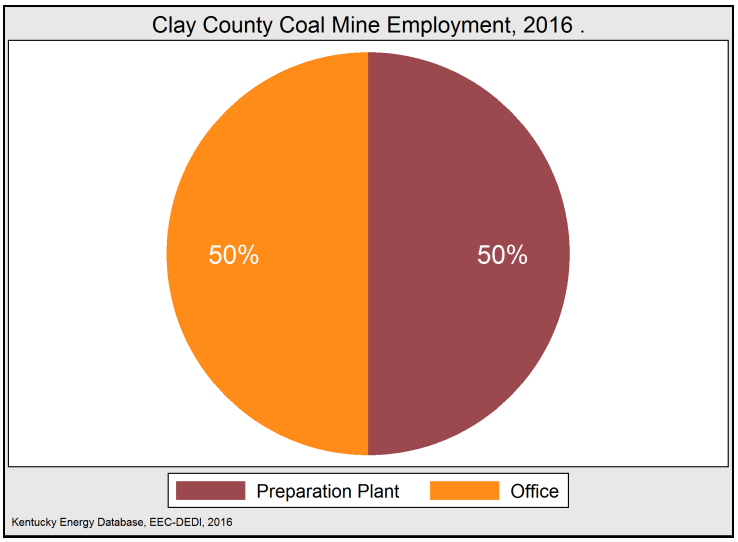
Breathitt County Coal Mining Productivity

Breathitt County's productivity in 2016, including labor hours at the county's four preparation plants, decreased to 1.69 tons per labor hour from 2.13 in 2015. County productivity has decreased by more than 70 percent from the year 2000.

Chemical Composition and Cost

Coal mined in Breathitt County had a median sulfur content of 1.01 percent, a median ash content of 10.3 percent, and a median heat content of 24.26 MMBtu per ton. These costs resulted in a median delivered price per ton of $75.12—ranging from $68.77 to $98.19 per ton. The price per MMBtu of Breathitt County coal had a median of $3.15 per MMBtu and ranged from $2.92 to $4.11 per MMBtu.

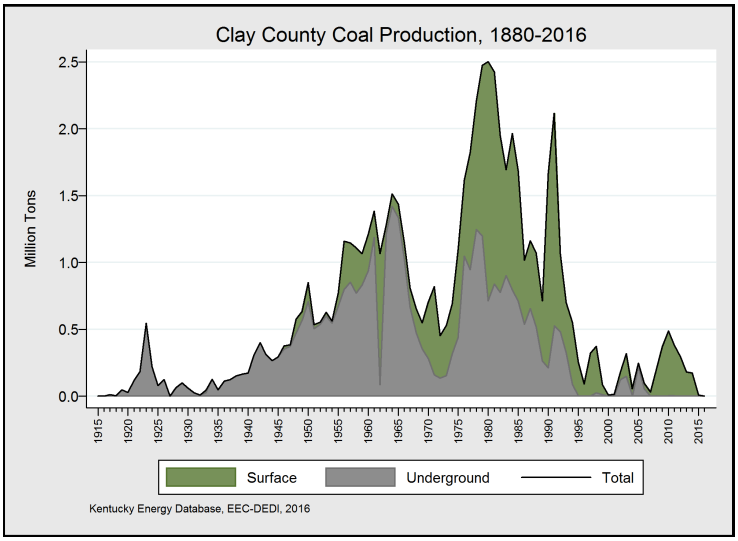
Clay County

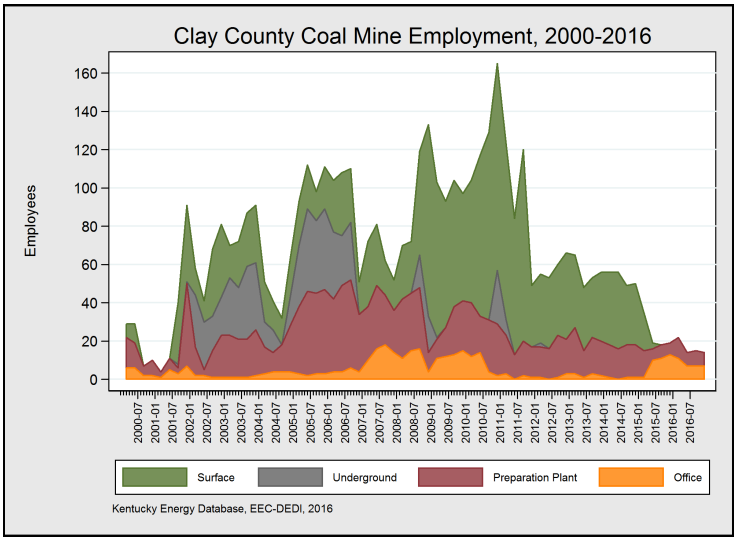


Production Method	Production	Annual Change
Total	0	-100%
Surface	0	-100%

On-Site Activity	Employment	Annual Change
Total	16	-29.8%
Surface	0	-100%
Preparation Plant	8	-2.1%
Office	8	-16.1%

Pictured above: a Clay County coal tipple and railroad in 1969, courtesy of the University of Kentucky Libraries.

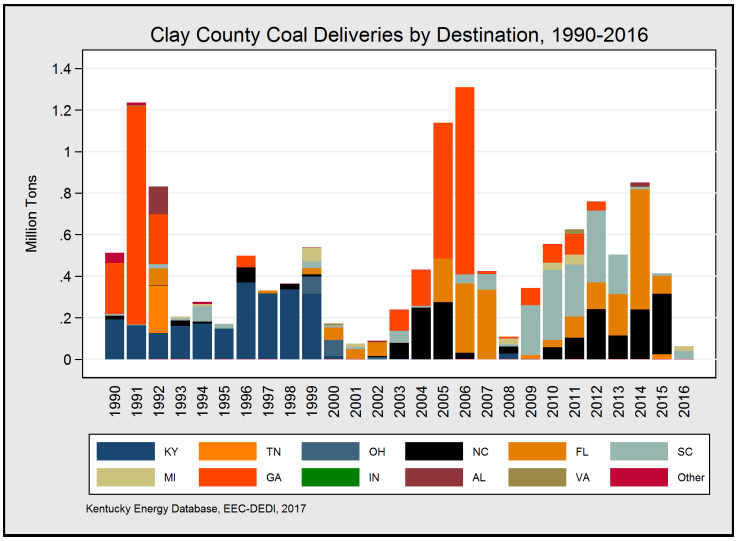


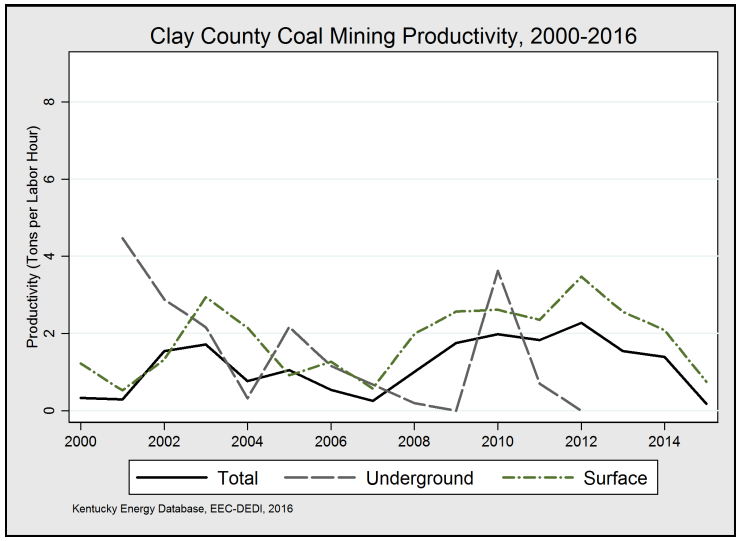


Coal mines in Clay County produced no coal in 2016. Clay County has mined coal since 1829, but production did not exceed 10,000 tons annually until 1917. Production peaked at 2.5 million tons in 1980. All of the coal mined in Clay County in recent years has come from surface mines.

Clay County coal mines employed an average of 16 on-site employees in 2016, which was a decrease of 29.8 percent from 2016. 8 employees worked full-time in coal preparation plants and 8 people worked in an on-site office. From 1950 to 1987, 1,200 coal miners were employed in Clay County, on average. Coal mining employment has decreased by 99 percent since peaking at 2,411 in 1984.

Clay County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**62,347**	**100%**
Michigan	**23,360**	**37.5%**
St. Clair	23,360	37.5%
South Carolina	**38,987**	**62.5%**
Cope	38,987	62.5%

Clay County Coal Market

Of the 62 thousand tons of steam coal exported from Clay County in 2016, more than 60 percent was delivered to the Cope plant in South Carolina.

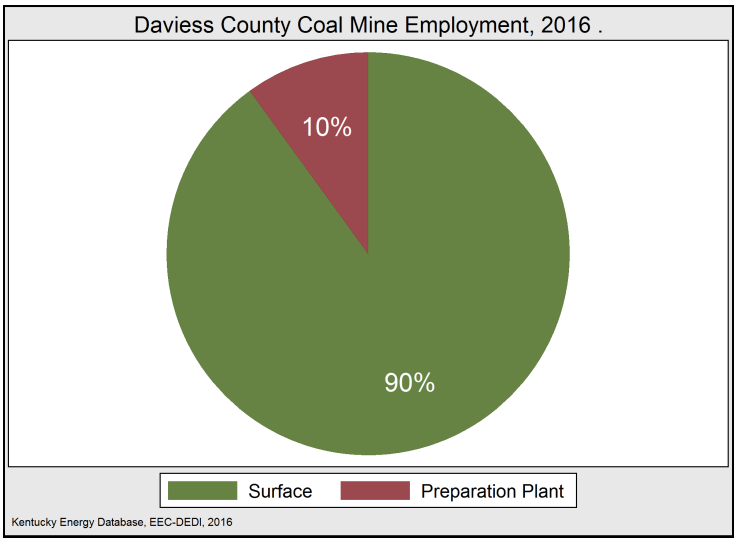
Clay County Coal Mining Productivity

Clay County's overall coal mining productivity in 2014 was 1.39 tons per labor hour, which is higher than the historical average of 1.23, a decrease of 9.73 percent from 2013. Clay County surface mines alone yielded 2.09 tons per labor hour, down from 2.56 tons per labor hour the year before.

Chemical Composition and Cost

On average, coal mined in Clay County had a median sulfur content of 1.14 percent, a median ash content of 10.6 percent, and a median heat content of 24.55 MMBtu per ton. The delivered price per MMBtu of coal from Clay County had a median of $2.86 per MMBtu.

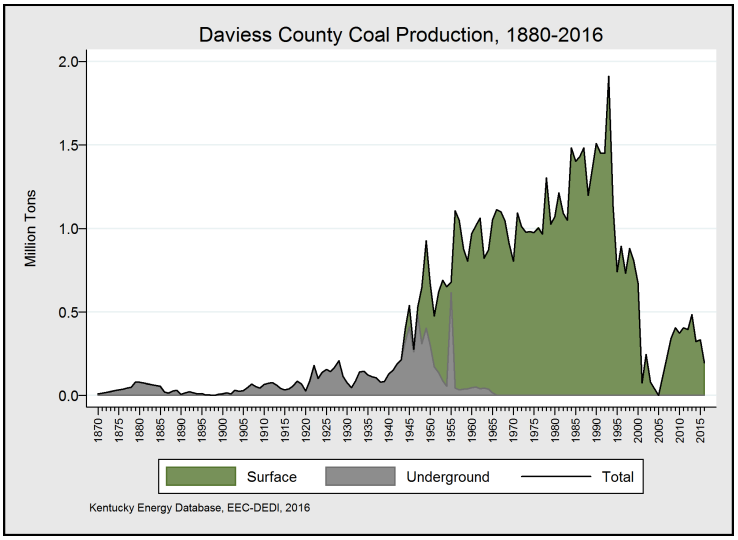
Daviess County

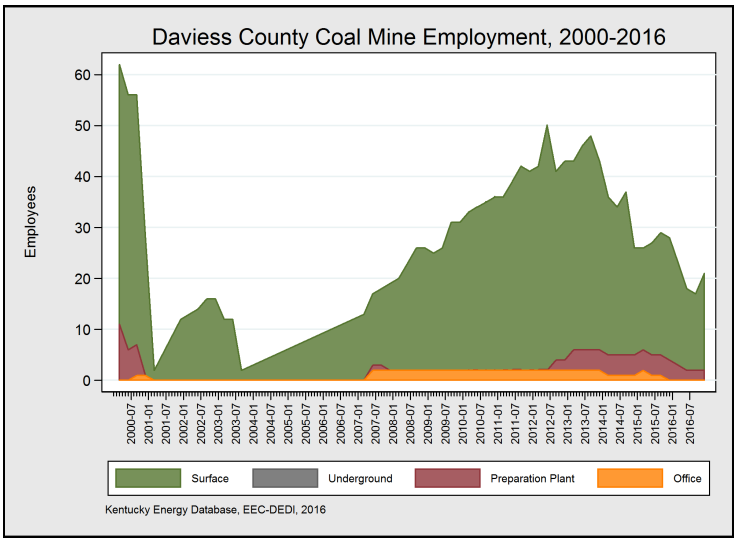


Production Method	Production	Annual Change
Total	194,922	-41.8%
Surface	194,922	-41.8%

On-Site Activity	Employment	Annual Change
Total	20	-39.5%
Surface	18	-43.2%
Preparation Plant	2	+0.0%
Office	0	-50.0%

Daviess County mined 194,922 tons of coal in 2016, a 41.8 decrease from 2015. *Pictured above: Owensboro coal dock circa 1985 from the Kentucky Energy and Environment Cabinet archives.*

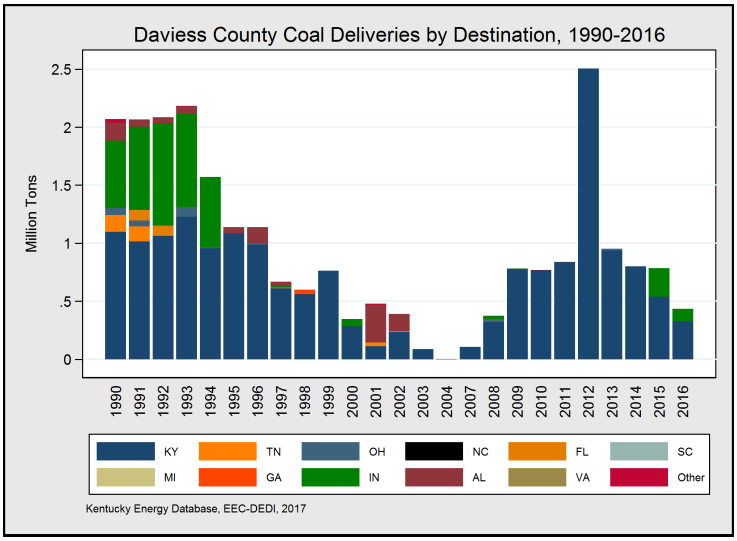


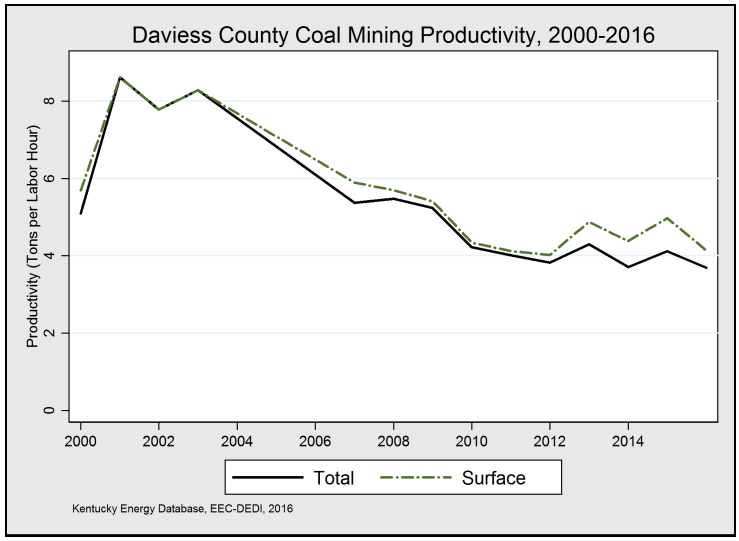


Underground coal mining began in Daviess County in 1825 at 3,000 tons and peaked in 1955 at 615,873 tons. Since 1966, all of the coal mined in Daviess County has come from surface mines. Coal production in Daviess County peaked at 1.9 million tons, from surface mines, in 1993 and declined by 89 percent through 2016. Coal production stopped in 2004 but resumed in 2007.

At the end of 2016, there were 20 persons employed in coal production in Daviess County, 18 miners, 2 preparation plant operators, and 0 in an on-site office. During peak production in 1991-1992, there were up to 342 persons employed at coal mines in Daviess County.

Daviess County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**433,574**	**100%**
Kentucky	**327,519**	**75.5%**
Elmer Smith	327,519	75.5%
Indiana	**106,055**	**24.5%**
Clifty Creek	106,055	24.5%

Daviess County Coal Market

Since 2002, the vast majority of coal mined in Daviess County has been used in Kentucky to generate electricity. Elmer Smith, operated by Owensboro Municipal Utilities and within Daviess County, received 75 percent of known coal shipments from the county in 2016. Ghent, R.D. Green and D.B. Wilson all ceased coal consumption from Daviess County in 2015, leading to a decrease of coal deliveries for the county.

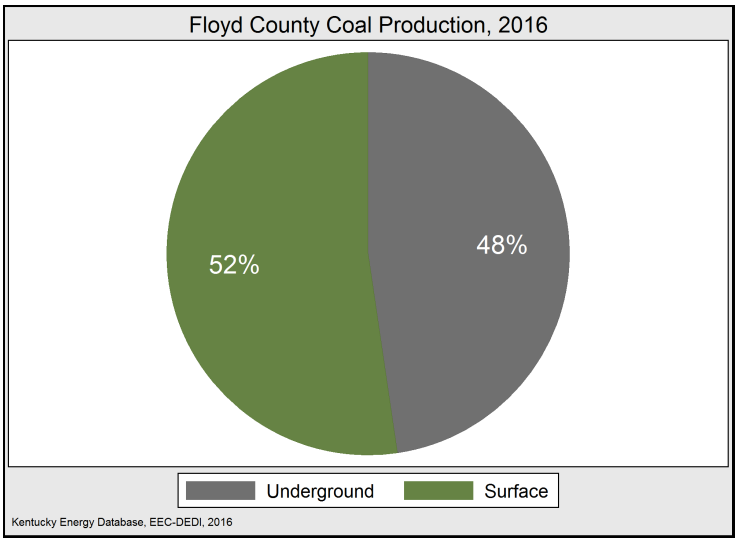
Chemical Composition and Cost

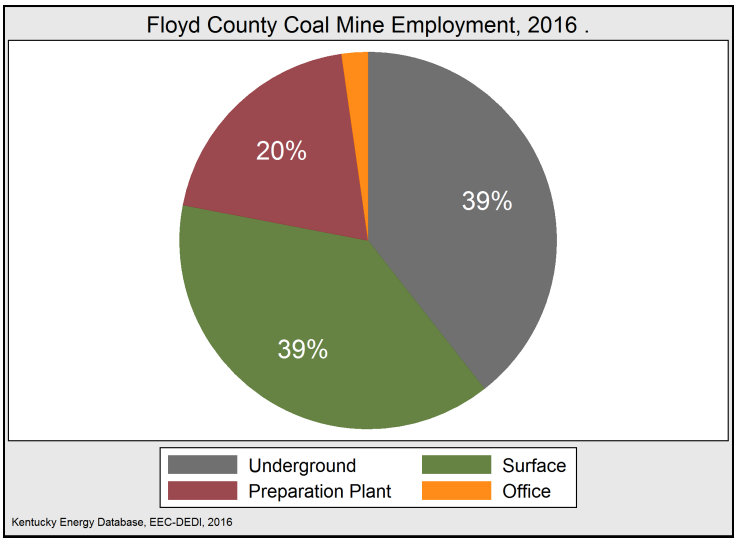
Coal mined in Daviess County had a median sulfur content of 2.87 percent, a median ash content of 9.7 percent, and a median heat content of 22.23 MMBtu per ton. The median delivered price per ton for Daviess County coal in 2016 was $43.32. The delivered price per MMBtu of coal from Daviess County had a median of $1.96 per MMBtu.

Daviess County Coal Mining Productivity

Although Daviess County in Western Kentucky had the sixth-highest mine productivity in the Commonwealth in 2016, productivity is less than half of its recent peak in 2001. Overall productivity was 3.69 tons per labor hour, while surface productivity averaged 4.84 tons per labor hour. In 2016, total productivity was 3.69 tons per labor hour, while surface productivity averaged 4.84 tons per labor hour.

Floyd County

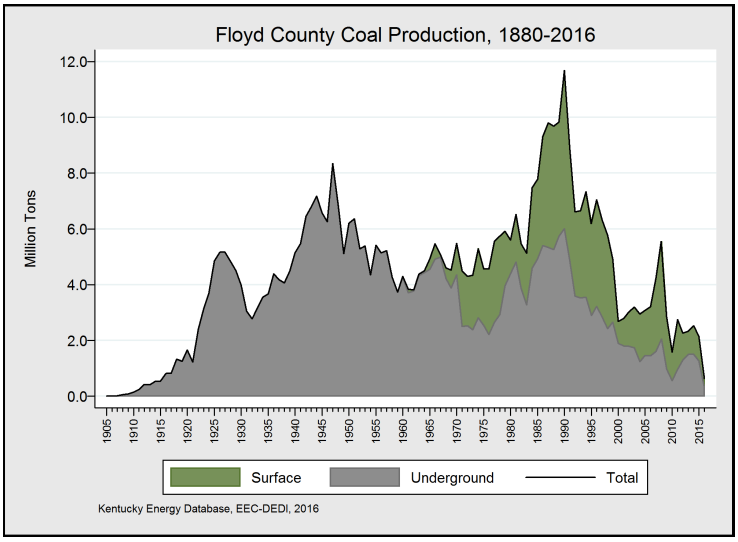


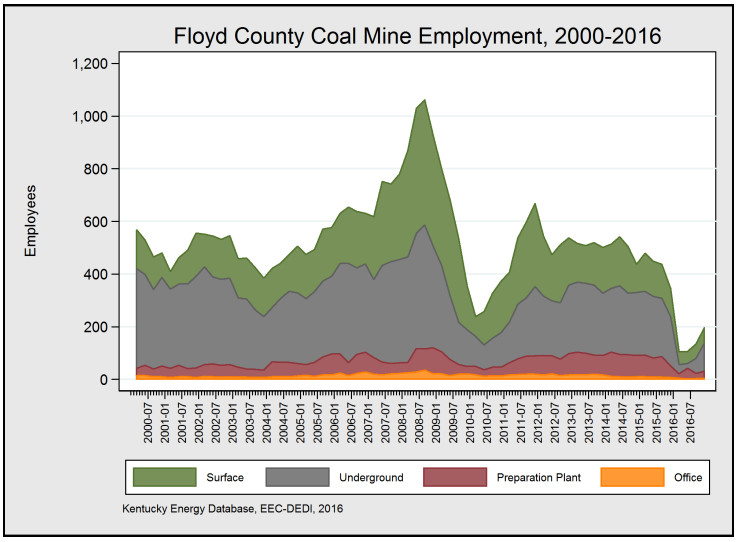


Production Method	Production	Annual Change
Total	640,971	-70.2%
Underground	305,509	-75.8%
Surface	335,462	-62.1%

On-Site Activity	Employment	Annual Change
Total	132	-69.5%
Underground	52	-77.3%
Surface	51	-60.1%
Preparation Plant	26	-62.5%
Office	3	-60.5%

The 23 active coal mines in Floyd County in 2016 produced 640 thousand tons of coal. Underground mines produced 48 percent of county production that year.

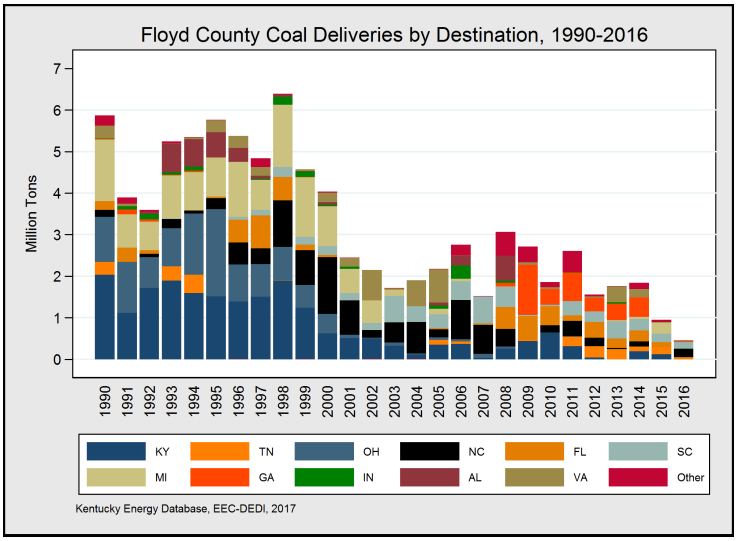


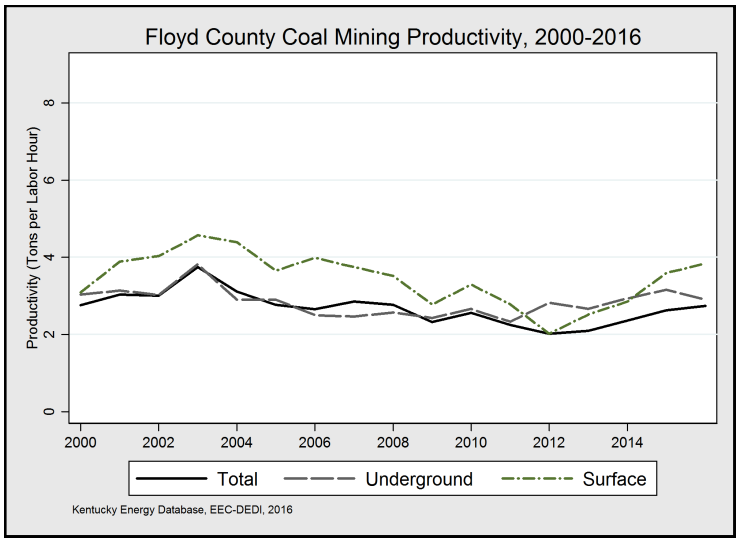


Coal production in Floyd County began in 1889 with 2,236 tons. Between 1889 and 2016, 640 thousand tons of coal have been extracted in Floyd County. The production time series above shows that Floyd County responded to calls for increased coal production during the first and second world wars. Production peaked at 11.7 million tons in 1990 and has declined by 95 percent thereafter.

Coal mines and preparation plants in Floyd County employed 132 persons on-site in 2016, which was a decrease of 69.5 percent from 2015. Underground mines were the largest source of direct coal mine employment in 2016 with 52 jobs, followed by surface mines at 51 jobs, and coal preparation plants at 26 jobs.

Floyd County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**441,745**	**100%**
North Carolina	**205,773**	**46.6%**
Roxboro	205,773	46.6%
South Carolina	**158,521**	**35.9%**
Kapstone	158,521	35.9%
Tennessee	**48,286**	**10.9%**
Tennessee Eastman	48,286	10.9%
Georgia	**15,834**	**3.6%**
Bowen	12,800	2.9%
International Paper Augusta Mill	3,034	0.7%
Virginia	**11,789**	**2.7%**
Chesterfield	11,789	2.7%
Michigan	**1,542**	**0.3%**
Dan E Karn	387	0.1%
J C Weadock	1,155	0.3%

Floyd County Coal Market

Floyd County shipped coal to 6 states in total during 2016. Of the 441 thousand tons of steam coal exports tracked from Floyd County in 2016, Kapstone plant in South Carolina and Roxboro plant in North Carolina consumed 82 percent of shipments.

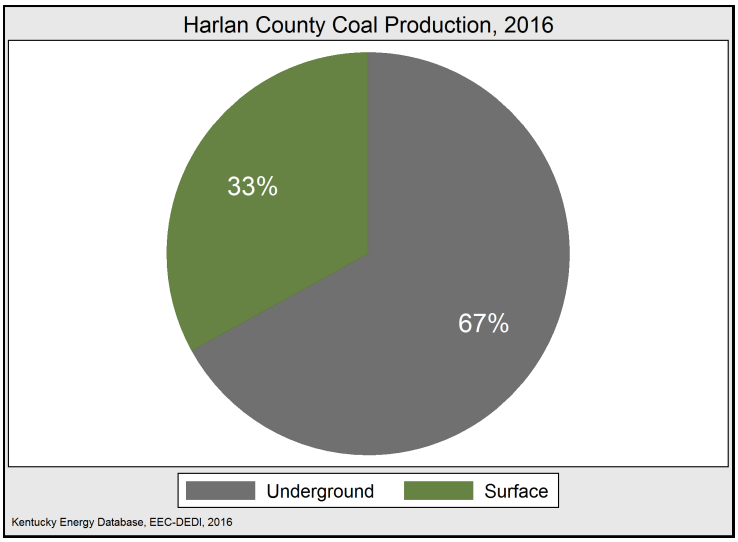
Floyd County Coal Mining Productivity

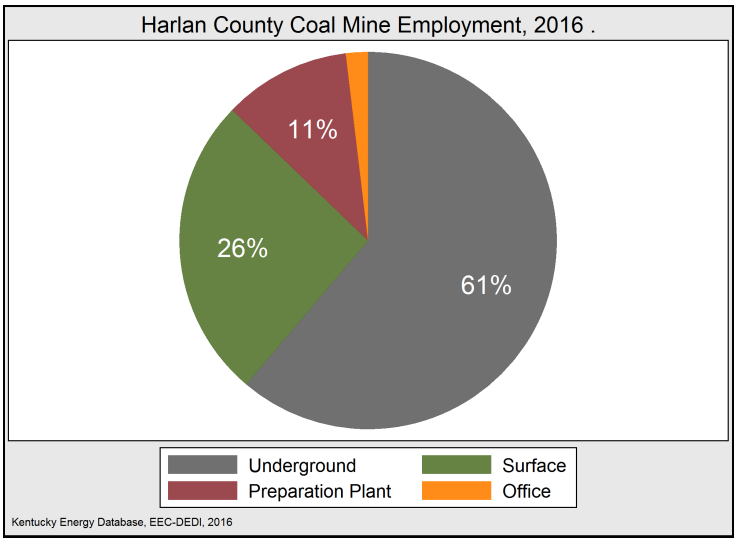
Floyd County mining productivity increased to 2.76 tons per labor hour in 2016. Underground operations averaged 2.91 tons per labor hour, while surface operations produced at a rate of 3.83 tons per labor hour.

Chemical Composition and Cost

Coal mined in Floyd County had a median sulfur content of 0.92 percent, a median ash content of 10.5 percent, and a median heat content of 24.51 MMBtu per ton. These costs resulted in a median delivered price per ton of $87.90. The delivered price per MMBtu of coal from Floyd County had a median of $3.37 per MMBtu.

Harlan County

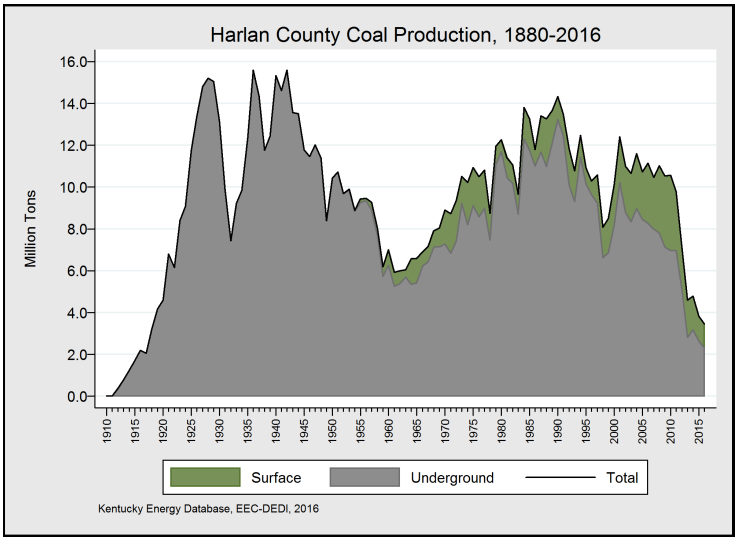


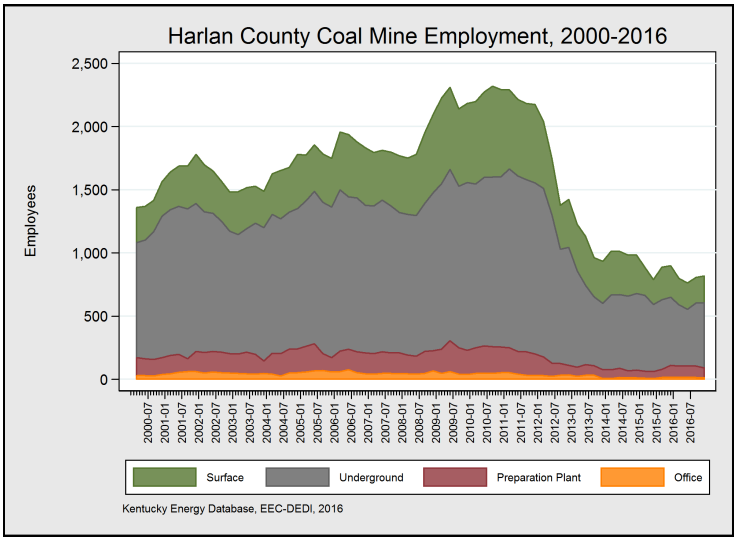


Production Method	Production	Annual Change
Total	3,457,164	-9.8%
Underground	2,316,724	-12.1%
Surface	1,140,440	-4.5%

On-Site Activity	Employment	Annual Change
Total	796	-8.0%
Underground	487	-13.1%
Surface	207	-9.7%
Preparation Plant	87	+30.0%
Office	15	+23.0%

In 2016, Harlan County mined 3.4 million tons of coal. Historically, Harlan County has produced a billion tons of coal, the second-most of any Kentucky county.

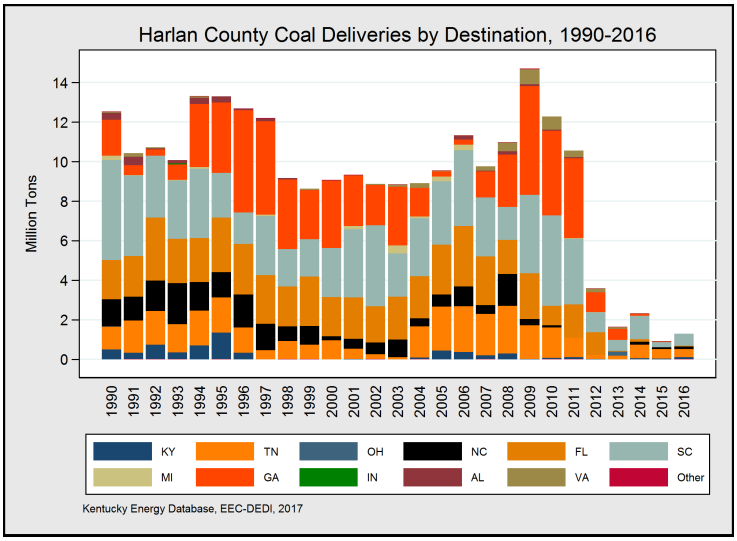


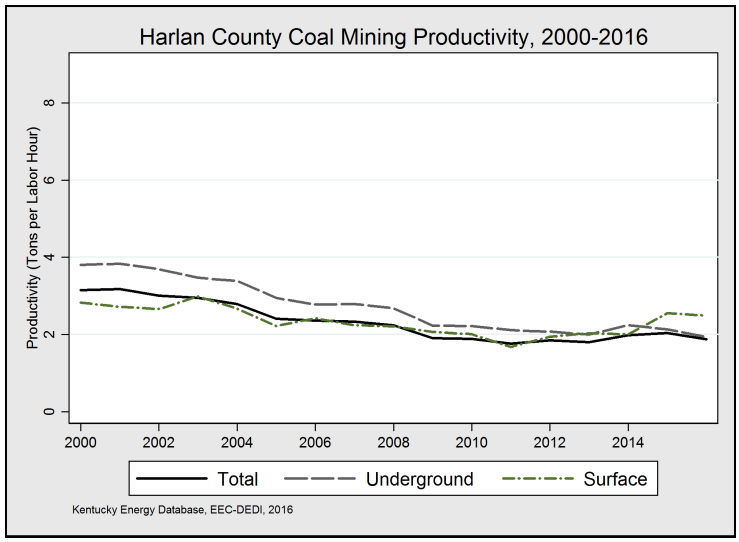


The earliest known commercial coal production in Harlan County was 4,100 tons in 1833. Coal production rose from 25,814 tons in 1910 to 15.2 million in 1929, which was 25 percent of total production in Kentucky that year. Coal production peaked at 15.6 million tons in 1942 during World War II. Mining in the county has been predominantly underground. Harlan County has extracted over one billion tons of coal, or 10.4 percent of all coal ever mined in Kentucky, and was the highest-producing county from 1923 to 1946, even during the miner strikes of 1930's.

On site employment in Harlan County increased by five percent in 2016 to 796 employed. Underground mines were the largest source of mining employment at 487 miners, followed by surface operations at 207 miners. Coal mine employment in Harlan County peaked at 16,795 in 1941, when 28 percent of all Kentucky coal miners worked in Harlan County, and has declined by 95 percent through 2016.

Harlan County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**1,288,244**	**100%**
South Carolina	**616,132**	**47.8%**
Wateree	153,333	11.9%
Cope	206,719	16.0%
Williams	216,810	16.8%
International Paper Eastover Facility	39,270	3.0%
Tennessee	**406,793**	**31.6%**
Tennessee Eastman	280,821	21.8%
Bull Run	125,972	9.8%
North Carolina	**141,911**	**11.0%**
James E. Rogers Energy Complex	141,911	11.0%
Kentucky	**97,825**	**7.6%**
H L Spurlock	31,613	2.5%
E W Brown	22,726	1.8%
Cooper	43,486	3.4%
Florida	**25,583**	**2.0%**
Indiantown Cogeneration	25,583	2.0%

Harlan County Coal Market

The states of South Carolina and Tennessee consumed nearly 79 percent of the steam coal shipped from Harlan County in 2016. Four plants, Wateree, Williams, Cope, and Cross purchased 47 percent of Harlan County coal in 2016. The largest consumer state was South Carolina, receiving 60 percent of Harlan County coal shipments. Coal shipments have increased by 25 percent from the county in 2016 compared to 2015.

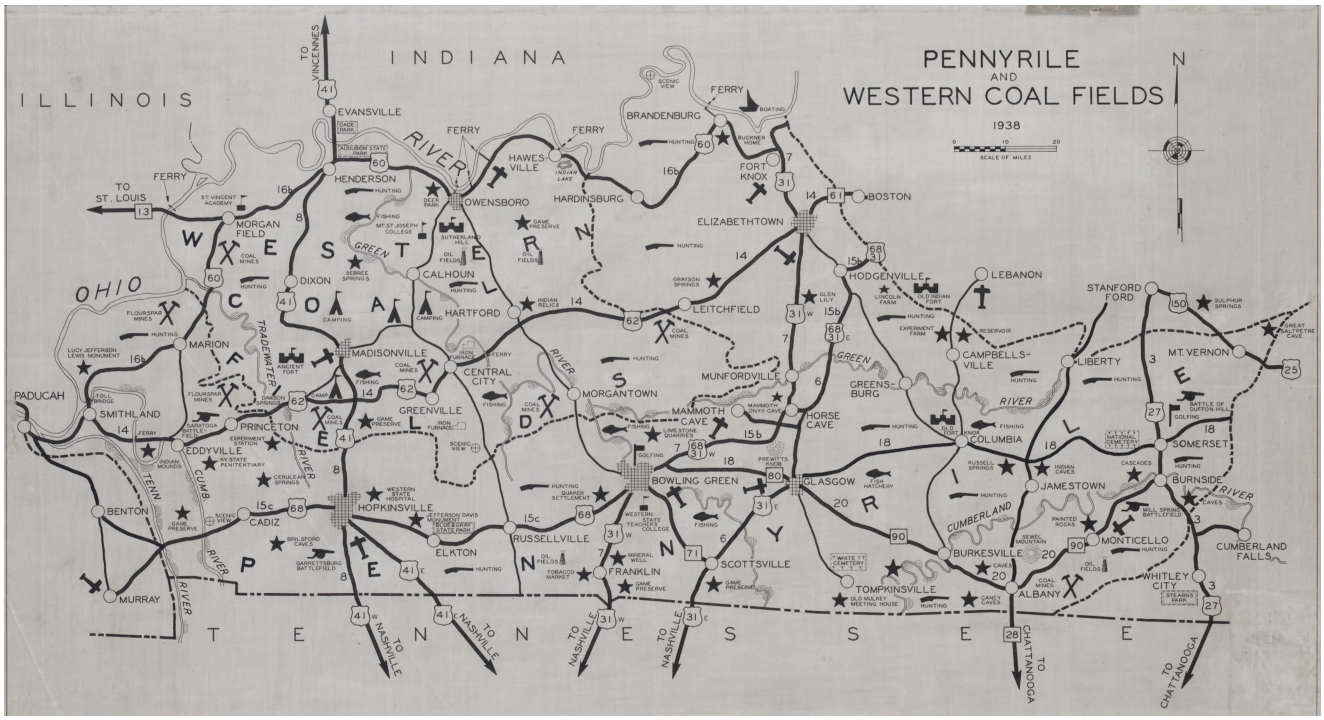
Harlan County Coal Mining Productivity

Harlan County's productivity in 2016 was 1.87 tons per labor hour, a decrease of 8.3 percent from 2015, but a decrease of 40 percent since the year 2000. Surface mines in Harlan County historically have not been as productive as the county's underground mines. In 2016, underground mines on average yielded 1.94 tons per labor hour while surface mines yielded 2.49 tons per labor hour.

Chemical Composition and Cost

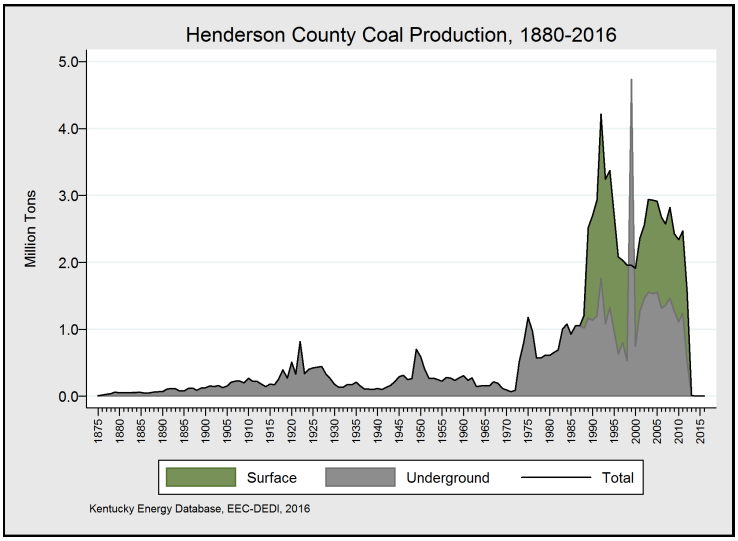
Coal mined in Harlan County had a median sulfur content of 1.03 percent, a median ash content of 9.2 percent, and a median heat content of 25.33 MMBtu per ton. These costs resulted in a median delivered price per ton of $77.38. The delivered price per MMBtu of coal from Harlan County had a median of $3.09 per MMBtu.

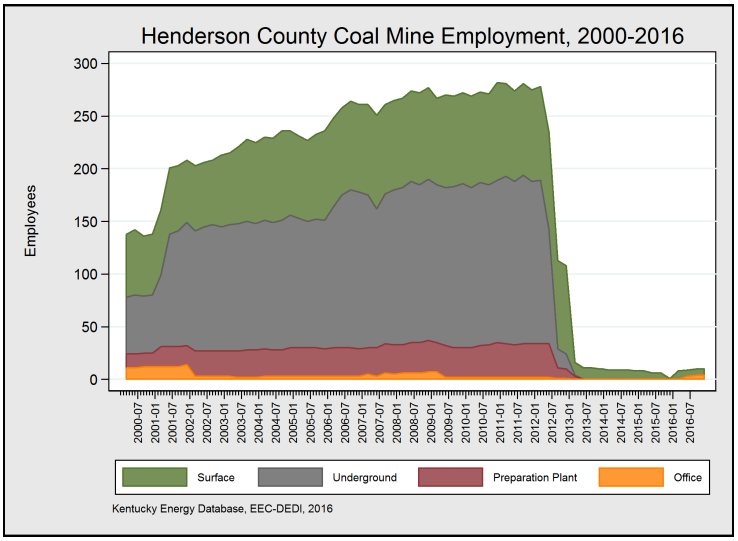
Henderson County



Pictured above: a map of the Western Kentucky coal field by the Work Projects Administration for the State of Kentucky, 1939.

On-Site Activity	Employment	Annual Change
Total	10	+61.0%
Surface	6	+23.8%
Office	4	+100%

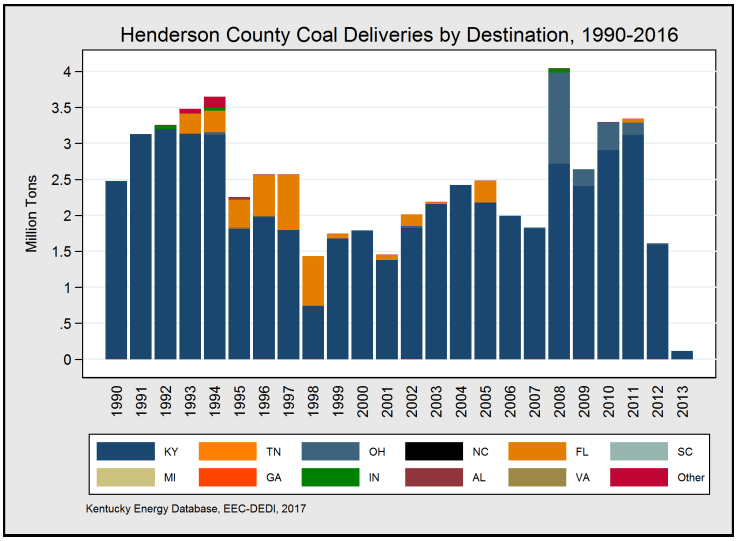


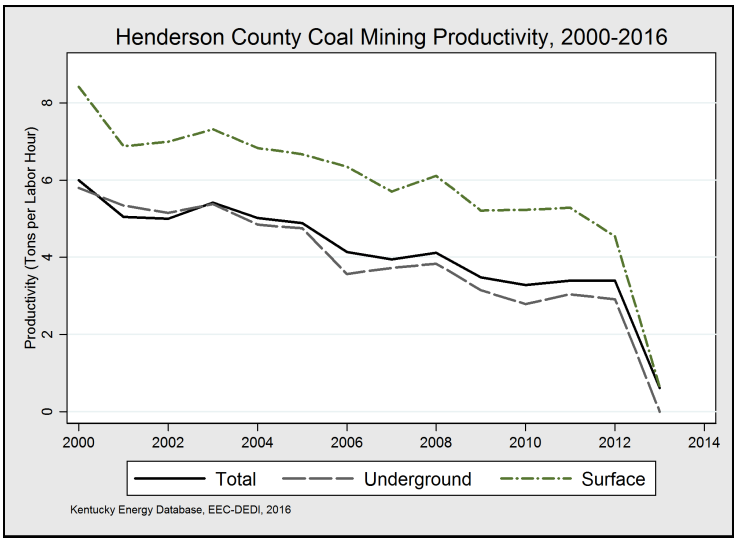


Henderson County produced 14 thousand tons of coal in 2013, which was less than one percent of total production across the Commonwealth and a decrease of over 99 percent from 2012. Most of Henderson County coal production had been from underground mines until 1988, when both types of mining were used.

Coal mines in Henderson County employed an average of 6 persons full-time in 2016. Total mining employment in the county decreased by 100 jobs, or by 93 percent compared with 2012. From 2001 to 2012, underground mines were the largest source of coal mine employment in Henderson County. However, from 2012 through 2013, direct employment at underground mines, then surface mines, decreased drastically.

Henderson County



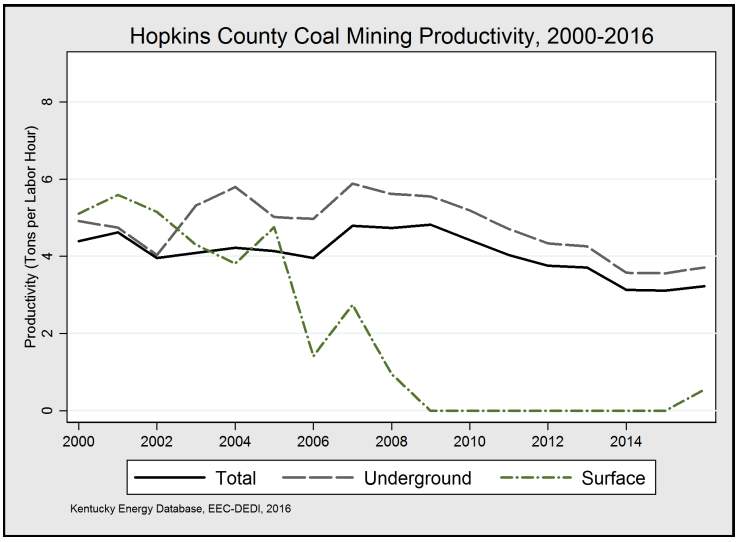


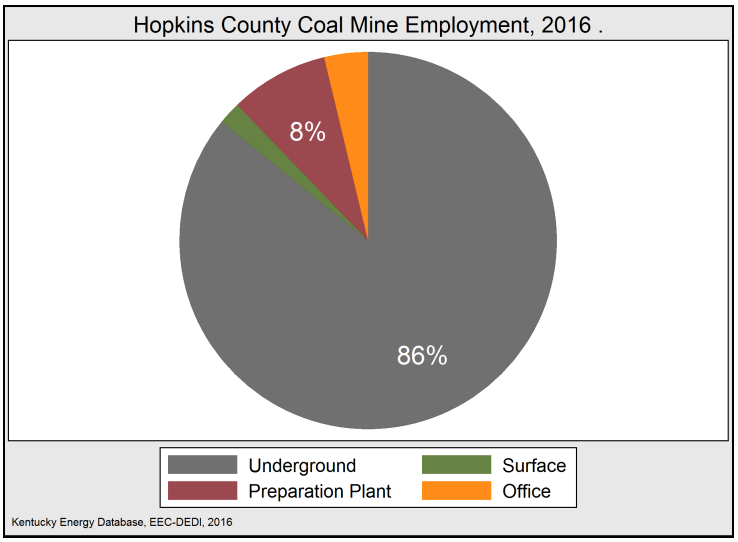
Total	**639,037**	**100%**
Kentucky	639,037	100%
Mill Creek	49,985	7.8%
Trimble County	9,720	1.5%
D.B. Wilson	21,812	3.4%
Ghent	557,520	87.2%

Henderson County Coal Mining Productivity

Mining productivity in Henderson County averaged 0.62 tons per labor hour in 2013, a decrease of almost 82 percent from the year prior. The rapid drop of productivity in Henderson County is largely a result of the near complete stoppage of coal production in the county. From 2000 to 2013, Henderson County was typically among the top five most productive coal mining counties and was fifth-most productive in 2012 with 3.39 tons of coal mined per labor hour.

Hopkins County

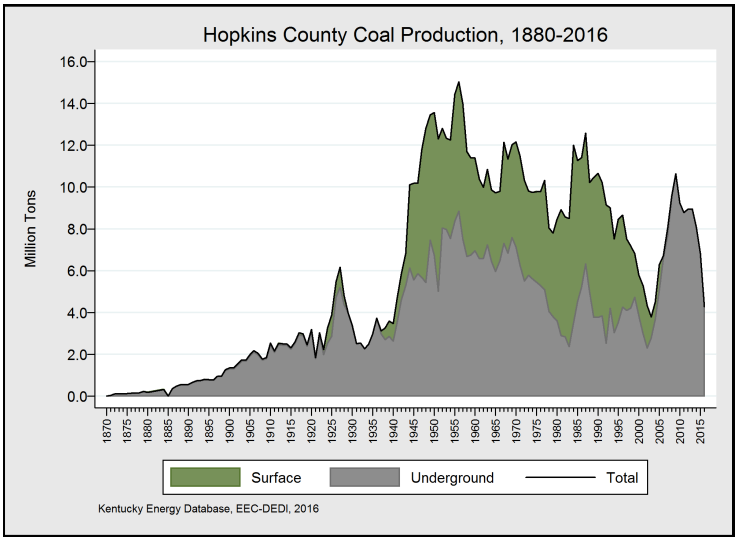


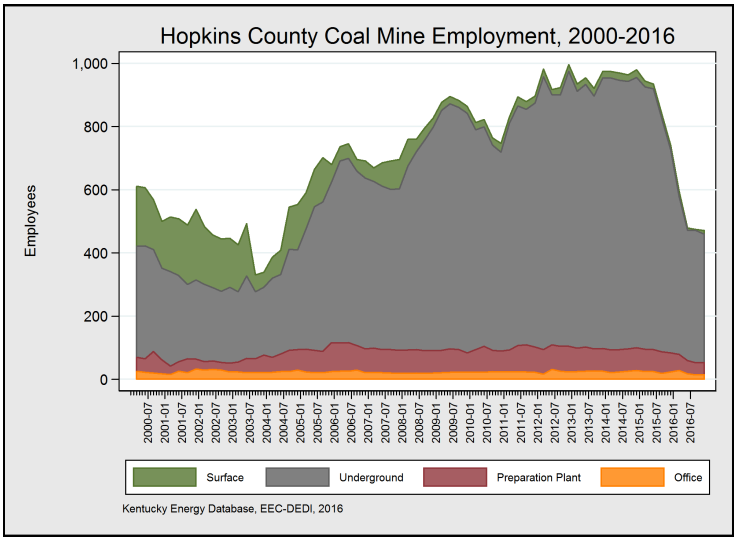


Production Method	Production	Annual Change
Total	4,281,379	-37.4%
Underground	4,268,336	-37.6%
Surface	13,043	-

Coal mines in Hopkins County produced 4.2 million tons of coal in 2016.

On-Site Activity	Employment	Annual Change
Total	509	-41.3%
Underground	437	-43.4%
Preparation Plant	43	-36.0%
Office	19	-15.1%
Surface	10	-38.5%

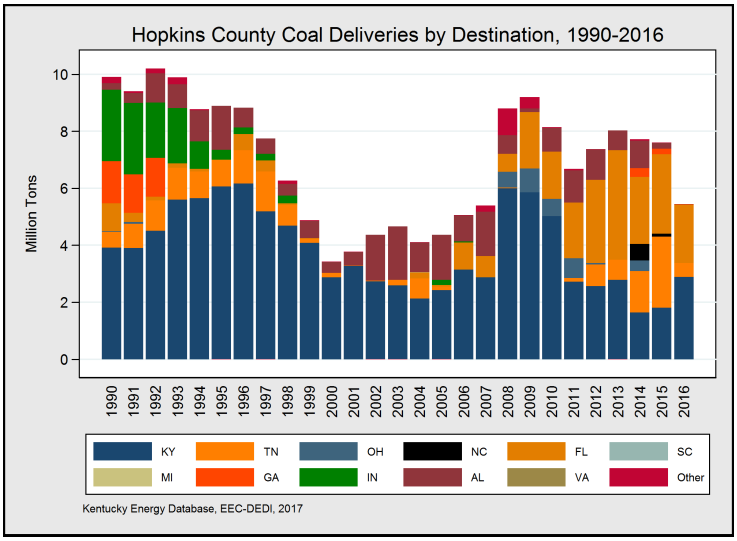




Historically, Hopkins County is the third largest coal-producing county in Kentucky, producing 846 million tons to date, or 8.8 percent of all coal produced in Kentucky. The earliest known coal production in Hopkins County was in 1866 with 500 tons. Coal production quickly increased to 100,000 tons in 1872, and one million tons by 1899. Production increased during both world wars. Since 1899, Hopkins County has averaged 7.2 million tons annually, peaking at 15 million in 1956.

509 people were employed full-time in Hopkins County in of 2016. Coal mine employment peaked in Hopkins County at over 4,236 miners in 1947 and has declined by 88 percent through 2016. Employment has been strong in Hopkins County since reaching its lowest point of 339 miners in 2003.

Hopkins County



State and Power Plant	Deliveries (Tons)	Percentage
Total	**5,443,643**	**100%**
Kentucky	**2,884,453**	**53.0%**
H L Spurlock	34,907	0.6%
Paradise	267,883	4.9%
R D Green	136,119	2.5%
HMP&L Station Two Henderson	475,672	8.7%
Calvert City	1,917,882	35.2%
GRT Terminal	29,093	0.5%
Mill Creek	22,897	0.4%
Florida	**2,047,950**	**37.6%**
Davant Transfer	33,484	0.6%
Crystal River	11,822	0.2%
Seminole	1,752,657	32.2%
Big Bend	249,987	4.6%
Tennessee	**496,852**	**9.1%**
Kingston	496,852	9.1%
Illinois	**14,388**	**0.3%**
Marion	14,388	0.3%

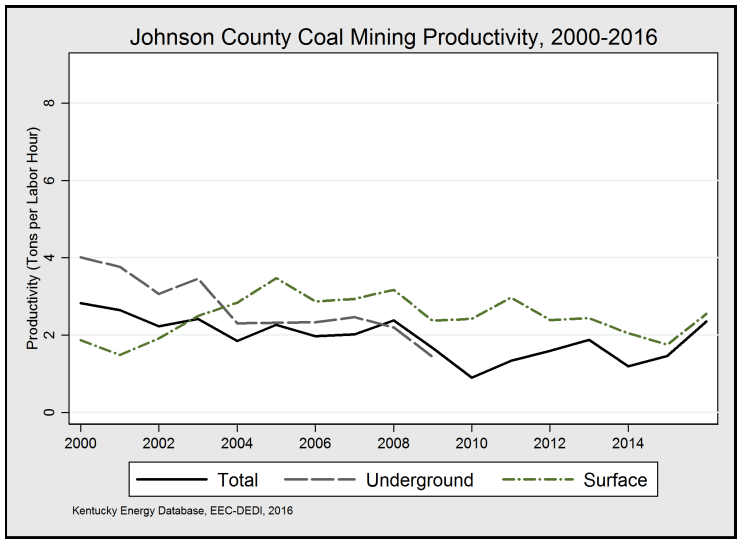
Hopkins County Coal Market

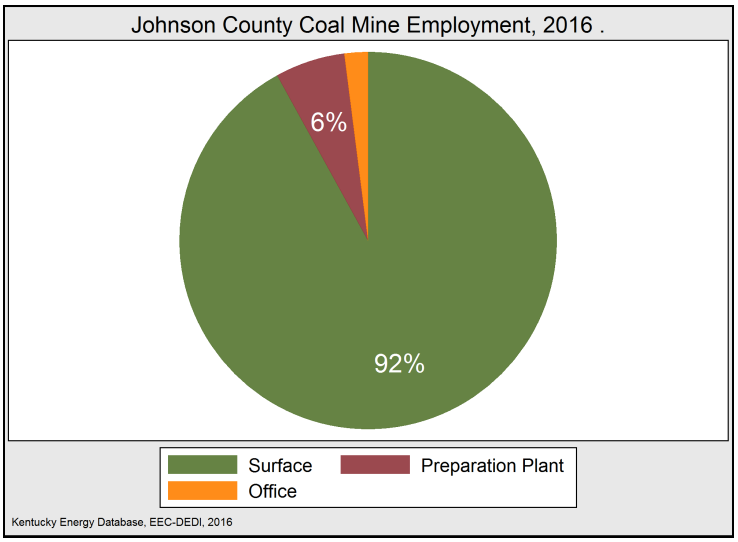
Coal shipments from Hopkins County decreased by 26 percent from 2015 to 5.4 million tons. Kentucky became the single-largest market for Hopkins County steam coal in 2016, followed by Florida. The Seminole Generating Station itself received approximately 32 percent of coal shipped from Hopkins County during 2016. The Calvert City Power Station, in Kentucky, purchased 35 percent of its coal in 2016 from Hopkins County.

Chemical Composition and Cost

On average, coal mined in Hopkins County had a median sulfur content of 3.12 percent, a median ash content of 10.2 percent, and a median heat content of 23.38 MMBtu per ton. The median delivered price per ton for Hopkins County coal in 2016 was $63.11. The delivered price per MMBtu of coal from Hopkins County had a median of $2.45 per MMBtu.

Johnson County

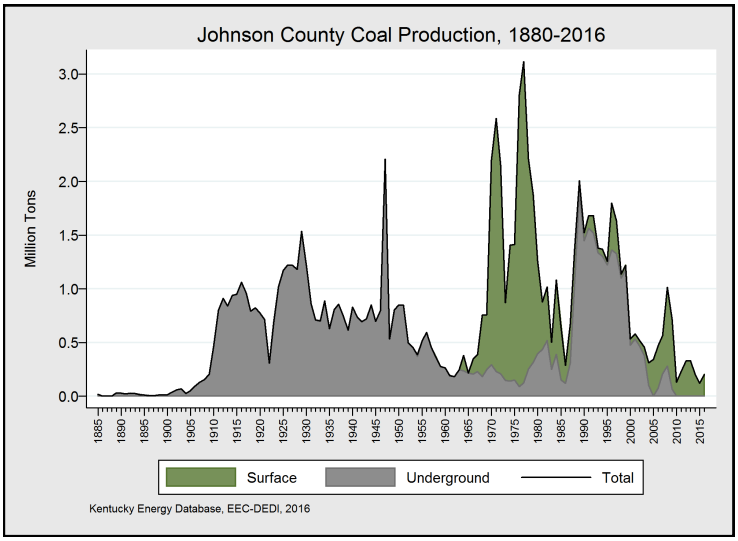


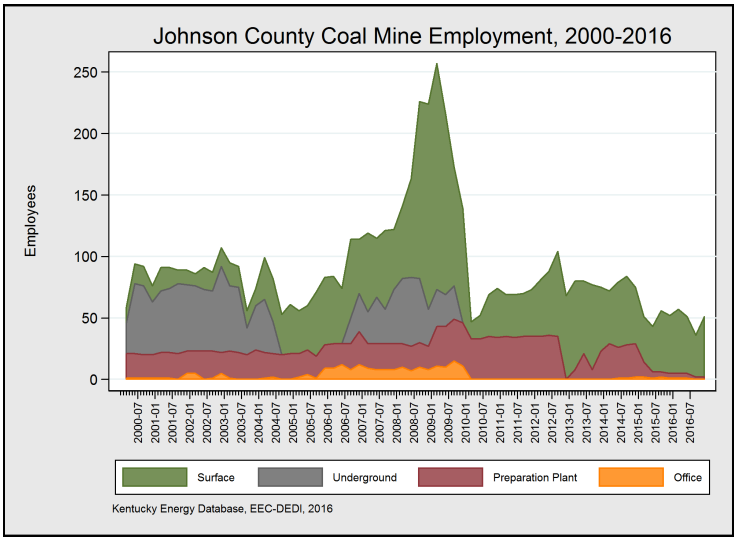


Production Method	Production	Annual Change
Total	204,438	+67.4%
Surface	204,438	+67.4%

On-Site Activity	Employment	Annual Change
Total	50	-2.4%
Surface	46	+7.3%
Preparation Plant	3	-52.0%
Office	1	-100%

Johnson County mined 204 thousand tons of coal in 2016, all of which came from surface mines.

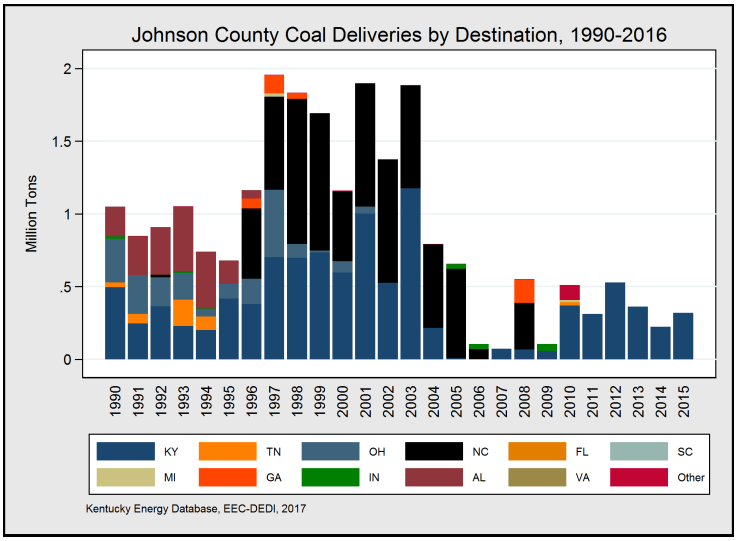




The earliest known commercial coal production in Johnson County was 169 tons in 1869. Underground coal production increased to one million tons by 1916 and peaked at 2.2 million tons in 1947. Total coal production peaked in 1977 at 3.1 million tons due largely to surface production. In all, Johnson County has produced 97 million tons of coal since 1869.

In 1950, there were 2,465 people employed at coal mines in Johnson County. At the end of 2016, there were only 50 people employed in coal production in Johnson County, a decrease of 98 percent since 1950.

Johnson County



Johnson County Coal Market

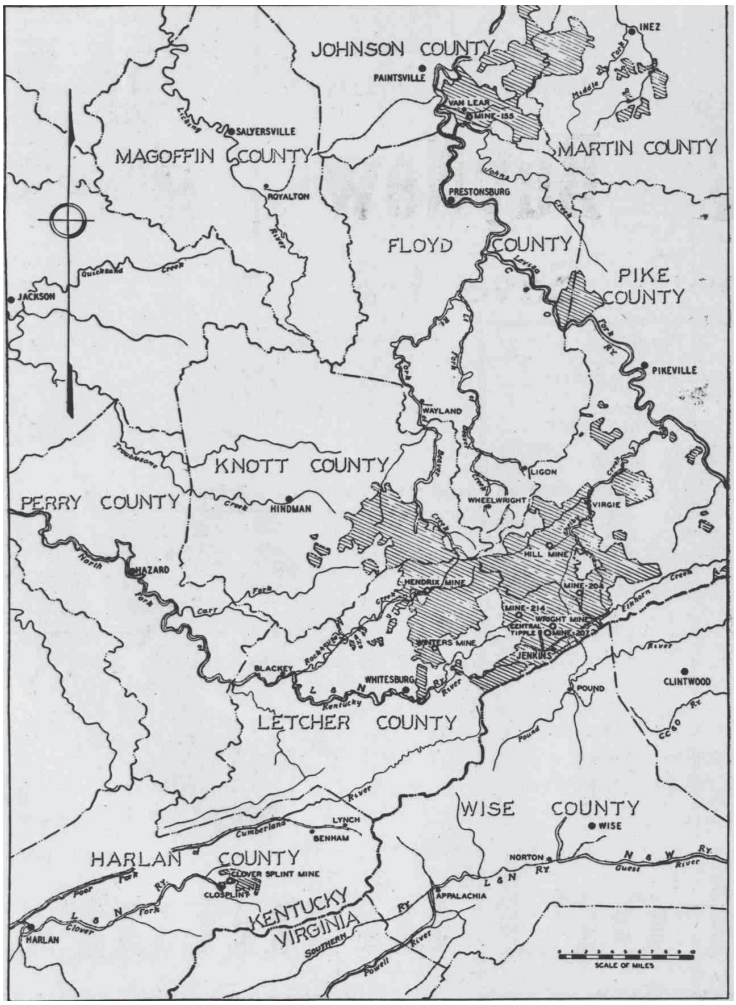
The Big Sandy Power Plant in Louisa, Kentucky, whose coal units are closing or converting to run on natural gas, has been the sole purchaser of Johnson County coal since 2011. In 2010, coal from the county was shipped to plants in West Virginia, Tennessee, and Michigan. Johnson County registered production, but did not register deliveries in 2016.

Johnson County Coal Mining Productivity

Johnson County's overall coal mining productivity in 2016 was 2.35 tons per labor hour, which is an increase of 62 percent from 2015. Johnson County surface mines alone yielded 2.54 tons per labor hour, up from 1.75 tons per labor hour the year before.

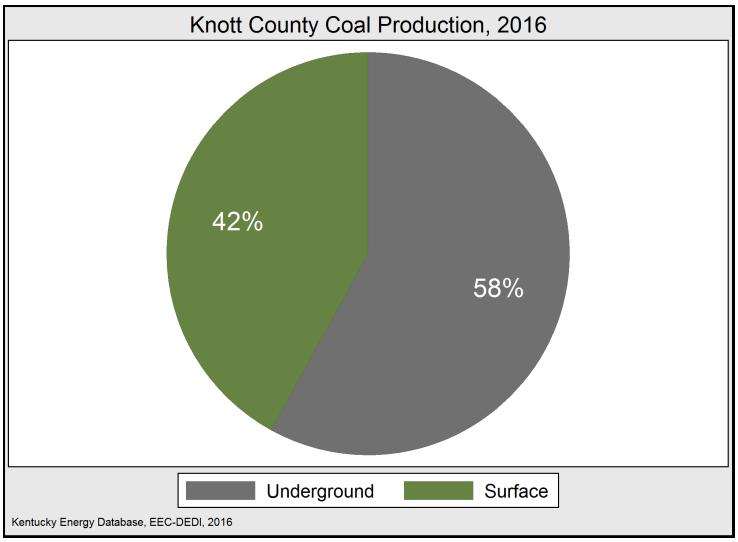
Chemical Composition and Cost

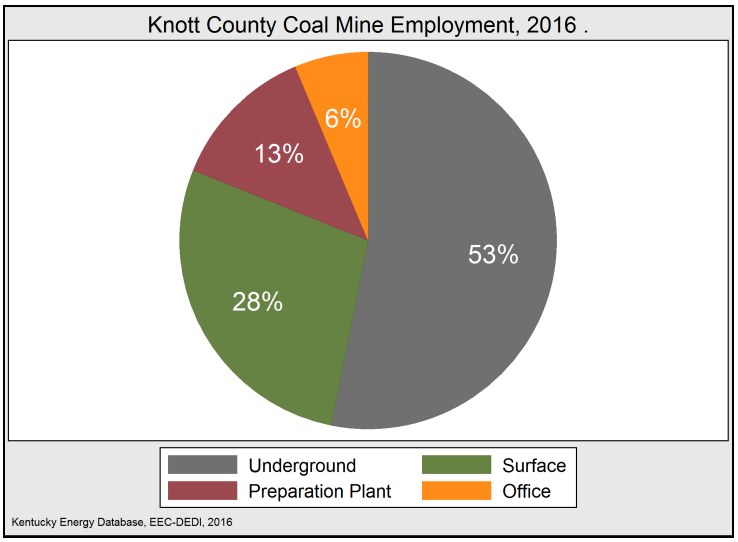
Coal mined in Johnson County had a median sulfur content of 1.17 percent, a median ash content of 10.6 percent, and a median heat content of 24.02 MMBtu per ton. These costs resulted in a median delivered price per ton of $65.98. The delivered price per MMBtu of coal from Johnson County had a median of $2.74 per MMBtu.



Picture: Properties Operated by Consolidation Coal Company, 1949 in The Mountain Eagle of Whitesburg, Kentucky. The above map displays mines in Johnson, Letcher, and Harlan counties and the mineral lands owned by the Consolidation Coal Company.

Knott County

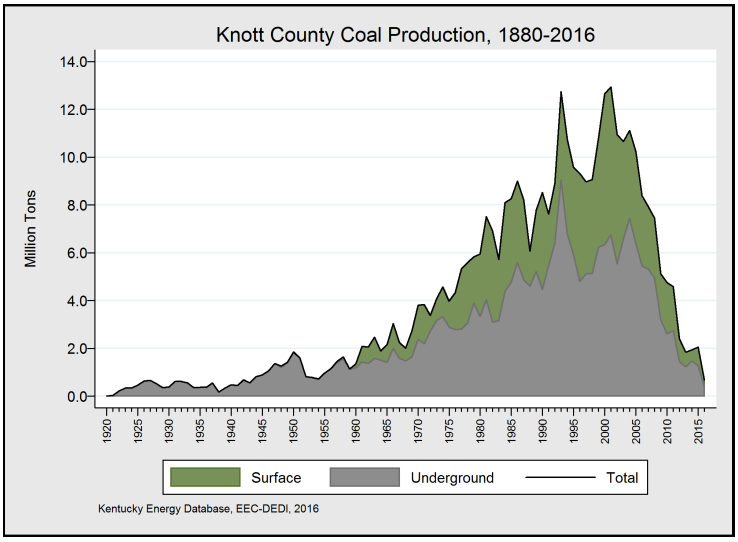


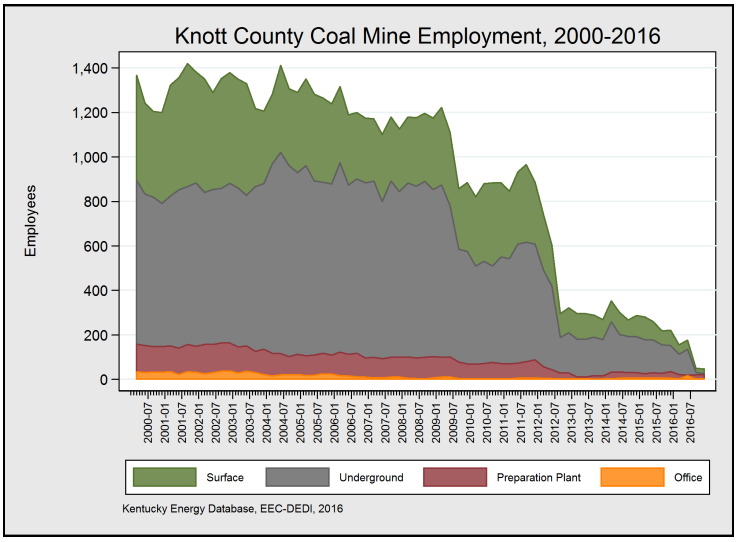


Production Method	Production	Annual Change
Total	681,708	-67.0%
Underground	395,425	-69.0%
Surface	286,283	-63.6%

On-Site Activity	Employment	Annual Change
Total	111	-54.9%
Underground	59	-52.4%
Surface	31	-60.3%
Preparation Plant	14	-38.2%
Office	7	+20.0%

Mines in Knott County decreased coal production by 67 percent from 2015 to produce more than 681 thousand tons of coal in 2016.

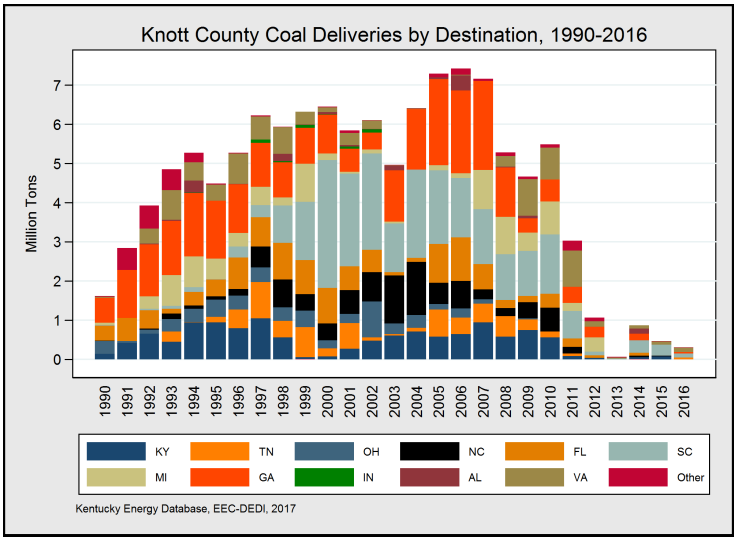


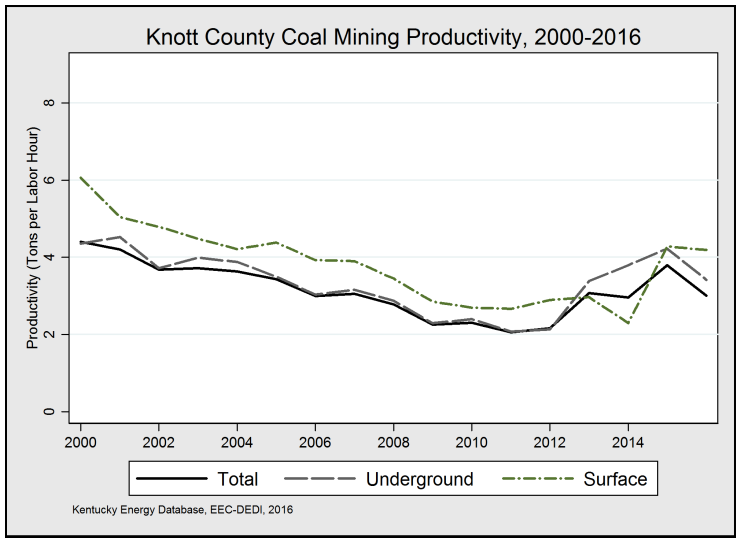


While the earliest-known coal production in Knott County was 1,158 tons in 1889, production did not begin in earnest in Knott County until 1921 when production increased from 34 thousand tons to one million in 1946 and peaked at 12.9 million in 2001. Coal production in Knott County has been on a steady trajectory of decline since 2001, decreasing by 85 percent through 2016. Over the past 125 years, Knott County has produced 380.3 million tons of coal, which is four percent of all coal ever mined in Kentucky.

Coal mines in Knott County employed an average of 111 persons full-time at the end of 2016. Coal mine employment in Knott County peaked at 1,817 in 1950, but as recently as 2004, there were over 1,412 coal miners in Knott County. Just over half of all coal miners in Knott County work underground.

Knott County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**303,490**	**100%**
Virginia	**106,312**	**35.0%**
Chesterfield	106,312	35.0%
South Carolina	**102,124**	**33.6%**
Cross	12,367	4.1%
Cope	13,601	4.5%
Kapstone	24,364	8.0%
Williams	25,951	8.6%
Wateree	25,841	8.5%
Tennessee	**44,260**	**14.6%**
Bull Run	44,260	14.6%
Georgia	**39,477**	**13.0%**
Georgia-Pacific Cedar Springs	39,477	13.0%
Maryland	**11,317**	**3.7%**
Herbert A Wagner	11,317	3.7%

Knott County Coal Market

Knott County shipped 303 thousand tons to 5 states in 2016, a decrease from 2015, when the county shipped 452 thousand tons to 7 plants in 4 states. Coal shipments from the county have decreased by 94.8 percent since 2008.

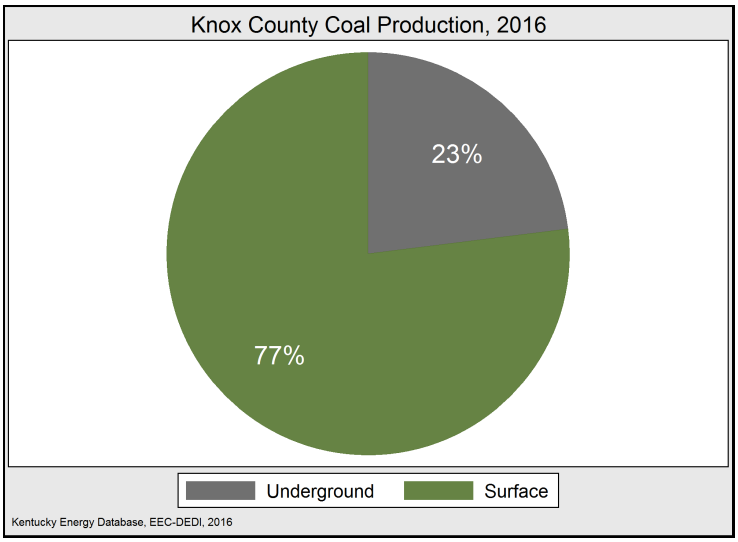
Knott County Coal Mining Productivity

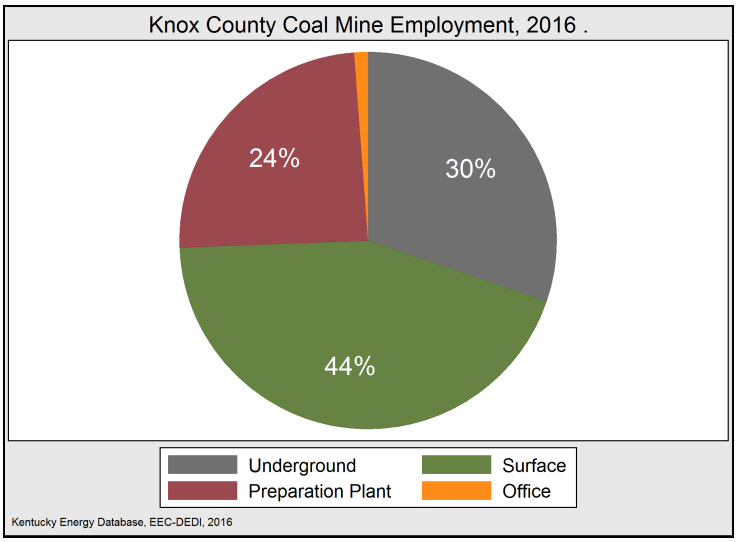
Knott County's productivity in 2016 was 3.00 tons per labor hour, a decrease of 20.8 percent from 2015, but an increase of more than 38 percent from the 2012. Underground mines in Knott County decreased in productivity and were less productive than surface mines, yielding 3.42 tons per labor hour, from 2.38 tons per labor hours the year before.

Chemical Composition and Cost

Coal mined in Knott County had a median sulfur content of 1.07 percent, a median ash content of 10.01 percent, and a median heat content of 24.94 MMBtu per ton. These costs resulted in a median delivered price per ton of $67.43. The delivered price per MMBtu of coal from Knott County had a median of $2.82 per MMBtu.

Knox County

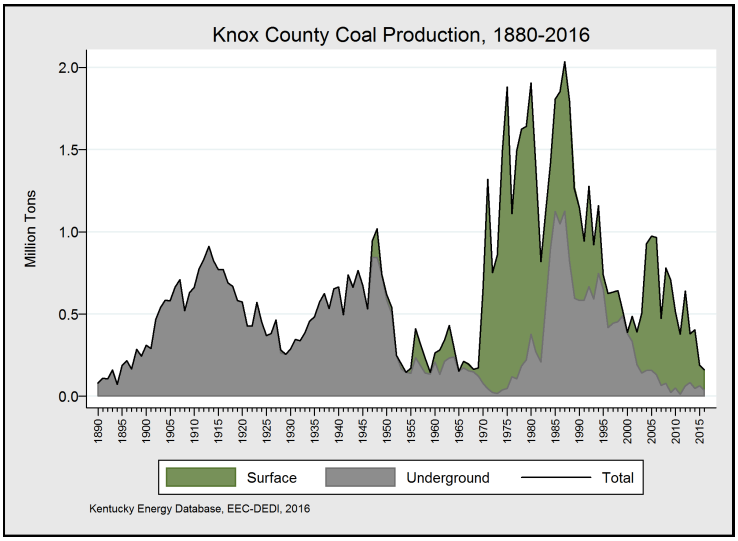


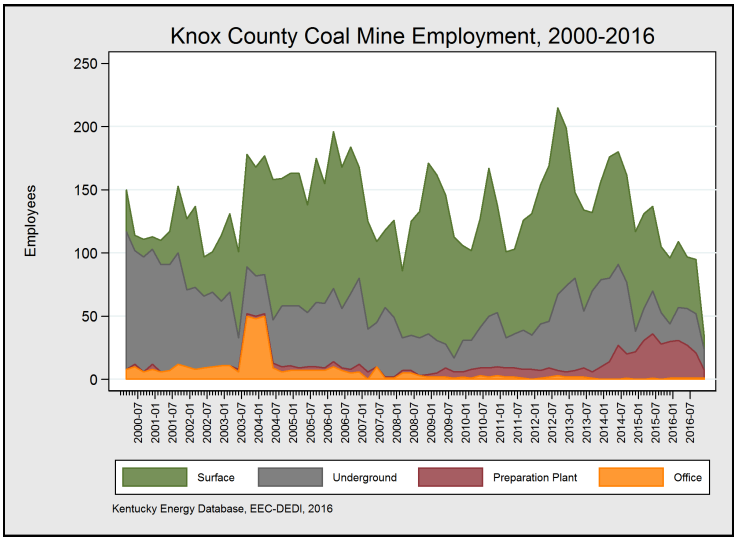


Production Method	Production	Annual Change
Total	161,808	-14.3%
Surface	124,550	-0.62%
Underground	37,258	-41.4%

Knox County produced 161 thousand tons of coal in 2016, primarily from surface mining operations.

On-Site Activity	Employment	Annual Change
Total	86	-26.0%
Surface	38	-35.7%
Underground	26	+9.6%
Preparation Plant	21	-38.2%
Office	1	+0.0%

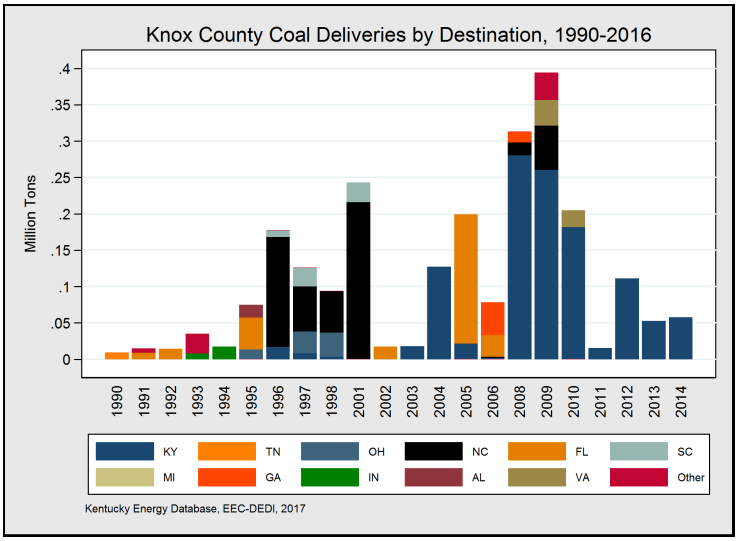


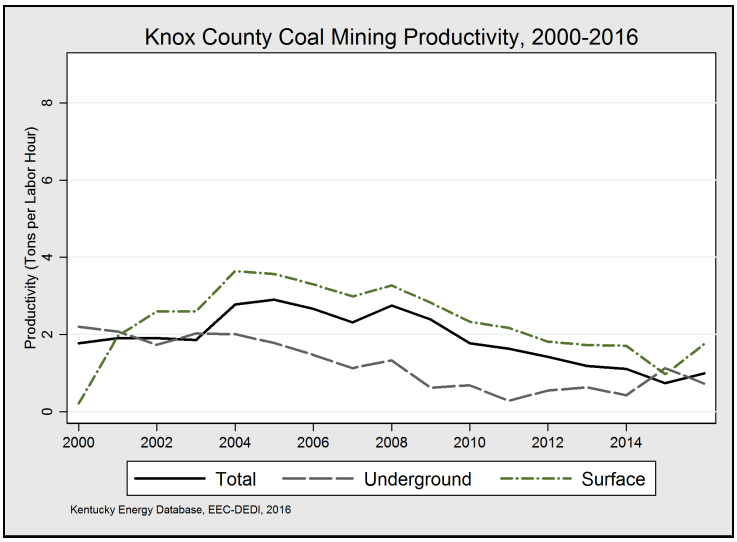


Coal production began in Knox County in 1890 with 80,105 tons and increased steadily to 912,589 tons in 1916. There were three periods of expansion contraction in Knox County coal production, which peaked in 1987 at two million tons and has declined by 92 percent through 2016.

Knox County coal mines employed 86 people at the end of 2016, down 26 percent from 116 miners in 2015. Most coal miners in Knox County work in surface operations. Coal mine employment in Knox County peaked in 1950 at 1,333 and has declined by 94 percent through 2016.

Knox County





Knox County Coal Market

Knox County has not registered coal deliveries since 2014. Since 1990, Knox County has delivered 11.4 million tons of coal. These deliveries were primarily to Kentucky, North Carolina, South Carolina, Virginia and Florida.

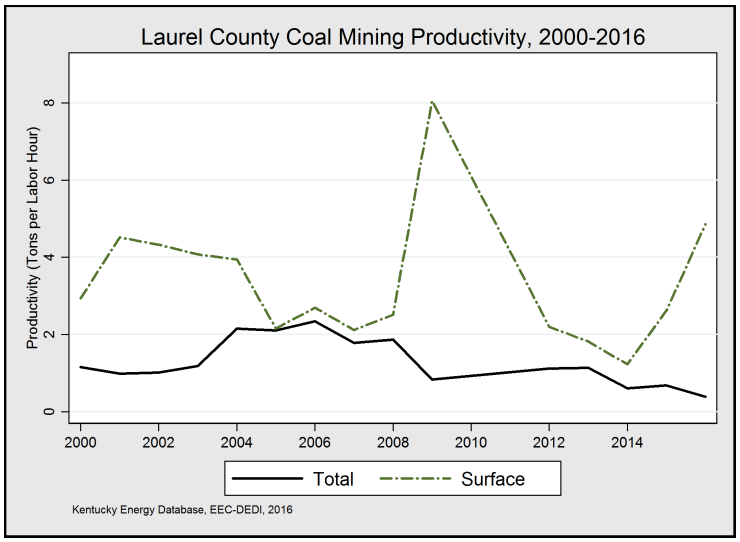
Knox County Coal Mining Productivity

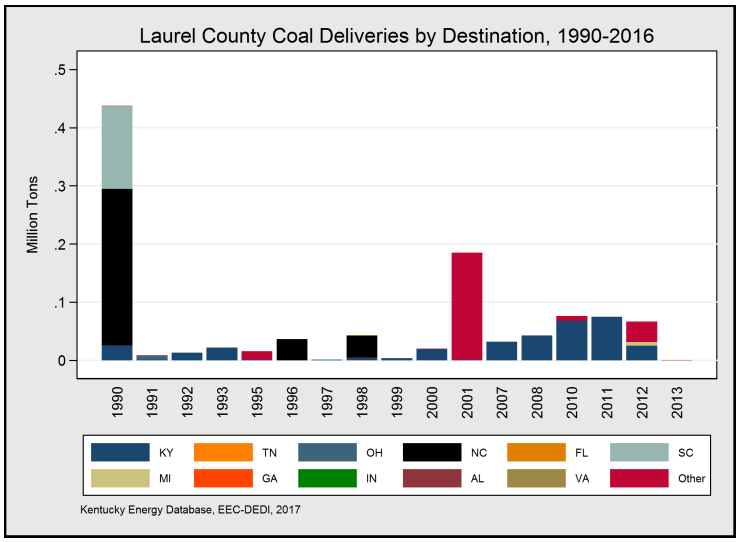
Knox County's overall coal mining productivity in 2016 was 0.99 tons per labor hour, which is an increase of 34 percent from 2015. Knox County surface mines have continually been more productive than underground mining operations in the county since 2002. In 2016, surface mining operations in Knox county produced 0.97 tons per labor hour and underground operations produced 1.13 tons per labor hour.

Chemical Composition and Cost

On average, coal mined in Knox County had a median sulfur content of 1.06 percent, a median ash content of 9.6 percent, and a median heat content of 25 MMBtu per ton. The average delivered price per ton for Knox County coal in 2014 was $75.37, and ranged from $71.85 to $77.05 per ton. The delivered price per MMBtu of coal from Knox County had a median of $3.06 per MMBtu and ranged from $3.01 to $3.06 per MMBtu.

Laurel County

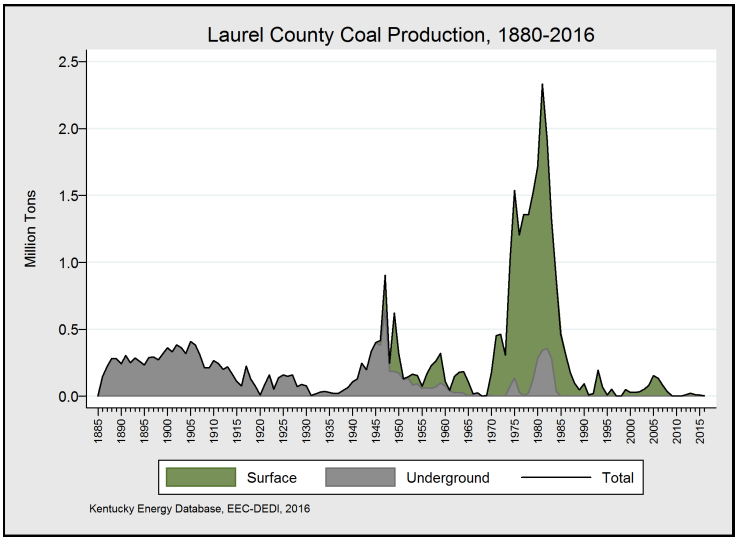


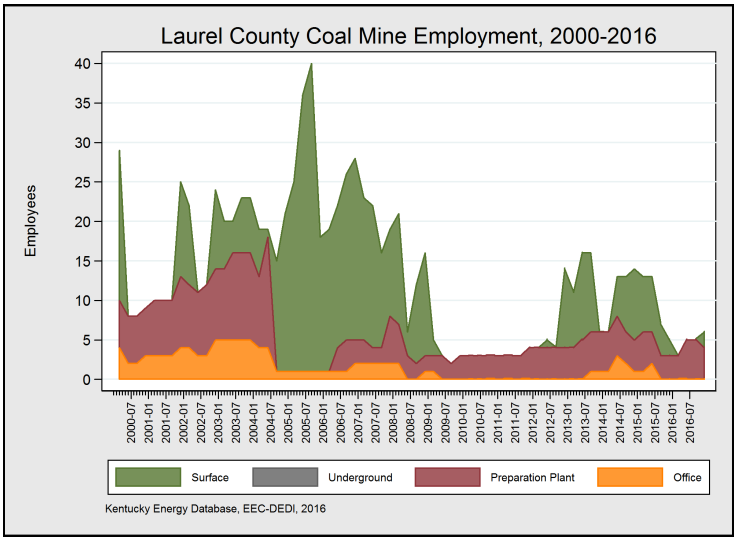


Production Method	Production	Annual Change
Total	3,292	-62.0%
Surface	3,292	-62.0%

On-Site Activity	Employment	Annual Change
Total	6	-53.6%
Surface	2	-65.4%
Preparation Plant	4	+13.3%

Coal production stopped in Laurel County in 2010 and 2011, but small operations resumed in 2012. In 2016, the county produced 3,292 tons from surface mines.

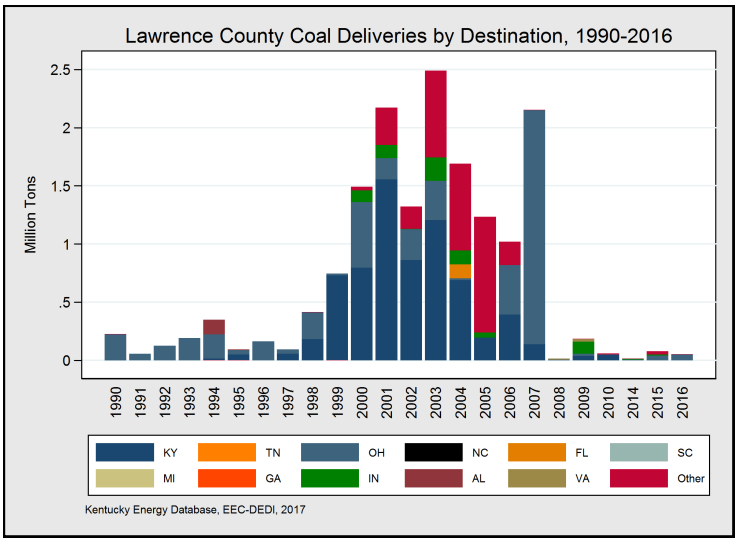


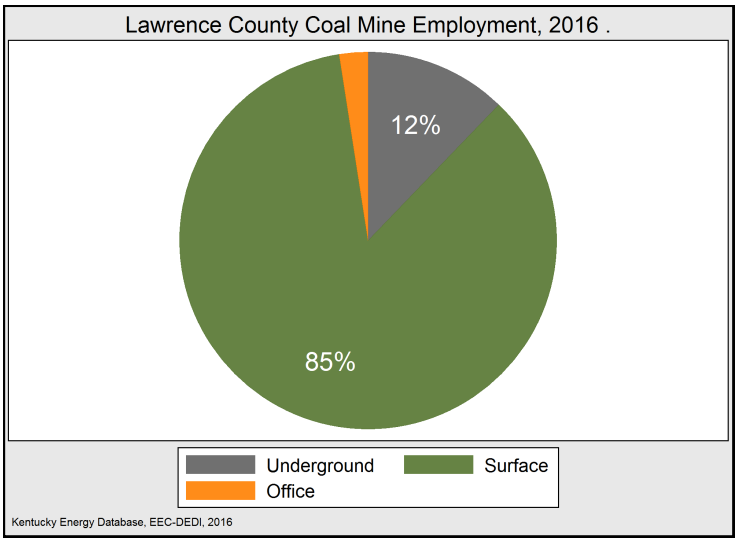


Coal production began in Laurel County in 1886 and peaked at 2.3 million tons in 1981. Since 1886, a total of 36.4 million tons of coal has been mined in Laurel County.

The mines in Laurel County employed an average of six coal miners at the end of 2016, two people worked on the surface in strip or auger operations and four people were employed in the preparation plant.

Lawrence County

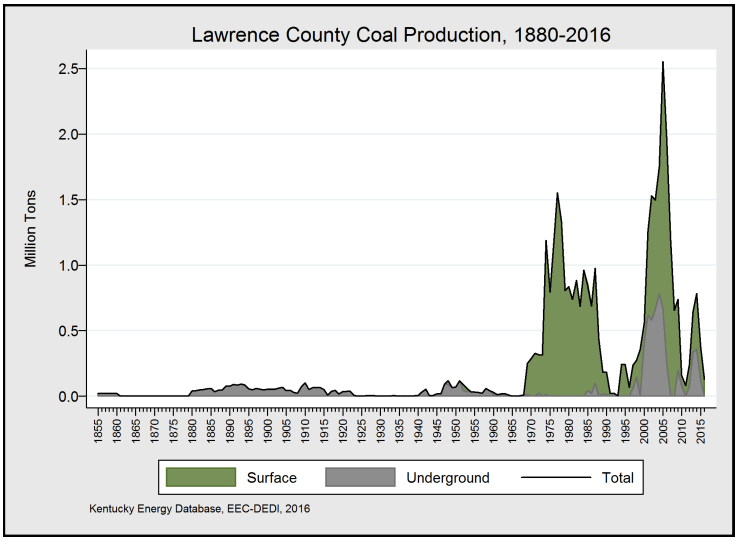


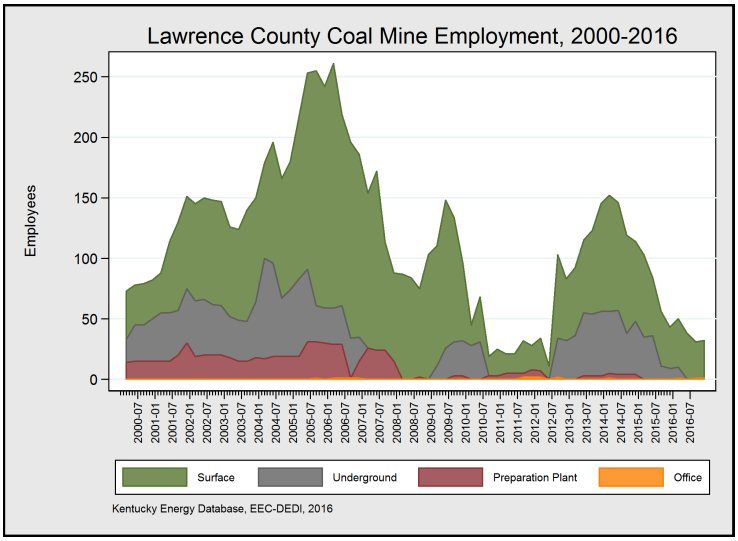


Production Method	Production	Annual Change
Total	131,221	-64.9%
Surface	131,221	-49.1%

On-Site Activity	Employment	Annual Change
Total	41	-47.3%
Surface	35	-29.9%
Underground	5	-80.2%
Office	1	+0.0%

In 2016, Lawrence County mined 131,221 tons of coal. Underground mining operations ceased in mid 2016 and underground mining operations registered no production.

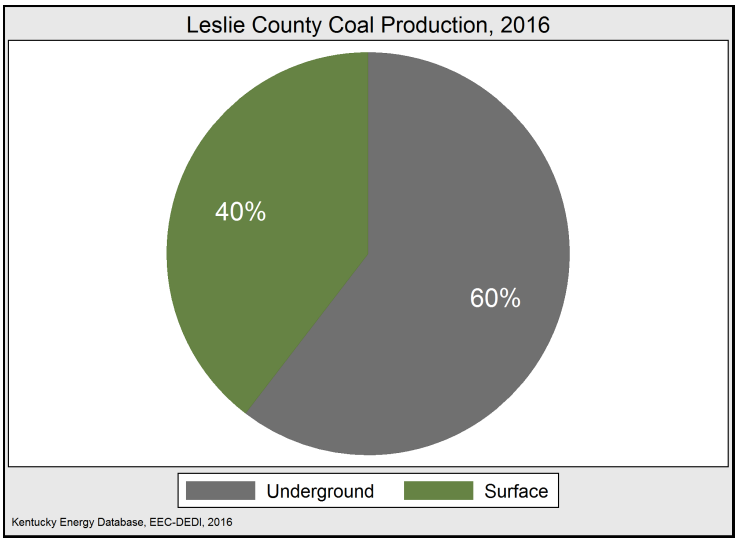


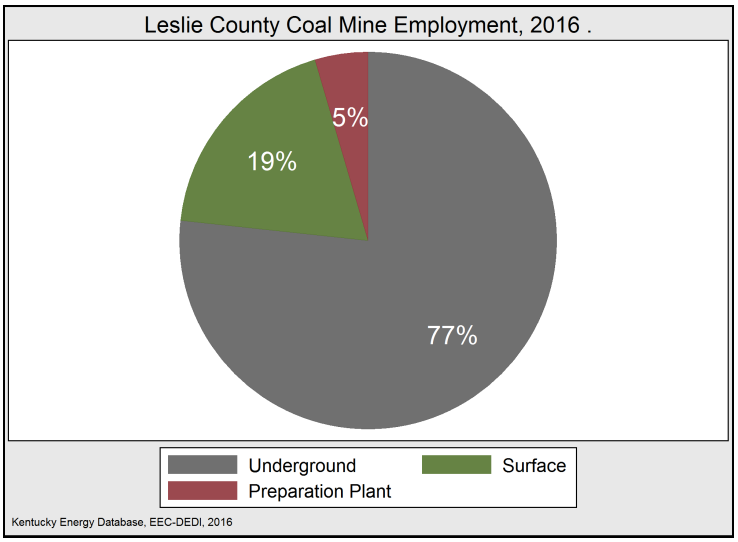


In 1838, the first commercial coal mine in Lawrence County produced 200 tons of coal. While very small underground mines in the county continued to produce coal throughout the 19th Century, it was not until 1894 that the cumulative sum of coal mined in the county would reach one million tons. Annual coal production reached one million tons in 1974 with the advent of large-scale surface mining. Coal production peaked in 2005 at 2.6 million tons.

Coal mine employment in Lawrence County decreased by 47 percent in 2016 to 41 full-time workers, including 35 surface and 5 underground miners. On average, surface mines in Lawrence County were the largest mining employer, followed by underground operations.

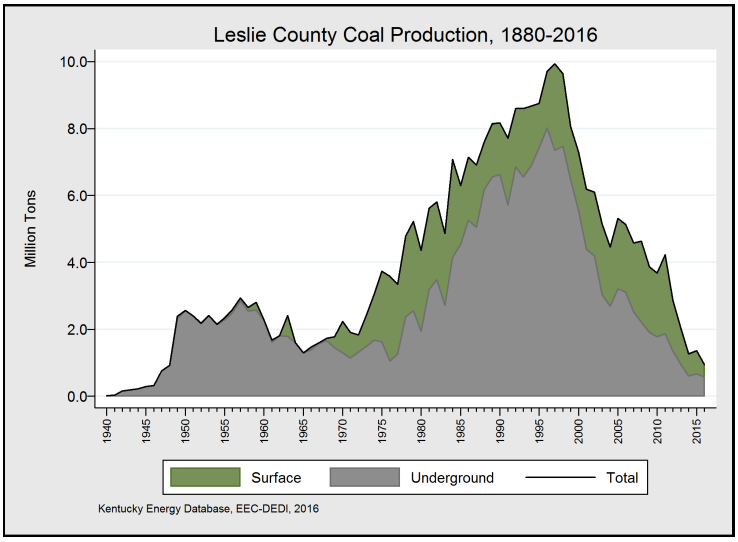
Leslie County

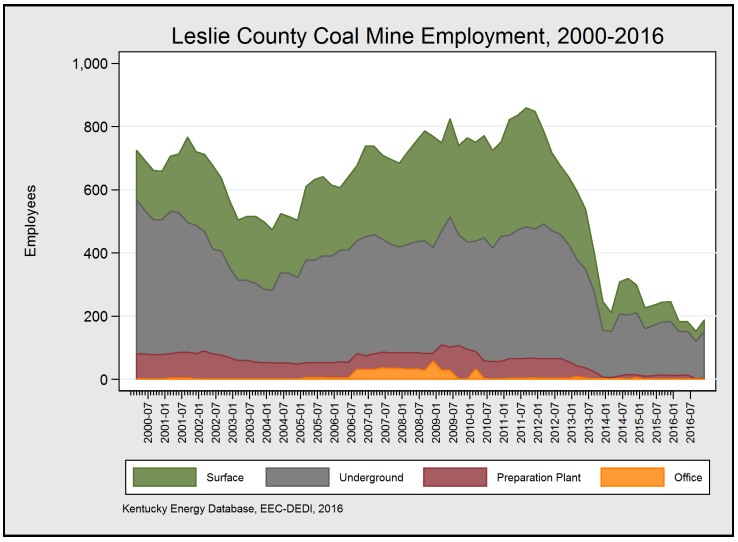




Production Method	Production	Annual Change
Total	945,906	-30.5%
Surface	374,248	-46.1%
Underground	571,658	-14.4%

On-Site Activity	Employment	Annual Change
Total	176	-25.9%
Underground	135	-16.1%
Surface	33	-48.6%
Preparation Plant	8	-31.9%

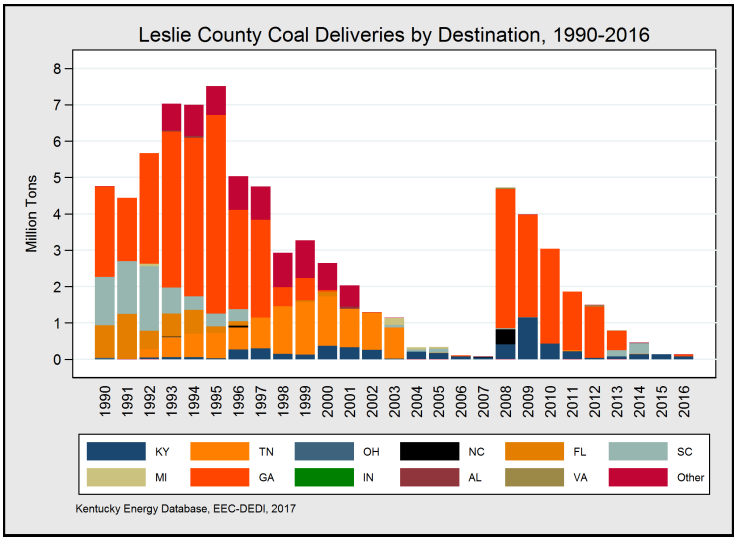


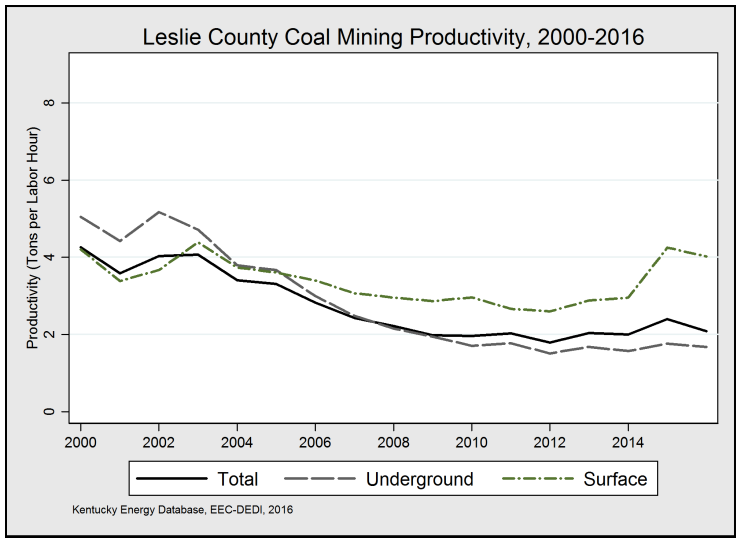


Leslie County did not begin commercial coal production until 1933 with 840 tons, much later than most coal producing counties. During this relatively short coal-mining history, Leslie County has produced more than 300 million tons of coal, or three percent of all coal ever mined in Kentucky. While 40 percent of the county's production in 2016 was from surface mining, most of the county's historical production was from underground operations.

Coal mine employment in Leslie County decreased by 25 percent in 2016 to 176. Most coal miners in 2016, 77 percent, worked in underground coal mines. Coal mine employment in Leslie County peaked at 2,267 in 1957, which was equivalent to 20 percent of the entire county population. Coal mine employment has declined by 92 percent through 2016.

Leslie County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**138,891**	**100%**
Kentucky	**79,342**	57.1%
Cooper	79,342	57.1%
Georgia	**49,061**	35.3%
Georgia-Pacific Cedar Springs	26,623	19.2%
Savannah River Mill	22,438	16.2%
Maryland	**10,488**	**7.6%**
Herbert A. Wagner	10,488	7.6%

Leslie County Coal Market

138 thousand tons of coal was delivered to 4 power plants in 3 different states. 92 percent of known deliveries were to Cooper power station in Kentucky, the Georgia-Pacific Cedar Springs and Savannah River Mill station in Georgia.

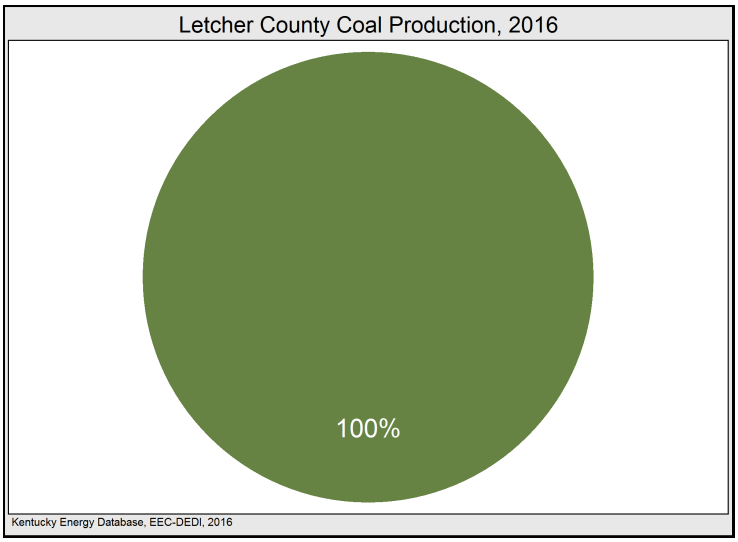
Leslie County Coal Mining Productivity

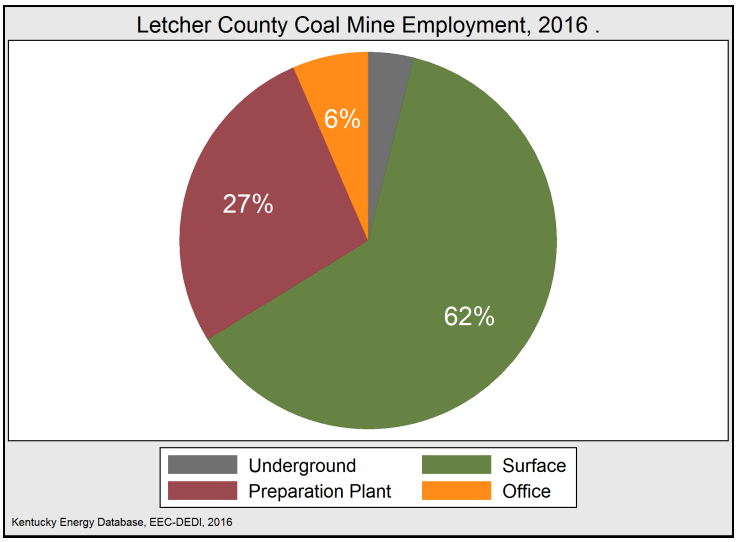
Average mine productivity in Leslie County was 2.09 tons per labor hour in 2016. Overall, county-level productivity was boosted by surface operations, which has been rising since 2011, and averaged 4.02 tons per labor hour. In 2016, underground mines yielded 1.67 tons per labor hour, a decrease from 1.76 the year before.

Chemical Composition and Cost

Coal mined in Leslie County had a median sulfur content of 1.2 percent, a median ash content of 9.83 percent, and a median heat content of 24.90 MMBtu per ton. These costs resulted in a median delivered price per ton of $68.73. The delivered price per MMBtu of coal from Leslie County had a median of $2.84 per MMBtu.

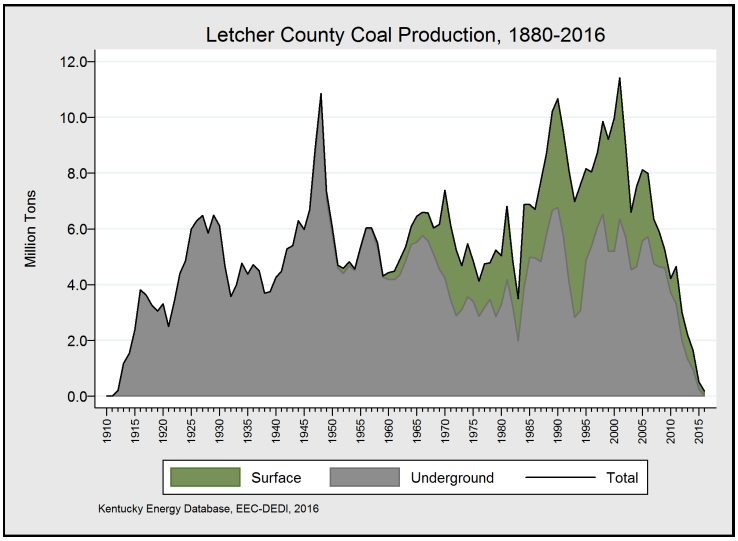
Letcher County

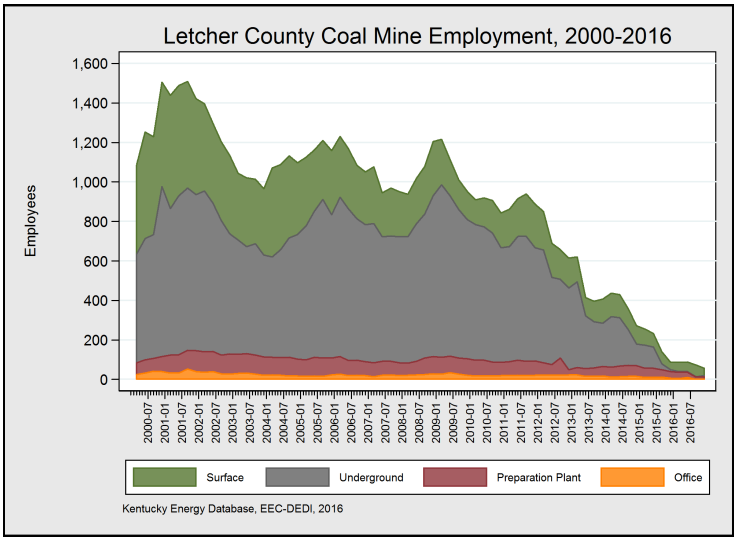




Production Method	Production	Annual Change
Total	184,786	-64.7%
Surface	184,786	-31.8%
Underground	0	-

On-Site Activity	Employment	Annual Change
Total	77	-57.9%
Underground	3	-95.5%
Surface	48	-24.5%
Preparation Plant	21	-49.6%
Office	5	-49.2%

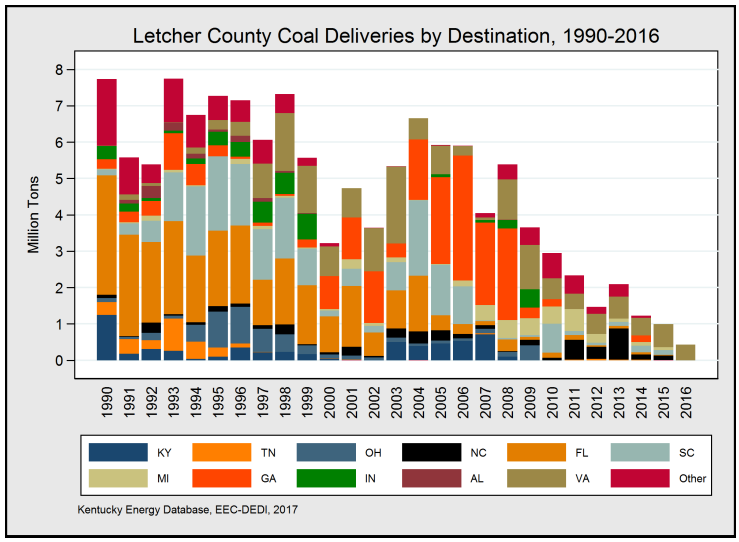


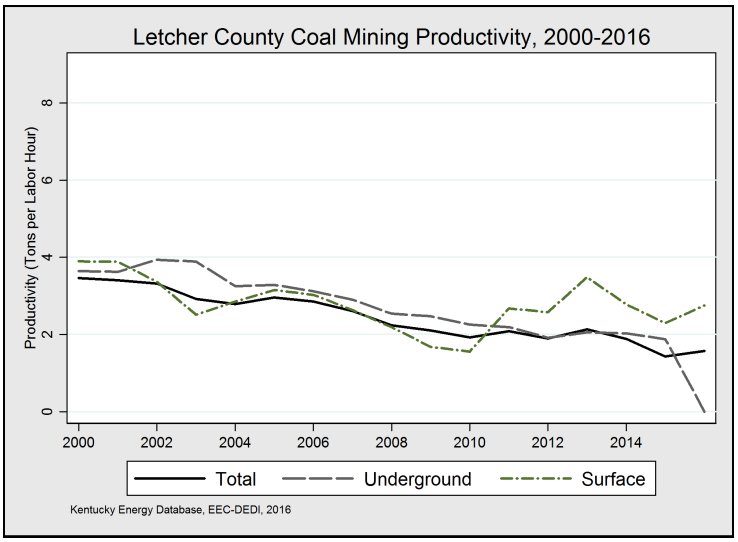


Coal production began in 1889 in Letcher County with 1,573 tons. In the 125 years since 1889, Letcher County has produced more than 588 million tons of coal, six percent of all coal ever mined in Kentucky. In 2016, coal production in Letcher County declined to 184 thousand tons, a decrease of 64.7 percent since 2016, and a decrease of 98 percent since peak production in 2001 at 11.4 million tons. Historically, production in Letcher County primarily came from underground coal mines. However, production now comes from surface mines.

Coal mine operations in Letcher County employed an average of 77 people full-time throughout 2016, an average loss of 57 percent of all mining jobs compared to the year prior. Just over half of these workers worked in surface operations. Coal mine employment has declined by 95 percent since the year 2000, when employment reached 1,505. Coal mine employment peaked in 1949 at 9,114 full time miners in Letcher County, which was equivalent to almost one-quarter of the county's population at that time.

Letcher County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**429,142**	**100%**
Virginia	**429,142**	**100%**
Covington Facility	278,783	65.0%
Chesterfield	150,359	35.0%

Letcher County Coal Market

429 thousand tons of coal mined in Letcher County was shipped to power plants in Virginia during 2016. Specifically, the Covington facility and Chesterfield power plants. Coal deliveries have decreased by 54 percent since 2015.

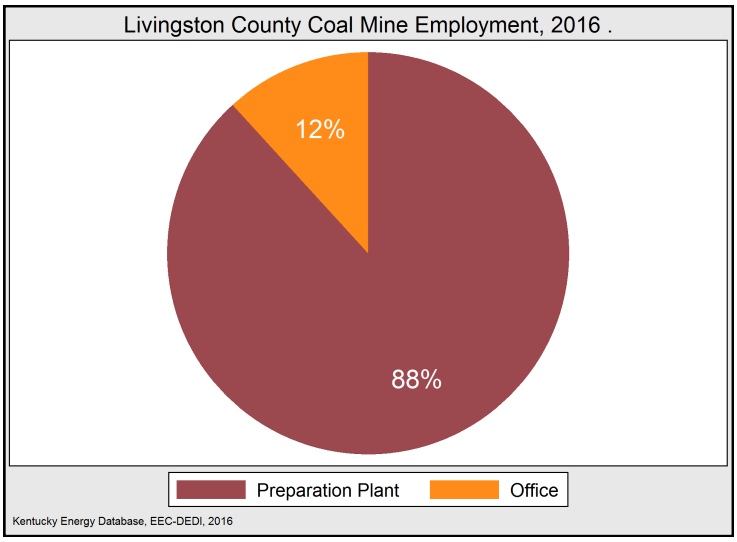
Letcher County Coal Mining Productivity

Average coal mine productivity in Letcher County was 1.57 tons per hour in 2016. While underground operations had productivity of 1.88 tons per hour in 2015, they produced no coal in 2016. Surface operations produced 2.75 tons per labor hour in 2016.

Chemical Composition and Cost

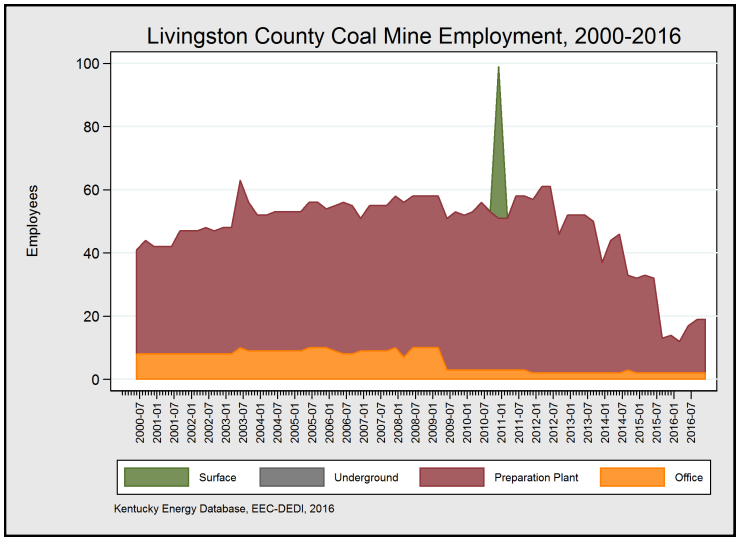
Letcher County produces very high quality coal. Coal mined in Letcher County had a median sulfur content of 1.12 percent, a median ash content of 8.7 percent, and a median heat content of 25.54 MMBtu per ton. Letcher County had a median delivered price per ton of $75.51. The median delivered price per MMBtu was $3.15 per MMBtu.

Livingston County



Pictured above: The Grand River Terminal in Livingston, County

On-Site Activity	Employment	Annual Change
Total	17	-27.2%
Preparation Plant	15	-29.7%
Office	2	+0.0%

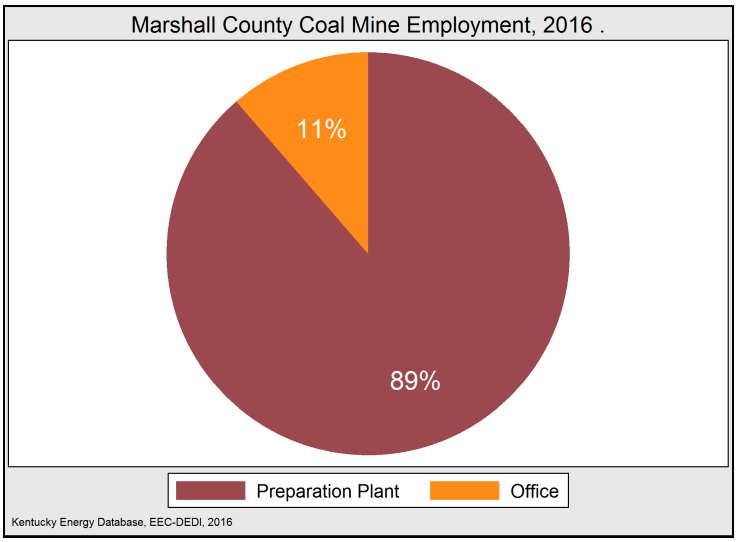


Livingston County Coal Shipments

Although Livingston County—in Western Kentucky northeast of Paducah—has never registered coal production, its location on Kentucky Lake and near the Ohio River southwest of many of Kentucky's coal producing counties make it a good location to process and ship coal. During 2016, coal preparation and transportation facilities in Livingston County supported an average of 17 full-time employees. 15 of these individuals operated coal preparation plants, cleaning and loading coal for delivery to electric utilities. Two people were employed in office capacities, in direct support of preparation plants.

Marshall County

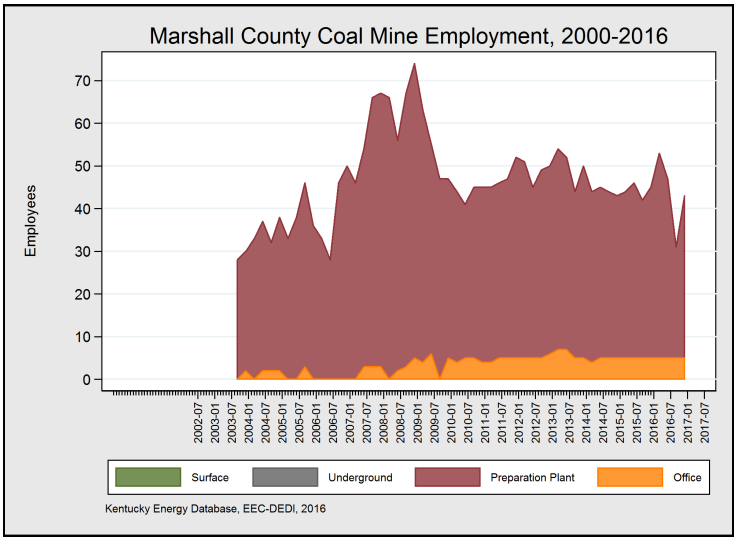
Pictured above: The Calvert City Terminal in Marshall County.



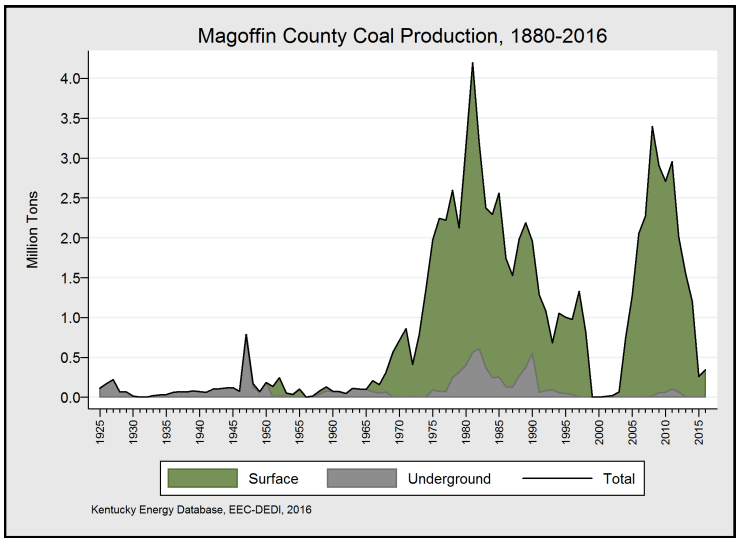
On-Site Activity	Employment	Annual Change
Total	44	+0.0%
Preparation Plant	39	+0.0%
Office	5	+0.0%

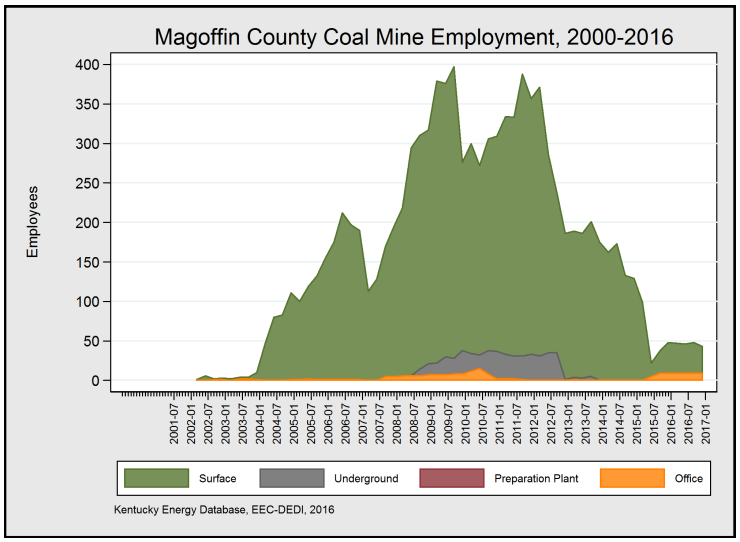
Marshall County Coal Mining Employment

Marshall County, in Western Kentucky, has never mined coal. However, the coal mining operations in Marshall County on the Ohio River near Calvert City do prepare and ship coal from neighboring coal-producing counties. During 2015, coal preparation and transportation facilities in Marshall County supported 44 full-time employees. 39 of these individuals operated coal preparation plants, cleaning and loading coal for delivery to electric utilities. Around five people were employed in office capacities, in direct support of preparation plants.



Magoffin County





Production Method	Production	Annual Change
Total	344,489	-33.34%
Surface	344,489	-33.34%

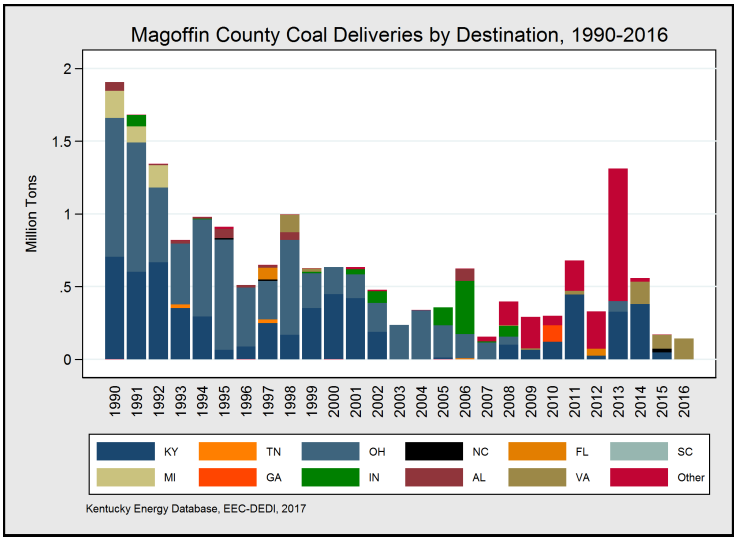
On-Site Activity	Employment	Annual Change
Total	46	-8.5%
Surface	37	-21.9%
Office	9	+9.8%

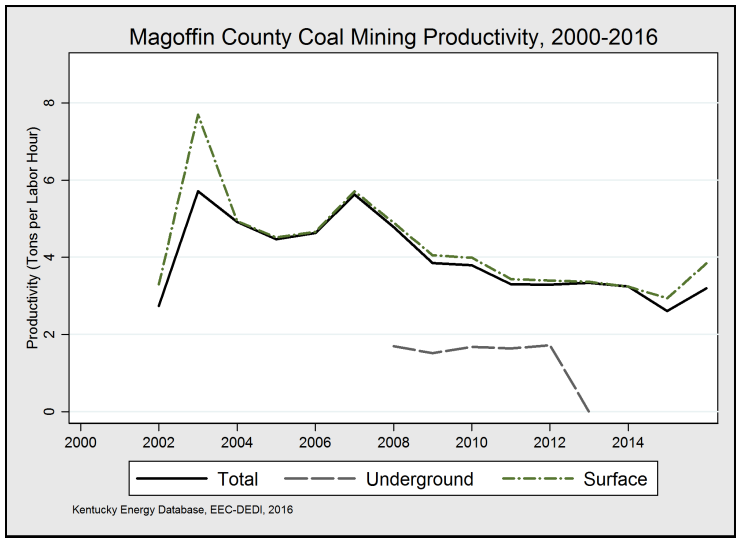
Magoffin County, in Eastern Kentucky, has continued to have vast fluctuations in its coal mine production and employment since the 1960s. The first-recorded commercial coal production in Magoffin County was 5,404 tons in 1889. In the 125 years since, Magoffin County has recorded nearly 80 million tons of coal. Throughout its history, coal production in Magoffin County has fluctuated substantially, with coal production decreasing from peak production of 4.2 million tons in 1981 to zero by 1999 and recovering to 3.4 million by 2008. In 2016, the mines in Magoffin County mined 344 thousand tons of coal, a decrease of 33 percent from 2015.

In the year 2000, many areas of Magoffin County were considered mined-out, and no longer supported productive mine operations. However, a substantial increase in the market price of coal starting in 2002 changed the economics of mining in Magoffin County, and new mines were developed on less productive seams. As coal prices have declined, so too has production and employment. In 2016, there were 46 production workers, a decrease of 8.5 percent from the year prior.

Pictured: Former Kentucky Coal Facts authors Aron Patrick and Adam Blandford exploring a Kentucky coal mine 900 feet underground.

Magoffin County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**142,441**	**100%**
Virginia	**142,441**	**100%**
Chesterfield	142,441	100%

Magoffin County Coal Market

Coal deliveries from Magoffin County decreased by 14 percent in 2016, relative to the year prior. In 2013, Magoffin County registered its highest level of coal shipments during the last five years, but because most coal shipments went to the Mitchell Power Plant in West Virginia, the majority of coal demand was lost when the plant drastically decreased coal shipments from the county in 2014. The majority of coal from Magoffin County was shipped to the Chesterfield Power Plant in Virginia in 2016.

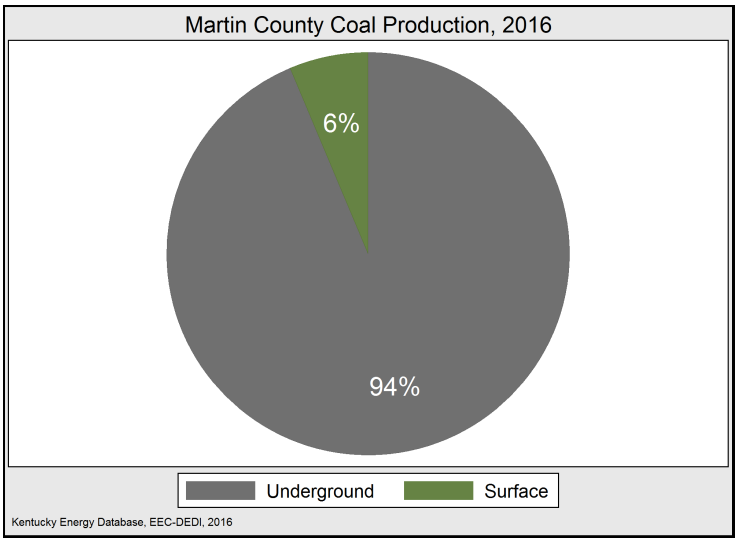
Magoffin County Coal Mining Productivity

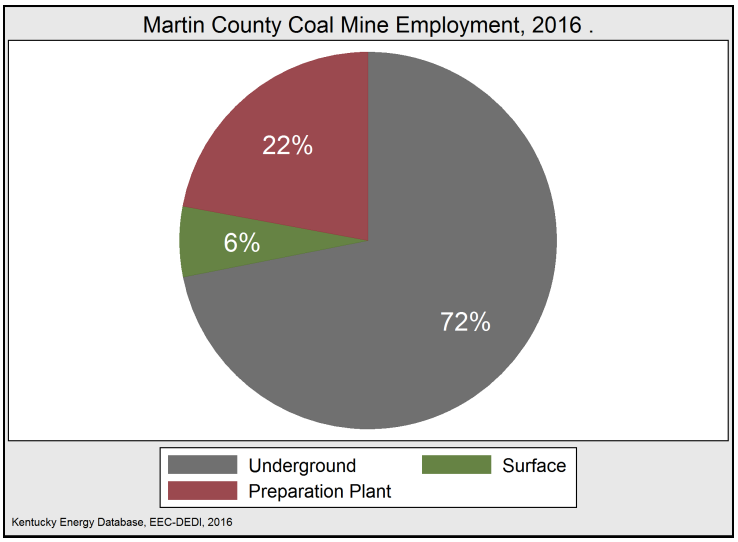
Magoffin county had a total productivity of 3.2 tons per labor hour. This level of productivity was influenced entirely by surface mine operations, which represented all coal production in Magoffin County in 2016. Production in the county increased from 2.61 tons per labor hour in 2015.

Chemical Composition and Cost

Coal mined in Magoffin County had a median sulfur content of 0.98 percent, a median ash content of 11.5 percent, and a median heat content of 23.96 MMBtu per ton.

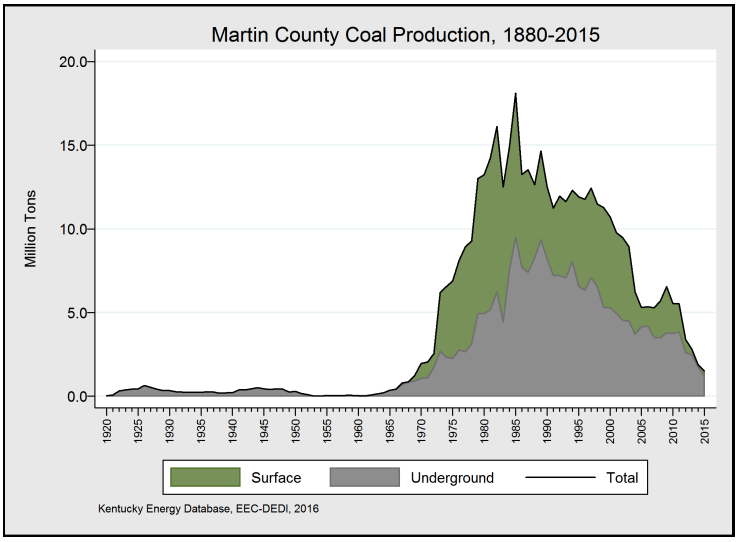
Martin County

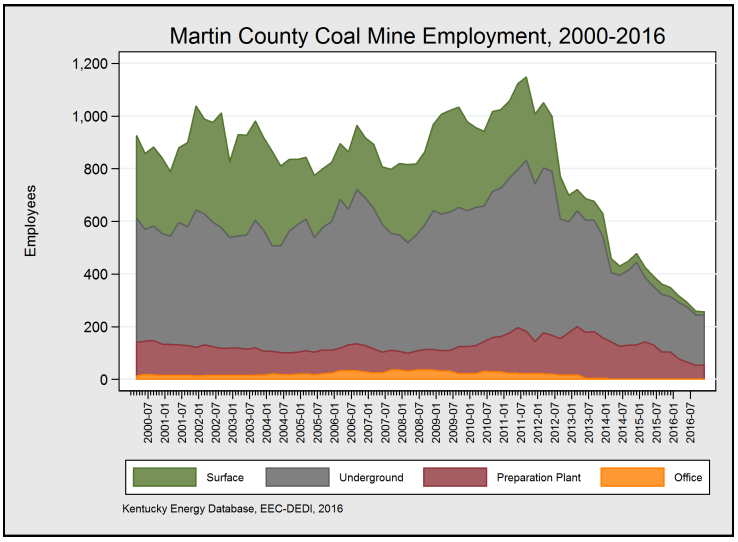




Production Method	Production	Annual Change
Total	945,048	-37.9%
Underground	885,320	-81.9%
Surface	59,728	-25.7%

On-Site Activity	Employment	Annual Change
Total	281	-27.4%
Underground	202	-9.9%
Preparation Plant	17	-48.5%
Surface	62	-55.8%

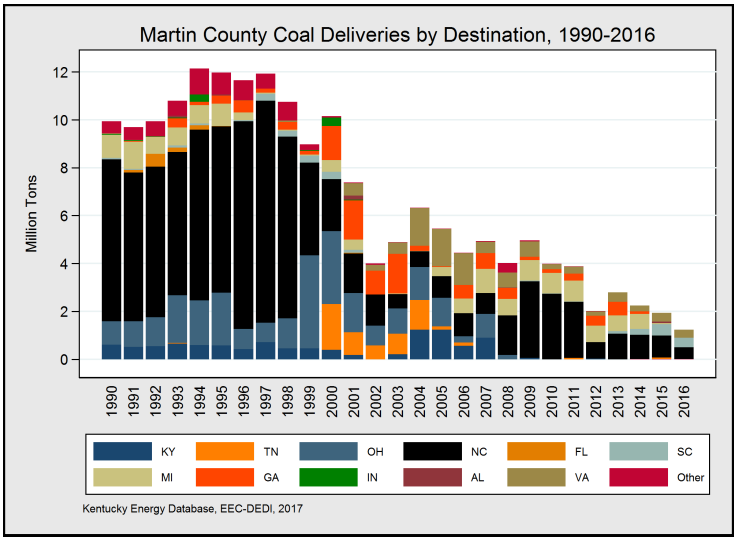


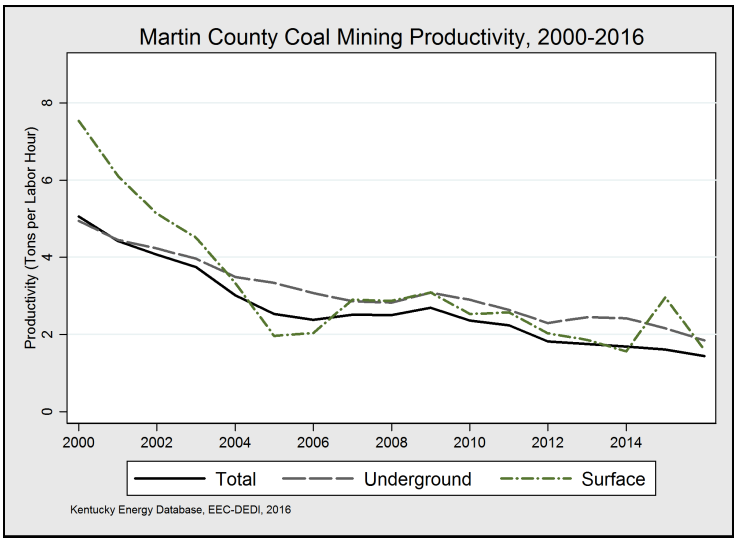


Coal production in Martin County was recorded as early as 1879 at 56 tons. It was not until the First World War that production would be recorded annually when Martin County mined 56,091 tons in 1918. In 1969, the county produced over one million tons for the first time and coal production began to rapidly increase, peaking in 1985 at 18 million tons. Coal production has declined by 94 percent through 2016.

Coal mines in Martin County employed, on average, 281 people full-time through 2016, a decrease of 27 percent from 2015. The majority of coal miners in Martin County have been employed in underground operations. Additionally, 17 people worked in coal preparation plants, 62 people worked in surface mining operations.

Martin County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**1,226,218**	**100%**
North Carolina	**498,330**	**40.6%**
Roxboro	435,709	35.5%
Belews Creek	11,238	0.9%
Mayo	51,383	4.2%
South Carolina	**399,468**	**32.6%**
Williams	360,793	29.4%
Cope	25,602	2.1%
Wateree	13,073	1.1%
Virginia	**328,420**	**26.8%**
James River Genco	151,457	12.4%
Chesterfield	176,963	14.4%

Martin County Coal Market

In total, 1.2 million tons of coal mined in Martin County was shipped to power plants in 2016. 73 percent of those shipments were to power plants in North Carolina and South Carolina.

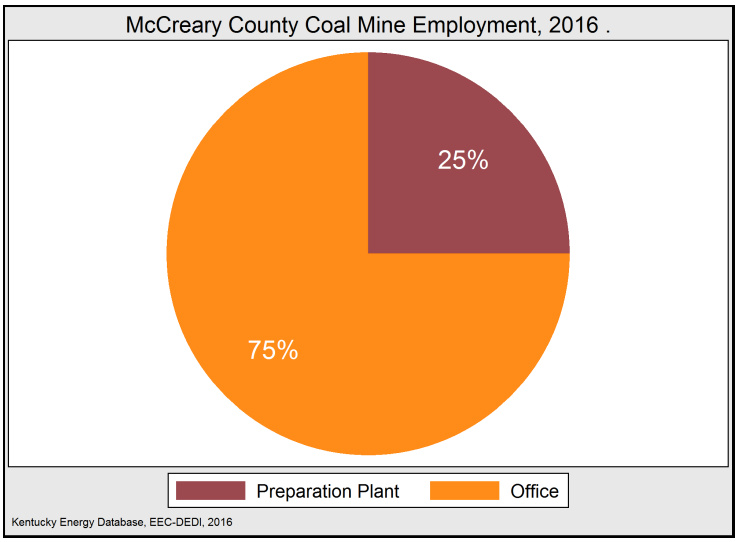
Martin County Coal Mining Productivity

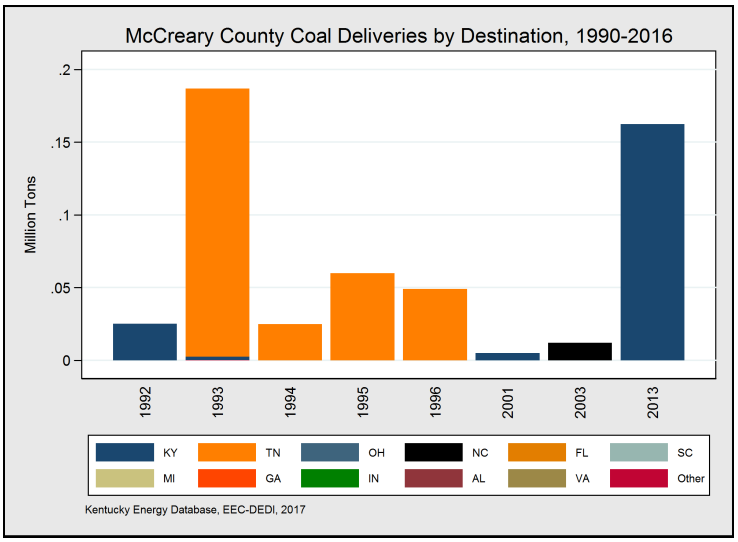
Since, 2000, Martin County coal mine productivity has declined steadily, which has increased the costs of coal production, and decreased cost-competiveness versus alternative sources of energy. Martin County's productivity in 2016 was 1.44 tons per labor hour, a decrease from 1.61 in 2015. In 2016, underground mines in Martin County were more productive than surface mines—1.84 tons per hour compared to 1.6 tons per hour. However, the productivity of surface mines in Martin County has fluctuated substantially over time, compared to the relative stability of underground operations.

Chemical Composition and Cost

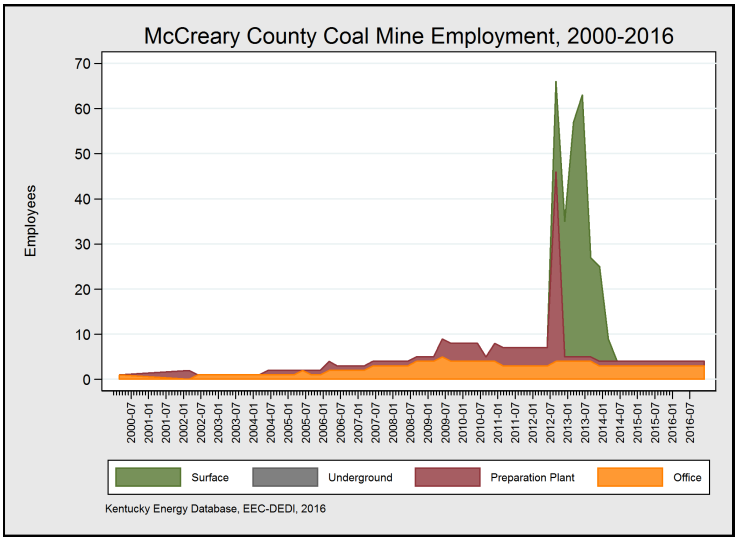
Coal mined in Martin County had a median sulfur content of 0.92 percent, a median ash content of 9.7 percent, and a median heat content of 24.69 MMBtu per ton. These costs resulted in a median delivered price per ton of $74.67. The delivered price per MMBtu of coal from Martin County had a median of $2.69 per MMBtu and an average price of $3.02 per MMBtu.

McCreary County





On-Site Activity	Employment	Annual Change
Total	4	+0%
Office	3	+0%
Preparation Plant	1	+0%



Though there was no coal production in McCreary County in 2016, three office workers and one preparation plant worker were employed in the county. In 2013, 21 surface miners worked in the county, but operations ceased by July of 2014.

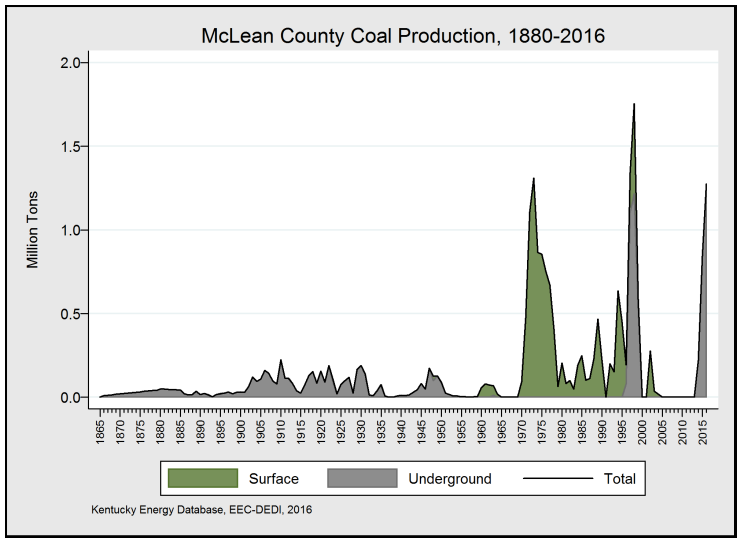
McCreary County Coal Market

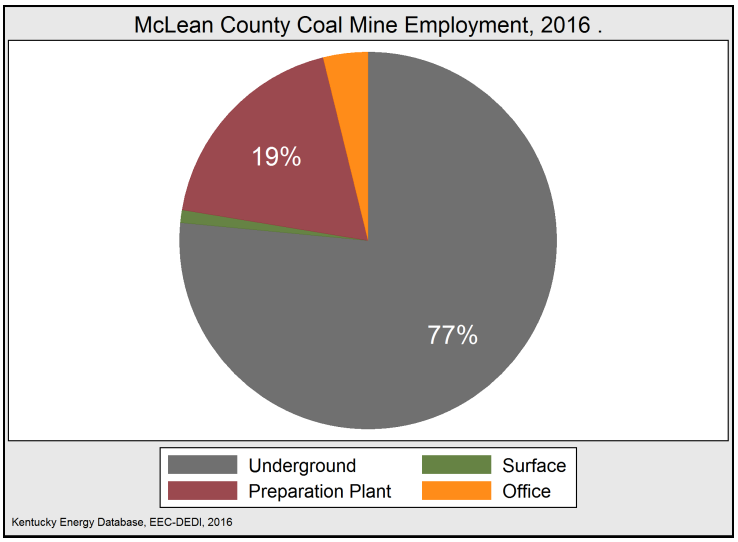
The John S. Cooper Plant in Pulaski County, Kentucky received 12 shipments totaling 79 thousand tons of coal in 2013 from McCreary County. The plant was the last plant that recorded coal shipments from the county and the only receiver of coal from the county in the last decade.

Chemical Composition and Cost

Coal mined in McCreary County since 1990 had a median sulfur content of 1.01 percent, a median ash content of 5.6 percent, and a median heat content of 26.09 MMBtu per ton. The average delivered price per ton for McCreary County coal in 2013 was $53.39, and ranged from $48.51 to $54.97 per ton. The delivered price per MMBtu of coal from McCreary County had a median cost of $2.14 per MMBtu and ranged from $2.03 to $2.19 per MMBtu.

McLean County





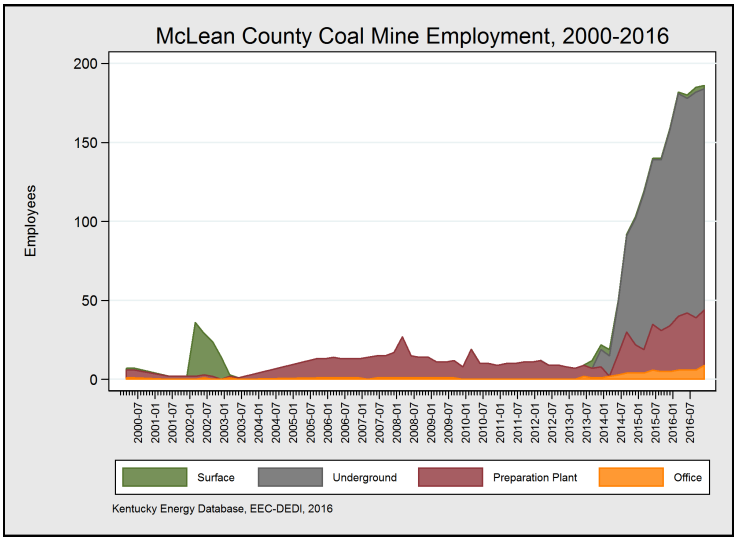
Production Method	Production	Annual Change
Total	1,274,873	+51.2%
Underground	1,274,873	+51.2%

McLean County produced 1.2 million tons of coal in 2016 from underground mining operations at the Riveredge Mine.

On-Site Activity	Employment	Annual Change
Total	183	+31.6%
Underground	140	+28.7%
Preparation Plant	34	+39.4%
Surface	2	+100%
Office	7	+40.0%

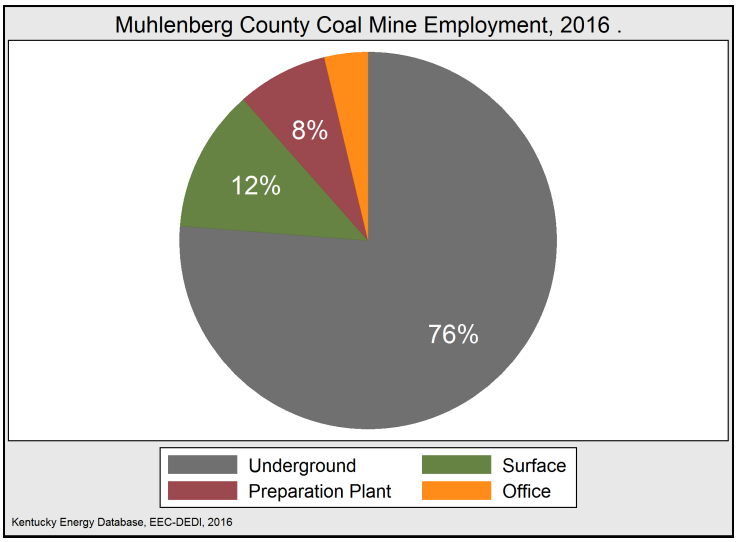
State and Power Plant	Deliveries (Tons)	Percentage
Total	**453,902**	**100.0%**
Kentucky	**453,902**	**100.0%**
D B Wilson	65,055	14.3%
R D Green	11,565	2.5%
Ghent	361,759	79.7%
East Bend	15,523	3.4%

Although McLean County began mining coal in 1825, which has continued until this day with few exceptions. No coal was produced in McLean County during the decade between 2004-2013, and while coal was not mined during this period, preparation plants continued to operate in the county. McLean County recorded 453 thousand tons of known coal deliveries in 2016 while it produced 1.2 million tons of production.



Coal mines and preparation plants in McLean County employed, on average, 183 people in 2016, including 140 underground miners, 34 preparation plant workers, 2 surface miner, and 7 people employed full time in an on-site office. The Riveredge Mine is the only producing mine in McLean County.

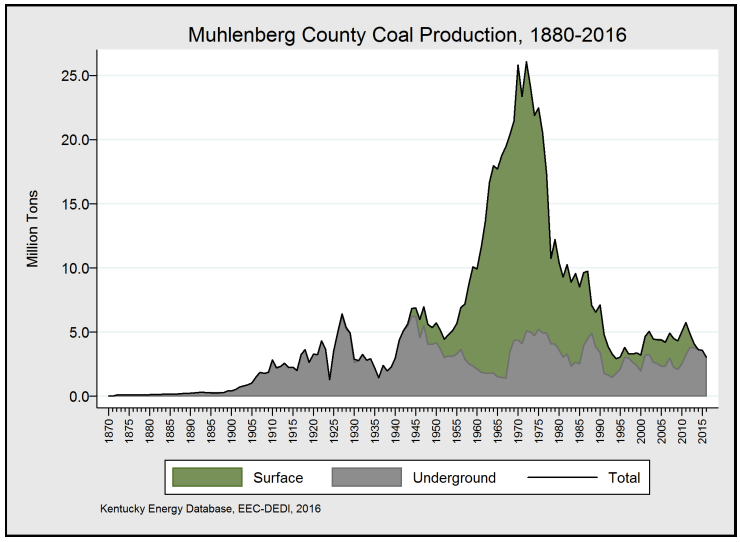
Muhlenberg County

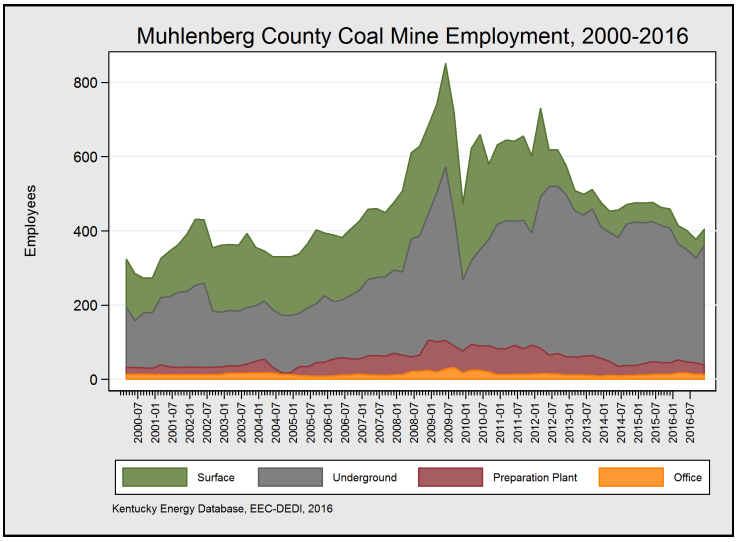


Production Method	Production	Annual Change
Total	3,051,705	-14.5%
Underground	3,025,787	-15.2%
Surface	25,918	+0.0%

On-Site Activity	Employment	Annual Change
Total	400	-14.8%
Underground	305	-18.2%
Surface	49	-5.1%
Preparation Plant	31	-5.5%
Office	15	+21.2%

Muhlenberg County decreased production by 14.5 percent in 2016 to 3 million tons of coal. *Pictured: Peabody's "Big Hog", a Marion 8800 dragline mining near Paradise in 1961.*

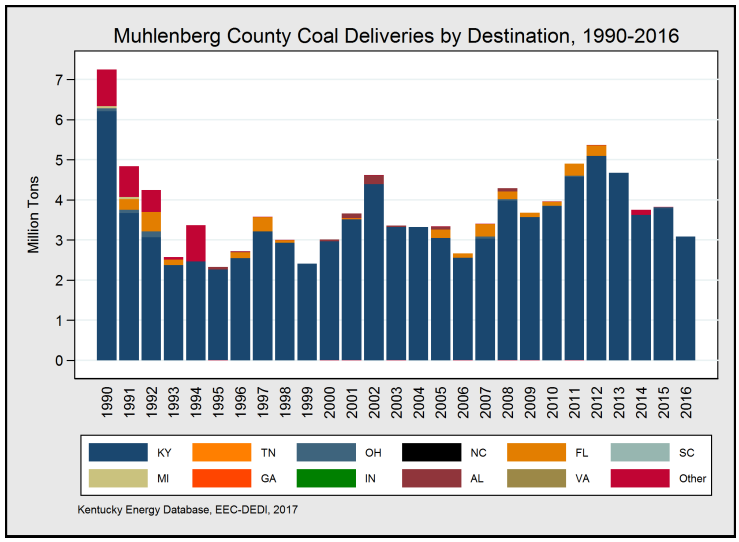


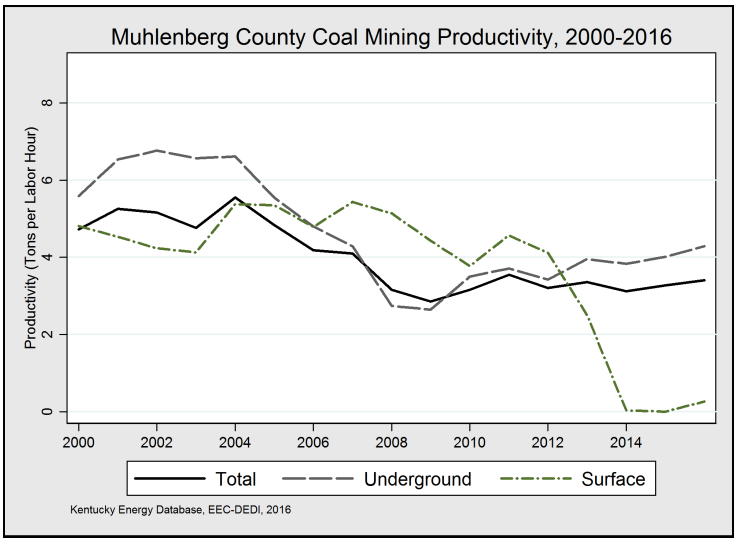


Muhlenberg County is situated on the Green River in Western Kentucky and has been mining coal since the year 1820. Muhlenberg County was the largest producing county in Kentucky between 1908-1913 from underground mines, and 1961-1976 from surface mines. Coal production in Muhlenberg County peaked in 1972 at 26 million tons and has declined by 88 percent through 2016. To date, Muhlenberg County has produced 800 million tons.

In 1977, shortly after peak production, mines in Muhlenberg County employed 3,765 coal miners full time. In 2016, there were an average of 400 persons employed at coal production facilities. In 2016, Muhlenberg county employed 305 underground miners, 49 surface miners, and 31 preparation plant employees. There were 15 people employed in full time office positions.

Muhlenberg County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**3,055,184**	**100%**
Kentucky	**3,085,184**	**100%**
Paradise	2,073,471	67.2%
D B Wilson	650,327	21.1%
Elmer Smith	331,386	10.7%

Muhlenberg County Coal Market

Power plants in Kentucky consumed almost all of the coal shipped from Muhlenberg County in 2016, which has been the case since at least the 1960's. In fact, most of the coal is used in Muhlenberg County, which is home to the Paradise Fossil Plant. Paradise is the largest power plant in Kentucky, among the ten largest coal-fired plants in the United States, and the single-largest consumer of Kentucky coal globally. Paradise Fossil Plant alone, where units 1 and 2 will be retired in 2017, received 67 percent of Muhlenberg County's coal shipments. Muhlenberg County has always been among the main sources of coal shipped to Paradise Fossil Plant, situated adjacent to the former town of Paradise, Kentucky.

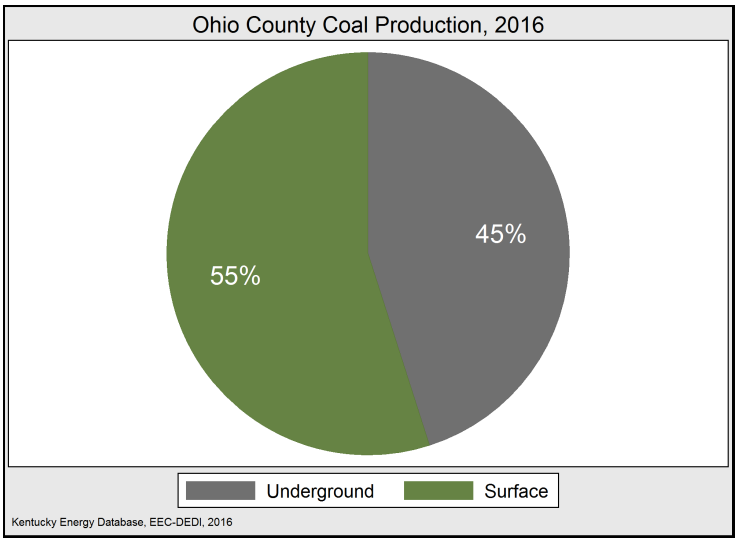
Muhlenberg County Coal Mining Productivity

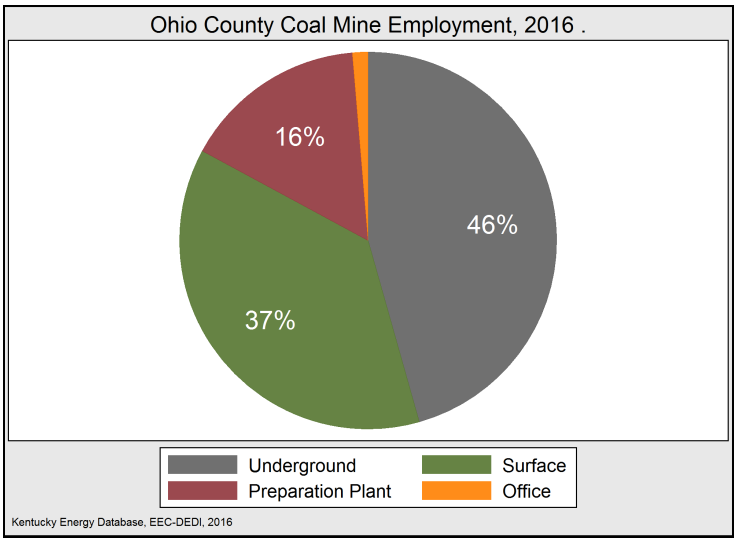
While average productivity at mines in Muhlenberg County was 3.40 tons per hour in 2016, productivity at underground mines was 4.29 tons per labor hour and surface mines was 0.26 tons per hour. This contrasts significantly from 2012, when underground mines yielded 3.42 tons per labor hour and surface mines produced at a rate of 4.12 tons per labor hour.

Chemical Composition and Cost

On average, coal mined in Muhlenberg County had a median sulfur content of 3.03 percent, a median ash content of 10.4 percent, and a median heat content of 22.78 MMBtu per ton. The average delivered price per ton for Muhlenberg County coal in 2016 was $49.79. The delivered price per MMBtu of coal from Muhlenberg County had a median of $2.12 per MMBtu.

Ohio County

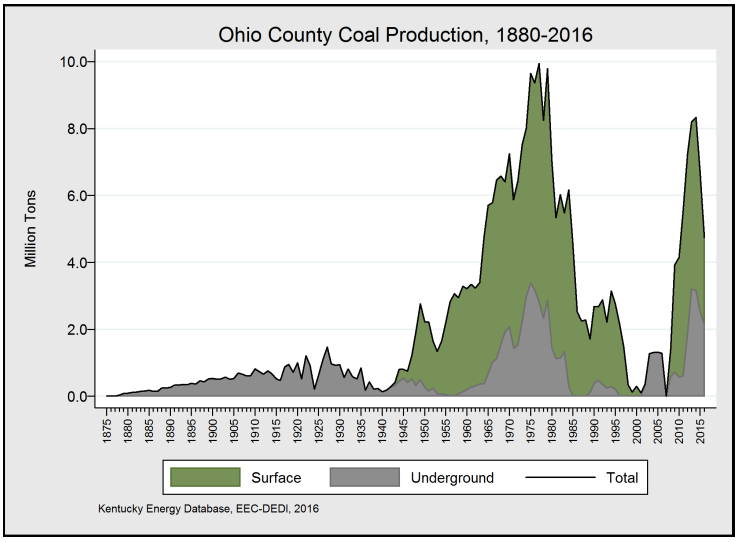


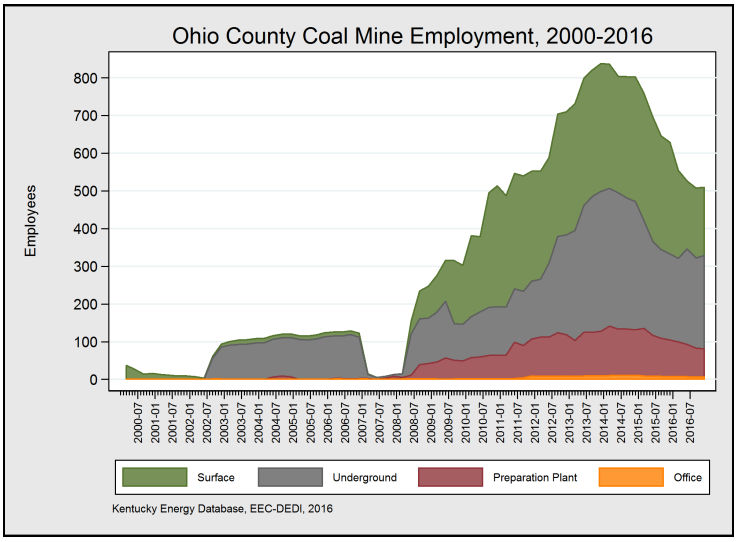


Production Method	Production	Annual Change
Total	4,742,266	-29.7%
Underground	2,136,725	-15.9%
Surface	2,605,541	-38.1%

On-Site Activity	Employment	Annual Change
Total	526	-23.5%
Underground	240	-6.0%
Surface	196	-38.1%
Preparation Plant	83	-24.0%
Office	7	-15.6%

In 2016, Ohio County mined more than 4.7 million tons of coal. More than half of production came from surface operations.

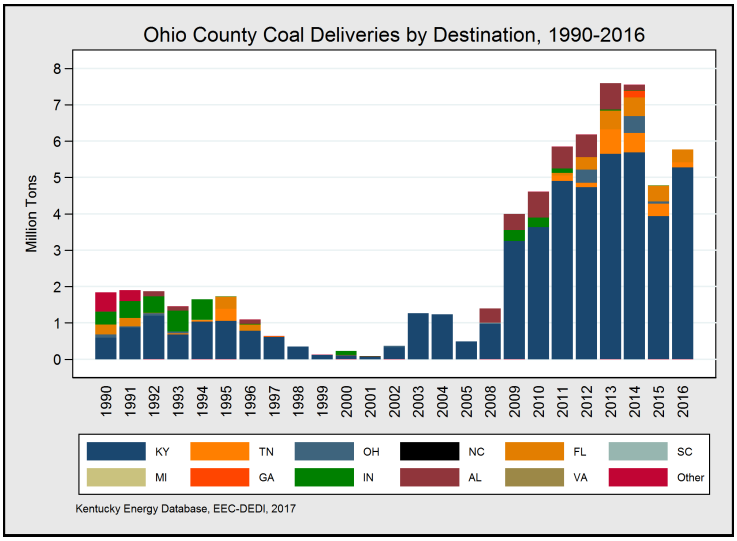


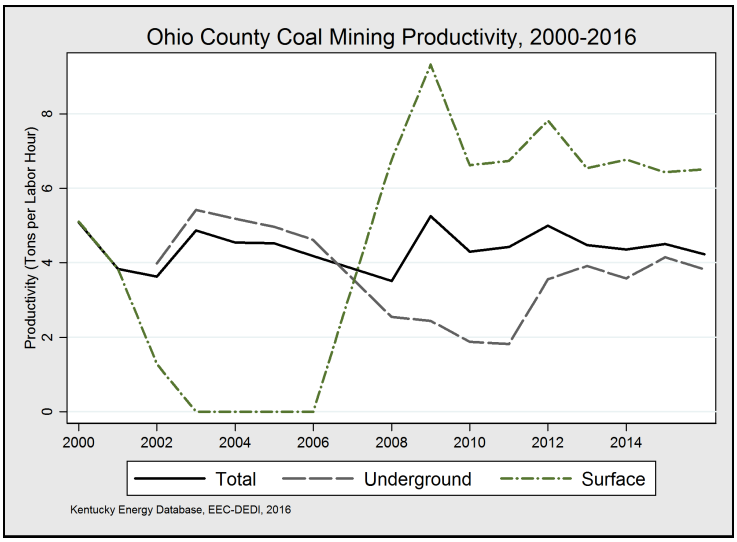


Ohio County coal production in 2016, at more than 4.7 million tons, is 53 percent lower than the levels of peak production of more than 9.9 million tons reached in 1977. Coal production has been recorded in Ohio County since 1865, and during 150 years of production, more than 311 million tons of coal have been extracted in Ohio County. The majority of mining production has been from surface operations since 1947 with the exception of 2001 through 2007.

Coal companies in Ohio County have, on average, employed 526 full time employees in 2016. Of the 526 employees, 240 worked in underground mines, 196 in surface mines, 83 in preparation plants, and 7 in on-site offices.

Ohio County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**5,773,915**	**100.0%**
Kentucky	**5,276,042**	**91.4%**
Ghent	2,006,432	34.7%
Mill Creek	1,353,966	23.4%
Paradise	838,741	14.5%
East Bend	246,873	4.3%
Trimble County	799,388	13.8%
GRT Terminal	30,642	0.5%
Florida	**359,409**	**6.2%**
Big Bend	237,893	4.1%
Davant Transfer	121,516	2.1%
Tennessee	**138,464**	**2.4%**
Kingston	138,464	2.4%

Ohio County Coal Market

More than 5.7 million tons of Ohio County coal were delivered to power plants in 2016. Ohio County coal shipments grew by 20 percent in 2016 and are five times 2008 levels. Kentucky received 91 percent of the market for Ohio County coal in 2016, and coal from the county was delivered to 9 different power plants that year.

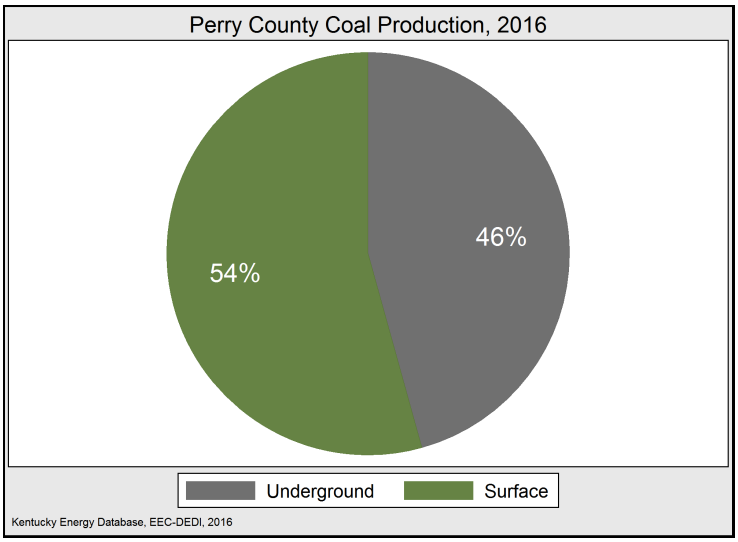
Ohio County Coal Mining Productivity

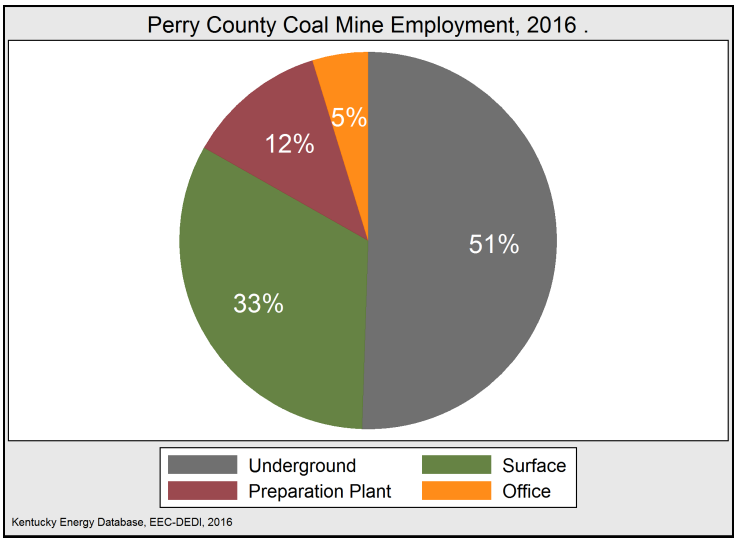
Of all coal mining counties in Kentucky in 2016, Ohio County in Western Kentucky had productivity at 4.23 tons per labor hour. Surface operations, which represented 37 percent of annual production, achieved productivity of 6.51 tons per labor hour. Underground operations had an average productivity of 3.82 tons per hour.

Chemical Composition and Cost

Coal mined in Ohio County had a median sulfur content of 2.99 percent, a median ash content of 9.8 percent, and a median heat content of 22.62 MMBtu per ton. The average delivered price per ton for Ohio County coal in 2016 was $47.91. The delivered price per MMBtu of coal from Ohio County had a median of $2.12 per MMBtu.

Perry County

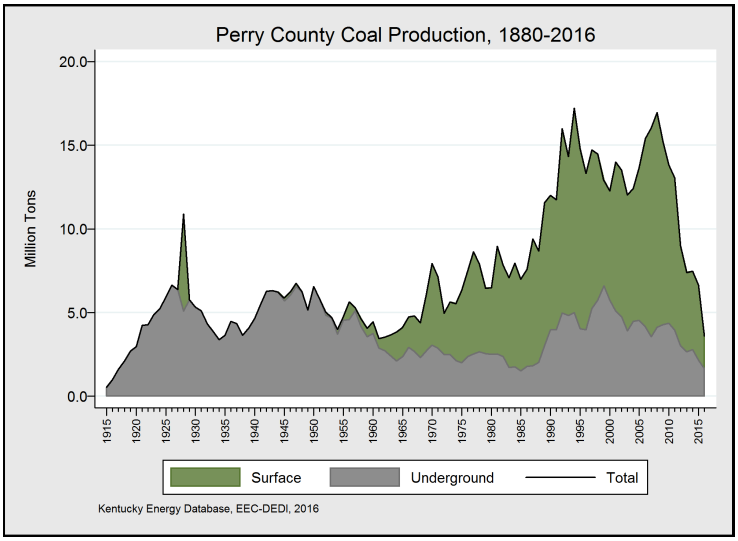


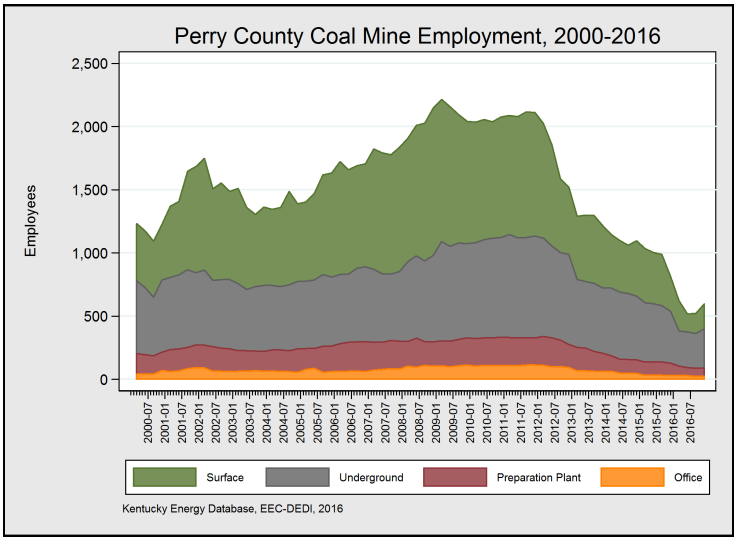


Production Method	Production	Annual Change
Total	3,591,754	-46.0%
Surface	1,950,585	-56.6%
Underground	1,641,169	-23.9%

In 2016, Perry County mined 3.5 million tons of coal, which was fifth among all Kentucky counties in tonnage.

On-Site Activity	Employment	Annual Change
Total	566	-41.4%
Underground	286	-35.7%
Surface	185	-51.6%
Preparation Plant	68	-35.3%
Office	27	-14.9%

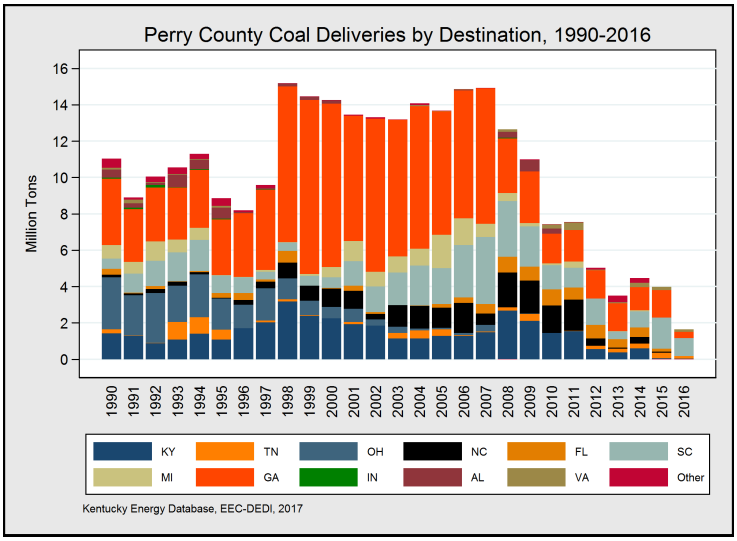


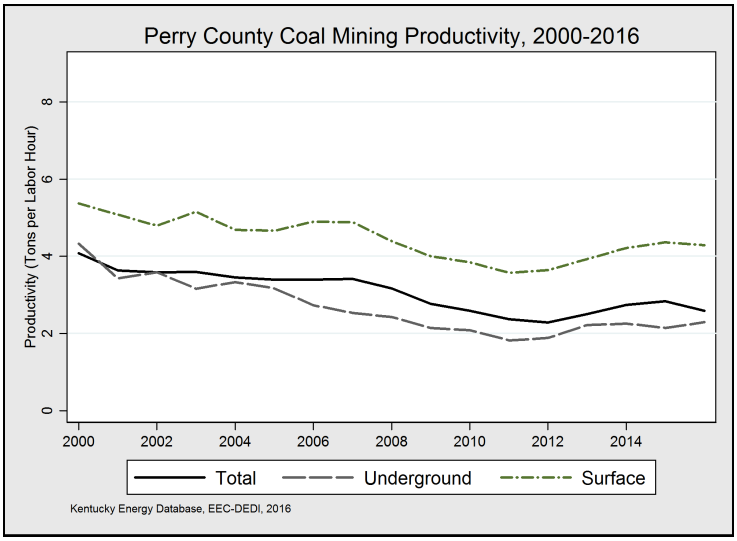


Coal production has been recorded in Perry County since 1889, but it was not until 1917, during the First World War, that production would reach one million tons. Coal production rose again during the Second World War. In 1972, surface mining became the dominant method of coal extraction in Perry County. Production peaked in 1994 at 17.23 million tons, and in 2008 rose again to 17.17 million tons, but has declined significantly since.

Perry County had the sixth-highest number of coal production workers in Kentucky in 2016, with 566 employed. A total of 286 miners worked underground, 185 worked above ground, 68 in preparation plants, and 27 in on-site office capacities. Coal mine employment peaked in at 7,451 in Perry County in 1949, which at the time, was equivalent to 16 percent of the county population. Through 2016, coal production employment has declined by 92 percent since 1949.

Perry County





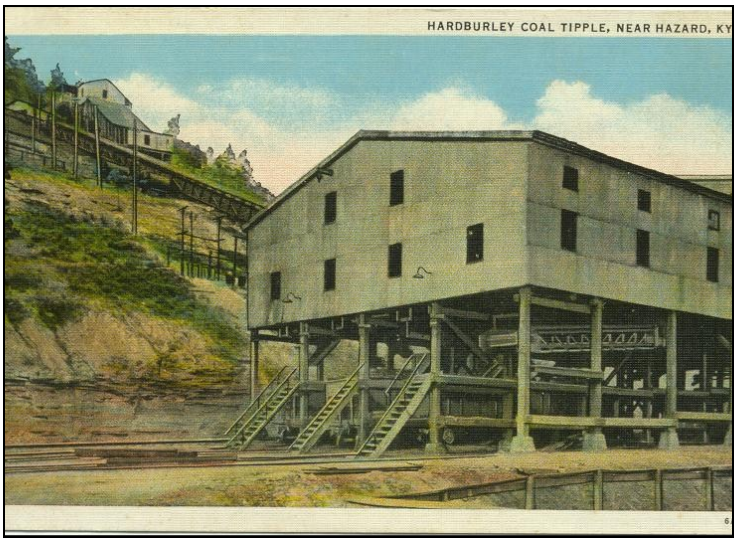
State and Power Plant	Deliveries (Tons)	Percentage
Total	**1,652,406**	**100%**
South Carolina	**984,134**	**59.6%**
Wateree	77,268	4.7%
Winyah	350,776	21.2%
Cope	129,488	7.8%
Cross	219,926	13.3%
Williams	206,676	12.5%
Georgia	**339,949**	**20.6%**
Bowen	284,358	17.2%
Georgia-Pacific Cedar Springs	55,591	3.4%
Virginia	**155,693**	**9.4%**
Spruance Genco LLC	155,693	9.4%
Tennessee	**136,432**	**8.3%**
Bull Run	69,875	4.2%
Tennessee Eastman	66,557	4.0%
Kentucky	**36,198**	**2.2%**
Cooper	36,198	2.2%

Perry County Coal Market

Steam coal from Perry County was delivered to power plants in 5 different states during reporting year 2016. Plant Bowen of Georgia by itself received 20 percent of Perry County coal deliveries. Total shipments of Perry County steam coal decreased by 58 percent from the year previous.

Perry County

Pictured above: Scuddy Coal Camp on Carr's Fork near Hazard, Kentucky during the 1920s



Pictured above: Hardburley Coal Tipple, near Hazard, Kentucky.

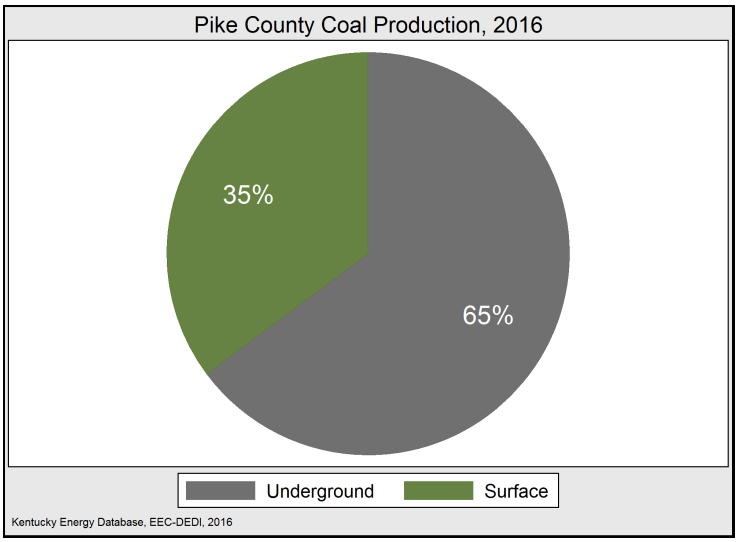
Perry County Coal Mining Productivity

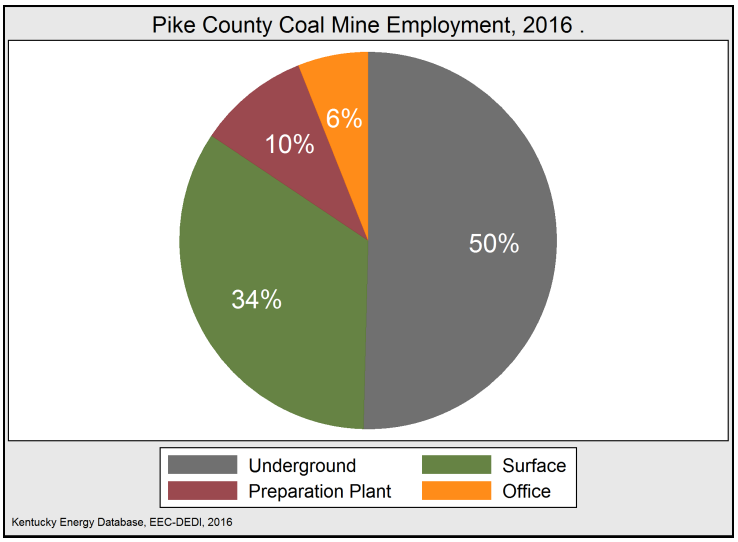
Perry County had a productivity of 2.59 tons per labor hour in 2016. Surface coal mines in Perry County were more productive than underground coal mines (4.28 compared to 2.29). Since 2000, Perry County coal mine productivity has declined steadily, which has increased the costs of coal production, and decreased cost-competiveness versus alternative sources of energy. Mining productivity in Perry County has remained relatively stable compared to other counties in Eastern Kentucky.

Chemical Composition and Cost

Coal mined in Perry County had a median sulfur content of 0.94 percent, a median ash content of 10.1 percent, and a median heat content of 24.75 MMBtu per ton. Perry County had a median delivered price per ton of $78.46. The delivered price per MMBtu of coal from Perry County had a median of $3.13 per MMBtu.

Pike County

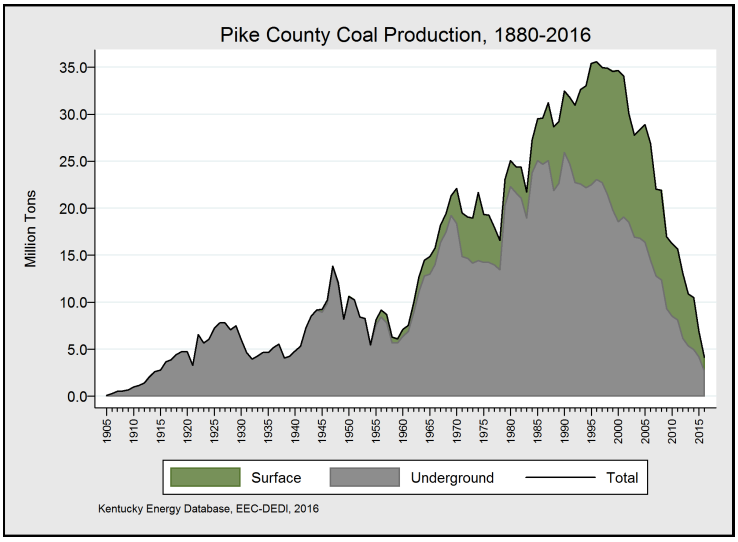


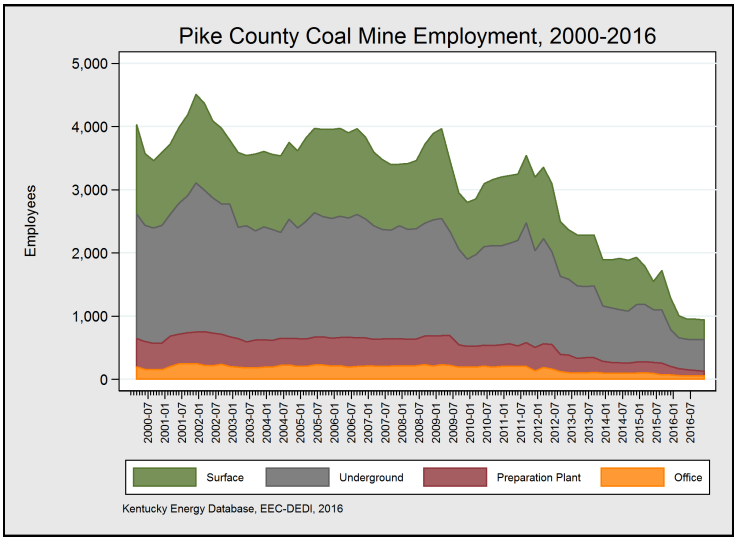


Production Method	Production	Annual Change
Total	4,136,454	-40.1%
Surface	1,455,742	-46.6%
Underground	2,680,712	-35.9%

On-Site Activity	Employment	Annual Change
Total	962	-39.5%
Underground	485	-38.8%
Surface	327	-39.8%
Preparation Plant	92	-43.8%
Office	58	-33.4%

In 2016, Pike County mined 4.1 million tons of coal which was the second highest tonnage amongst Kentucky counties.

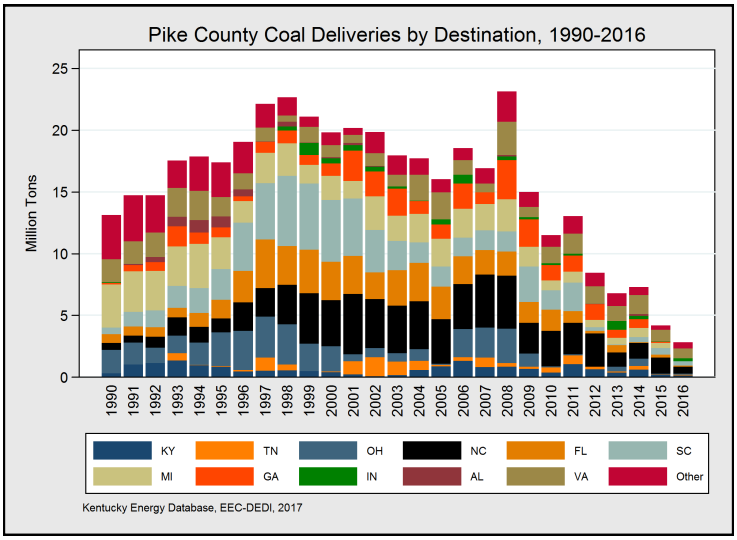




Coal mines in Pike County have produced 1.6 billion tons of coal since 1889, which is more coal than was produced in any other Kentucky county. Even the second largest producer historically, Harlan County, trails by 500 million tons. Annual production peaked in Pike County at 35.6 million tons in 1996, and in the 18 years since has declined by 88 percent to 4.1 million tons in 2016. Historically, the vast majority of Pike County coal has come from underground operations, 65 percent came from underground mines in 2016.

In 2016, coal mines in Pike County employed more coal workers than any other Kentucky county. There was an average of 962 persons at coal production facilities, including 812 coal miners—485 underground and 357 surface—92 persons employed in coal preparation plants, and 58 working in on-site offices. Coal mine employment in the county peaked at 14,392 in 1948, which was 18 percent of the county's population at the time.

Pike County



State and Power Plant	Deliveries (Tons)	Percentage
Total	**2,819,118**	**100%**
Virginia	**802,194**	**28.5%**
Clover	318,311	11.3%
Mecklenburg Station	68,301	2.4%
Yorktown	11,899	0.4%
Chesterfield	403,683	14.3%
North Carolina	**571,201**	**20.3%**
Marshall (NC)	92,224	3.3%
Asheville	11,725	0.4%
G G Allen	23,638	0.8%
Edgecombe Genco	74,148	2.6%
Belews Creek	369,466	13.1%
South Carolina	**337,426**	**12.0%**
Cope	37,323	1.3%
Williams	11,501	0.4%
Wateree	288,602	10.2%
West Virginia	**293,957**	**10.4%**
John E Amos	84,470	3.0%
Mitchell (WV)	209,487	7.4%
Indiana	**241,836**	**8.6%**
Rockport	241,836	8.6%
Kentucky	**129,625**	**4.6%**
Bent Mountain	129,625	4.6%
Ohio	**102,731**	**3.6%**
J M Stuart	102,731	3.6%
Florida	**87,954**	**3.1%**
Indiantown Cogeneration LP	87,954	3.1%
New York	**80,124**	**2.8%**
RED-Rochester, LLC	80,124	2.8%
Maryland	**53,679**	**1.9%**
Herbert A Wagner	53,679	1.9%
Mississippi	**47,456**	**1.7%**
R D Morrow	47,456	1.7%
Tennessee	**46,825**	**1.7%**
Kingston	23,658	0.8%
Bull Run	23,167	0.8%
Michigan	**13,114**	**0.5%**
Escanaba Mill	13,114	0.5%
New Jersey	**10,996**	**0.4%**
Logan Generating Co.	10,996	0.4%

Pike County

Pictured: McCoy Elkhorn Coal Corp., Mine #15, Pike County, Kentucky. (Courtesy of the James River Coal Company).

Pike County Coal Mining Productivity

In 2016, average coal mine productivity in Pike County was 2.11 tons per labor hour. Surface mines in the county were less productive at 2.39 tons per hour, while underground operations averaged 2.59 tons per hour. Compared with 2015, coal mining productivity decreased from 2.17 tons per labor hour to 2.11.

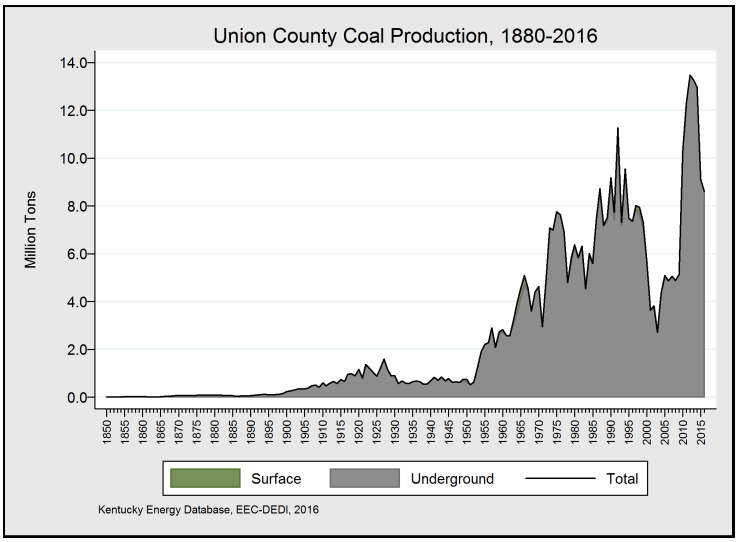
Pike County Coal Market

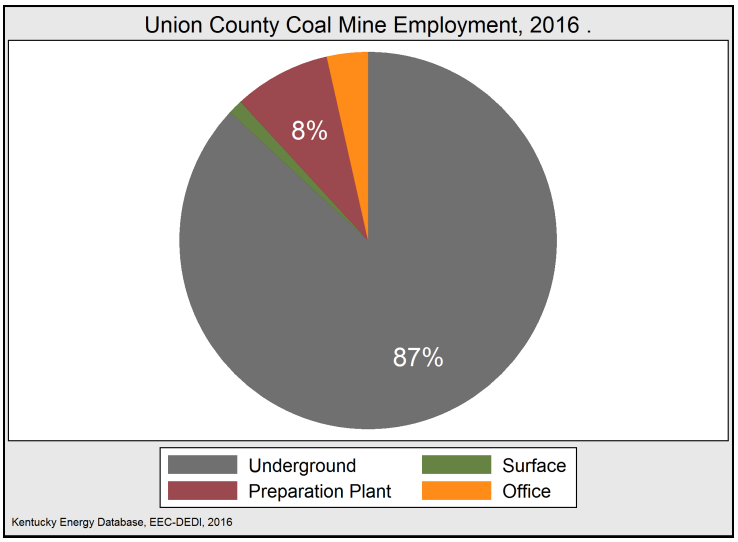
A total of 2.8 million tons of coal mined in Pike County was shipped to power plants in 14 different states in 2016. Of this amount, 403 thousand tons were shipped to the Chesterfield power plant. Pike County is relatively insulated from the closure or decreased consumption of any single plant because of the sheer size and diversity of its shipments relative to other Kentucky counties—no single plant consumed more than 15 percent of Pike County coal in 2016. Regardless, fuel shipments from the county have declined over the last five years.

Chemical Composition and Cost

Coal mined in Pike County had a median sulfur content of 0.93 percent, a median ash content of 9.54 percent, and a median heat content of 25.23 MMBtu per ton. These costs resulted in a median delivered price per ton of $75.64. The delivered price per MMBtu of coal from Pike County had a median of $3.02 per MMBtu.

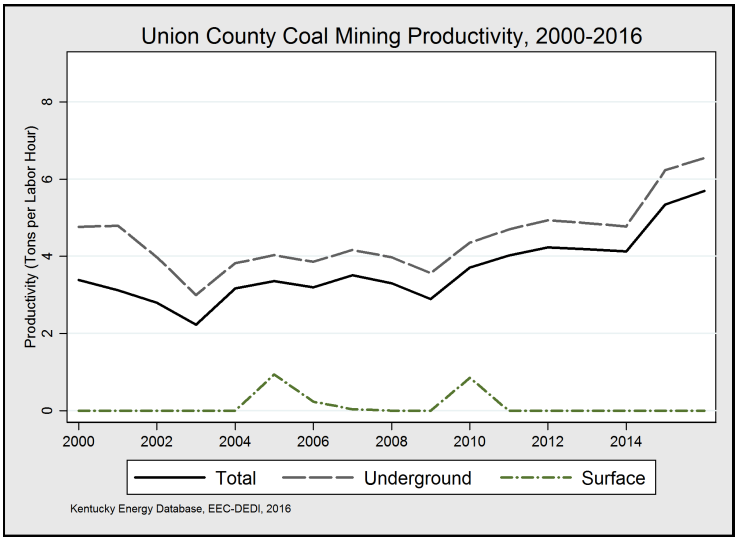
Union County

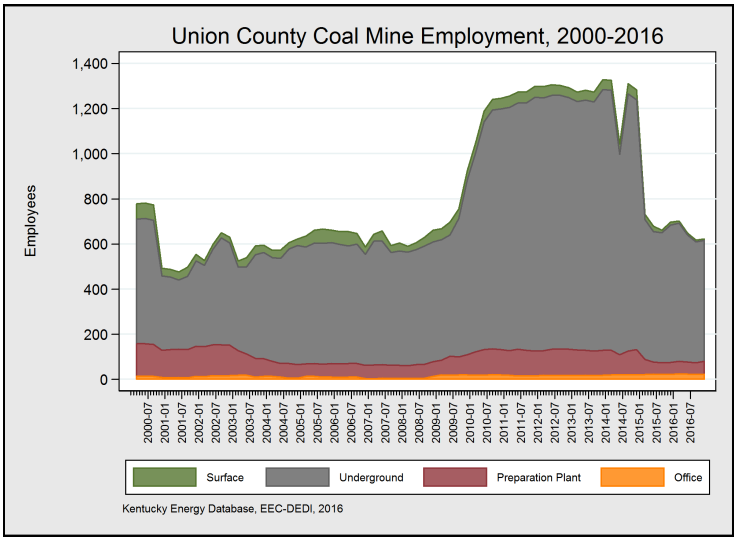




Production Method	Production	Annual Change
Total	8,607,528	-5.6%
Underground	8,607,528	-5.6%

On-Site Activity	Employment	Annual Change
Total	651	-5.5%
Underground	566	-4.4%
Preparation Plant	54	-3.0%
Surface	8	-55.4%
Office	23	-4.3%

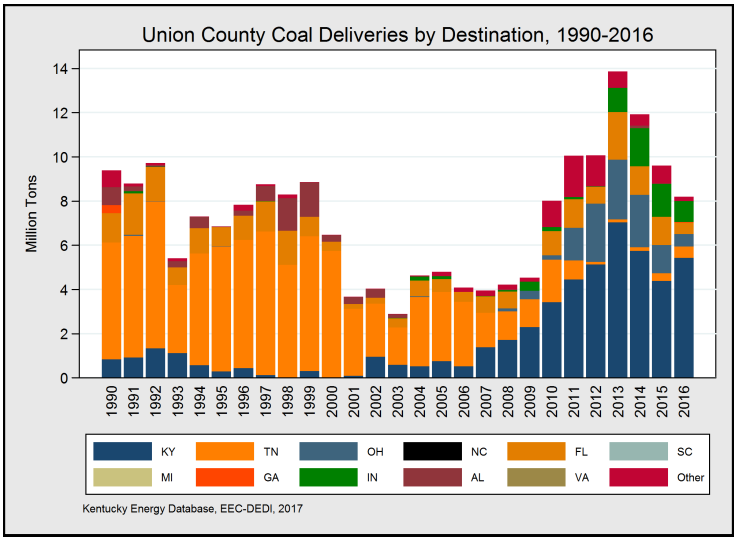




Coal production in 2016 in Union County decreased by 5.6 percent; however, Union County remained the largest coal-producing county in Kentucky. The vast majority of Union County's coal production comes from the underground operations at Alliance Resource's River View Mine, which is Kentucky's largest producing coal mine. Coal production began in Union County in 1836 at 500 tons and the county's highest production was 13.5 million tons in 2012.

On average, coal mines in Union County on average employed 651 workers full-time. The vast majority of direct mining jobs in Union County has always been in underground mine operations with at least 67 percent of mine employment since 2000 and at least 80 percent of mine employment since 2004.

Union County



Pictured above: River View Coal Mine, Union County, 2012.
Photo courtesy of River View Coal, LLC.

State and Power Plant	Deliveries (Tons)	Percentage
Total	**8,196,267**	**100%**
Kentucky	**5,419,377**	**66.1%**
Ghent	939,324	11.5%
Mill Creek	765,947	9.3%
Elmer Smith	68,402	0.8%
Paradise	273,996	3.3%
East Bend	565,931	6.9%
H L Spurlock	666,134	8.1%
Trimble County	1,523,442	18.6%
R D Green	318,010	3.9%
D B Wilson	298,191	3.6%
Indiana	**952,397**	**11.6%**
Clifty Creek	927,703	11.3%
R Gallagher	24,694	0.3%
Ohio	**565,405**	**6.9%**
Miami Fort	17,749	0.2%
J M Stuart	368,715	4.5%
Killen Station	178,941	2.2%
Tennessee	**526,779**	**6.4%**
Cumberland	498,313	6.1%
Tennessee Eastman	28,466	0.3%
Florida	**512,430**	**6.3%**
Big Bend	30,212	0.4%
Davant Transfer	147,649	1.8%
IMT Transfer	334,569	4.1%

State and Power Plant	Deliveries (Tons)	Percentage
Mississippi	**165,010**	**2.0%**
Associated Terminals	165,010	2.0%
West Virginia	**30,448**	**0.4%**
Ceredo	30,448	0.4%
Georgia	**24,421**	**0.3%**
Bowen	24,421	0.3%

Union County Coal Market

Union county shipped the most coal of any county in Kentucky in 2016. During the year, more than 8.1 million tons of coal mined in the county were delivered to eight different states, with nearly half going to coal plants in Kentucky. The largest consumer of Union County coal in 2015, Trimble County Generating Station, received approximately 18 percent of its coal from Union County.

Union County

River View Coal Mine, Union County, 2012.
Photo courtesy of River View Coal, LLC.

Union County Coal Mining Productivity

Unlike most coal-producing counties in Kentucky, mine productivity in Union County had been stable between 2004 and 2009 and has increased since. In 2016, average coal mine productivity in Union County was 5.69 tons per labor hour. Underground operations averaged 6.55 tons per labor hour, making Union County the most productive county for underground mining. In fact, Union County has had the most productive underground operations in Kentucky since 2012.

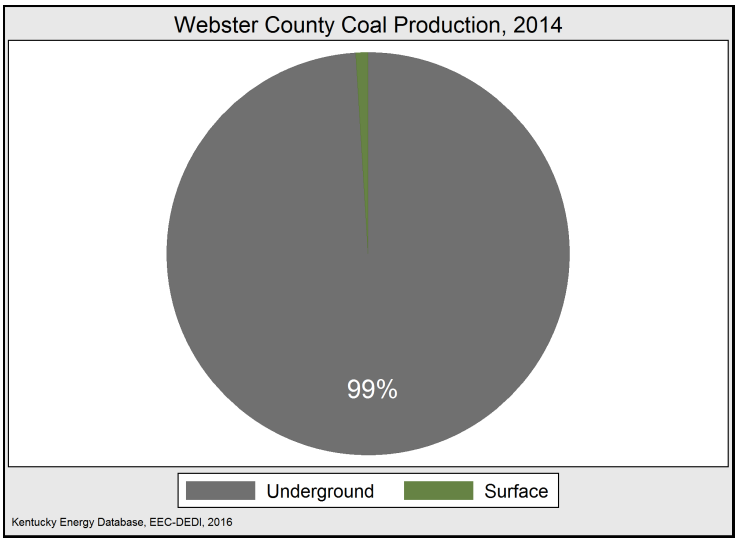
Chemical Composition and Cost

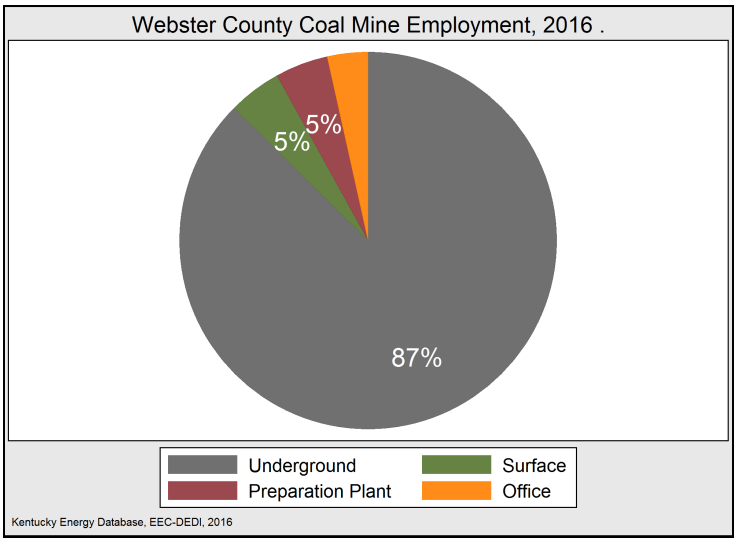
Coal mined in Union County had a median sulfur content of 2.9 percent, a median ash content of 8.5 percent, and a median heat content of 23.09 MMBtu per ton. These costs resulted in a median delivered price per ton of $51.38. The delivered price per MMBtu of coal from Union County had a median cost of $2.22 per MMBtu.

Union County

Photos taken of underground mining and coal preparation at the River View Coal Mine in March, 2010 by Aaron Camenisch, University of Kentucky, for the Kentucky Energy and Environment Cabinet.

Webster County

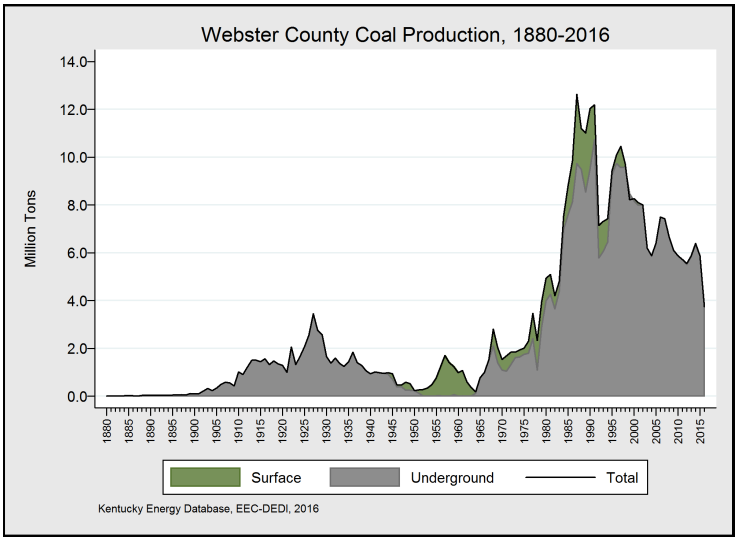


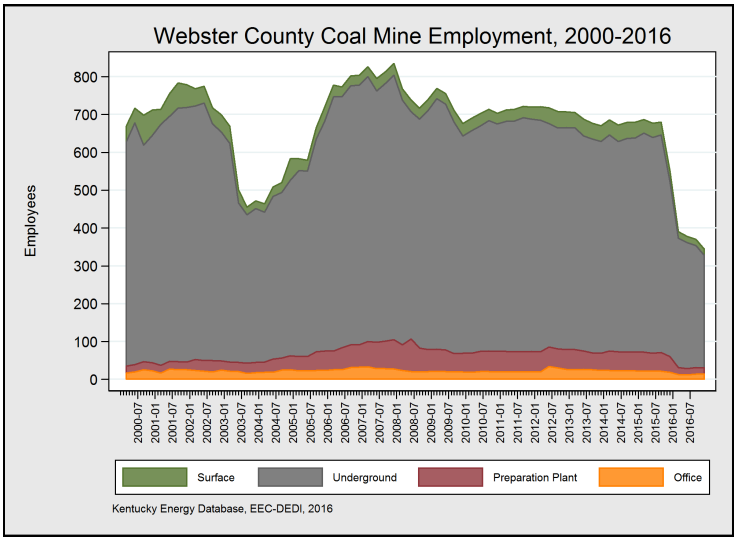


Production Method	Production	Annual Change
Total	3,744,015	-36.2%
Underground	3,744,015	-36.2%
Surface	0	+0.0%

On-Site Activity	Employment	Annual Change
Total	373	-42.7%
Underground	326	-40.7%
Preparation Plant	17	-63.5%
Surface	17	-51.7%
Office	13	-38.0%

In 2016, Webster mined 3.7 million tons of coal, which was a decrease of 36 percent from 2015. All of this coal came from underground mines.

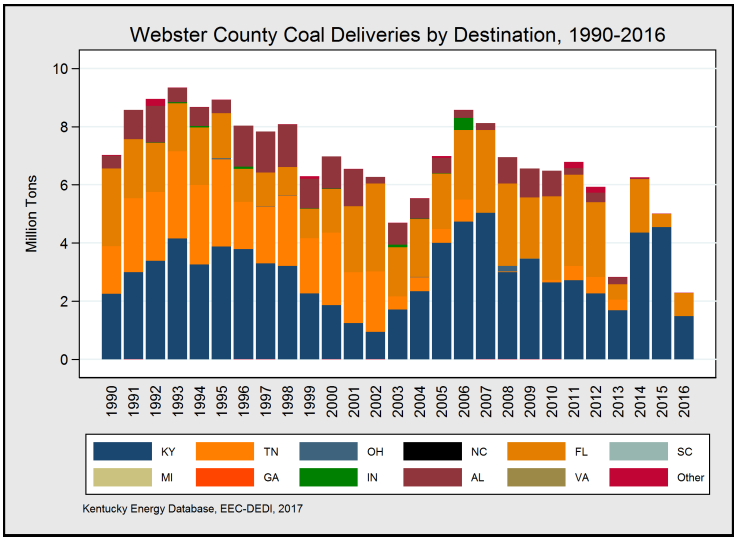


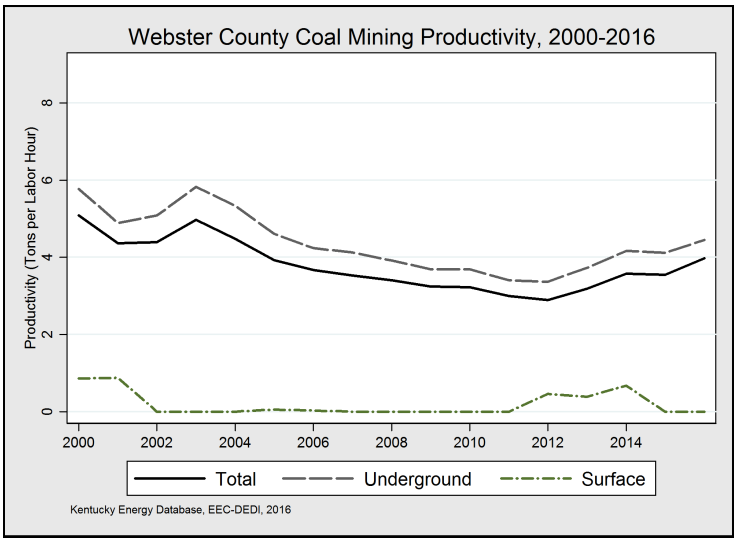


Coal production has been recorded in Webster County since 1869 and would first reach one million tons annually in 1910. Production peaked in Webster County in 1987 at 12.6 million tons and has declined by 53 percent through 2015. The vast majority of coal produced in Webster County comes from Alliance's Dotiki Mine or Onton #9 mine.

Coal mines in Webster County directly employed 373 people full-time in 2016. Most of these workers, 326 or 87 percent, were underground coal miners. There were also 17 workers employed in preparation plants, 17 surface mine workers, and 13 on-site office staff. Coal mine employment peaked at 1,343 in 1994 and has declined by 72 percent through 2016.

Webster County





State and Power Plant	Deliveries (Tons)	Percentage
Total	**2,269,773**	**100%**
Kentucky	**1,484,144**	**65.4%**
Mill Creek	1,070,085	47.1%
HMP&L Station Two	263,630	11.6%
R D Green	39,920	1.8%
D B Wilson	110,509	4.9%
Florida	**785,629**	**34.6%**
Seminole (FL)	751,019	33.1%
Davant Transfer	34,610	1.5%

Webster County Coal Market

Mill Creek Station, located near Louisville, Kentucky, was the largest single consumer of coal shipped from Webster County in 2016, consuming nearly 47 percent of all coal shipped from Webster County that year. Overall, known steam coal shipments had been stable between 2008 and 2012, but decreased by 55 percent in 2013, but more than doubled again in 2014. Coal shipments have decreased by 54.6 percent compared to 2015.

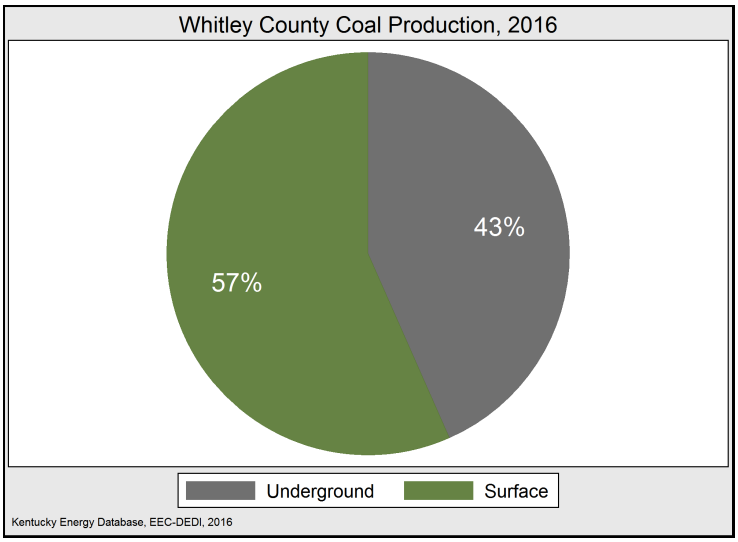
Webster County Coal Mining Productivity

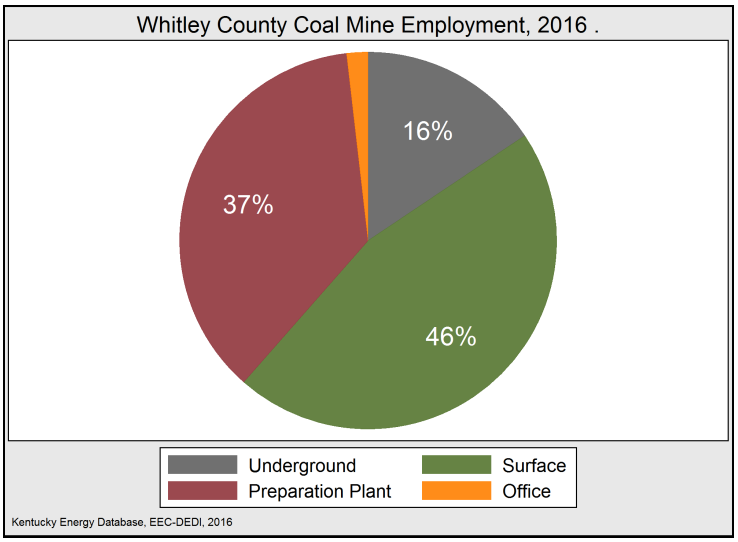
Overall coal mine productivity in Webster County was 3.97 tons per labor hour during 2016. Most of the coal production in the county came from underground operations in 2016, which produced at a rate of 4.45 tons per labor hour.

Chemical Composition and Cost

On average, coal mined in Webster County had a median sulfur content of 2.95 percent, a median ash content of 10 percent, and a median heat content of 24 MMBtu per ton. The average delivered price per ton for Webster County coal in 2016 was $57.56. The delivered price per MMBtu of coal from Webster County had a median of $2.23 per MMBtu.

Whitley County

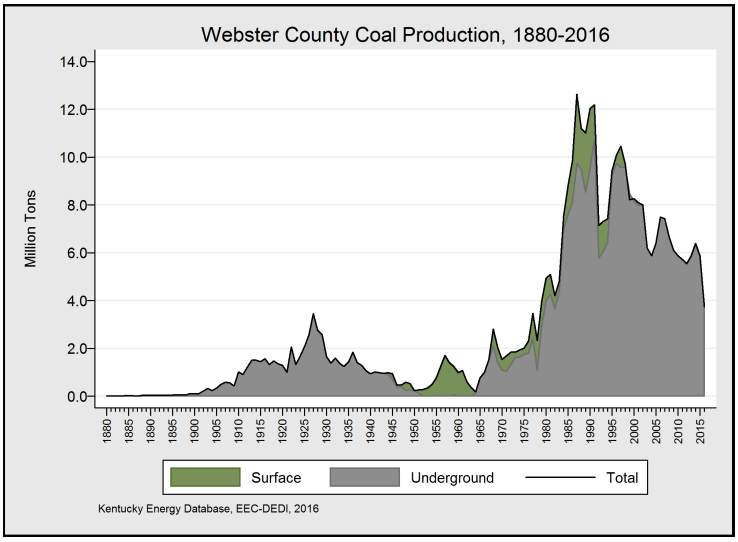


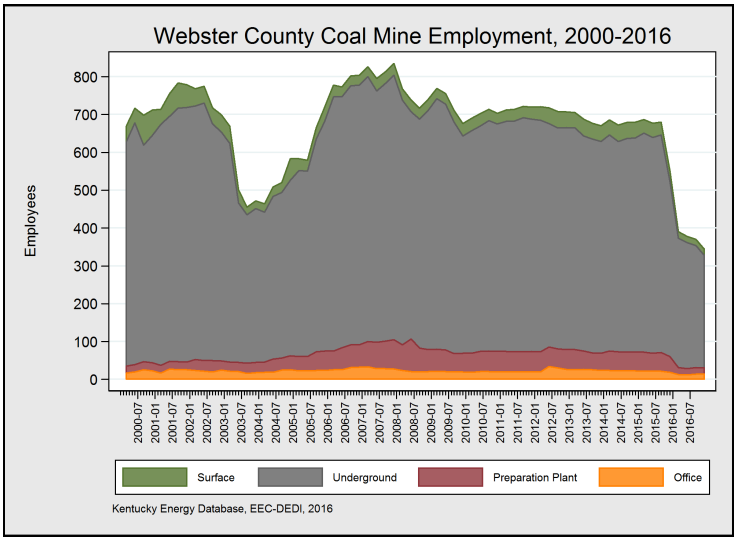


Production Method	Production	Annual Change
Total	210,838	-16.8%
Surface	119,366	-22.0%
Underground	91,472	-9.0%

On-Site Activity	Employment	Annual Change
Total	109	-31.6%
Surface	50	-40.5%
Preparation Plant	40	-27.2%
Underground	17	-4.2%
Office	2	+0.0%

The mines in Whitley County in 2016 produced 210 thousand tons of coal, which was a decrease of 16.8 percent from 2016.

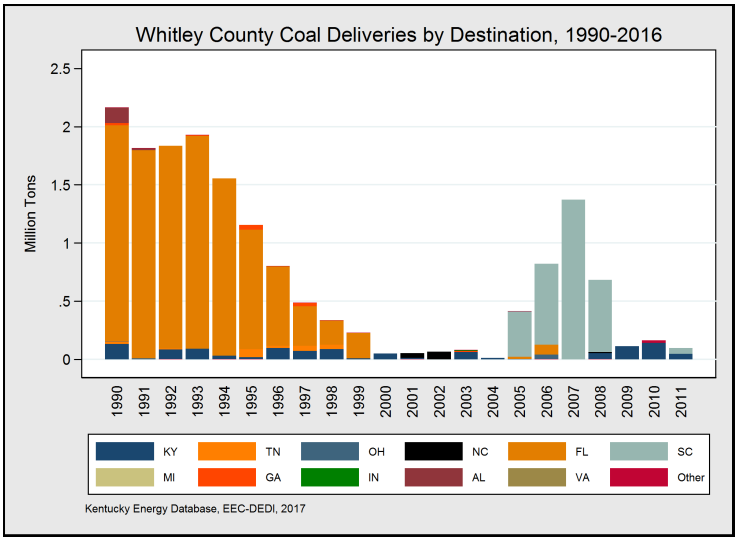


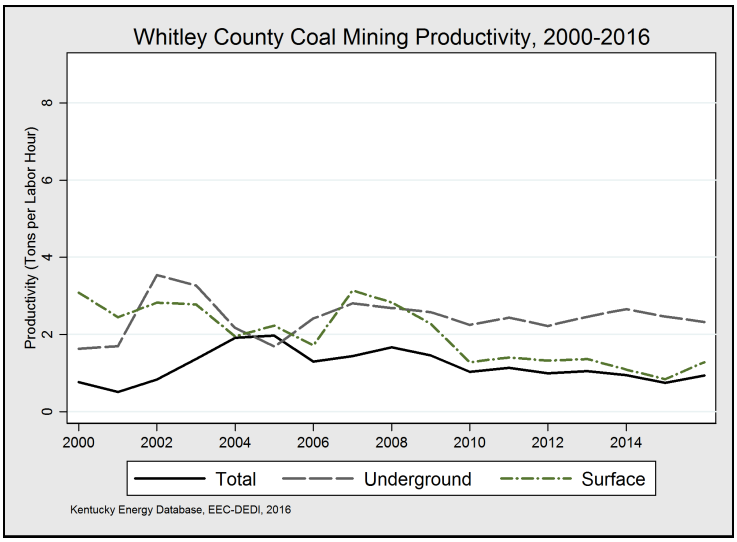


Whitley County began mining coal with 300 tons in 1837. Coal production peaked at 2.8 million tons in 1975, primarily from surface mines, and has declined by 93 percent through 2016. Whitley County has not produced more than 600 thousand tons in one year since 1996. Coal produced in Whitley County today comes primarily from surface mines, while 43 percent comes from underground mines.

In 2016, a total of 109 persons were employed at coal production facilities in Whitley County, a decrease of 31.6 percent from 2016. Whitley County surface operations provided 50 full time jobs to the county in 2016, a decrease of 40 percent from 2015. Preparation plants in Whitley County employed 40 people. Only 17 coal miners worked underground.

Whitley County





Whitley County Coal Mining Productivity

Whitley County coal mines had an overall productivity of .79 tons per labor hour, an overall decrease from .95 in 2015. Underground mines averaged 2.52 tons per labor hour in 2015. Surface mines remained closer to the overall average at .89 tons per labor hour.

Kentucky Coal Production

Year	Production (1,000 Tons)			Year	Production (1,000 Tons)			Year	Production (1,000 Tons)		
	Total	East	West		Total	East	West		Total	East	West
1790	0.02	0.02	0	**1836**	40	31	9	**1882**	1,386	535	851
1791	0	0	0	**1837**	59	48	11	**1883**	1,486	581	905
1792	0	0	0	**1838**	74	62	12	**1884**	1,576	617	959
1793	0	0	0	**1839**	64	50	14	**1885**	1,341	693	648
1794	0.02	0.02	0	**1840**	62	47	15	**1886**	1,519	664	855
1795	0	0	0	**1841**	65	48	17	**1887**	1,933	951	982
1796	0	0	0	**1842**	67	48	19	**1888**	2,401	1,125	1,276
1797	0	0	0	**1843**	69	49	20	**1889**	2,399	1,109	1,290
1798	0	0	0	**1844**	71	49	22	**1890**	2,532	1,217	1,315
1799	0	0	0	**1845**	72	49	23	**1891**	2,963	1,355	1,608
1800	0.1	0.1	0	**1846**	72	49	23	**1892**	3,028	1,293	1,735
1801	0.1	0.1	0	**1847**	73	48	25	**1893**	3,302	1,502	1,800
1802	0.1	0.1	0	**1848**	74	48	26	**1894**	2,957	1,150	1,807
1803	0.2	0.2	0	**1849**	74	47	27	**1895**	3,207	1,423	1,784
1804	0.2	0.2	0	**1850**	76	47	29	**1896**	3,183	1,421	1,762
1805	0.3	0.3	0	**1851**	77	47	30	**1897**	3,304	1,189	2,115
1806	0.4	0.4	0	**1852**	79	47	32	**1898**	3,535	1,471	2,064
1807	0.5	0.5	0	**1853**	82	49	33	**1899**	4,506	1,765	2,741
1808	0.5	0.5	0	**1854**	85	51	34	**1900**	5,021	2,087	2,934
1809	0.6	0.6	0	**1855**	108	67	41	**1901**	5,325	2,253	3,072
1810	0.7	0.7	0	**1856**	114	67	47	**1902**	6,429	2,785	3,644
1811	0.8	0.8	0	**1857**	118	69	49	**1903**	7,198	2,953	4,245
1812	0.9	0.9	0	**1858**	123	71	52	**1904**	7,168	3,046	4,122
1813	1.0	1.0	0	**1859**	127	73	54	**1905**	8,039	3,357	4,682
1814	1.1	1.1	0	**1860**	129	75	54	**1906**	9,598	3,810	5,788
1815	1.2	1.2	0	**1861**	44	1	43	**1907**	10,436	4,275	6,161
1816	1.3	1.3	0	**1862**	4	0	4	**1908**	9,806	4,171	5,635
1817	1.4	1.4	0	**1863**	4	0	4	**1909**	10,294	4,716	5,578
1818	1.5	1.5	0	**1864**	104	0	104	**1910**	14,766	6,317	8,449
1819	1.6	1.6	0	**1865**	107	0	107	**1911**	13,899	6,939	6,960
1820	2.0	1.7	0.3	**1866**	139	30	109	**1912**	15,789	7,993	7,796
1821	2.1	1.8	0.3	**1867**	114	45	69	**1913**	18,797	10,359	8,438
1822	2.3	1.9	0.4	**1868**	175	71	104	**1914**	19,582	11,789	7,793
1823	2.4	2.0	0.4	**1869**	229	92	137	**1915**	20,704	13,119	7,585
1824	3.1	2.6	0.5	**1870**	282	125	157	**1916**	24,631	16,893	7,738
1825	6.7	3.1	3.6	**1871**	345	127	218	**1917**	27,125	17,187	9,938
1826	7.5	3.6	3.9	**1872**	530	155	375	**1918**	30,787	19,988	10,799
1827	8.5	4.2	4.3	**1873**	528	149	379	**1919**	29,289	20,657	8,632
1828	9.6	5.0	4.6	**1874**	583	164	419	**1920**	32,893	22,177	10,716
1829	16.0	11.1	4.9	**1875**	666	226	440	**1921**	29,715	21,596	8,119
1830	18.9	13.6	5.3	**1876**	732	260	472	**1922**	40,565	27,302	13,263
1831	21.7	16.1	5.6	**1877**	800	295	505	**1923**	42,248	32,273	9,975
1832	23.4	17.5	5.9	**1878**	889	316	573	**1924**	42,576	34,450	8,126
1833	26.6	19.5	7.1	**1879**	1,124	373	751	**1925**	53,836	42,072	11,764
1834	34.6	27.4	7.2	**1880**	1,201	458	743	**1926**	62,661	46,353	16,308
1835	36.0	28.0	8.0	**1881**	1,292	495	797				

Coal Production and Employment

Year	Production (1,000 Tons)			Employment			Year	Production (1,000 Tons)			Employment		
	Total	East	West	Total	East	West		Total	East	West	Total	East	West
1927	67,768	47,697	20,071	64,969	56,623	8,346	**1973**	127,518	73,954	53,564	30,505	20,375	10,130
1928	65,794	49,845	15,949	58,775	49,937	8,838	**1974**	136,769	85,018	51,751	37,716	26,556	11,160
1929	59,395	45,294	14,101	57,445	48,387	9,058	**1975**	144,202	88,237	55,965	44,961	32,017	12,944
1930	50,065	39,625	10,440	55,424	45,930	9,494	**1976**	142,932	89,315	53,617	46,097	32,313	13,784
1931	39,804	31,462	8,342	46,984	37,240	9,744	**1977**	147,575	95,902	51,673	50,922	36,141	14,781
1932	34,987	25,620	9,367	40,282	30,660	9,622	**1978**	135,281	97,056	38,225	52,115	37,961	14,154
1933	36,447	28,427	8,020	44,963	35,180	9,783	**1979**	149,834	106,665	43,169	54,407	38,643	15,764
1934	38,455	30,252	8,203	51,148	41,387	9,761	**1980**	149,969	109,011	40,958	46,395	34,521	11,874
1935	40,933	32,335	8,598	53,631	43,917	9,714	**1981**	156,537	117,661	38,876	48,050	37,505	10,545
1936	47,094	38,826	8,268	58,494	48,741	9,753	**1982**	151,278	112,021	39,257	44,860	35,101	9,759
1937	46,468	38,111	8,357	56,810	47,067	9,743	**1983**	131,596	95,818	35,778	36,433	28,100	8,333
1938	39,031	31,497	7,534	55,322	45,481	9,841	**1984**	170,678	124,567	46,111	37,876	29,801	8,075
1939	41,496	33,516	7,980	54,693	44,905	9,788	**1985**	169,571	125,780	43,791	36,814	29,099	7,715
1940	48,572	40,012	8,560	56,293	46,574	9,719	**1986**	165,607	119,905	45,702	32,654	26,030	6,624
1941	53,354	41,865	11,489	60,160	51,096	9,064	**1987**	177,259	126,382	50,877	32,590	25,640	6,950
1942	62,531	49,136	13,395	58,815	49,290	9,525	**1988**	161,209	118,680	42,529	29,559	23,346	6,213
1943	63,231	47,956	15,275	51,777	42,468	9,309	**1989**	170,516	127,284	43,232	30,656	24,620	6,036
1944	71,394	50,998	20,396	53,586	44,610	8,976	**1990**	179,373	130,971	48,402	30,498	24,912	5,586
1945	69,290	48,325	20,965	49,855	39,992	9,863	**1991**	163,293	119,159	44,134	26,642	21,129	5,513
1946	68,493	49,638	18,855	56,623	47,712	8,911	**1992**	161,068	119,382	41,686	24,624	19,419	5,205
1947	87,556	64,933	22,623	73,091	63,714	9,377	**1993**	156,299	120,191	36,108	24,063	18,711	5,352
1948	81,384	58,405	22,979	75,633	66,410	9,223	**1994**	161,637	125,064	36,573	23,368	18,577	4,791
1949	73,278	48,075	25,203	75,707	66,300	9,407	**1995**	153,493	118,558	34,935	21,125	16,840	4,285
1950	80,988	56,474	24,514	74,457	66,141	8,316	**1996**	152,425	116,951	35,474	18,826	15,130	3,696
1951	73,036	51,504	21,532	58,991	51,767	7,224	**1997**	155,551	120,615	34,936	18,937	15,422	3,515
1952	63,826	42,977	20,849	50,555	42,680	7,875	**1998**	150,295	116,654	33,641	18,927	15,417	3,510
1953	63,318	42,114	21,204	46,109	39,000	7,109	**1999**	139,626	110,043	29,583	17,211	14,287	2,924
1954	58,055	35,537	22,518	38,658	31,326	7,332	**2000**	131,985	105,932	26,053	14,508	12,288	2,220
1955	68,165	41,869	26,296	41,291	33,344	7,947	**2001**	134,584	109,963	24,621	17,093	14,508	2,585
1956	75,328	45,523	29,805	44,935	37,105	7,830	**2002**	124,634	99,864	24,770	15,131	12,607	2,524
1957	75,394	45,030	30,364	42,261	34,259	8,002	**2003**	113,306	91,801	21,505	13,791	11,614	2,177
1958	67,252	39,066	28,186	38,693	31,890	6,803	**2004**	114,674	91,265	23,409	14,899	12,361	2,538
1959	64,468	34,131	30,337	34,488	28,138	6,350	**2005**	120,529	94,102	26,427	16,461	13,543	2,918
1960	61,612	31,208	30,404	34,473	27,917	6,556	**2006**	121,808	94,531	27,277	16,756	13,749	3,007
1961	65,395	34,786	30,609	29,765	24,303	5,462	**2007**	115,505	87,238	28,267	16,112	13,061	3,051
1962	70,050	38,389	31,661	28,015	22,842	5,173	**2008**	121,138	90,971	30,167	19,028	15,418	3,610
1963	78,183	42,464	35,719	29,445	23,927	5,518	**2009**	108,169	75,217	32,952	16,378	12,727	3,651
1964	83,238	45,256	37,982	28,066	23,074	4,992	**2010**	105,466	68,135	37,331	17,796	13,484	4,312
1965	87,207	47,328	39,879	26,501	21,389	5,112	**2011**	108,933	67,922	41,011	18,085	13,579	4,506
1966	93,189	51,207	41,982	25,114	20,335	4,779	**2012**	91,201	49,155	42,046	14,105	9,562	4,543
1967	100,106	54,492	45,614	24,643	19,473	5,170	**2013**	80,277	39,398	40,879	11,890	7,441	4,449
1968	100,976	54,845	46,131	23,667	18,413	5,254	**2014**	77,427	37,458	39,969	11,586	7,153	4,433
1969	108,026	60,461	47,565	25,297	17,584	7,713	**2015**	61,414	28,090	33,324	9,557	5,947	3,610
1970	125,308	72,596	52,712	27,689	19,223	8,466	**2016**	42,982	25,969	17,013	6,612	3,875	2,737
1971	119,189	71,337	47,852	29,313	20,912	8,401	*This report uses the best-available estimate for each factor at the time of publication. As a result of data revisions, confidentiality, rounding, and reporting errors, the table values may not precisely equal the sum of the included components and may be subject to change.*						
1972	120,271	67,967	52,304	30,221	20,696	9,525							

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Office of Property Valuation	**Phone:**	**502-564-8338**
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Transportation Cabinet	**Phone:**	**502-564-7183**
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Kentucky Community & Technical College System	FAX 606-589-3117
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In order to provide the public with timely access to these data, this report uses the best-available estimate for each factor at the time of publication. However, as a result of data revisions, confidentiality, rounding, and reporting errors, the table values may not precisely equal the sum of the included components and certain indicators may be subject to change. Please direct all data-related inquiries to Greg Bone (Greg.Bone@ky.gov) or by calling the Kentucky Department for Energy Development and Independence at 502-782-7246.

Data Sources

Kentucky Energy and Environment Cabinet
Department for Energy Development and Independence (DEDI)
Department for Natural Resources (DNR)
Department for Environmental Protection (DEP)

Kentucky Geological Survey

United States Department of Energy (DOE)

Energy Information Administration (EIA)

Federal Energy Regulatory Commission (FERC)

United States Department of Commerce (DOC)
Bureau of Economic Analysis (BEA)
Bureau of Labor Statistics (BLS)
U.S. Census Bureau

United States Department of the Interior (DOI)
Environmental Protection Agency (EPA)

United States Department of Labor (DOL)
Mine Safety and Health Administration (MSHA)
Bureau of Labor Statistics (BLS)

Additional Reference and Educational Materials (Not Used in this Document)

U. S. Department of Energy
(www.fossil.energy.gov/education/)

American Coal Foundation
(www.teachcoal.org)

UK Center for Applied Energy Research
(www.caer.uky.edu)

Coal In Kentucky
University of Kentucky, documentary (2010)
(www.coalinkentucky.com)

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