

Kentucky Energy Profile

8th Edition • 2023

TEAM 
KENTUCKY

ENERGY AND
ENVIRONMENT CABINET

Executive Summary

The Kentucky Energy and Environment Cabinet (EEC) offers the Kentucky Energy Profile 2023 to serve as an impartial point of reference for the general public and as a foundation for discussing Kentucky's energy future.

In 2020, after more than two centuries of commercial mining operations, Kentucky's domestic supply of coal remained a primary source of energy. Kentucky is the seventh-largest coal producing state in the United States with 95% of the coal staying in the US and 46% being used in-state (pg. 52-53). Coal accounts for 69% of Kentucky's electricity portfolio (pg.16) and 32% of its total energy consumption (pg. 37-38). Although coal is Kentucky's primary energy source (76%), the state also produces small amounts of oil (pg. 55) and natural gas (pg. 59). Kentucky also has growing renewable energy resources and opportunities (pg. 60-64).

Kentucky's low energy costs stimulate economic growth by lowering the costs of doing business. Kentucky was tied for the fourth lowest industrial electricity price in the United States in 2020 and tied for the second-lowest east of the Mississippi River (pg. 8-10). In 2020, 39% of the energy and electricity consumed in Kentucky went to manufacturing (pg. 16), which remains Kentucky's largest source of revenue and one of the leading sources of employment (pg. 5). In addition to large flagship manufacturers, Kentucky is also home to other energy-intensive manufacturing processes and a growing commercial sector. Kentucky is also a transportation and logistics hub, which consume large amounts of transportation fuels to ship manufactured goods around the United States and the world.

While Kentucky maintains one of the lowest electricity prices in the United States (pg. 8-12), electricity prices do vary across the Commonwealth and between utilities. Electricity in Kentucky is supplied by 173 individual electricity generating units at 52 power plants across the state (pg. 20-21). In 2020, our utility power plants average 31 years of age, with our oldest hydroelectric station being built in 1925 and the newest solar facilities coming online in 2019. Electricity is sold by six major electric utilities and dozens of smaller municipalities, as shown on the maps (pg. 14-15). Each major electric utility is profiled (pg. 24-35), as well as each coal-fired power plant (pg. 70-105). Kentucky's power plants have reduced emissions of pollutants such as sulfur dioxide and nitrogen oxides by more than 85% since 1995 (pg. 23), as shown on the profile for each utility and power plant.

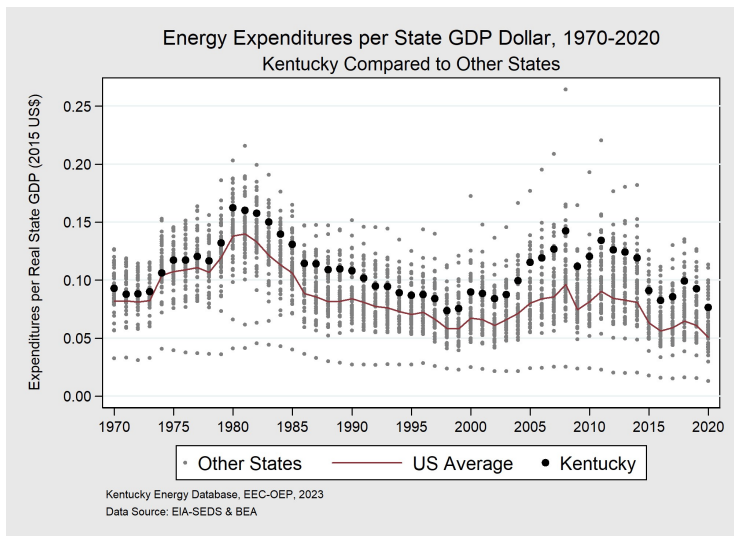
Direct all inquiries or feedback to Evan Moser (Evan.Moser@ky.gov). All of the data in this report are public information aggregated from a variety of state and federal government agencies, and are available at: <https://eec.ky.gov/Energy/News-Publications/Pages/Kentucky-Energy-Profile.aspx>

Disclaimer: The information expressed in this document is for general educational purposes only and does not reflect the endorsement of a specific program or policy. The information contained in this document is up-to-date as of the date of publication. Data utilized for this document is preliminary and subject to revision. Contact The Kentucky Office of Energy Policy for questions regarding data updates. The document provides links to other resources but does not imply endorsement of any particular resource or organization.

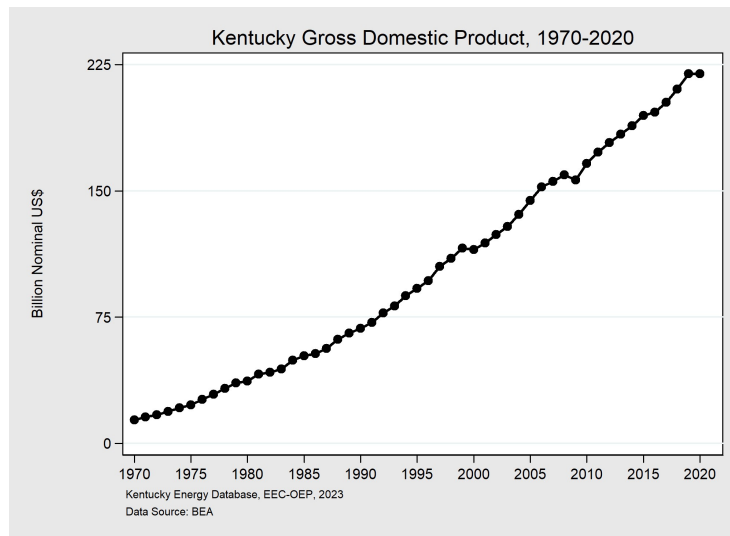
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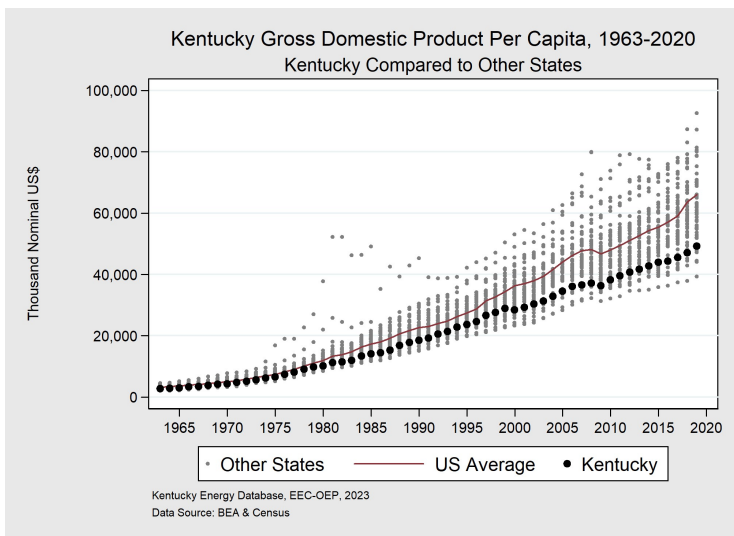
General Statistics



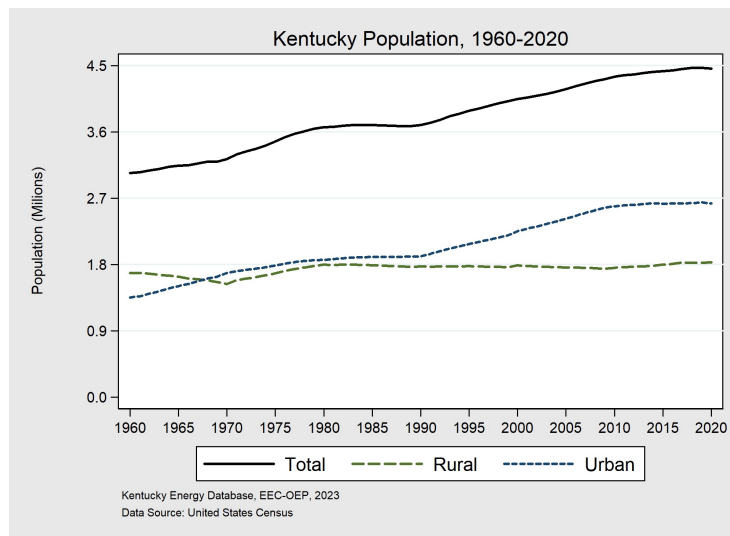
In 2020, on average \$0.07 was spent in Kentucky on energy to produce one dollar of state Gross Domestic Product (GDP). Kentucky ranked 10th in energy intensity of GDP in 2020, and decreased its intensity by 2% from 2019. Kentucky is home to large, energy-intensive, manufacturing operations which cause Kentucky's electricity intensity to be higher than other states.



In 2020, the gross domestic product of Kentucky was \$215 billion, a decrease of 0.2% from 2019. Kentucky has experienced steady growth in nominal GDP over the course of recorded history.

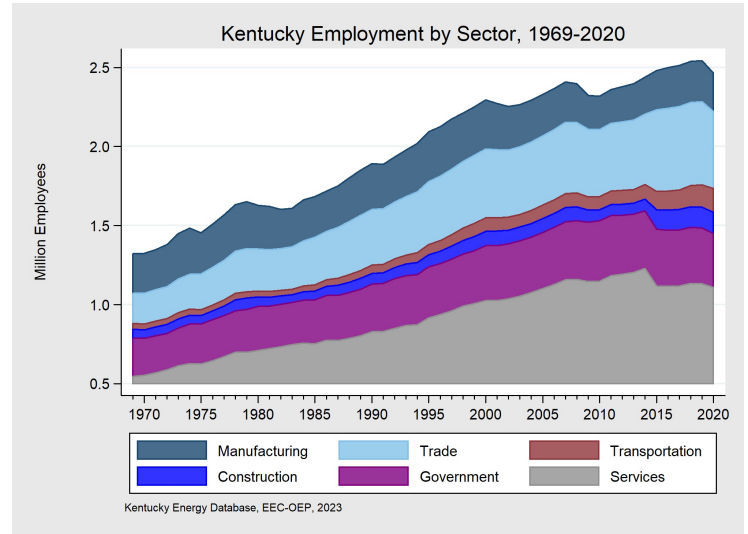
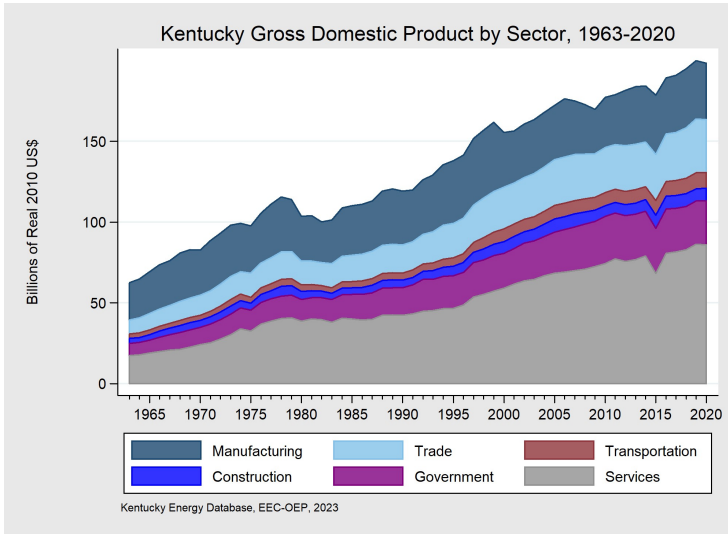


In 2020, Kentucky's GDP per capita was \$49,201, an increase of 0.1% from 2019. Kentucky ranked 45th in the nation in terms of GDP per capita and below the national average of \$64,787 in 2020.



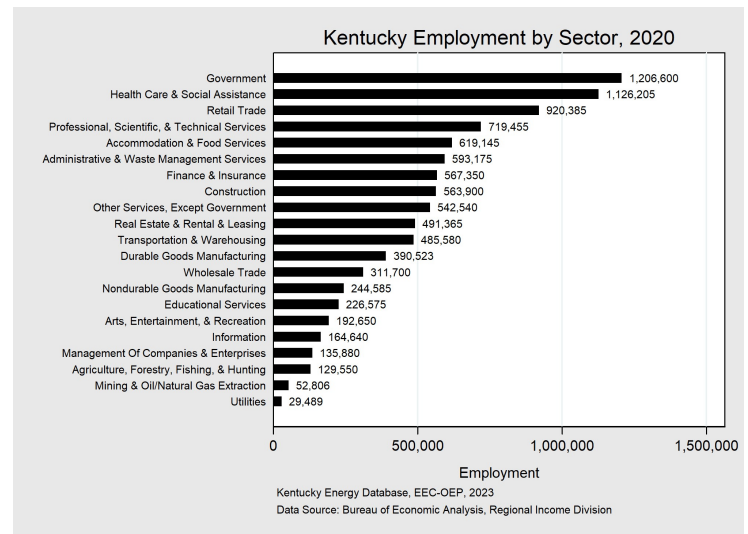
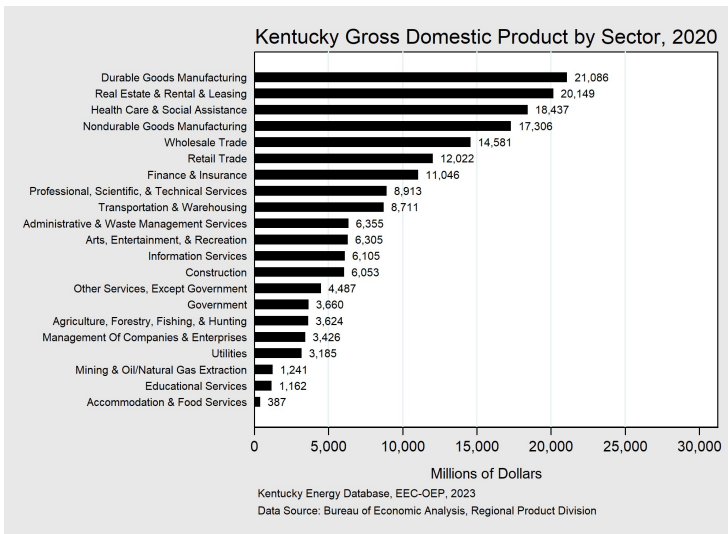
In 2020, Kentucky's population was approximately 4.5 million people, a decrease of 5,721 or 0.1% since 2019. From 1960 to 2020, Kentucky's urban population has doubled while the rural population has stayed consistent.

Kentucky's Economy



GDP from most sectors has risen gradually in the last 50 years, with output from the service sector rising the most. Manufacturing GDP has been relatively more volatile than that from other sectors, with peaks of output in 1999 and 2006 followed by significant decreases thereafter.

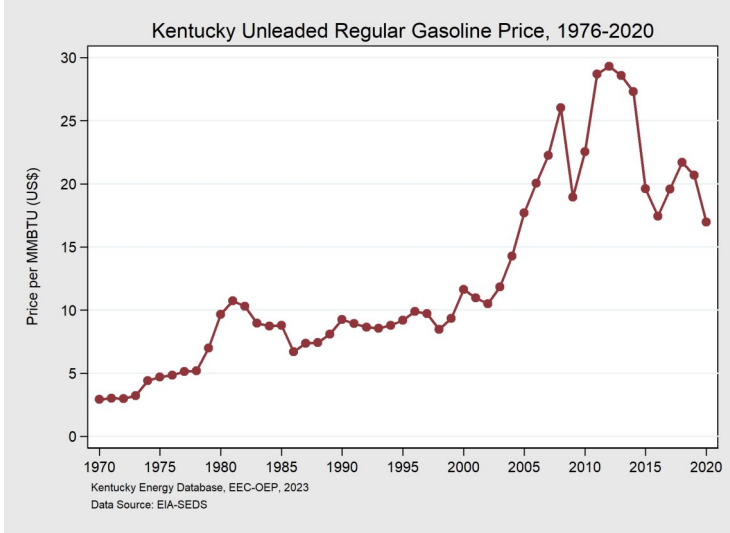
With the exception of manufacturing, employment in all sectors of the Kentucky economy remained stable until 2008, when most sectors experienced decreases in employment. In 2020, total employment across all sectors decreased by 3% compared to 2019.



The durable goods manufacturing sector had the largest portion of state GDP with 10.7%, followed by real estate and rental leasing with approximately 10.2% of the total GDP in 2020. Nondurable goods manufacturing contributes 8.7%.

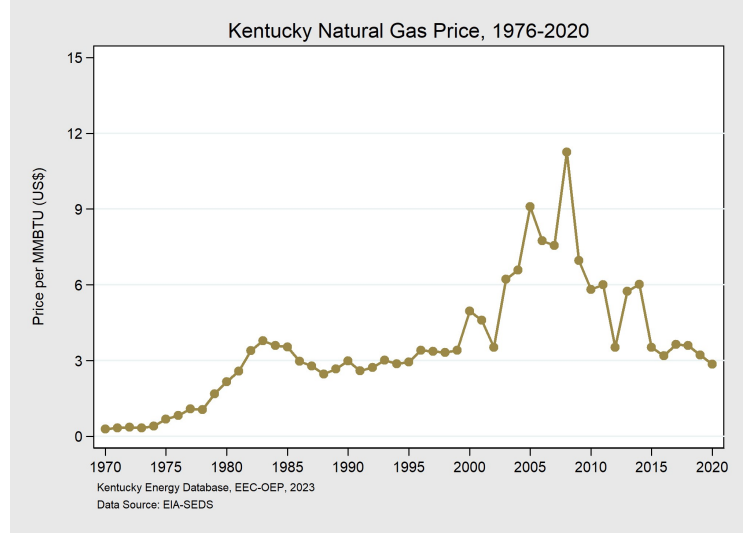
In 2020, the government sector was the single largest employer in Kentucky. Government employment was approximately 13.5% of total employment, healthcare was 11.2%, and retail trade 10.1%. Employment is defined as the average number of full-time and part-time jobs where wages or salaries are paid.

Kentucky Commodity Prices



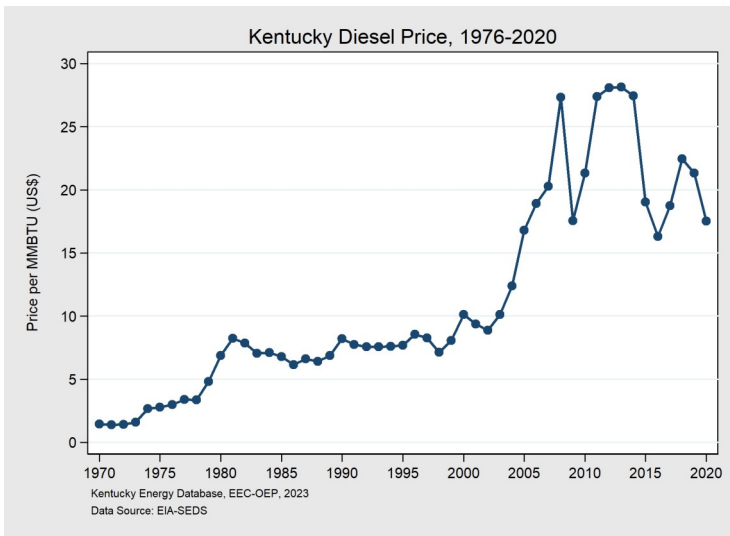
Fuel Type	U.S.\$/MMBtu	% Change
Gasoline	16.97	-17.9%

Unleaded gasoline in Kentucky cost \$16.97 per MMBtu in 2020, a 18% decrease from the previous year.



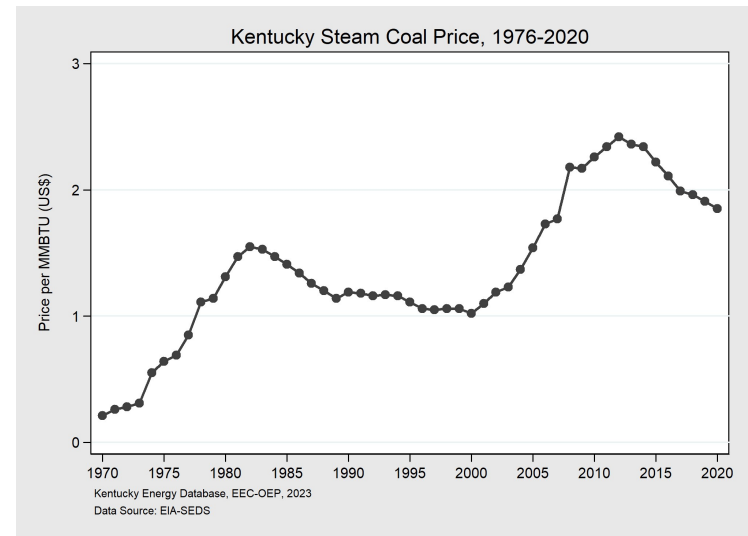
Fuel Type	U.S.\$/MMBtu	% Change
Natural Gas	2.86	-11.8%

The average citygate price of natural gas in Kentucky in 2020 was \$2.86 per million Btus, an 11.8% decrease in the price of natural gas compared with 2019.



Fuel Type	U.S.\$/MMBtu	% Change
Diesel	17.51	-17.9%

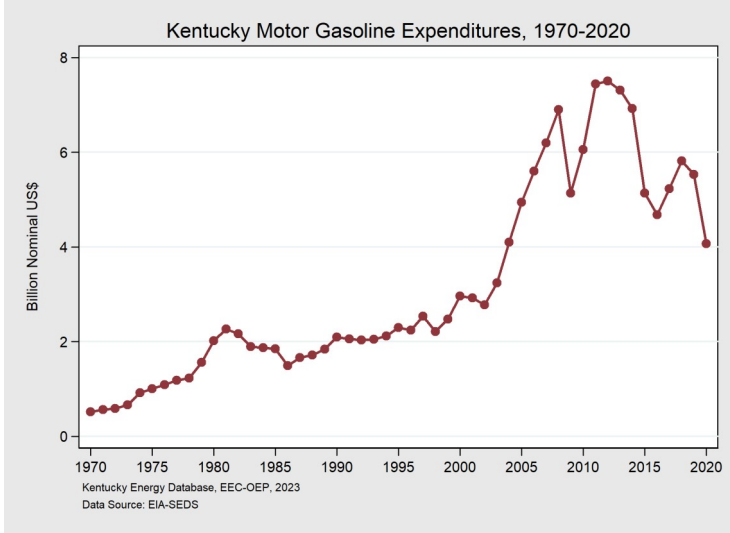
The average retail price of diesel in Kentucky in 2020 was \$17.51 per million Btus, a 17.9% decrease in the price of diesel compared with 2019.



Fuel Type	U.S.\$/MMBtu	% Change
Coal	1.85	-3.1%

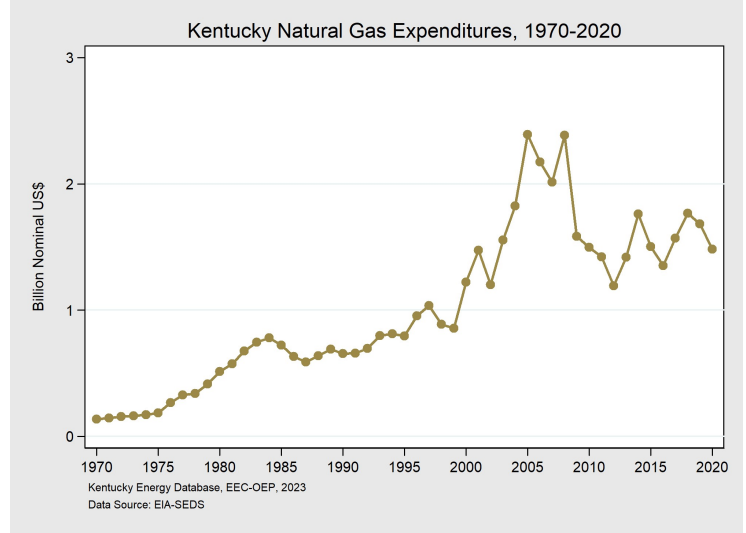
The average price of steam coal in Kentucky in 2020 was \$1.85 per million Btus, a 3.1% decrease in the price of steam coal compared with 2019.

Kentucky Commodity Expenditures



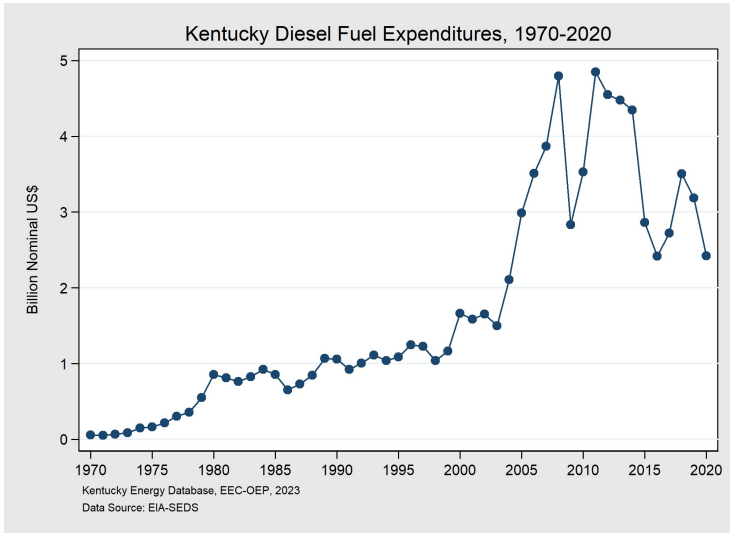
Fuel Type	Million U.S.\$	% of Total
Gasoline	4,071	26.3%

Gasoline expenditures in Kentucky were approximately \$4.1 billion in 2020; a 26.4% decrease in gasoline expenditures compared with 2019, and accounted for 26.3% of energy expenditures in the state.



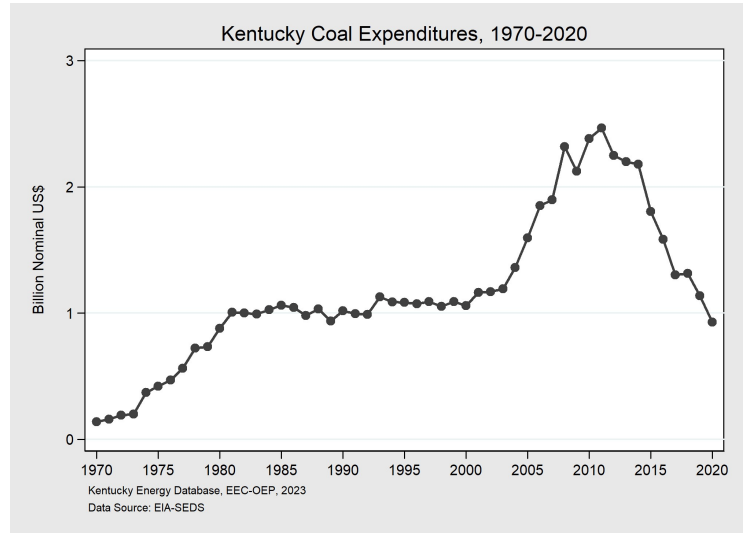
Fuel Type	Million U.S.\$	% of Total
Natural Gas	1,482	9.6%

Total natural gas expenditures in Kentucky were approximately \$1.5 billion in 2020; an 11.9% decrease in natural gas expenditures compared with 2019, and accounted for 9.6% of energy expenditures in the state.



Fuel Type	Million U.S.\$	% of Total
Diesel	2,421	15.6%

Approximately \$2.4 billion was spent on diesel in Kentucky in 2020, a 24.1% decrease in diesel expenditures compared with 2019, and accounted for 15.6% of energy expenditures in the state.



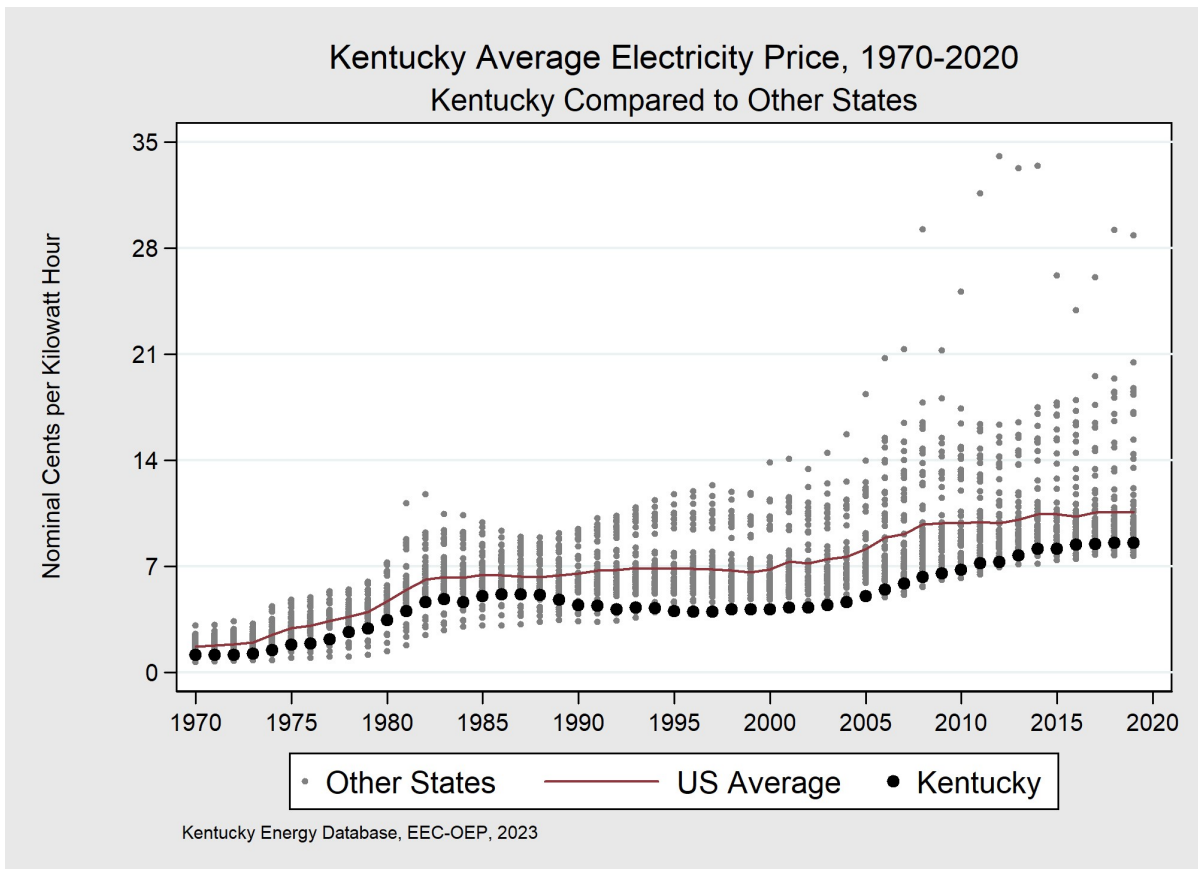
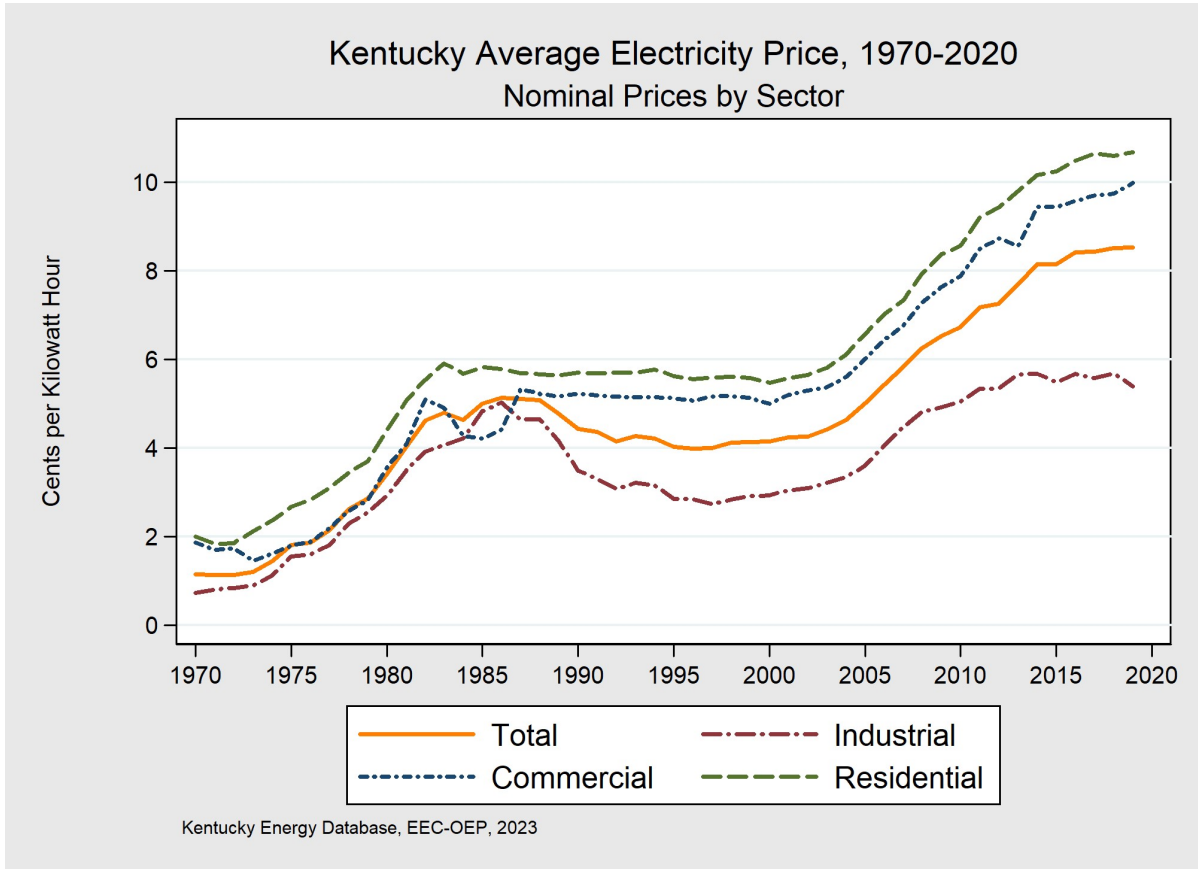
Fuel Type	Million U.S.\$	% of Total
Coal	929	6%

Coal expenditures in Kentucky were approximately \$929 million in 2020. Spending on coal decreased by 18.2% from 2019 and accounted for 6% of energy expenditures in the state.

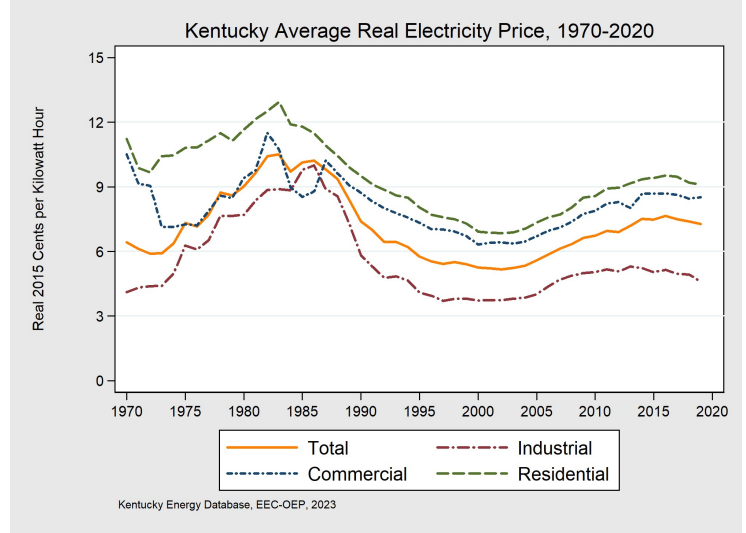
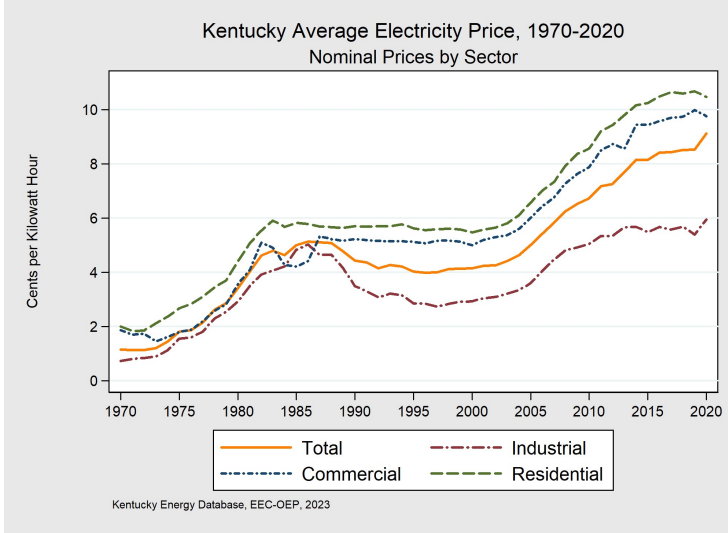
Average Price of Electricity by State

Rank	State	Primary Generation Source	2020 Industrial Price (Cents/kWh)	2020 Total Price (Cents/kWh)	Inflation Adjusted 1 Year Change	Inflation Adjusted 5 Year Change
1	Idaho	Hydroelectric	6.39	8.17	+2.2%	-1.1%
2	Wyoming	Coal	6.83	8.25	+0.2%	-0.4%
3	Utah	Coal	6.19	8.34	+0.8%	-3.1%
4	Oklahoma	Natural Gas	5.5	8.52	+11.0%	+3.8%
5	Nevada	Natural Gas	6.02	8.58	+3.0%	-2.1%
6	North Dakota	Coal	7.37	8.65	+1.4%	-1.5%
7	Washington	Hydroelectric	5.81	8.75	+4.9%	+9.7%
8	Louisiana	Natural Gas	6.21	8.82	+16.0%	+12.4%
9	Nebraska	Coal	7.26	8.84	+1.5%	-2.7%
10	West Virginia	Coal	6.07	8.87	+1.4%	-1.5%
11	Oregon	Hydroelectric	5.97	8.95	+1.5%	+1.6%
12	Arkansas	Natural Gas	6.57	9.1	+9.0%	+9.7%
13	Kentucky	Coal	5.95	9.12	+6.1%	+6.2%
14	Iowa	Coal	6.63	9.13	+1.8%	+4.5%
15	Texas	Natural Gas	6.12	9.14	+8.9%	+8.7%
16	Virginia	Natural Gas	6.49	9.14	-0.2%	-0.4%
17	North Carolina	Natural Gas	6.14	9.29	-1.5%	+2.7%
18	Mississippi	Natural Gas	5.95	9.5	+4.0%	+4.4%
19	Montana	Coal	6.24	9.5	+4.0%	+6.3%
20	Ohio	Natural Gas	6.55	9.76	+3.3%	-0.8%
21	Tennessee	Nuclear	5.51	9.78	+2.7%	+3.4%
22	New Mexico	Coal	6.16	9.79	+4.8%	+2.1%
23	Missouri	Coal	7.11	9.85	+13.1%	-1.8%
24	South Carolina	Nuclear	6.07	9.96	+0.6%	-0.1%
25	Pennsylvania	Natural Gas	6.54	9.97	+2.8%	-1.6%
26	Illinois	Nuclear	7.3	10.14	+3.9%	+6.6%
27	Alabama	Natural Gas	6.33	10.18	+3.4%	+3.5%
28	Indiana	Natural Gas	7.39	10.36	+4.3%	+5.9%
29	Georgia	Natural Gas	6.49	10.43	+4.9%	+5.9%
30	South Dakota	Hydroelectric	8.02	10.43	+3.6%	+3.7%
31	Kansas	Coal	7.38	10.47	+3.1%	+1.2%
32	Delaware	Natural Gas	7.6	10.5	+2.5%	-3.7%
33	Florida	Natural Gas	7.65	10.67	+5.9%	+2.4%
34	Arizona	Natural Gas	6.79	10.73	+2.7%	+0.8%
35	Colorado	Coal	8.01	10.9	+6.0%	+8.7%
36	Wisconsin	Natural Gas	7.63	11.01	+1.7%	+2.3%
37	Minnesota	Coal	8.29	11.08	+4.7%	+7.6%
	United States	Natural Gas	7.18	11.1	+4.7%	+5.7%
38	Maryland	Natural Gas	8.46	11.48	+2.9%	+4.3%
	District of Columbia	Natural Gas	7.87	12.81	+7.4%	+8.2%
39	Michigan	Natural Gas	7.69	12.93	+5.7%	+13.6%
40	Maine	Natural Gas	9.55	13.96	+3.1%	+7.0%
41	New Jersey	Natural Gas	10.7	14.01	+2.7%	+5.0%
42	New York	Natural Gas	6.34	16.11	+8.0%	+8.9%
43	Vermont	Hydroelectric	11.38	16.34	+0.1%	+17.3%
44	New Hampshire	Nuclear	13.81	17.37	+4.4%	+7.2%
45	Connecticut	Natural Gas	9.63	18.32	-4.3%	+4.3%
46	Rhode Island	Natural Gas	16.06	18.44	-0.5%	+11.6%
47	Massachusetts	Natural Gas	15.18	19.06	+4.7%	+10.7%
48	California	Natural Gas	14.82	19.65	+8.8%	+20.1%
49	Alaska	Natural Gas	16.85	20.02	+1.0%	+4.7%
50	Hawaii	Petroleum	27.12	30.31	+9.5%	+15.1%

Average Price of Electricity by State



Kentucky Electricity Prices



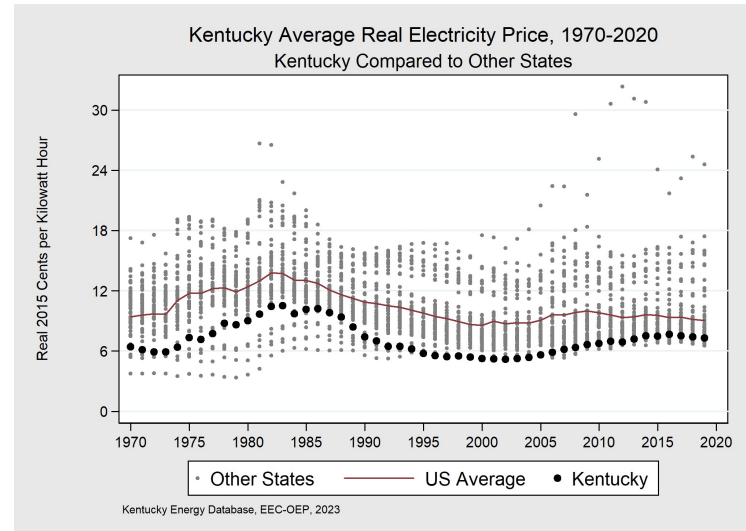
Sector	Nominal Cents/kWh	Since 2010
Average	9.12	+35.5%
Residential	10.47	+22.2%
Commercial	9.76	+23.9%
Industrial	5.95	+17.8%

Sector	Real* Cents/kWh	Since 2010
Average	9.15	+9.9%
Residential	10.05	+7.4%
Commercial	9.28	+7.3%
Industrial	5.49	-2.3%

*Real 2015 \$US

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 & distribution lines, service the outstanding interest on debt, and earn a scheduled return on equity.

In 2020, the average price of electricity across economic sectors in Kentucky was 9.12¢ per kilowatt-hour. This average price ranked Kentucky electricity prices the thirteenth-lowest in the country. The residential sector paid the highest price for electricity at 10.67¢ per kilowatt-hour, followed by the commercial sector at 9.76¢ per-kilowatt hour, and the industrial sector at 5.95¢ per kilowatt-hour, the seventh lowest in the country. Since 1970, the average price of electricity in Kentucky has been among the lowest in the United States and well below the national average.



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. The rising price of steam coal used by electric utilities drove real electricity prices in Kentucky upwards from 2002 – 2015, however, since 2016, real electricity prices have trended downward.

Kentucky Utility Prices

Utility	Average (cents/kWh)	Commercial (cents/kWh)	Industrial (cents/kWh)	Residential (cents/kWh)	Average Residential Bill
Big Sandy Rural Elec Co-op	11.42	10.82	8.11	11.88	\$126.92
Blue Grass Energy Co-op	10.02	10.92	6.56	10.99	\$123.02
City of Bardstown	8.51	8.90	7.89	9.25	\$100.61
City of Benton	11.40	11.83	8.14	12.51	\$141.65
City of Berea Municipal Utility	8.30	8.68	7.13	8.93	\$95.31
City of Bowling Green	9.69	9.91	6.54	10.67	\$115.95
City of Frankfort	9.56	10.20	8.67	10.52	\$108.69
City of Franklin	9.88	11.92	6.31	12.11	\$136.22
City of Fulton	10.47	11.27	7.68	12.01	\$131.73
City of Glasgow	11.37	11.00	7.92	12.92	\$114.67
City of Hickman	14.08	15.10	-	13.33	\$139.06
City of Hopkinsville	10.15	11.67	5.64	11.09	\$135.17
City of Jellico	11.35	12.85	-	11.00	\$116.47
City of Mayfield Plant Board	11.54	11.34	9.38	12.30	\$110.52
City of Murray	10.10	10.11	6.06	12.35	\$118.14
City of Owensboro	13.42	14.46	12.05	15.95	\$124.33
City of Paducah	14.17	14.11	10.08	14.65	\$128.34
City of Russellville	9.85	11.33	7.37	10.74	\$116.12
Clark Energy Coop, Inc.	11.26	11.02	8.70	11.39	\$115.36
Cumberland Valley Electric, Inc.	10.43	11.55	7.84	11.04	\$113.73
Duke Energy Kentucky	9.44	9.10	7.89	10.58	\$116.56
Farmers Rural Electric Co-op	10.52	10.64	7.81	11.32	\$110.20
Fleming-Mason Energy Co-op, Inc.	7.24	8.81	5.26	10.74	\$123.80
Gibson Electric Members Corp	10.85	11.82	5.69	12.03	\$161.78
Grayson Rural Electric Co-op	13.23	12.15	6.78	14.72	\$135.90
Henderson City	6.23	7.48	5.22	7.83	\$96.09
Inter County Energy Co-op	10.57	10.44	6.83	11.33	\$128.45
Jackson Energy Co-op	11.54	10.70	7.10	12.21	\$131.97
Jackson Purchase Energy Corporation	11.30	10.38	9.22	12.06	\$135.00
Kenergy Corp	5.67	11.65	4.78	12.47	\$170.21

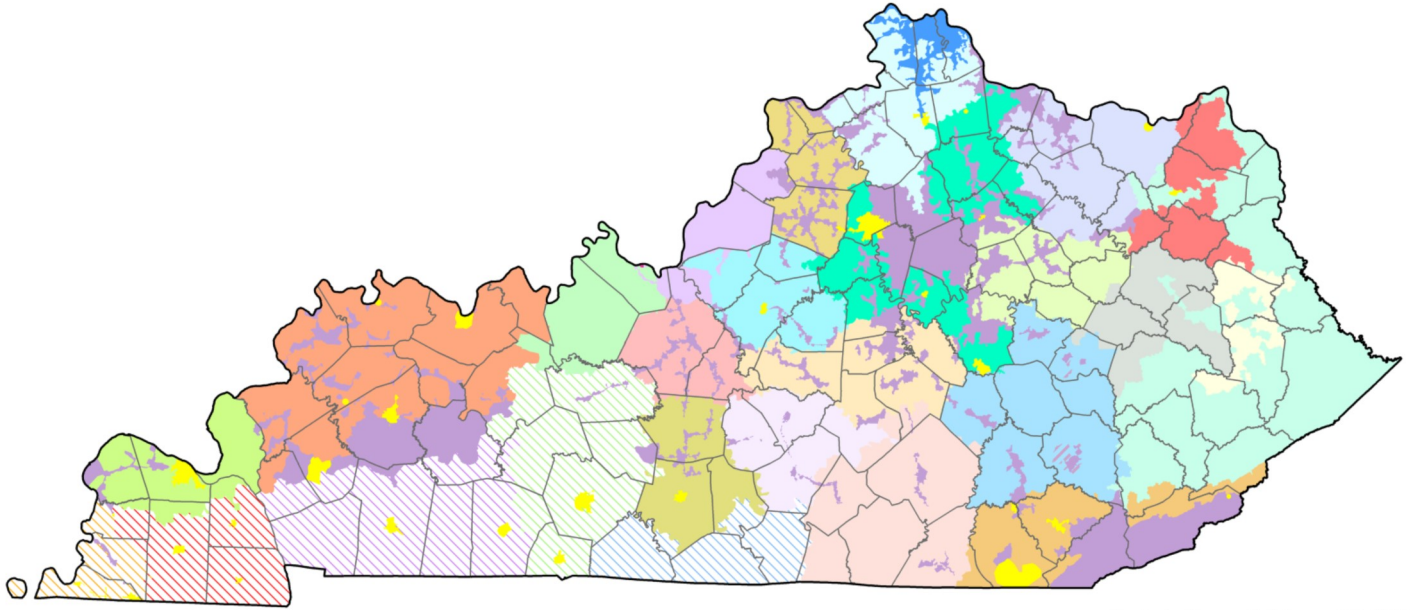
Kentucky Utility Prices

Utility	Average	Commercial	Industrial	Residential	Average
Kentucky Power	11.50	14.03	7.26	14.24	\$187.56
Kentucky Utilities	9.42	10.98	6.46	11.07	\$137.16
Licking Valley RECC	11.87	11.16	7.97	12.25	\$108.57
Louisville Gas & Electric	9.99	10.29	6.95	11.43	\$113.06
Madisonville Municipal	10.14	9.24	-	12.69	\$94.65
Meade County RECC	12.10	11.79	-	12.20	\$118.56
Nolin RECC	10.14	9.65	5.71	11.23	\$126.04
Owen Electric Co-op	7.63	9.44	4.97	11.32	\$117.57
Pennyrile Rural Electric Co-op	10.58	12.33	6.58	11.93	\$157.10
Salt River Electric Co-op	9.01	9.81	6.45	9.57	\$107.43
Shelby Energy Co-op	9.82	9.00	7.23	11.48	\$129.82
South Kentucky RECC	10.26	13.03	8.30	10.88	\$117.23
Taylor County RECC	8.34	8.97	4.51	9.66	\$96.80
Tennessee Valley Authority	4.36	6.92	4.17	-	-
Tri-County Elec Member	9.96	9.63	6.06	11.36	\$131.04
Warren Rural Elec Coop Corp	9.30	11.85	6.42	10.81	\$149.86
West Kentucky Rural E C C	11.95	13.87	6.22	12.20	\$137.19

Source : EIA Form 861 Monthly (Formerly EIA Form 826). Utility Sales and Revenue Tables.

Kentucky Electric Service Areas

Kentucky Electricity Service Areas



Kentucky Energy Database, EEC-DEDI, 2015

All Municipal Utilities		Kentucky Utilities*	
Big Sandy RECC†		Licking Valley RECC†	
Blue Grass ECC†		Louisville Gas & Electric*	
Clark ECC†		Meade County RECC‡	
Cumberland Valley RECC†		Nolin RECC†	
Duke Energy Kentucky*		Owen ECC†	
Farmers RECC†		Pennyrile RECC§	
Fleming-Mason ECC†		Salt River ECC†	
Grayson RECC†		Shelby ECC†	
Gibson Electric Members Corp RECC§		South Kentucky RECC†	
Inter-County ECC†		Taylor County RECC†	
Jackson ECC†		Tri-County Electric Member Corporation§	
Jackson Purchase Energy Corporation ‡		Warren RECC§	
Kenergy Corporation‡		West Kentucky RECC§	
Kentucky Power*			

The Commonwealth of Kentucky is divided into certified electric service territories as determined by the Kentucky Public Service Commission (KRS 278.016). Within these certified electric service areas, electricity service and delivery is restricted to one electricity provider per service area. Providers of electricity in Kentucky are either Investor-Owned Utilities (IOU), Municipal Utilities, Electric Cooperative Corporations (ECC), or Rural Electric Cooperative Corporations (RECC). Municipal Utilities and TVA Distributors are not subject to Kentucky Public Service Commission regulation.

*Investor-Owned Utilities

†EKPC Owner-Member Cooperative

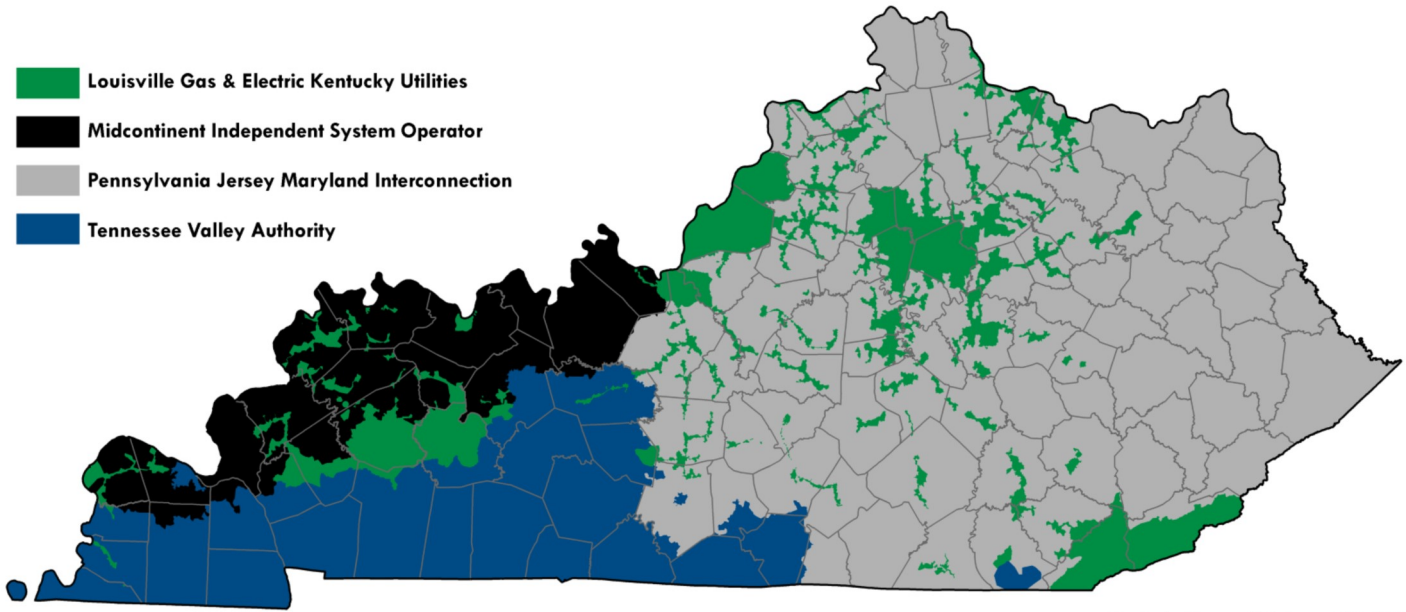
‡BREC Member Cooperative

§TVA Distributor

Kentucky Balancing Authority Areas

Kentucky Balancing Authority Areas

-  Louisville Gas & Electric Kentucky Utilities
-  Midcontinent Independent System Operator
-  Pennsylvania Jersey Maryland Interconnection
-  Tennessee Valley Authority



Kentucky Energy Database, EEC-DEDI, 2015

Local electricity grids are interconnected to form larger networks for reliability and commercial purposes. The actual operation of the electric system is managed by entities called balancing authorities. A balancing authority ensures, in real time, that power system demand and supply are finely balanced. Balancing authorities are responsible for maintaining operating conditions under mandatory reliability standards issued by the North American Electric Reliability Corporation and approved by the U.S. Federal Energy Regulatory Commission.

Retail Service:

Electricity in Kentucky is provided to customers by one of the following types of entities that have the exclusive right to serve the customers within its territory:

- Retail electric suppliers that are regulated by the Kentucky Public Service Commission (PSC) include: Investor-Owned Utilities (IOUs) and Rural Electric Cooperative Companies (RECCs)
- Municipal Utilities
- The Tennessee Valley Authority (TVA) and its associated distributors within the state

Electric suppliers fall into two categories: IOUs and RECCs. There are four investor-owned companies in Kentucky: Duke Energy Kentucky, Kentucky Power Company (aka. American Electric Power), Kentucky Utilities (KU), and Louisville Gas and Electric (LG&E). Each of these companies generates or purchases the power required to meet its respective customers' electricity demands. RECCs are owned by their individual ratepayers and are non-profit entities that reinvest profits into energy infrastructure or return profits to ratepayers.

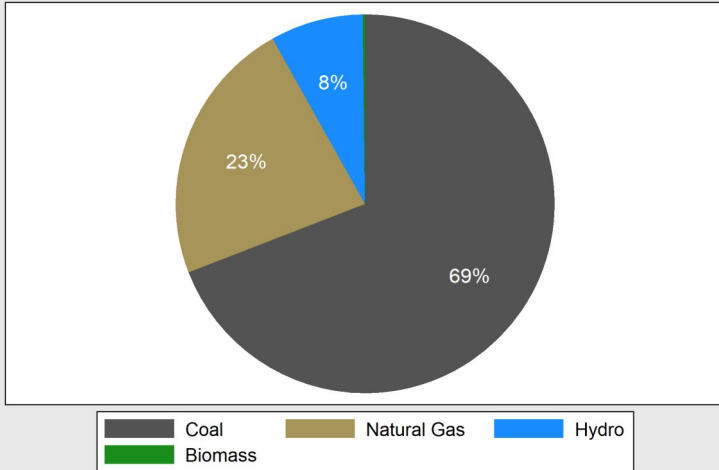
There are 24 RECCs in the state, 19 RECCs that are regulated by the PSC. A distribution cooperative typically receives power from its respective generation and transmission cooperative at a substation in the distributor's service territory. Five RECCs and ten municipal utilities purchase electricity from TVA. These RECCs and municipalities then resell and distribute electricity to customers within their service territories. TVA also directly serves several large industrial customers within Kentucky.

Eighteen municipal electric suppliers purchase power from various sources or self-generate electricity by owning and/or operating generating facilities.

*The Tennessee Valley Authority sets the wholesale rate for electricity supplied to its distributors, and approves the distributors' retail rate.

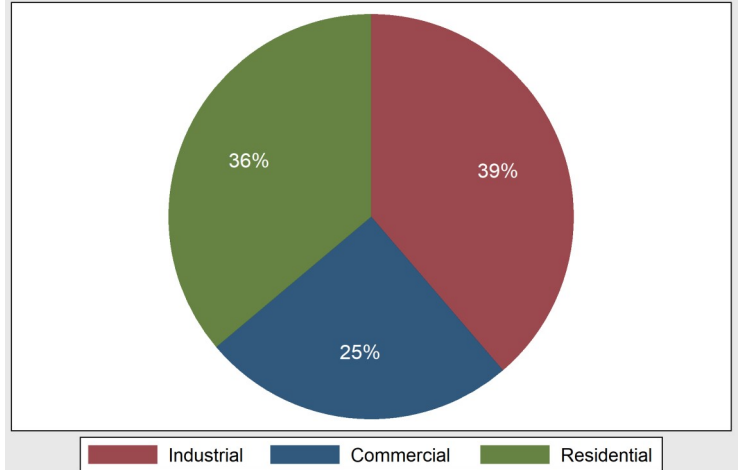
Kentucky Electricity

Kentucky Electricity Generation by Fuel, 2020



Kentucky Energy Database, EEC-OEP, 2023

Kentucky Electricity Consumption by Sector, 2020

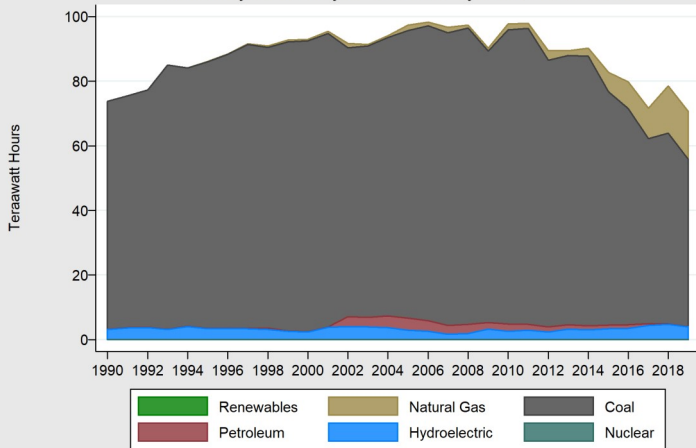


Kentucky Energy Database, EEC-OEP, 2023

Fuel Type	Gigawatt Hours	1 Year Change
Total	63,539	-11.5%
Coal	43,638	-15.6%
Hydro	5,006	+18.3%
Natural Gas	14,384	-6.2%

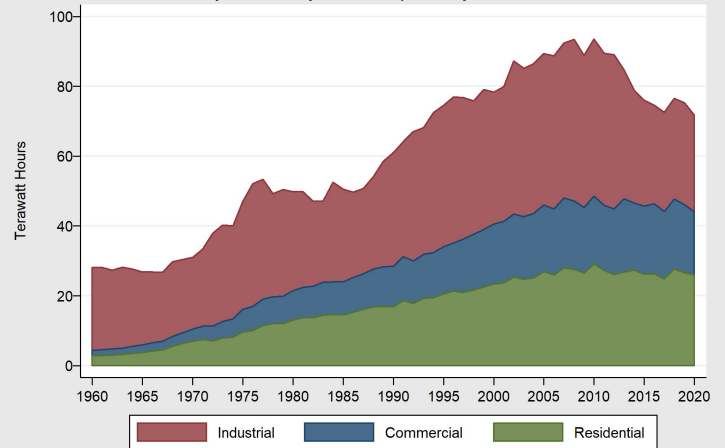
Sector	Gigawatt Hours	1 Year Change
Total*	71,800	-4.7%
Industrial	27,804	-4.7%
Residential	25,935	-2.4%
Commercial	18,061	-7.9%

Kentucky Electricity Generation by Fuel, 1990-2019



Kentucky Energy Database, EEC-OEP, 2023

Kentucky Electricity Consumption by Sector, 1960-2020



Kentucky Energy Database, EEC-OEP, 2023

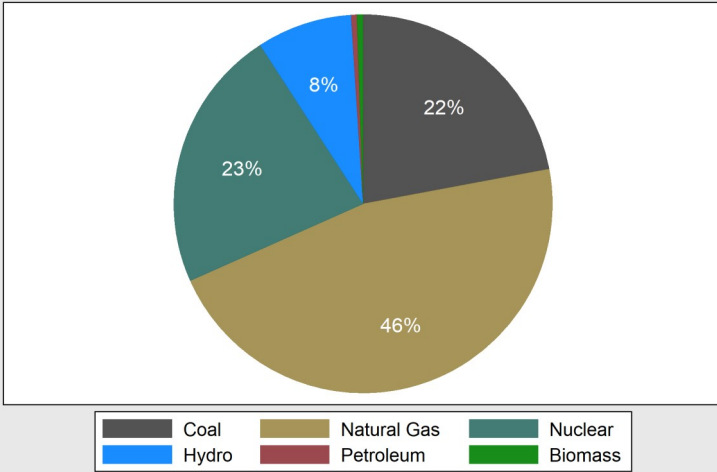
Of the electricity generated in Kentucky in 2020, 69% was derived through the combustion of coal. Coal-fired electricity generation decreased substantially. Natural gas facilities were the second-largest source of electricity. Hydroelectric power increased 18.3% and produced the third most of all fuels.

*The difference between generation and consumption are exports and transmission losses.

Electricity consumption in Kentucky during 2020 totaled 71.8 terawatt-hours, a decrease of 4.7% compared with 2019. The industrial sector became the largest consumer of electricity in Kentucky, representing 39% of total electricity consumption while the national average was 26% in 2020. The residential sector was the second largest consumer of electricity with 36% of consumption, followed by the commercial sector with 25%.

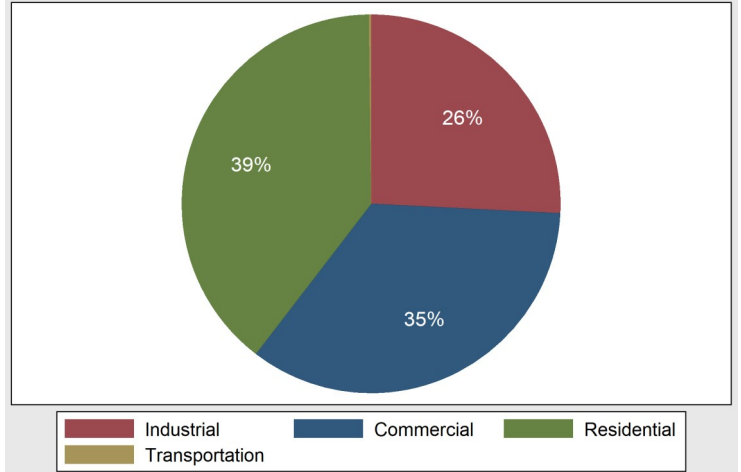
United States Electricity

United States Electricity Generation by Fuel, 2020



Kentucky Energy Database, EEC-OEP, 2023

United States Electricity Consumption by Sector, 2020

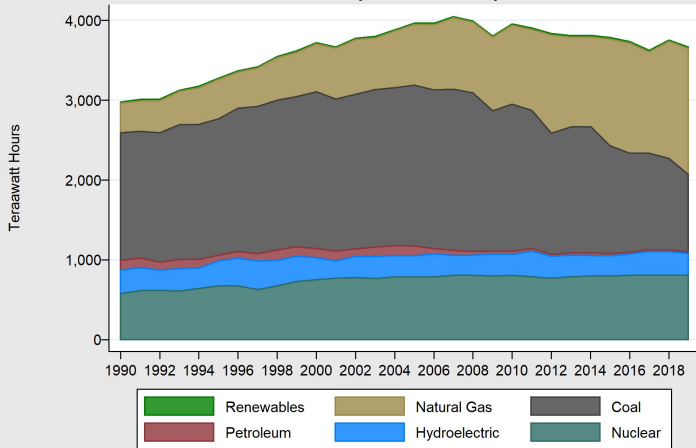


Kentucky Energy Database, EEC-OEP, 2023

Fuel Type	Gigawatt Hours	1 Year Change
Total	4,007,019	-2.9%
Natural Gas	1,624,050	+2.4%
Coal	773,393	-19.9%
Nuclear	789,879	+0.3%
Hydro	285,274	-0.9%

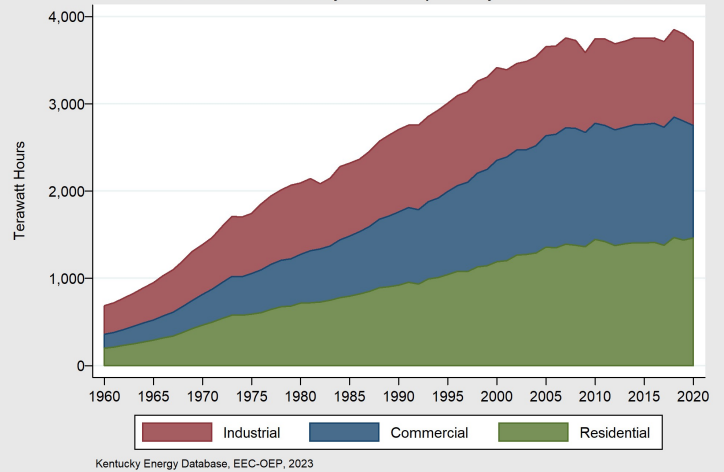
Sector	Gigawatt Hours	1 Year Change
Total	3,717,674	-2.5%
Residential	1,464,605	+1.7%
Commercial	1,287,440	-5.4%
Industrial	959,082	-4.3%

United States Electricity Generation by Fuel, 1990-2019



Kentucky Energy Database, EEC-OEP, 2023

United States Electricity Consumption by Sector, 1960-2020

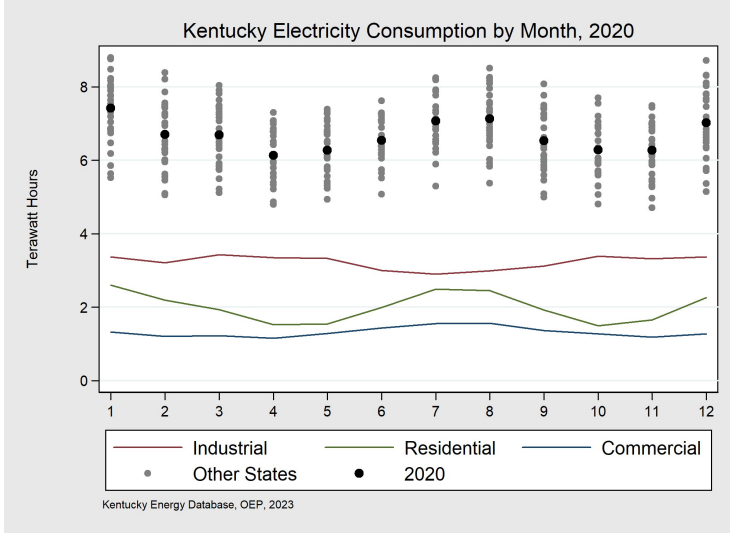


Kentucky Energy Database, EEC-OEP, 2023

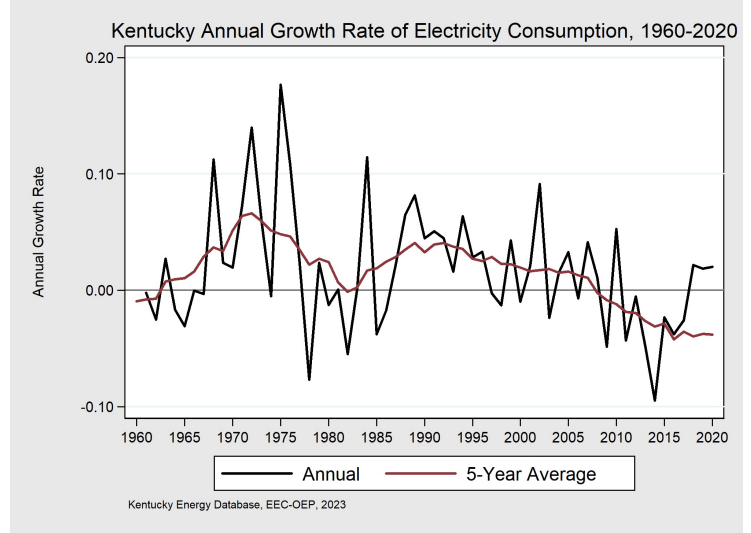
The United States generated more than four petawatt-hours in 2020, a decrease of 2.9% compared to 2019. Electricity generation from natural gas continued to be the largest source of electricity at 46% of total, and increased by 2.4% compared to 2019. Hydro electricity generated 8% of total electricity requirements. Nuclear has remained relatively constant for decades, supplying 23% in 2020.

Total electricity consumption decreased by 2.5% in 2020 to 3.7 petawatt-hours. Nationally, residential consumers are the largest share of electricity demand, 39% in 2020. Residential, which is highly responsive to changes in weather, increased by 1.7% in 2020. Industrial demand decreased by 4.3% to just under 1 terawatt-hour.

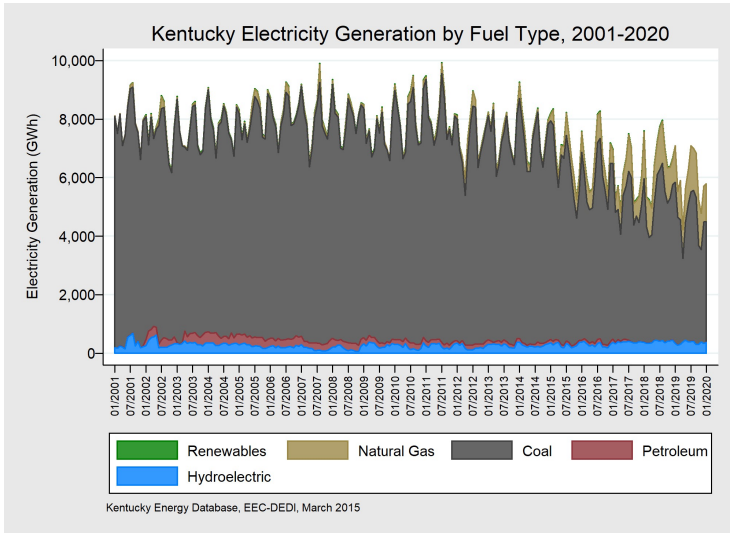
Kentucky Monthly Electricity



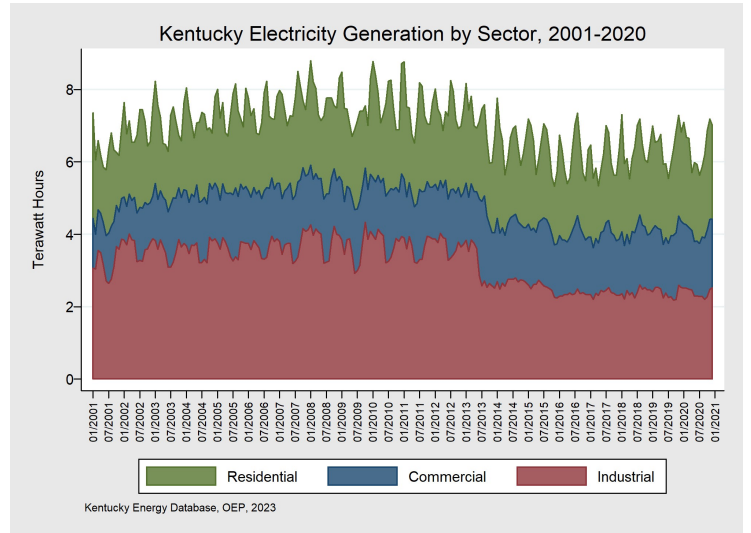
Seasonal fluctuations in Kentucky’s electricity consumption are largely the result of the residential sector, which utilizes electricity for air conditioning in the summer and heating in the winter. On average, the highest demand for electricity in Kentucky occurs in summer and winter.



Kentucky electricity demand grew rapidly in the late 1960s to the early 1970s and again from the late 1980s to the early 1990s, but has decreased overall since 2008.

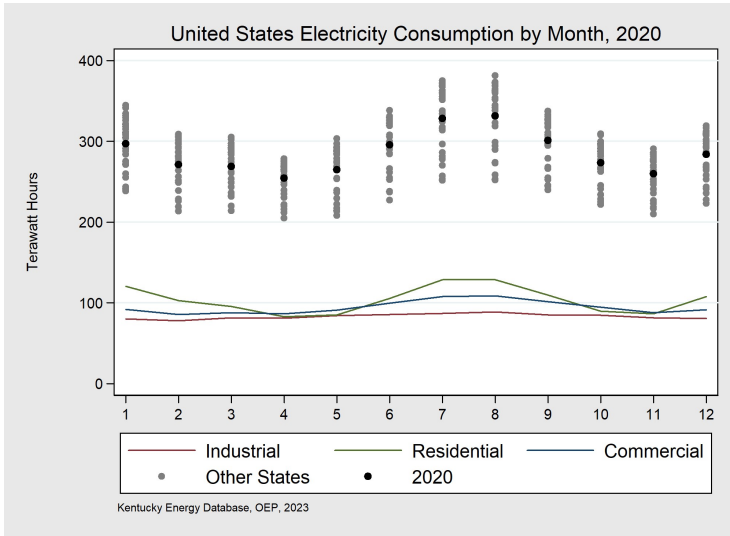


Coal-fired generation supplies the vast majority of electricity in Kentucky. During the spring and fall, electricity demand is lower and some coal plants go offline for maintenance. In the past five years, natural gas has become a bigger contributor to Kentucky’s electricity generation as well as an increase in renewable energy sources.

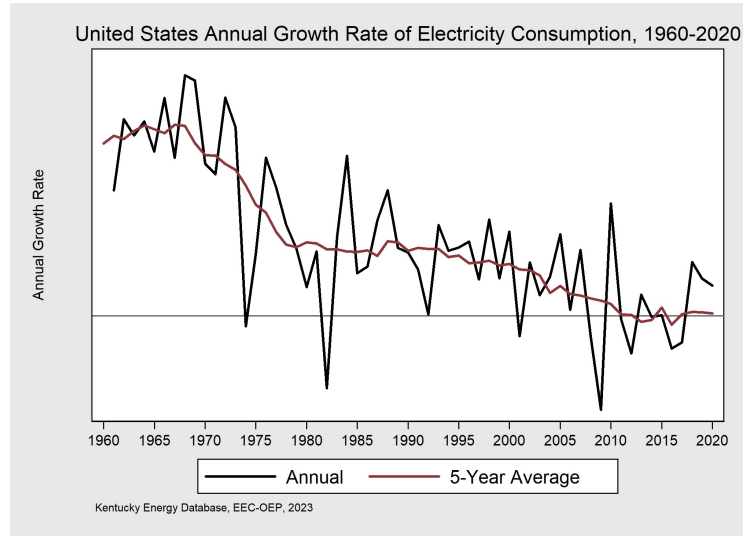


Industrial electricity demand in Kentucky tends to vary little relative to the residential sector. Industrial electricity demand had decreased between June and August, when the United States Enrichment Corporation in Paducah—approximately 15% of Kentucky’s total electricity demand—would shut down for annual maintenance. However, since the facility’s closure in May, 2013 industrial sales have remained steady.

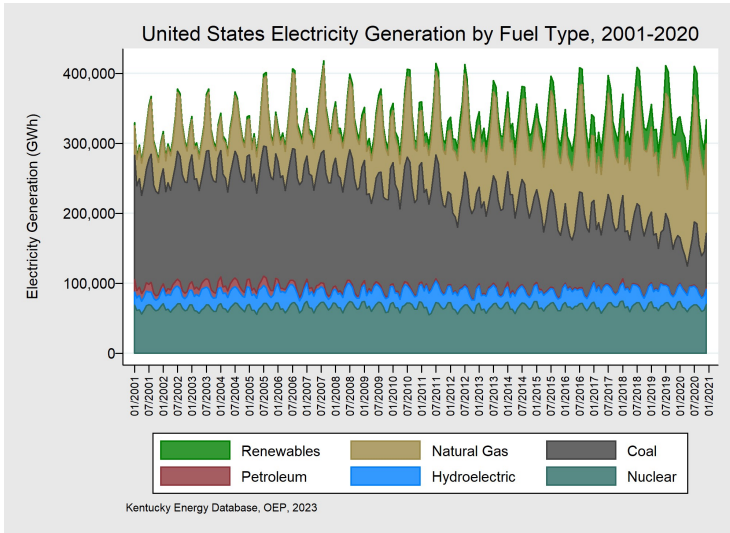
United States Monthly Electricity



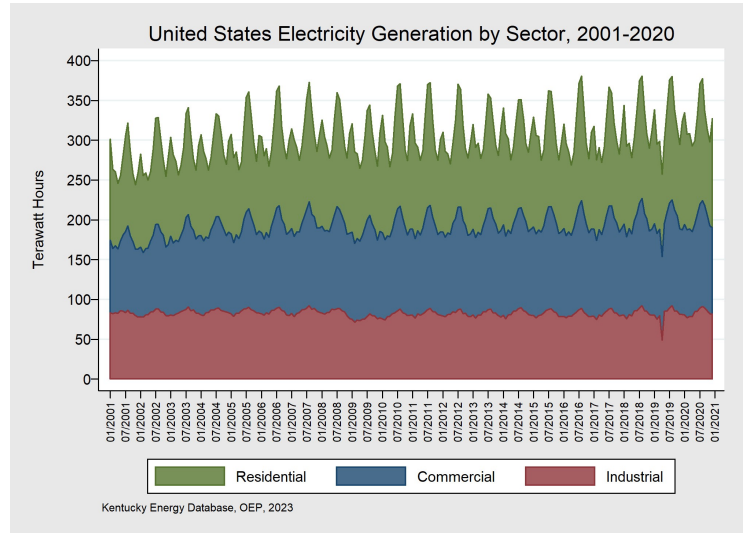
Electricity demand in the United States is approximately the same across all sectors during spring and fall, but demand for heating and air conditioning increases residential and commercial electricity demand in the summer and winter. In contrast, industrial demand is fairly constant throughout the year.



Although, electricity demand has grown in the United States for decades, the rate at which electricity demand has grown has decreased over time—from an average of 7% in the 1960s to less than one percent over the last 10 years. Since 2005, many states have experienced no growth or even decreases in electricity consumption.



Nuclear generation is relatively constant with the exception of regular shutdowns for maintenance, but renewable generation facilities depend on the presence of their respective resources. Coal and natural gas tend to make up the difference between electricity demand and electricity generated by renewables, nuclear, and hydroelectric generation. The United States has natural gas simple cycle turbines as well as combined cycle units, which are flexible and can be quickly ramped up during periods of peak electricity demand.



United States electricity demand is highest during the hotter summer, though there is a smaller increase in demand during colder winter months. Whereas summer heat can only be met with air conditioning, winter heating requirements can be remedied with a variety of non-electric fuels such as natural gas, wood, propane, and diesel fuel. Industrial demand varies somewhat, with increases in the summer months.

Kentucky Generation Infrastructure

Electricity Generating Capacity

Capacity is the maximum amount of electricity that can be produced at any one moment in time and is measured in watts, or joules per second. In 2020, Kentucky had 52 operating power plants that operated 173 individual electricity generating units. There were approximately 63.5 gigawatts of electric generation capacity in Kentucky. Of the current operating units in Kentucky, 68.9% of capacity is coal-fired, 22.5% is natural gas, 7.8% is hydroelectric. Petroleum, solar and biomass resources make up the remaining capacity (< 1%).

Generation

Of the electricity generated in Kentucky in 2020, 69% was derived through the combustion of coal. The amount of coal-based electricity generation decreased in 2020. Natural gas facilities were the second-largest source of electricity. Due to the presence of coal resources, and the low price of coal, Kentucky has consistently used coal to meet the vast majority of electricity demand within the Commonwealth; however, with the continued retirements of coal units, many have been converted into natural gas units.

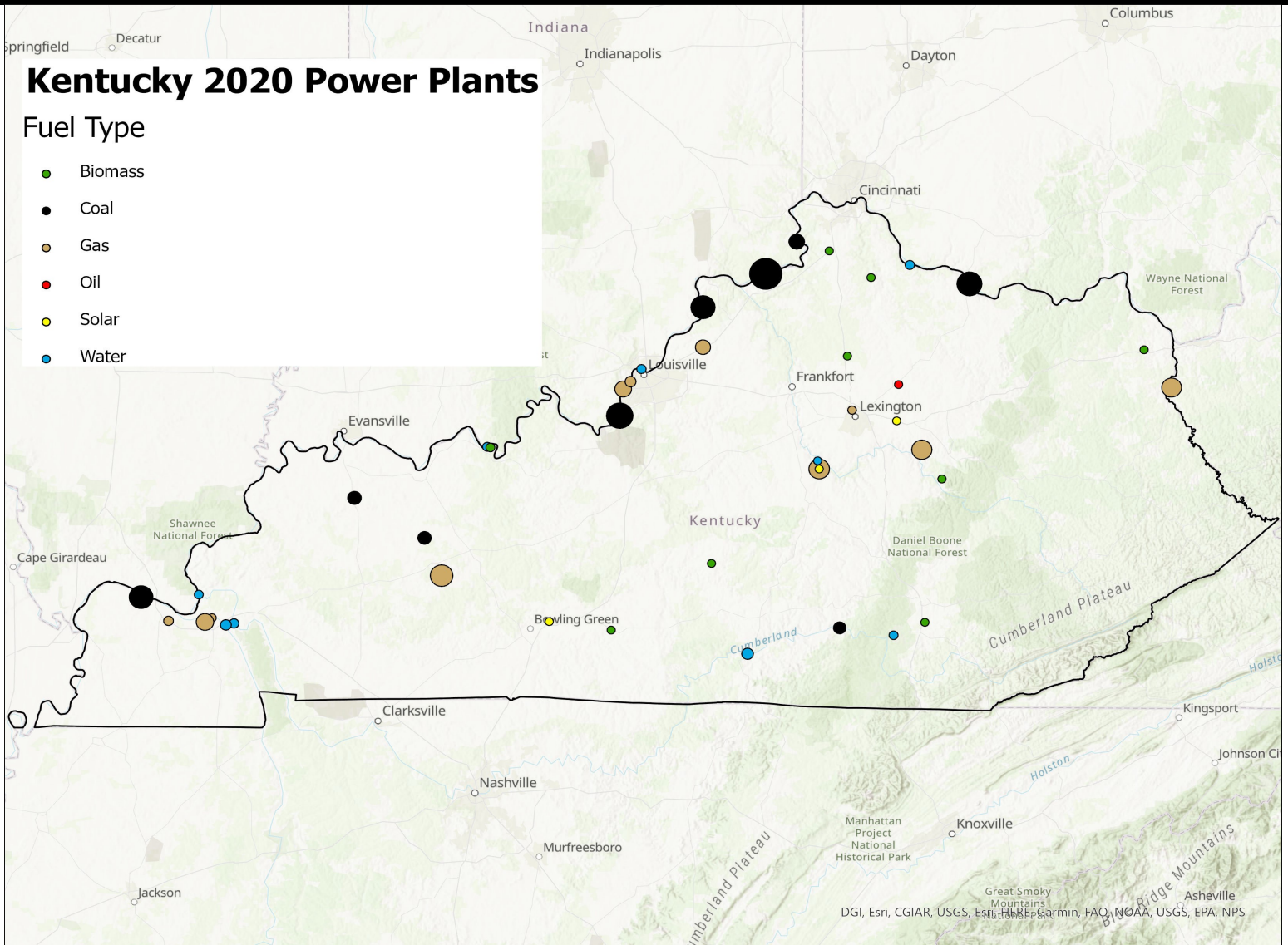
Capacity Factor

The capacity factor of a generating unit is a ratio of actual power output from a unit versus the maximum possible output from a unit over a period of time. To calculate the maximum possible output of a unit, the rated nameplate capacity (MW) is multiplied by time (typically, hours per year). The actual output (MWh) is then divided by the maximum possible output (MWh) to determine the capacity factor of the unit.

Many variable factors influence the actual capacity factor of a given generating unit including operational costs, operational design, age of a unit, emissions of criteria pollutants, electricity demand fluctuations, and the particular generation and environmental plans of individual power producers.

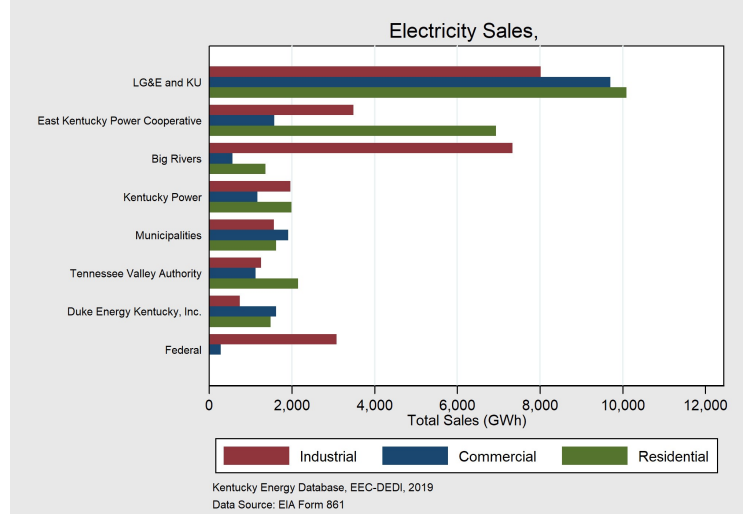
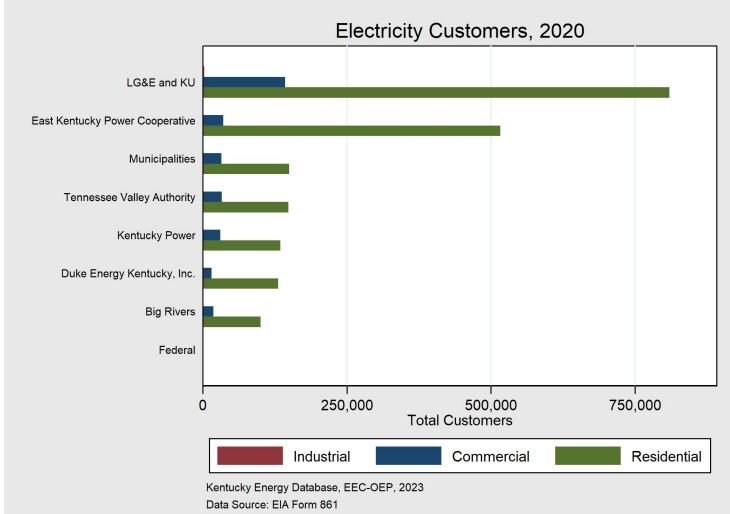
Name	Online Year	Owner	Name	Online Year	Owner
1 Dix Dam	1925	LG&E-KU	28 Riverside Generating Project	2001	LS Power Group
2 Mother Ann Lee Hydro	1927	Salt River Electric Coop	29 Bluegrass Generation Project	2002	E KY Power Coop
3 Ohio Falls	1928	LG&E-KU	30 Marshall County Generating Station	2002	Tennessee Valley Authority
4 Paris, KY	1934	Paris City of KY	31 Bavarian Landfill	2003	E KY Power Coop
5 Kentucky	1944	Tennessee Valley Authority	32 Green Valley Landfill	2003	E KY Power Coop
6 Wolf Creek Dam	1951	USCE - Nashville District	33 Laurel Ridge Landfill	2003	E KY Power Coop
7 Shawnee	1953	Tennessee Valley Authority	34 Hardin County LFGTE	2006	E KY Power Coop
8 E.W. Brown	1957	LG&E-KU	35 Pendleton County Landfill	2007	E KY Power Coop
9 Big Sandy	1963	Kentucky Power Co.	36 PPS Power Plant No 1	2010	Paducah Power System Co.
10 J. Sherman Cooper	1965	E KY Power Coop	37 Bowling Green Solar Project	2011	Scotty's Dev. Co. LLC
11 Barkley	1966	USCE - Nashville District	38 Blue Ridge Generating	2013	North Amer Natural Resources
12 Paddy's Run	1968	LG&E-KU	39 Glasgow Regional Landfill	2015	E KY Power Coop
13 Haefling	1970	LG&E-KU	40 Cane Run	2015	LG&E-KU
14 Mill Creek	1972	LG&E-KU	41 Meldahl Hydropower Project	2016	Hamilton City of (OH)
15 Ghent	1974	Kentucky Utilities Co.	42 Cannelton Dam	2016	American Mun Power Inc
16 R.A. Reid	1976	Big Rivers Electric Corp.	43 Central KY Landfill	2016	Toyota Motor Sales U.S.A. Inc.
17 Laurel	1977	USCE - Nashville District	44 Cooperative Solar One	2017	E KY Power Coop
18 H.L. Spurlock	1977	E KY Power Coop	45 Crittenden Solar Facility	2017	Duke Energy Kentucky Inc.
19 R.D. Green	1979	Big Rivers Electric Corp.	46 Walton Solar Facility	2017	Duke Energy Kentucky Inc.
20 Elmer Smith	1981	Owensboro Municipal	47 Paradise CC	2017	Tennessee Valley Authority
21 East Bend	1981	Duke Energy Kentucky Inc.	48 L'Oreal Solar - Florence	2017	L'Oreal USA Products Inc
22 D.B. Wilson	1984	Big Rivers Electric Corp.	49 Smithland Lock and Dam	2017	American Mun Power Inc
23 Trimble County	1990	Louisville Gas & Electric Co.	50 Morehead Generating Facility	2019	North American Bio-Fuels LLC
24 Cox Waste-to-Energy	1995	Cox Waste-To-Energy Inc	51 Community Solar Project	2019	LG&E-KU
25 J.K. Smith	1999	E KY Power Coop	52 LGE-KU Solar Share Facility	2019	LG&E-KU
26 Calvert City	2000	DTE Energy Services Inc.			
27 Kentucky Mill	2001	Domtar Paper Co. LLC			

Power Plants in Kentucky



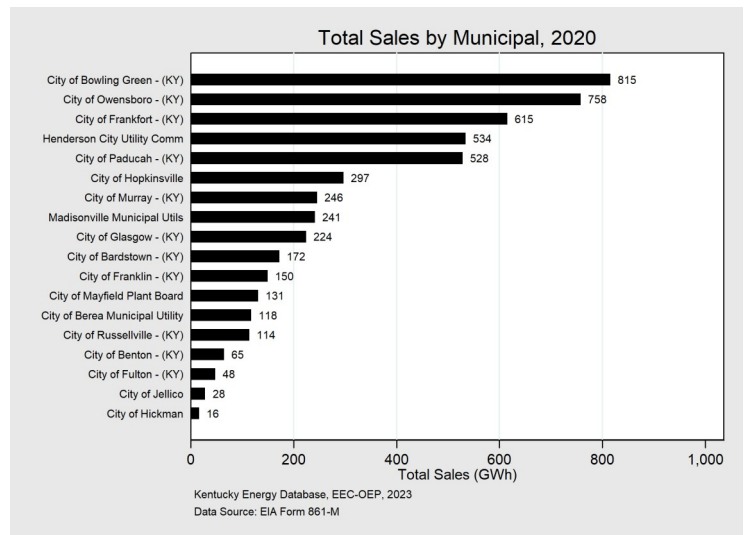
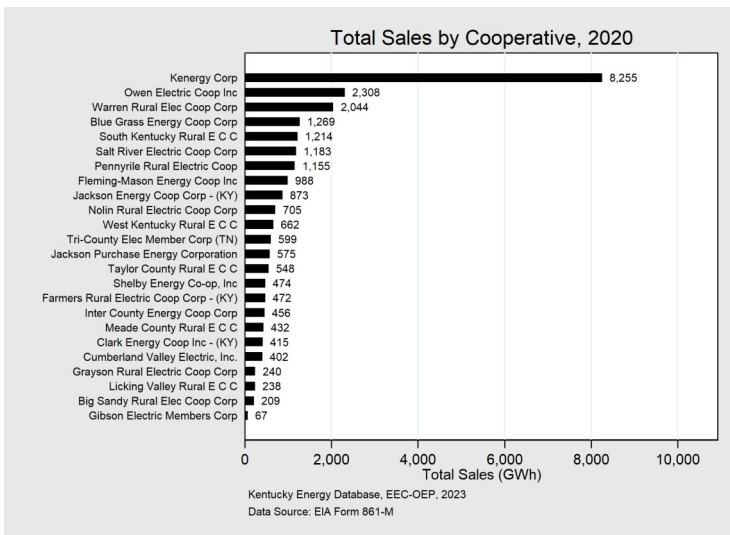
Coal-fired, natural gas, hydroelectric, and biomass-fired generators provide all of the baseload electricity in Kentucky because of their low operating costs. The coal fleet consists of large generators that were constructed between the mid-1950s and 2010. Most of these plants have been retrofitted with environmental controls to meet air quality emissions standards but many may need further upgrades as the standards have become more stringent. Peaking power—the additional electricity needed for short periods of high demand—is generated by natural gas and petroleum. Utilities typically satisfy these short periods of high demand (peaks) with simple cycle natural gas or petroleum generators because they are relatively cheap to build, and can rapidly power up and power down to balance electricity demand. However, peaking units are costlier to operate than baseload generators due to their designs, and are not optimized for baseload generation.

Electricity Utilities in Kentucky



Entity	Customers	Percentage
Total	2,301,520	100%
LG&E and KU	954,959	41.5%
EKPC	552,152	24.0%
Municipalities	182,314	7.9%
TVA	181,689	7.9%
Kentucky Power	165,763	7.2%
Duke Energy	145,957	6.3%
Big Rivers	118,686	5.2%

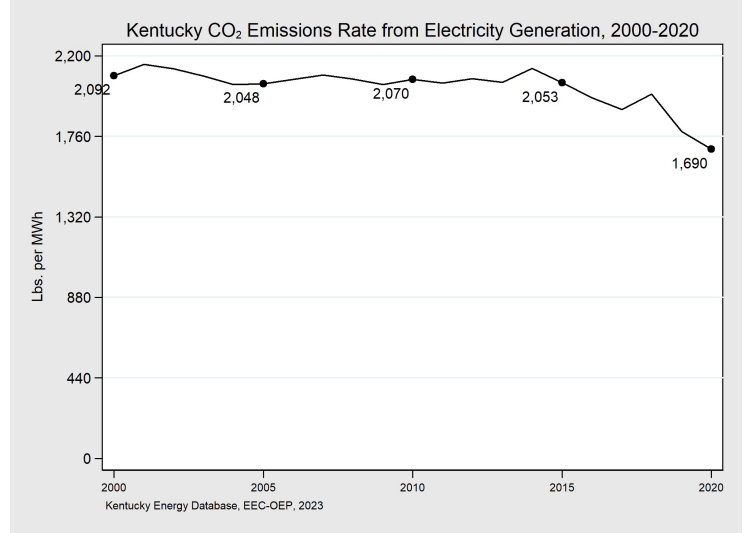
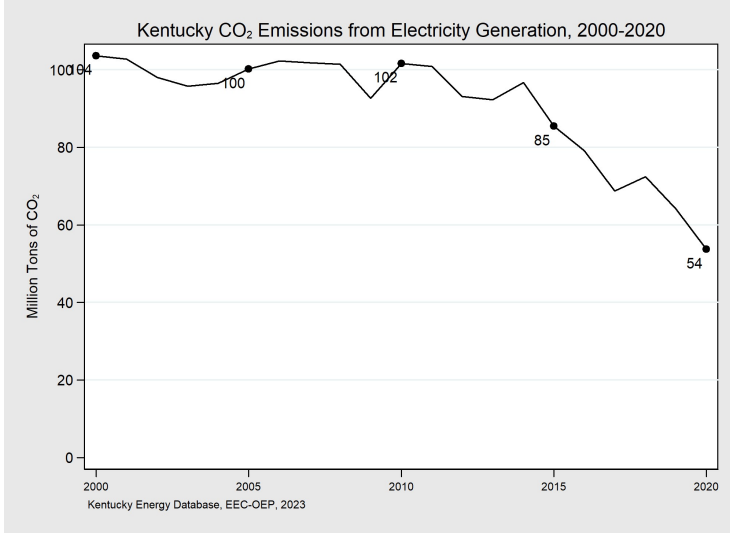
Entity	Sales (GWh) 2020	Percentage
Total	67,655	100%
LG&E and KU	27,816	41.1%
EKPC	11,994	17.7%
Big Rivers	9,261	13.7%
TVA	4,527	6.7%
Municipalities	5,091	7.5%
Kentucky Power	5,116	7.6%
Duke Energy	3,850	5.7%



Utilities in Kentucky sold 68 TWh to 2.3 million consumers in 2020. Households accounted for 86% of consumers, but were 36% of consumption. The 5,982 industrial firms are less than 1% of total customers, but used 38% of all electricity consumed in Kentucky in 2020. LG&E and KU sell to 41.5% of consumers in the Commonwealth, while East Kentucky Power Cooperative sells to 24%, and the rest 34.5%.

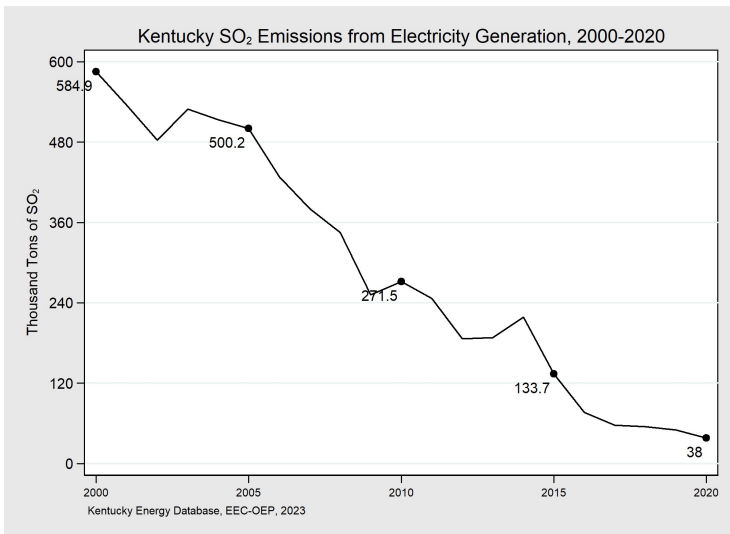
All of the sales from the Big Rivers Electric Corporation, East Kentucky Power Cooperative, and the majority from the Tennessee Valley Authority, are to RECCs and municipalities. Together, cooperatives consume more than all investor-owned corporations except LG&E and KU. Kenergy Corporation, a cooperative, sells 12.2% of Kentucky's total—more electricity than Kentucky Power, all municipalities, and Duke Energy.

Kentucky Electric Power Emissions

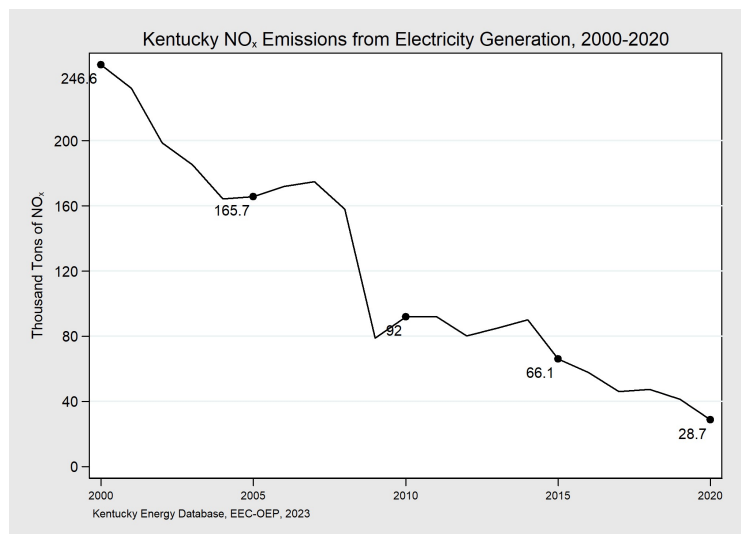


Emission	Tons	Since 2000
Carbon Dioxide	53,725,429	-48.2%
Sulfur Dioxide	37,979	-93.5%
Nitrogen Oxides	28,679	-88.4%

In 2020, power plants in Kentucky emitted 53.7 million tons of carbon dioxide, a decrease of 48% compared with 2000. In terms of emissions rate, power plants emit 19% less carbon dioxide as they did in 2000.

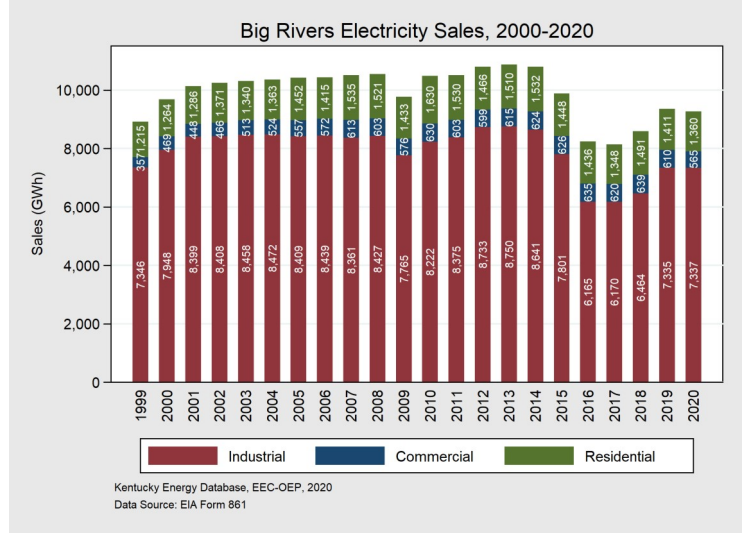
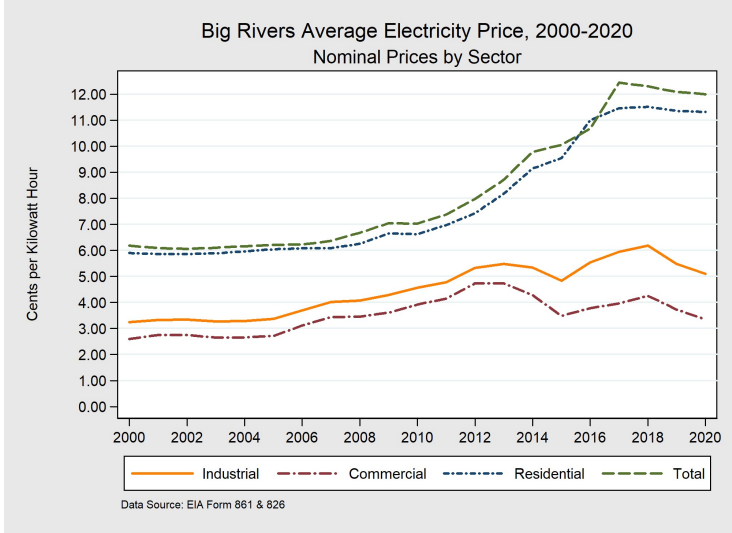


Sulfur dioxide (SO₂) is a highly reactive gas and major pollutant that is monitored and regulated by the state and federal government due to its connection to acid rain, incidence of asthma, and other respiratory problems. In 2020, the electric power sector of Kentucky emitted 37,979 tons of sulfur dioxide, a 93.5% decrease from 2000 and a 31% decrease from 2018.



Nitrogen oxides (NO_x) are a group of highly reactive regulated pollutants: Nitric oxide (NO), Nitrogen dioxide (NO₂), and Nitrous oxide (N₂O). 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 2020, the electric power sector of Kentucky emitted 28,679 tons of nitrogen oxides, a decrease of 88% from 2000 and a 39% decrease from 2018.

Big Rivers

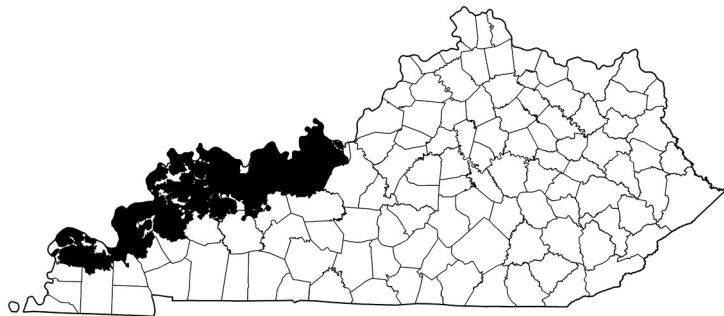


Sector	Price (Cents/kWh)	Since 2010
Total†	5.10	+11.6%
Residential	12.00	+70.7%
Commercial	11.32	+80.0%
Industrial	3.35	-14.5%

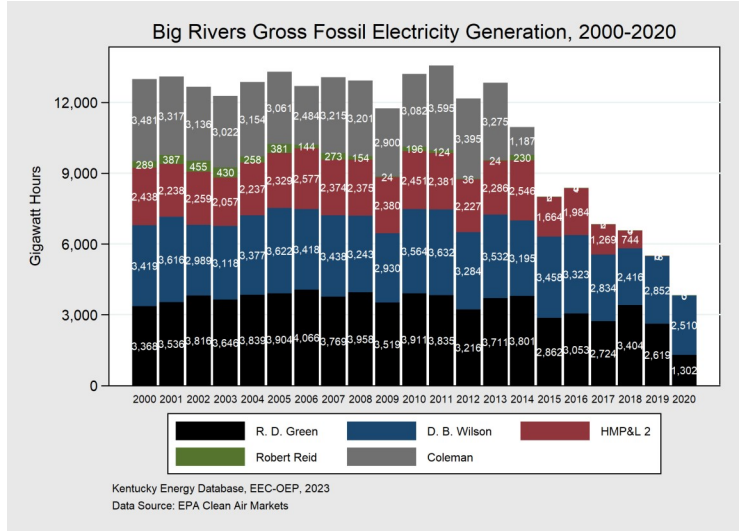
Sector	Sales (GWh)	Percentage
Total†	9,262	100%
Industrial	7,337	79.2%
Residential	1,360	14.7%
Commercial	565	6.1%

†Includes direct sales and sales to rural electric cooperatives

Big Rivers Electricity Corporation Service Territory



Kentucky Public Service Commission
Kentucky Energy Database, EEC-DEDI

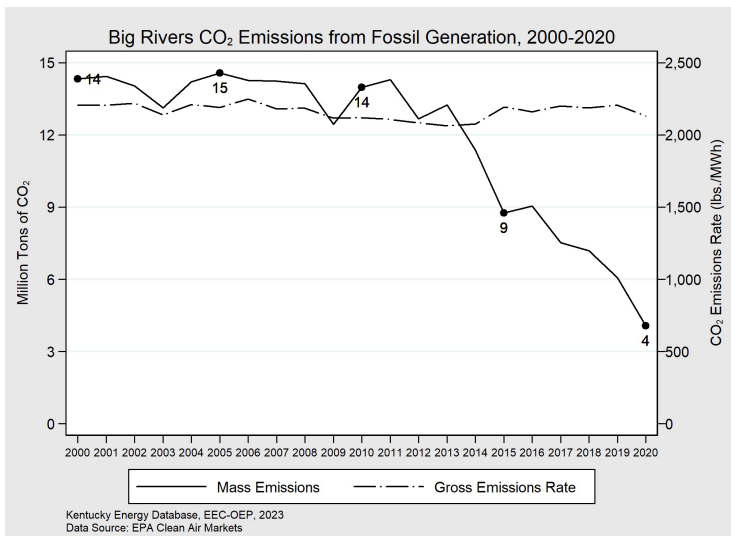
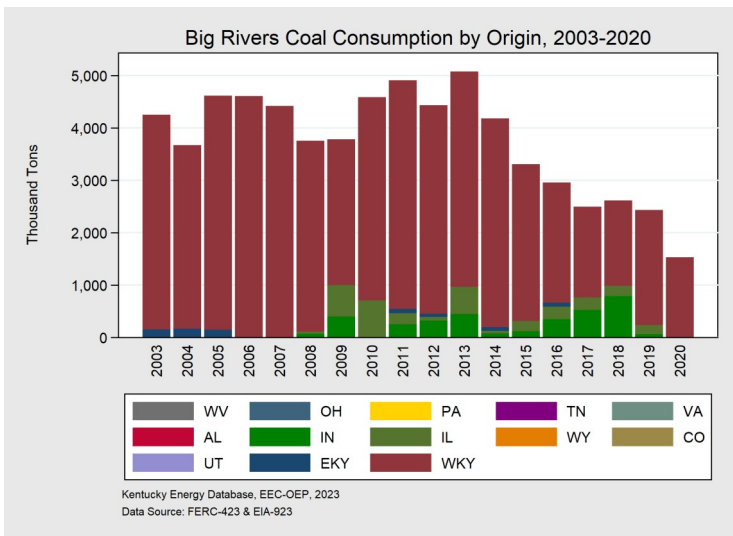


Big Rivers Electric Corporation generates and sells electricity in northwestern Kentucky. Total electricity prices in 2020 were 9.15 cents per kWh and have increased by 100% since 2010. Big Rivers serves three RECCs: Kenegy Corporation, Meade County RECC, and Jackson Purchase Energy Corporation. Big Rivers operates two coal-fired generating stations.

Electricity Generation	2020	Since 2010
Gigawatt Hours	3,812	-71.1%

Big Rivers generated 3.8 TWh and sold 9.3 TWh of electricity in 2020. Since the retirements of Henderson, Coleman and Reid power plants, fossil fuel generation has continued to decrease since 2013. When electricity sales are greater than generation, it means that the utility purchased power from another source. In many cases this includes a Regional Transmission Organization which serves as a market for generated power among its members.

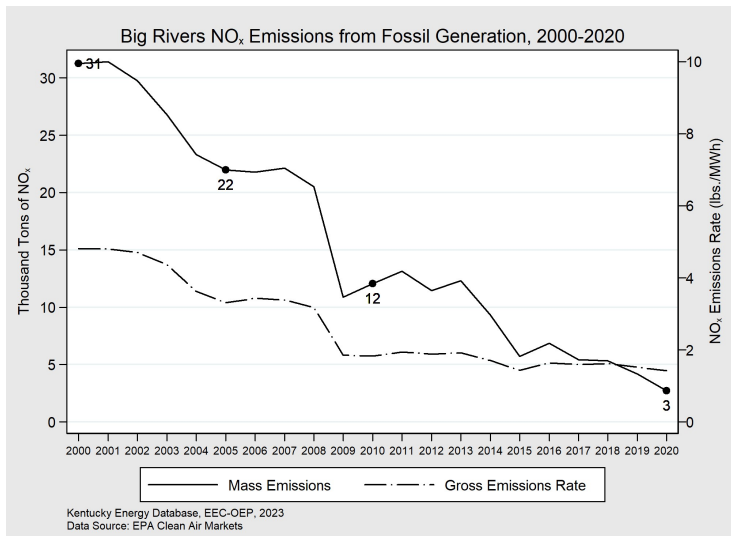
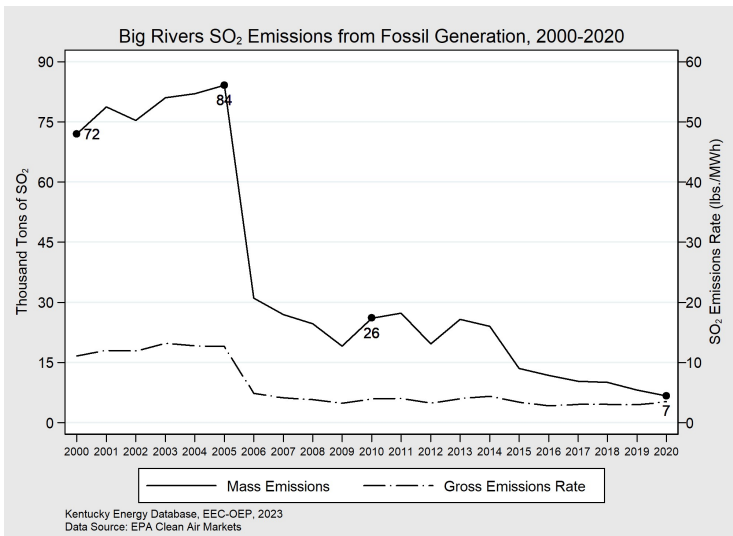
Big Rivers



State	2020 Tons	Percentage
Total	1,531,524	100%
Western Kentucky	1,531,524	100%

Carbon Dioxide	2020	Since 2010
Emissions (Tonnage)	4,065,261	-70.9%
Rate (lbs./MWh)	2,131	+1.9%

Big Rivers Electric Corporation emitted 4 million tons of CO₂ in 2018, a decrease of 71% since 2010. The rate of CO₂ emissions has increased by 2% during that period.



Sulfur Dioxide	2020	Since 2010
Emissions (Tonnage)	6,655	-74.5%
Rate (lbs./MWh)	3.4	-46.0%

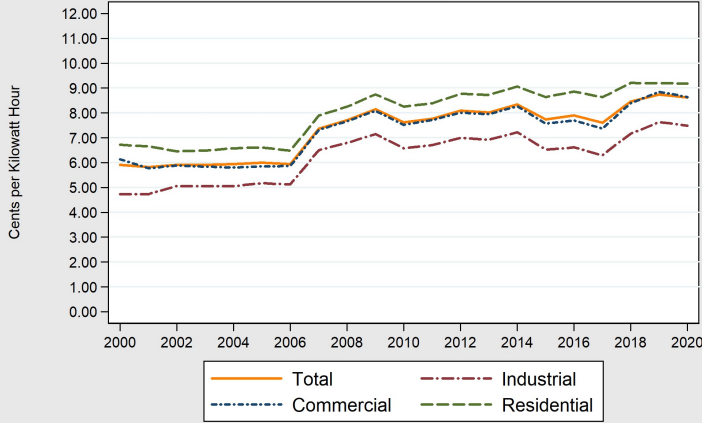
Nitrogen Dioxide	2020	Since 2010
Emissions (Tonnage)	2,718	-77.5%
Rate (lbs./MWh)	1.26	-28%

Big Rivers Electric Corporation emitted 6,655 tons of SO₂ in 2020, a decrease of 74.5% since 2010. The rate of SO₂ emissions decreased by 46% during that period.

Big Rivers Electric Corporation emitted 2,718 tons of NO_x in 2020, a reduction of 78% since 2010. The rate of NO_x emissions decreased by 28% during that period.

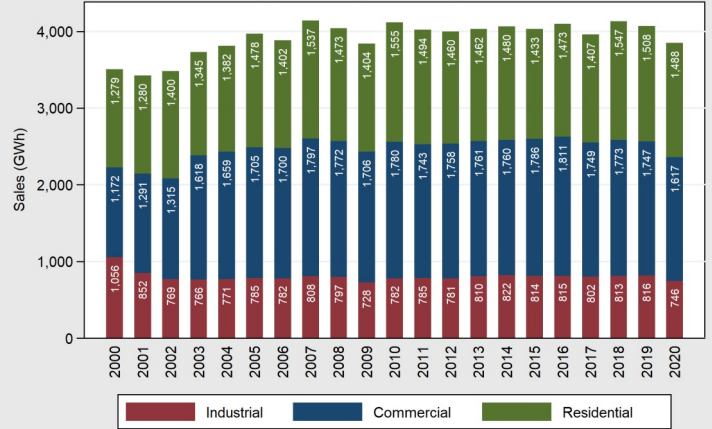
Duke Energy Kentucky

Duke Energy Kentucky Average Electricity Price, Inc., 2000-2020
Nominal Prices by Sector



Data Source: EIA Form 861 & 826

Duke Energy Kentucky Electricity Sales, 2000-2020

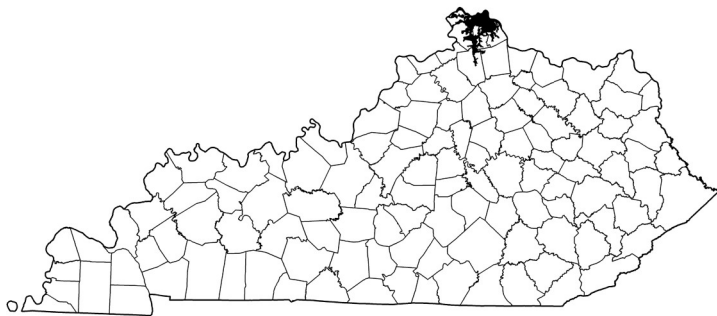


Kentucky Energy Database, EEC-OEP, 2020
Data Source: EIA Form 861

Sector	Price (Cents/kWh)	Since 2010
Total†	8.63	+13.3%
Residential	9.18	+11.1%
Commercial	8.64	+14.9%
Industrial	7.49	+13.8%

Sector	Sales (GWh)	Percentage
Total†	3,851	100%
Commercial	1,617	42.0%
Residential	1,488	38.6%
Industrial	746	19.4%

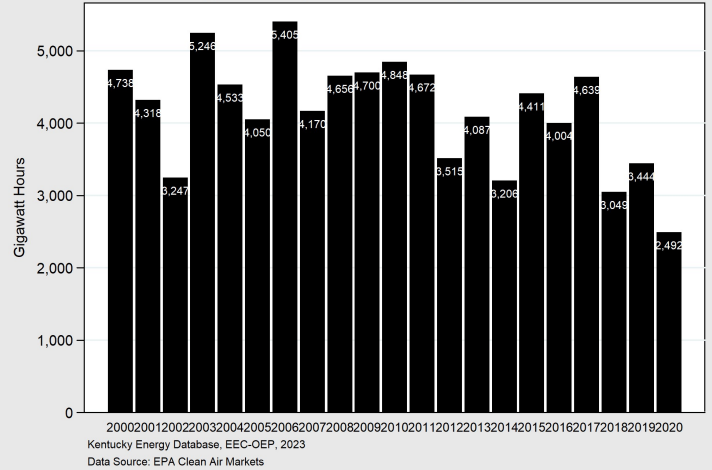
Duke Energy Kentucky Service Territory



Kentucky Public Service Commission
Kentucky Energy Database, EEC-DEDI

Duke Energy Kentucky generates and sells electricity in northern Kentucky and is owned and operated by Duke Energy. Total electricity prices in 2020 were 8.63 cents per kWh and has increased by 13.3% since 2010. Duke Energy owns and operates the East Bend coal-fired power plant in Boone County. Duke Energy also sells electricity throughout North and South Carolina, Indiana, and southwest Ohio.

Duke Energy Kentucky Gross Electricity Generation, 2000-2020

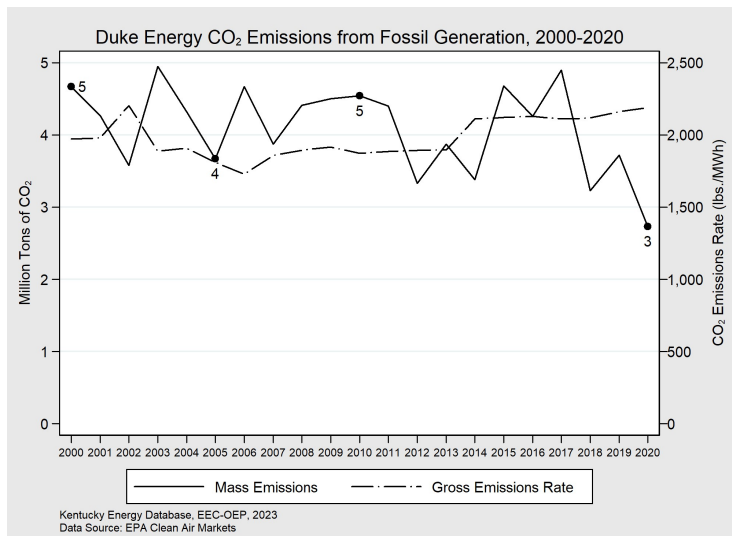
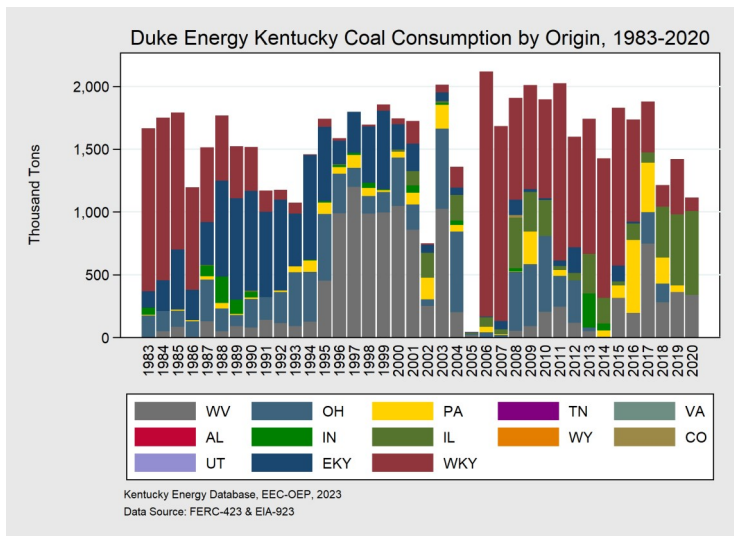


Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

Electricity Generation	2020	Since 2010
Gigawatt Hours	2,492	-48.6%

Duke Energy Kentucky generated 2.5 TWh of electricity in 2020, a decrease of 48.6% from 2010, when it generated 4.8 TWh.

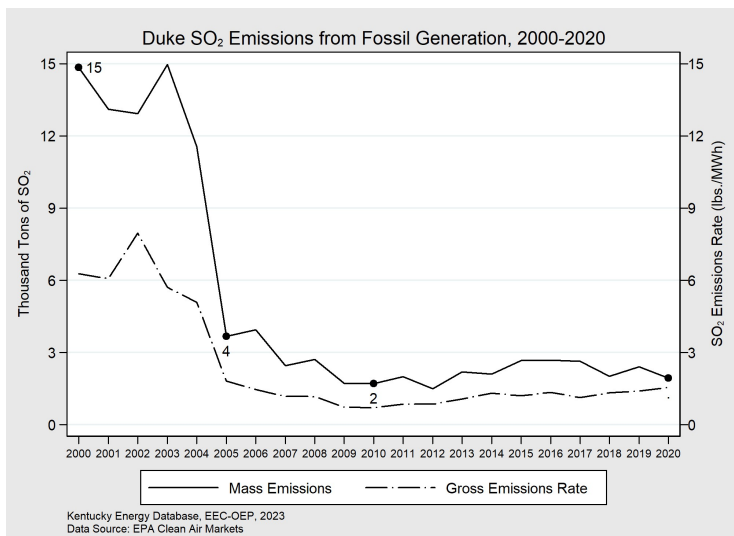
Duke Energy Kentucky



State	2020 Tons	Percentage
Total	1,115,715	100%
Western Kentucky	107,839	9.7%
Illinois	670,821	60.1%
West Virginia	337,055	30.2%

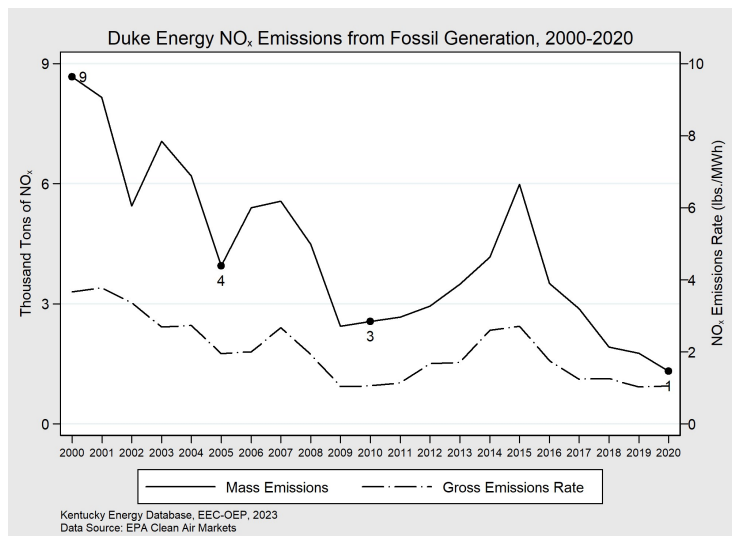
Carbon Dioxide	2020	Since 2010
Emissions (Tonnage)	2,730,063	-39.9%
Rate (lbs./MWh)	2,190	+17.0%

Duke Energy Kentucky emitted 2.7 million tons of CO₂ in 2020, a decrease of 39.9% since 2010. The rate of CO₂ emissions has increased by 17% during that period.



Sulfur Dioxide	2020	Since 2010
Emissions (Tonnage)	1,932	+13.0%
Rate (lbs./MWh)	1.55	+118.3%

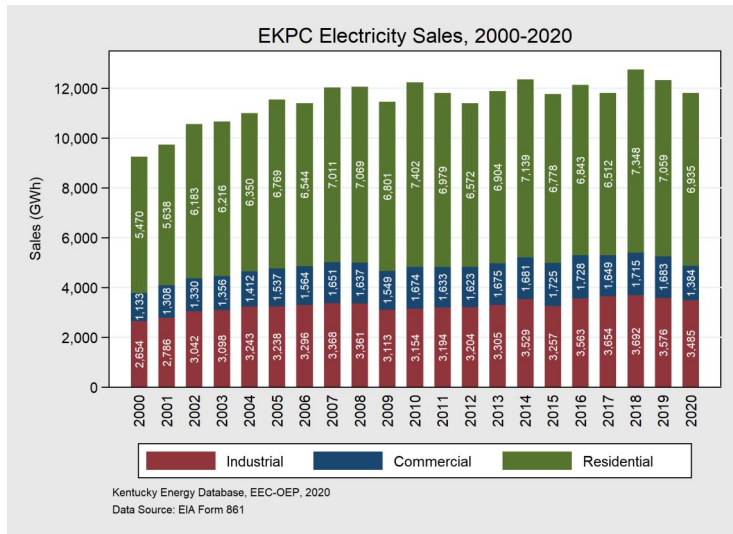
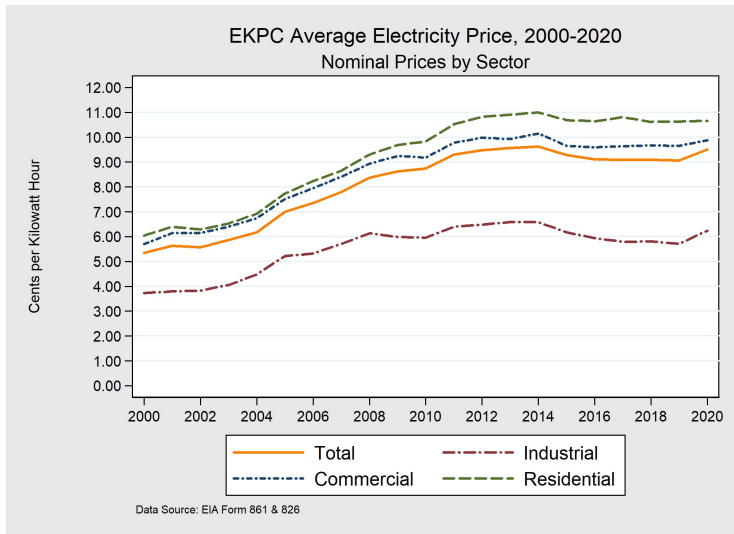
Duke Energy Kentucky emitted 1,932 tons of SO₂ in 2020, an increase of 13% since 2010. The rate of SO₂ emissions increased by 118.3% during that period while still remaining within the range of rates emitted by other utilities.



Nitrogen Dioxide	2020	Since 2010
Emissions (Tonnage)	1,320	-48.5%
Rate (lbs./MWh)	1.06	0%

Duke Energy Kentucky emitted 1,320 tons of NO_x in 2020, a reduction of 48.5% since 2010. The rate of NO_x emissions remains the same as it was in 2010.

East Kentucky Power Cooperative

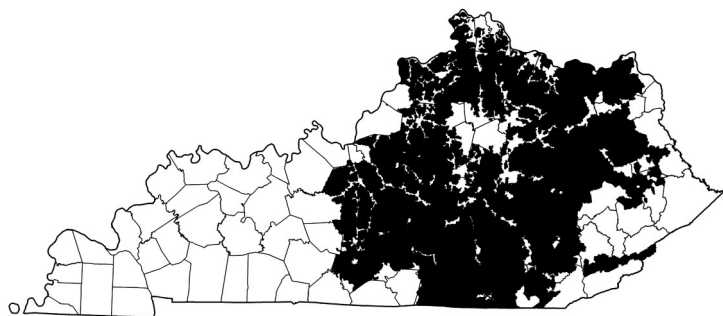


Sector	Price (Cents/kWh)	Since 2010
Total	9.51	+8.8%
Residential	10.66	+8.4%
Commercial	9.87	+7.5%
Industrial	6.24	+4.7%

Sector	Sales (GWh)	Percentage
Total	11,805	100%
Residential	6,935	58.8%
Industrial	3,486	29.5%
Commercial	1,384	11.7%

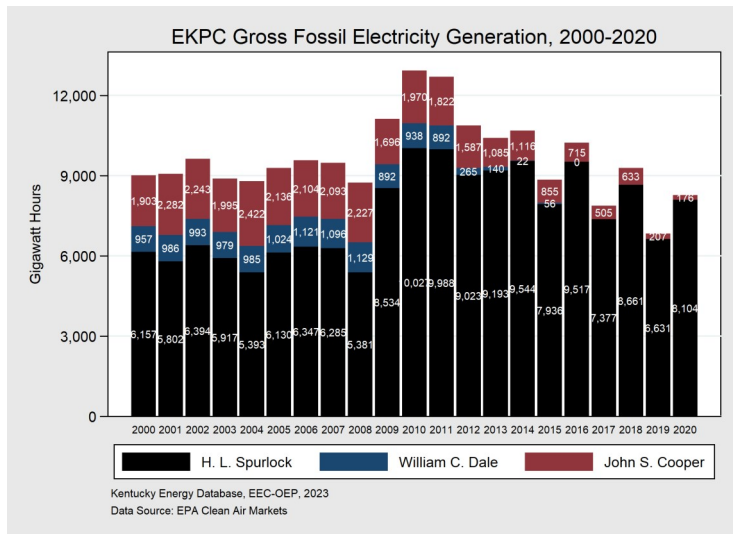
†Includes direct sales and sales to rural electric cooperatives

Eastern Kentucky Power Cooperative Service Territory



Kentucky Public Service Commission
Kentucky Energy Database, EEC-DEDI

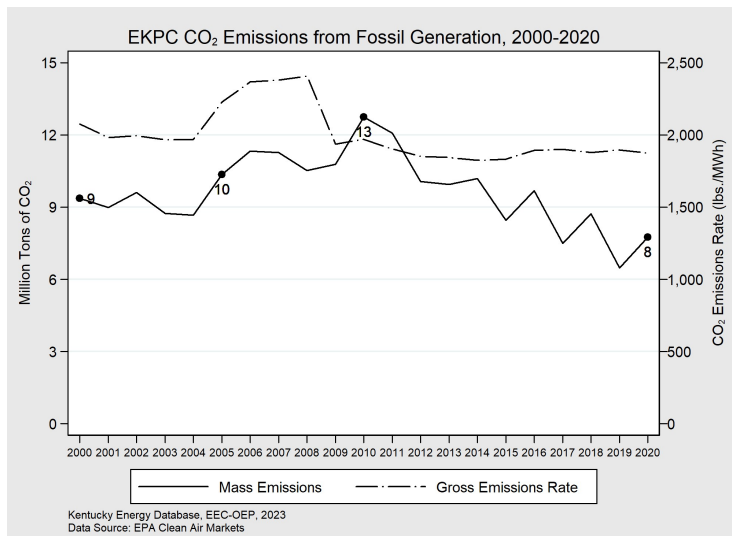
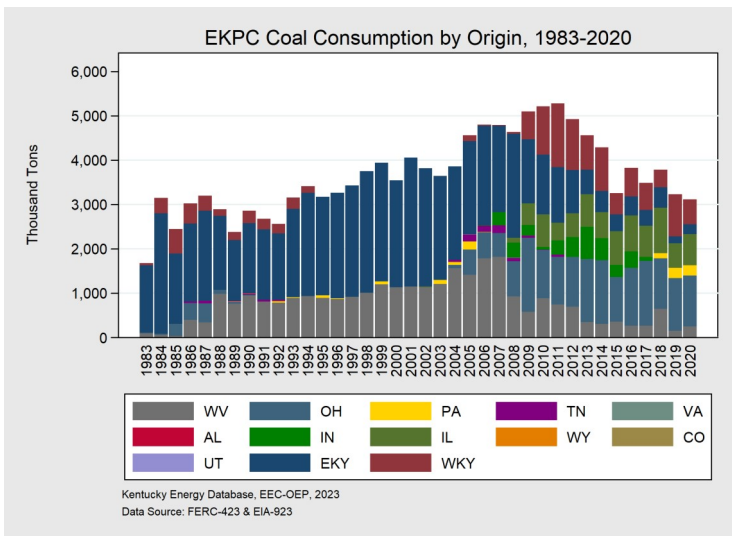
East Kentucky Power Cooperative serves central and eastern Kentucky where 16 RECCs jointly own and purchase electricity from EKPC. Total electricity prices in 2020 were 9.51 cents per kWh and have increased by 8.8% since 2010. EKPC owns and operates two coal-fired power plants, two natural gas electricity generating stations, and six landfill gas generating stations.



Electricity Generation	2020	Since 2010
Gigawatt Hours	8,280	-36%

East Kentucky Power Cooperative generated 8.2 TWh but sold 11.8 TWh of electricity in 2020. When electricity sales are greater than generation, it means that the utility purchased power from another source. In many cases this includes a Regional Transmission Organization which serves as a market for generated power among its members.

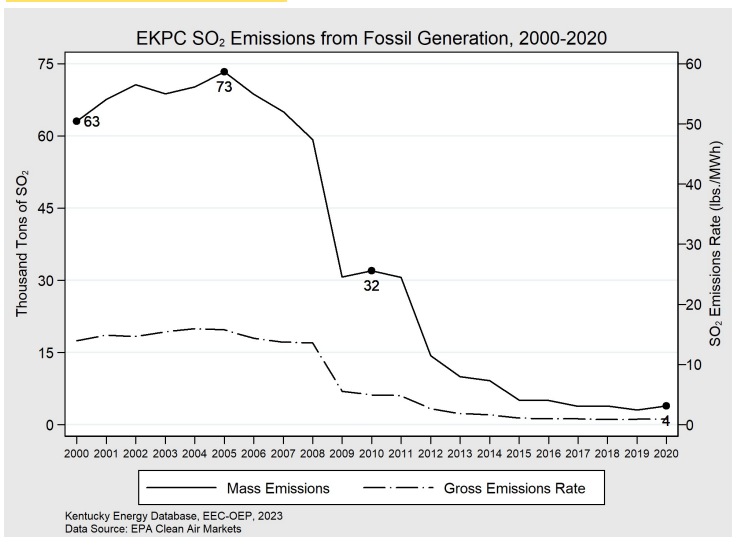
East Kentucky Power Cooperative



State	2020 Tons	Percentage
Total	3,115,315	100%
Ohio	1,149,563	36.9%
Western Kentucky	558,970	17.9%
Illinois	703,878	22.6%
Eastern Kentucky	223,247	7.2%
West Virginia	245,886	7.9%
Pennsylvania	233,771	7.5%

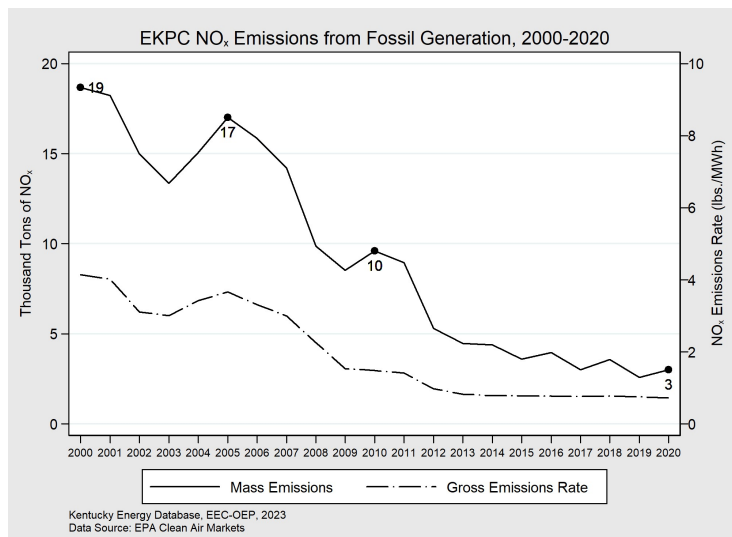
Carbon Dioxide	2020	Since 2010
Emissions (Tonnage)	7,753,863	-38.9%
Rate (lbs./MWh)	1,894	-6.1%

East Kentucky Power Cooperative emitted 7.8 million tons of CO₂ in 2020, a decrease of 38.9% since 2010. The rate of CO₂ emissions has decreased by 6.1% during that period.



Sulfur Dioxide	2020	Since 2010
Emissions (Tonnage)	3,878	-87.9%
Rate (lbs./MWh)	0.56	-99.4%

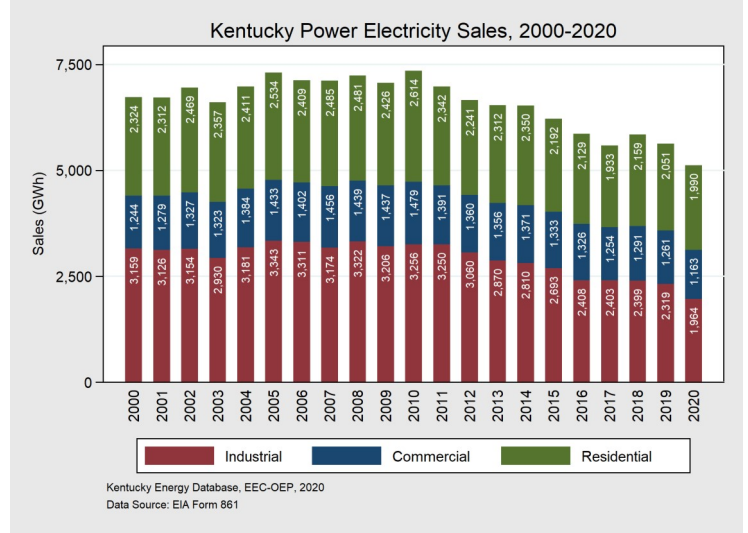
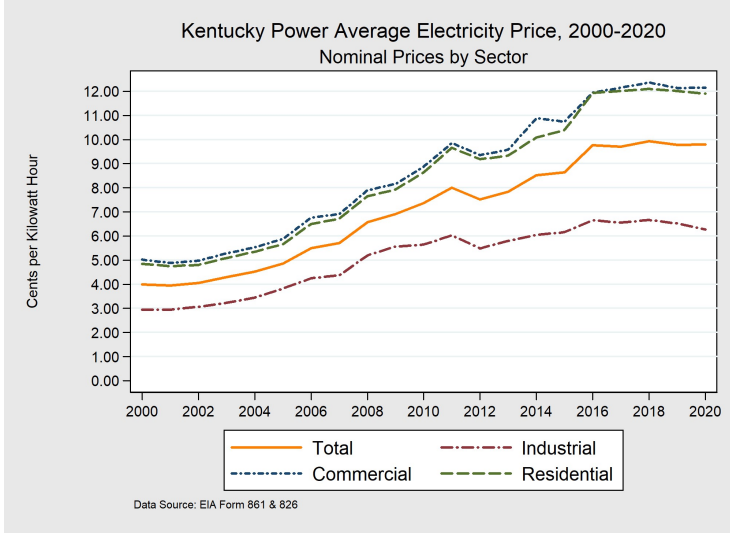
East Kentucky Power Cooperative emitted 3,878 tons of SO₂ in 2020, a decrease of 87.9% since 2010. The rate of SO₂ emissions decreased by 99.4% during that period.



Nitrogen Dioxide	2020	Since 2010
Emissions (Tonnage)	3,004	-68.7%
Rate (lbs./MWh)	0.58	-79.9%

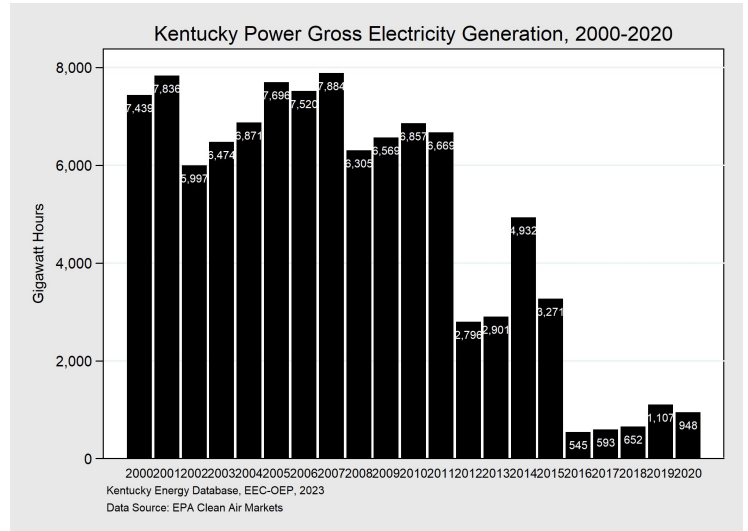
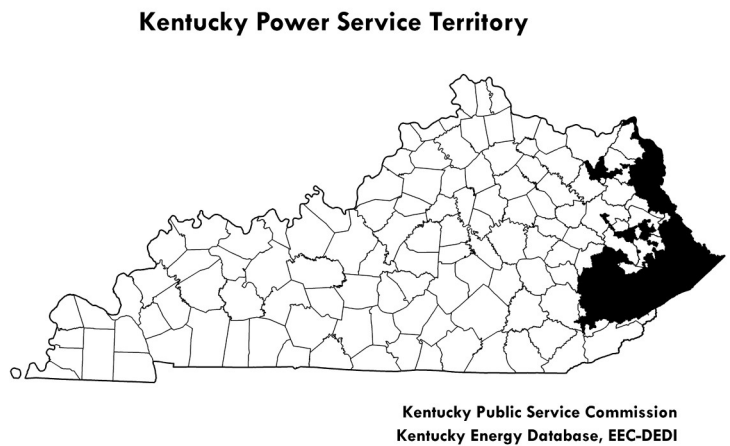
East Kentucky Power Cooperative emitted 3,004 tons of NO_x in 2020, a reduction of 68.7% since 2010. The rate of NO_x emissions decreased by 79.9% during that period and is the lowest in Kentucky.

Kentucky Power



Sector	Price (Cents/kWh)	Since 2010
Total	9.80	+33.2%
Residential	11.91	+37.8%
Commercial	12.15	+36.8%
Industrial	6.27	+11.2%

Sector	Sales (GWh)	Percentage
Total†	5,117	100%
Industrial	1,964	38.4%
Residential	1,990	38.9%
Commercial	1,163	22.7%

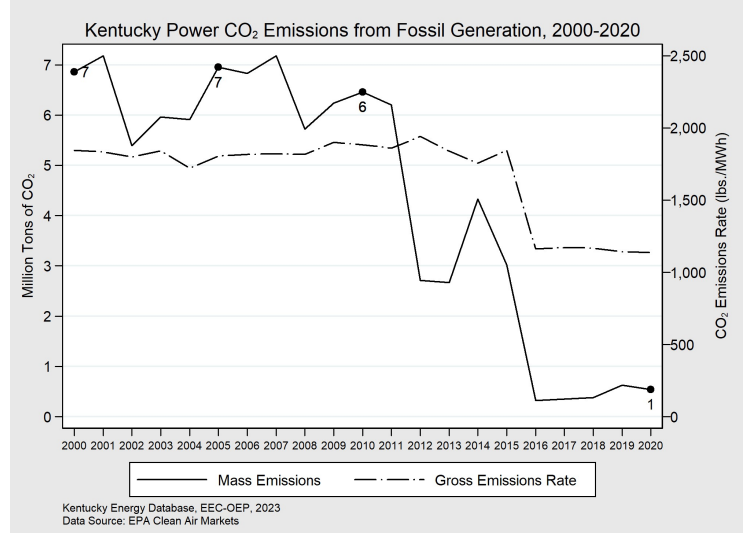
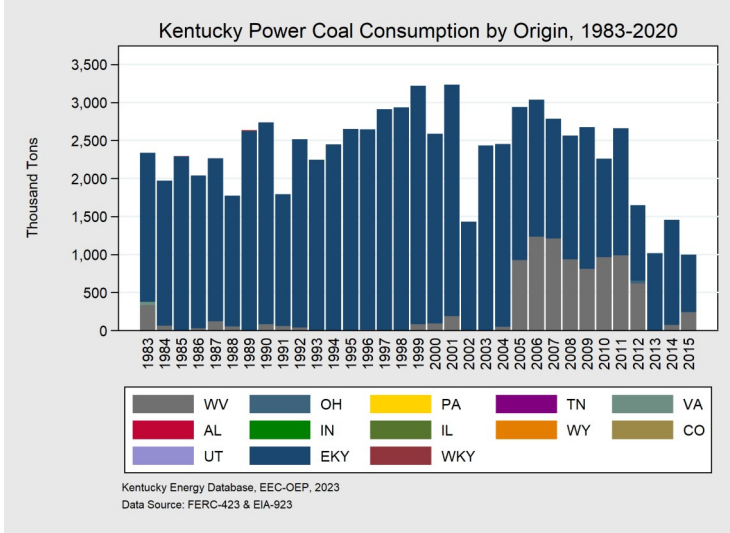


Kentucky Power, a subsidiary of American Electric Power, generates and distributes electricity in eastern Kentucky. Total electricity prices in 2020 were 9.8 cents per kWh and have increased by 33.2% since 2010. Kentucky Power operates the Big Sandy power plant in Louisa Kentucky.

Electricity Generation	2020	Since 2010
Gigawatt Hours	948	-86.2%

Kentucky Power generated 984 GWh and sold 5.1 TWh of electricity in 2020. Since 2010 generation has decreased by 86%.

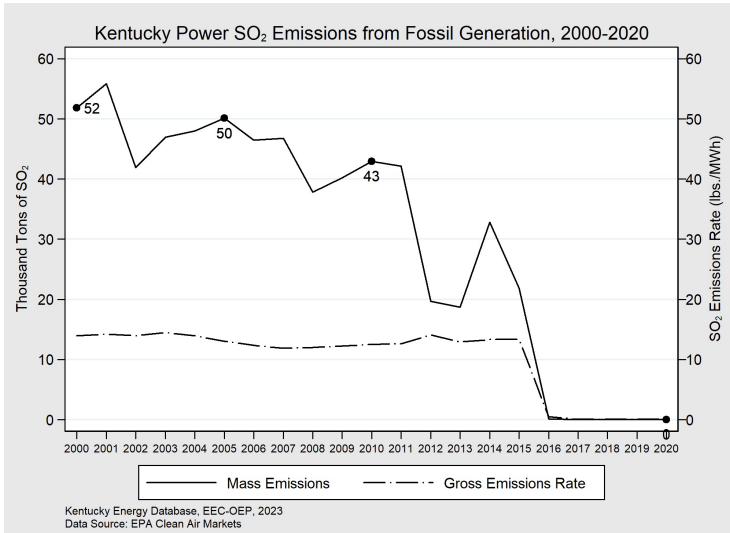
Kentucky Power



All units for the Big Sandy were retired in May of 2015 except unit 1, which was converted to natural gas.

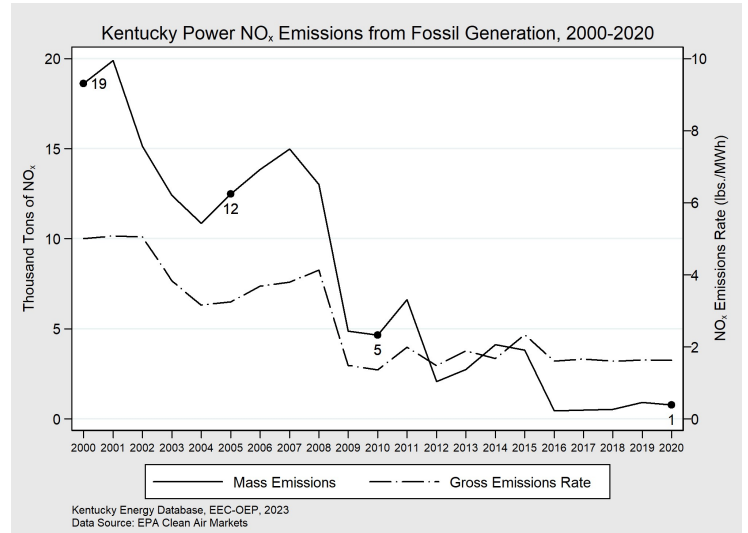
Carbon Dioxide	2020	Since 2010
Emissions (Tonnage)	539,187	-91.0%
Rate (lbs./MWh)	1,126	-33.7%

Kentucky Power emitted 539 thousand tons of CO₂ in 2020, a decrease of 91% since 2010. The rate of CO₂ emissions has decreased by 34% in that period of time.



Sulfur Dioxide	2020	Since 2010
Emissions (Tonnage)	23.4	-99.9%
Rate (lbs./MWh)	0.03	-99.6%

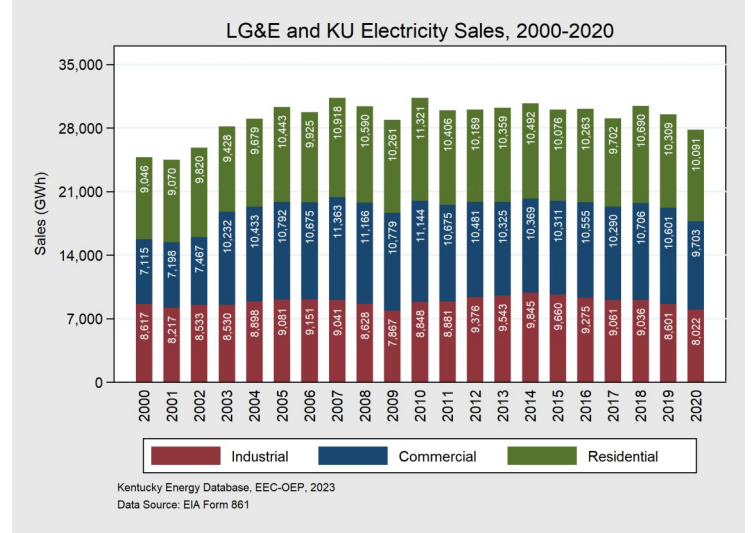
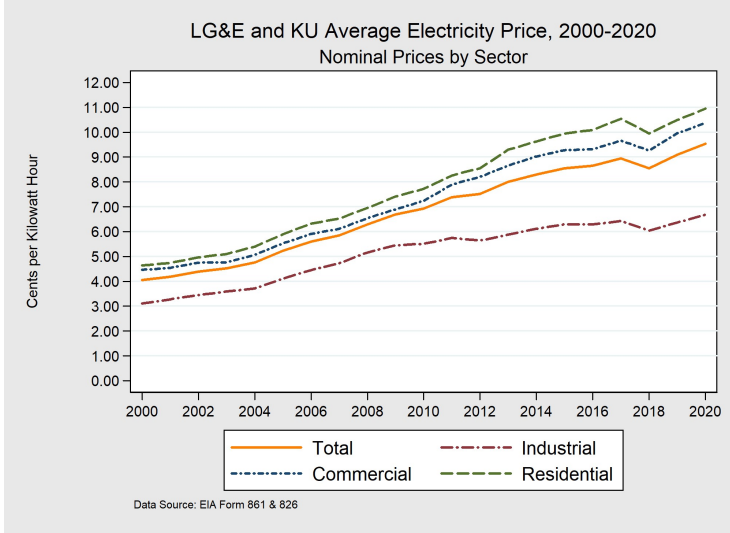
Kentucky Power emitted 23.4 tons of SO₂ in 2020, a decrease of 99.9% since 2010. The rate of SO₂ emissions reduced by 99.7% during that period.



Nitrogen Dioxide	2020	Since 2010
Emissions (Tonnage)	772.0	-84.2%
Rate (lbs./MWh)	1.7	+21.4%

Kentucky Power emitted 772 tons of NO_x in 2020, a reduction of 84.2% since 2010. The rate of NO_x emissions increased by 21.4% during that period. This is due to the unit's conversion to natural gas in 2016.

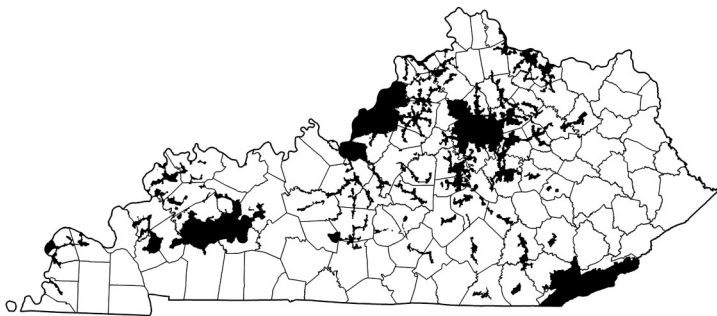
LG&E and KU



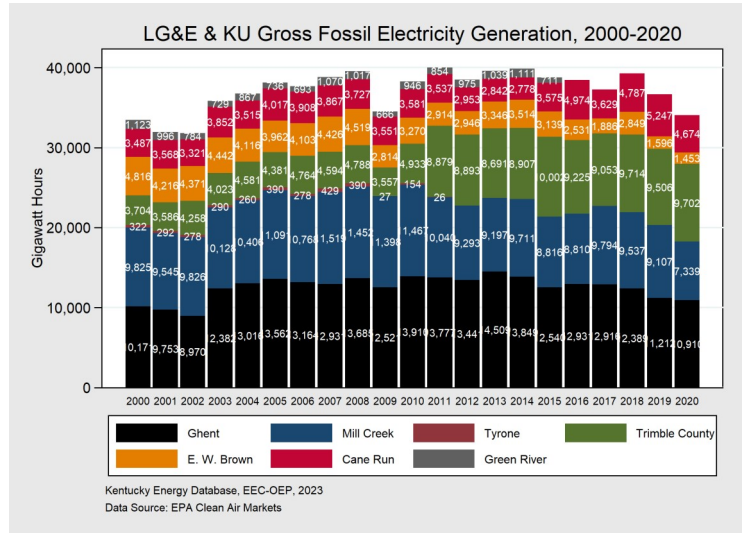
Sector	Price (Cents/kWh)	Since 2010
Total	9.54	+37.9%
Residential	10.95	+41.8%
Commercial	10.38	+43.4%
Industrial	6.68	+21.2%

Sector	Sales (GWh)	Percentage
Total	27,816	100%
Residential	10,091	36.3%
Commercial	9,703	34.9%
Industrial	8,022	28.8%

Louisville Gas & Electric and Kentucky Utilities



Kentucky Public Service Commission
Kentucky Energy Database, EEC-DEDI

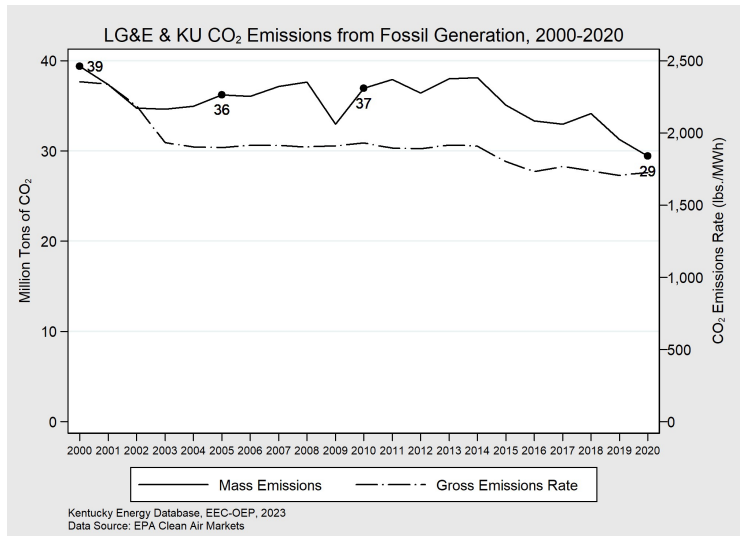
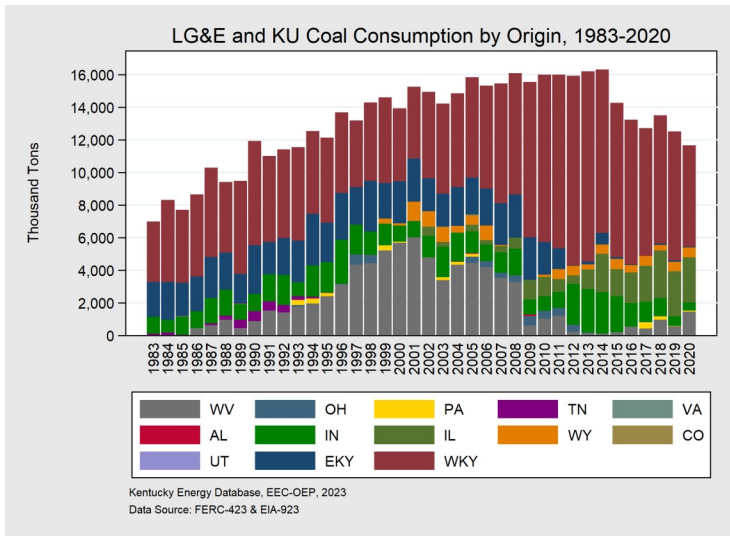


LG&E and KU is the single largest utility by sales in Kentucky and sells electricity throughout the state, primarily in densely populated areas. Total electricity prices in 2020 were 9.54 cents per kWh and have increased by 37.9% since 2010. LG&E and KU operate numerous electricity generation facilities throughout the state including four coal-fired power plants, two hydroelectric dams, five natural gas facilities and four solar operations.

Electricity Generation	2020	Since 2010
Gigawatt Hours	34,078	-11%

LG&E and KU generated just over 34 TWh and sold almost 27 TWh of electricity in 2020. Since 2010, generation has decreased by 11%.

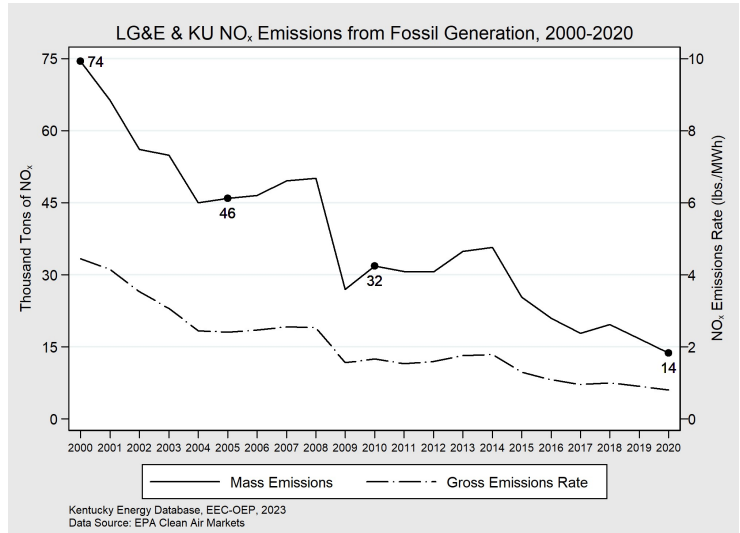
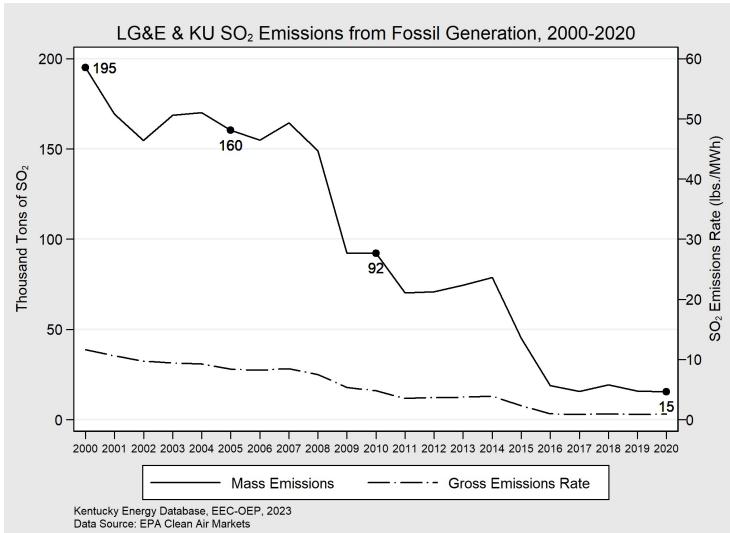
LG&E and KU



State	2020 Tons	Percentage
Total	11,586,349	100%
Western Kentucky	6,214,292	53.6%
Indiana	492,787	4.4%
Illinois	2,759,305	23.8%
Wyoming	605,446	5.2%
Eastern Kentucky	63,270	0.5%
West Virginia	1,451,249	12.5%

Carbon Dioxide	2020	Since 2010
Emissions (Tonnage)	29,417,229	-20.3%
Rate (lbs./MWh)	1,767	-7.1%

LG&E and KU emitted 29 million tons of CO₂ in 2020, a decrease of 20.3% since 2010. The rate of CO₂ emissions decreased by 7.1% during that period.



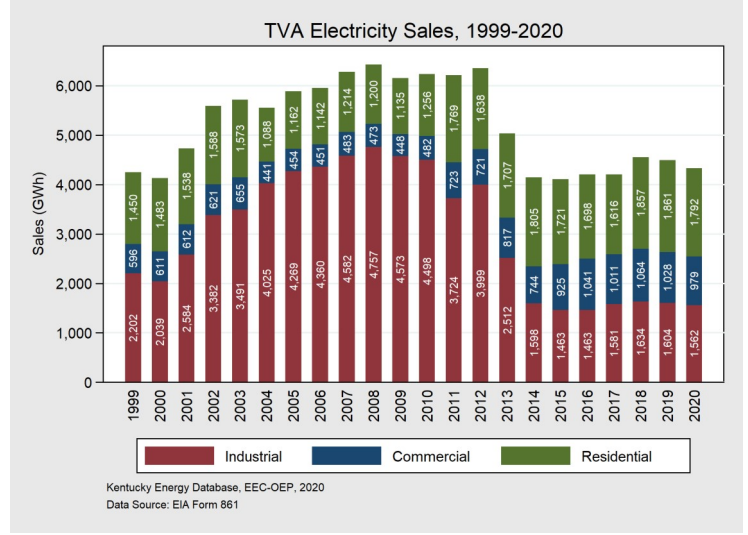
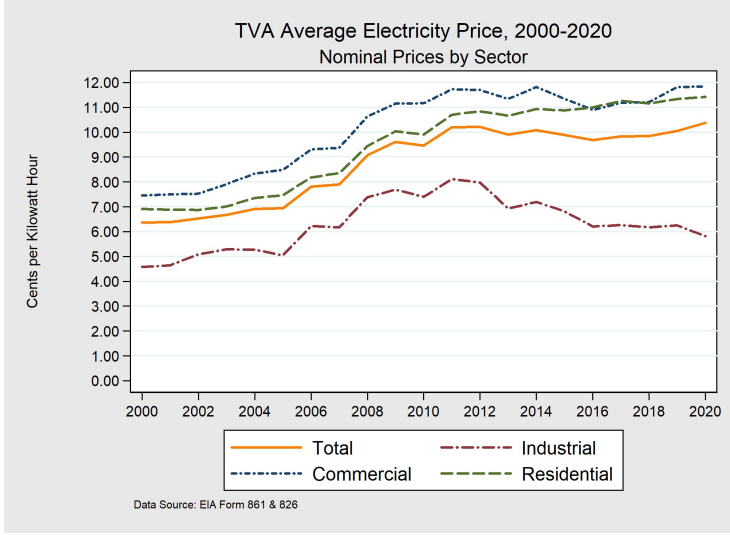
Sulfur Dioxide	2020	Since 2010
Emissions (Tonnage)	15,480	-83.2%
Rate (lbs./MWh)	1.23	-72.4%

Nitrogen Dioxide	2020	Since 2010
Emissions (Tonnage)	13,710	-56.9%
Rate (lbs./MWh)	0.96	-47.0%

LG&E and KU emitted 15,480 tons of SO₂ in 2020, a decrease of 83.2% since 2010. The rate of SO₂ emissions reduced by 72.4% during that period.

LG&E and KU emitted 13,710 tons of NO_x in 2020, a reduction of 56.9% since 2010. The rate of NO_x emissions decreased by 47% during that period.

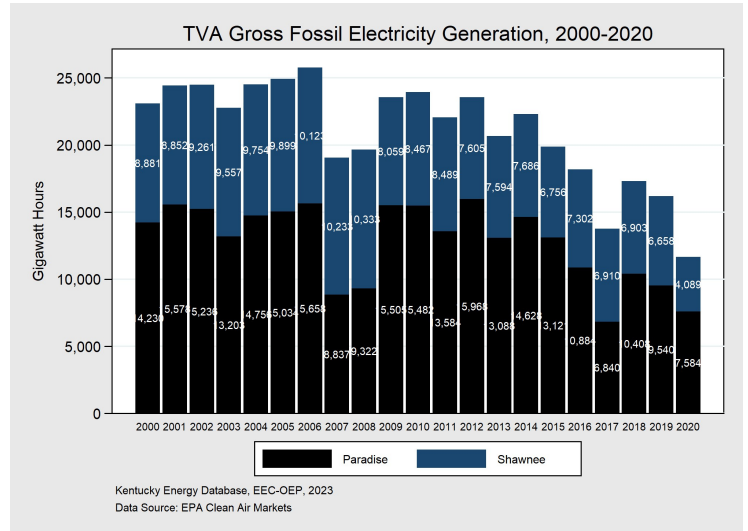
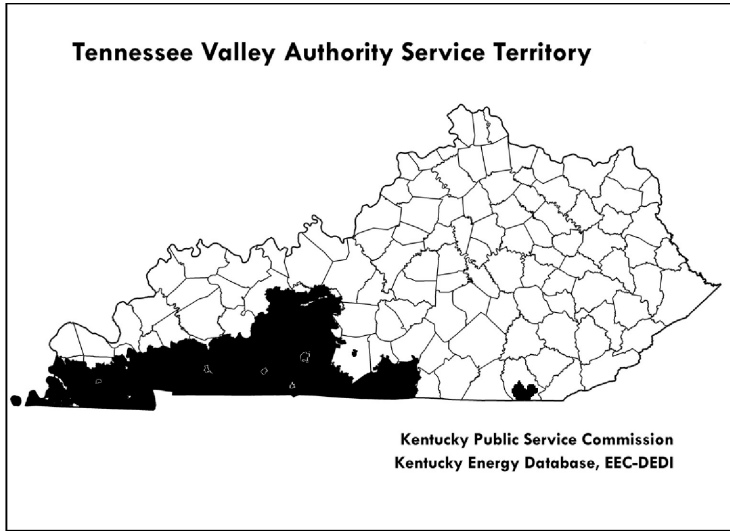
Tennessee Valley Authority



Sector	Price (Cents/kWh)	Since 2010
Total†	10.37	+9.5%
Residential	11.43	+15.5%
Commercial	11.84	+6.0%
Industrial	5.82	-21.4%

Sector	Sales (GWh)	Percentage
Total†	4,527	100%
Industrial	1,257	27.8%
Residential	2,151	47.5%
Commercial	1,119	24.7%

†Includes direct sales and sales to rural electric cooperatives

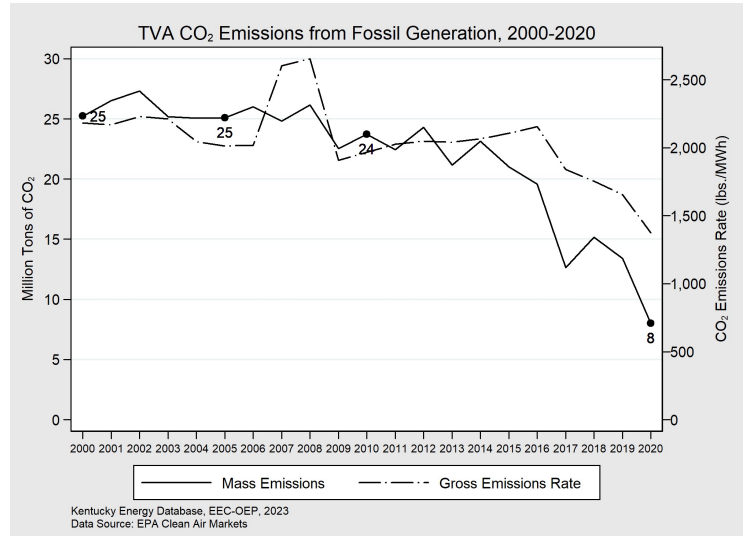
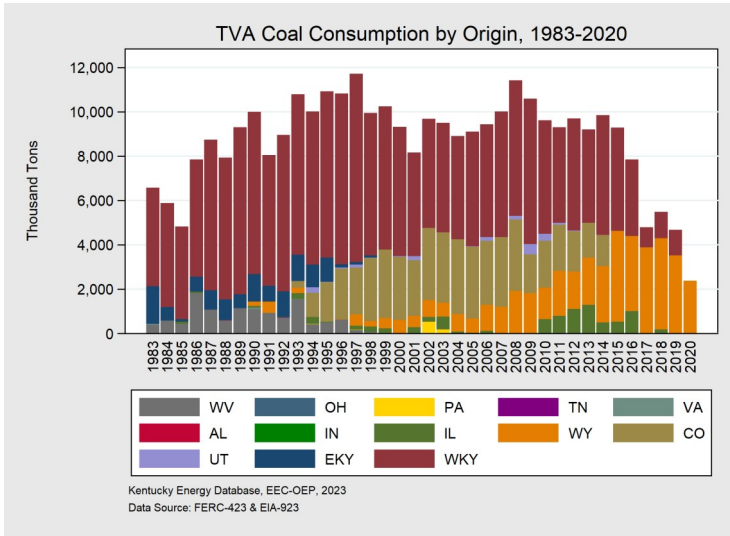


The Tennessee Valley Authority generates and sells electricity to five RECCs, 10 municipalities, and several industrial consumers in southwest Kentucky. Total electricity prices in 2020 were 10.37 cents per kWh and have increased by 9.5% since 2010. In Kentucky, TVA operates the Marshall Combustion Turbine Plant near Calvert City as well as the coal-fired power plants of Paradise and Shawnee.

Electricity Generation	2020	Since 2010
Gigawatt Hours	11,673	-51.3%

TVA generated 11.7 TWh and sold 4.5 TWh of electricity in 2020. Since 2010, generation has decreased by 51%. TVA directly sells electricity to a number of industrial manufacturers and five RECCs. The 10 municipalities TVA supplies are not shown in the figures above.

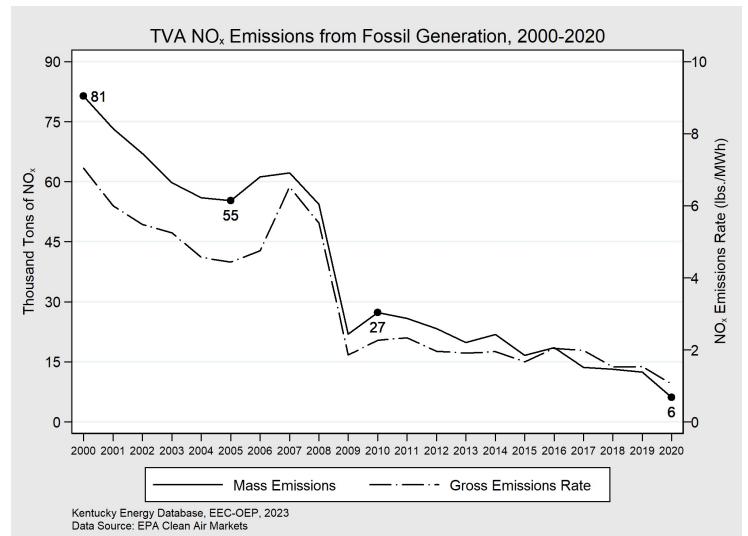
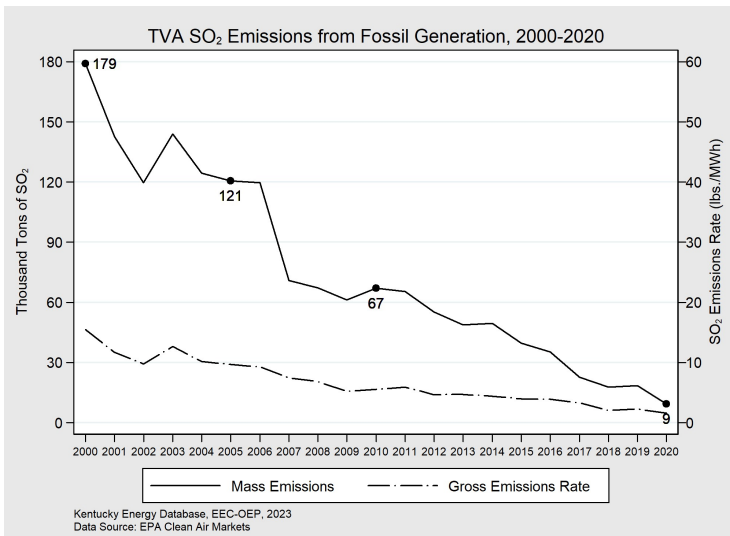
Tennessee Valley Authority



State	2020 Tons	Percentage
Total	2,382,441	100%
Wyoming	2,382,441	100%

Carbon Dioxide	2020	Since 2010
Emissions (Tonnage)	8,022,049	-66.2%
Rate (lbs./MWh)	1,412	-27.1%

The Tennessee Valley Authority emitted 8 million tons of CO₂ in Kentucky in 2020, a decrease of 66.2% since 2010. The rate of CO₂ emissions has decreased by 27.1% during that period.



Sulfur Dioxide	2020	Since 2010
Emissions (Tonnage)	9,419	-85.9%
Rate (lbs./MWh)	1.06	-84.7%

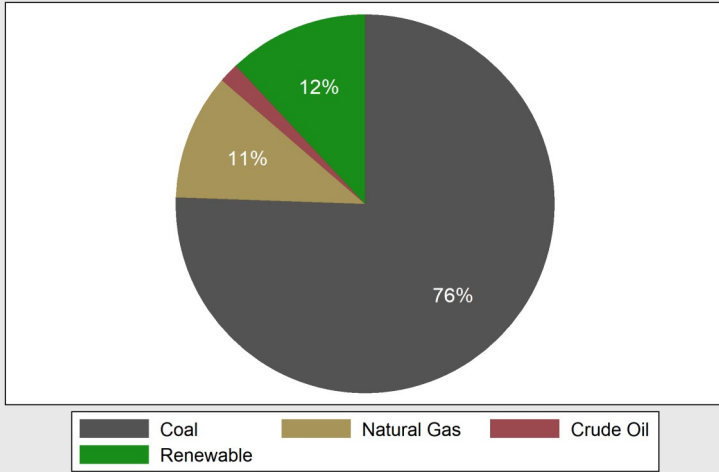
Nitrogen Dioxide	2020	Since 2010
Emissions (Tonnage)	6,126	-77.6%
Rate (lbs./MWh)	1.34	-35.8%

The Tennessee Valley Authority emitted 9,419 tons of SO₂ in 2020, a decrease of 86% since 2010. The rate of SO₂ emissions reduced by 85% during that period.

The Tennessee Valley Authority emitted 6,126 tons of NO_x in 2020, a reduction of 77.6% since 2010. The rate of NO_x emissions decreased by 35.8% during that period.

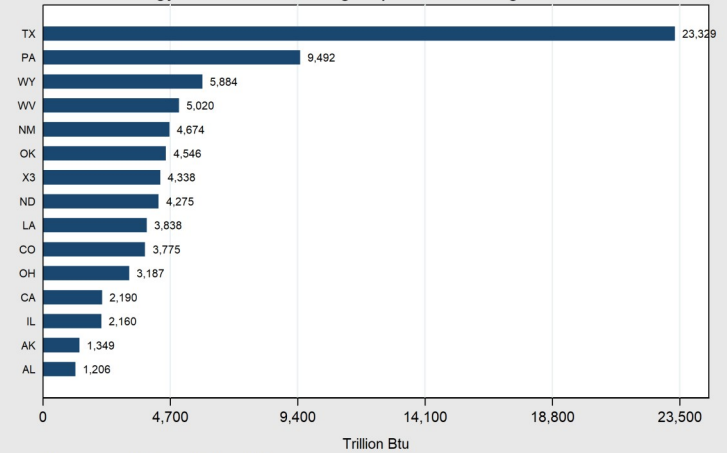
Kentucky Energy Production

Kentucky Energy Production by Fuel, 2020



Kentucky Energy Database, EEC-OEP, 2023

Energy Production Among Top 15 Producing States, 2020



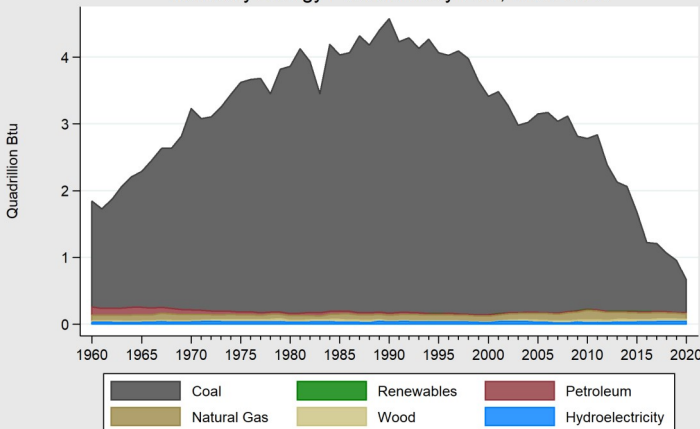
Kentucky Energy Database, EEC-OEP, 2023

Fuel Type	Billion Btu	1 Year Change
Total	756,015	-32.2%
Coal	571,089	-39.6%
Natural Gas	81,708	-8.9%
Renewable	90,327	+1.2%
Crude Oil	12,890	-10.2%

State	Quadrillion Btu	Rank
Texas	23.3	1st
Kentucky	.8	23rd

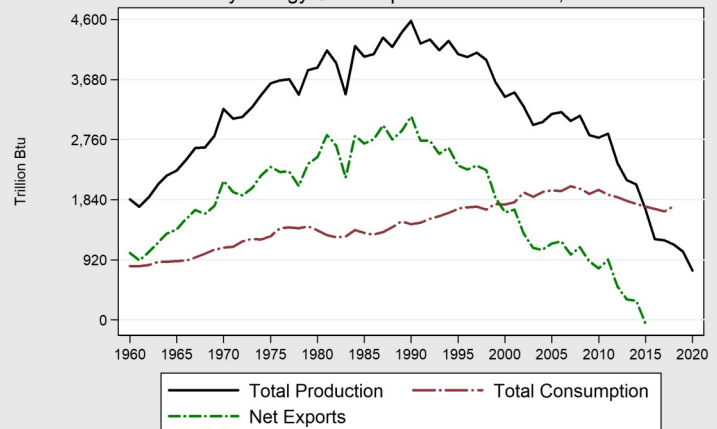
Kentucky was the 23rd largest producer of energy in 2020. As recently as 2009, Kentucky ranked 4th among all states; however, the increased adoption of horizontal hydraulic fracturing has increased production in other states and the decline of coal mining has decreased production in Kentucky.

Kentucky Energy Production by Fuel, 1960-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Kentucky Energy Consumption & Production, 1960-2020



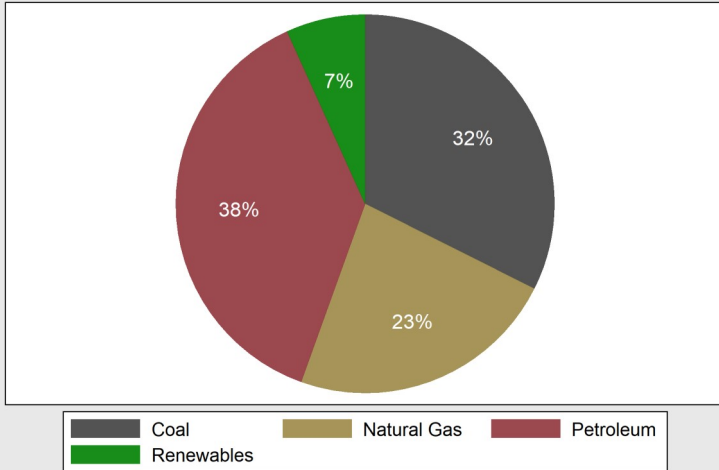
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Kentucky produced 756 Trillion Btu of energy in 2020. Despite declining production since 1990, coal supplies the vast majority of energy production in Kentucky at 571 Trillion Btu, or 76% of all energy produced. Natural gas, renewable resources, and crude oil—despite significant growth in recent years—combined to only account for 24% of energy production.

Due to abundant coal resources, Kentucky has historically been a net exporter of energy. The trend in coal production in Kentucky has always driven the trend in overall energy production. However, with decreasing coal production and stable demand, Kentucky's net exports of energy have declined since 1990.

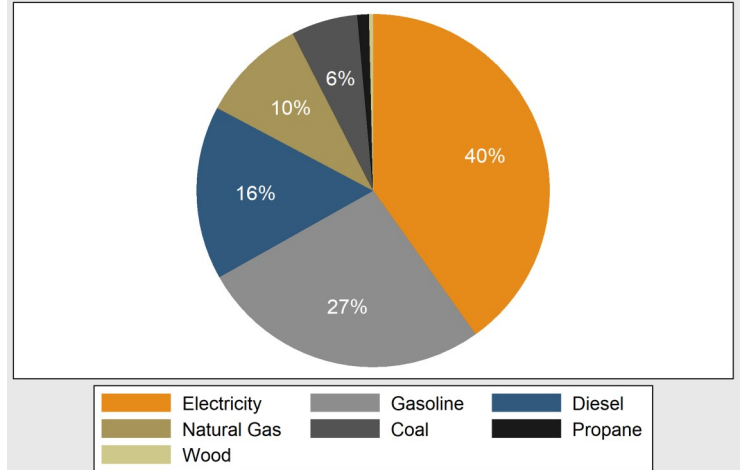
Kentucky Energy Consumption

Kentucky Energy Consumption by Fuel, 2020



Kentucky Energy Database, EEC-OEP, 2023

Kentucky Energy Expenditures by Fuel, 2020



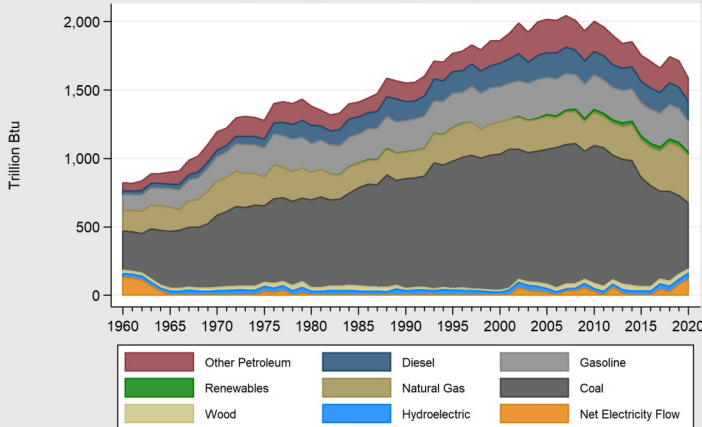
Kentucky Energy Database, EEC-OEP, 2023

Fuel Type	Billion Btu	1 Year Change
Total	1,510,853	-7.7%
Coal	482,266	-17.5%
Petroleum	561,889	-9.5%
Natural Gas	365,869	+6.2%
Renewables	100,829	-0.9%

Fuel Type*	Million (\$ US)	1 Year Change
Total	15,419	-18.1%
Gasoline	4,071	-30.4%
Electricity	6,117	-5.1%
Diesel	2,422	-27.3%
Coal	929	-20.0%
Natural Gas	1,482	-12.6%

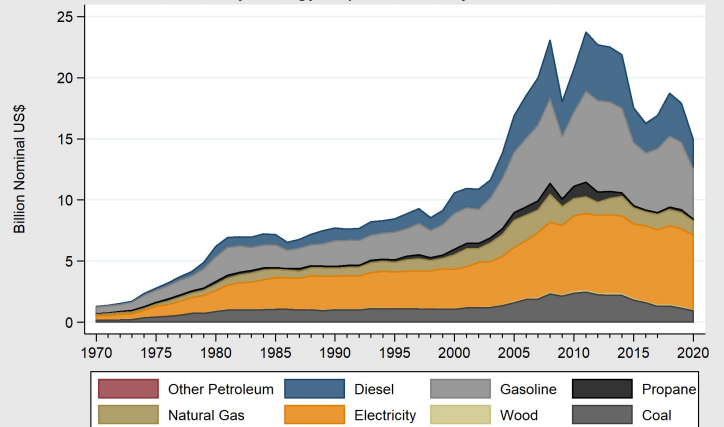
*Only top five sources listed

Kentucky Energy Consumption by Fuel, 1960-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Kentucky Energy Expenditures by Fuel, 1970-2020



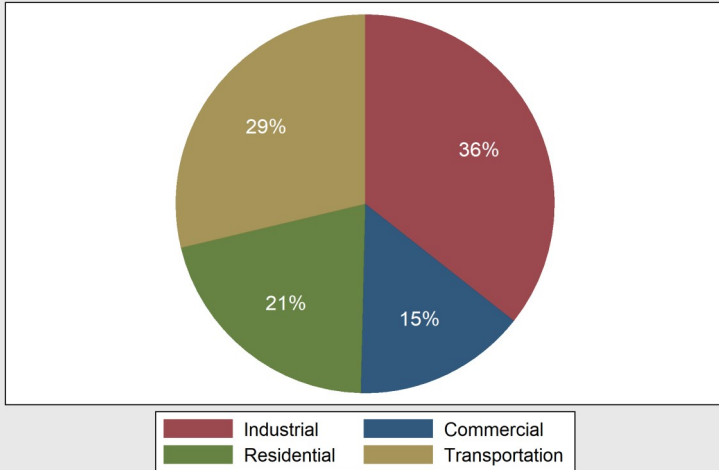
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

During 2020, Kentucky consumed 1.51 quadrillion Btu of energy, a decrease of 7.7% compared with 2019. Petroleum was Kentucky's primary energy source, providing 38% of the state's energy requirements. Coal was the second largest source of energy at 32%. The remainder of energy consumption was supplied by natural gas, at 23%, and renewable energy sources at 7%.

More than \$15 billion was spent on energy in Kentucky in 2020, a significant decrease in energy expenditures compared with 2019. During the year, electricity was 40% of energy expenditures and gasoline was 27%. Diesel fuel accounted for 16% of energy expenditures. Coal and natural gas consumption, other than electricity, together accounted for approximately 16% of energy expenditures.

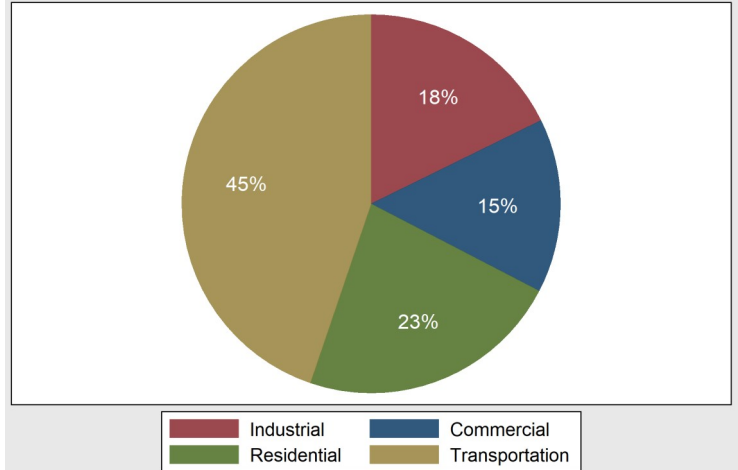
Kentucky Energy Consumption

Kentucky Energy Consumption by Sector, 2020



Kentucky Energy Database, EEC-OEP, 2023

Kentucky Energy Expenditures by Sector, 2020

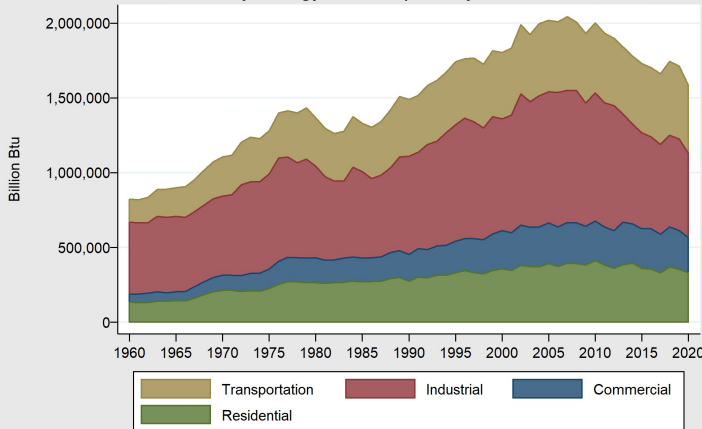


Kentucky Energy Database, EEC-OEP, 2023

Sector	Billion Btu	1 Year Change
Total	1,585,798	-7.7%
Industrial	564,615	-8.1%
Transportation	455,595	-7.0%
Residential	331,466	-6.1%
Commercial	234,122	-10.5%

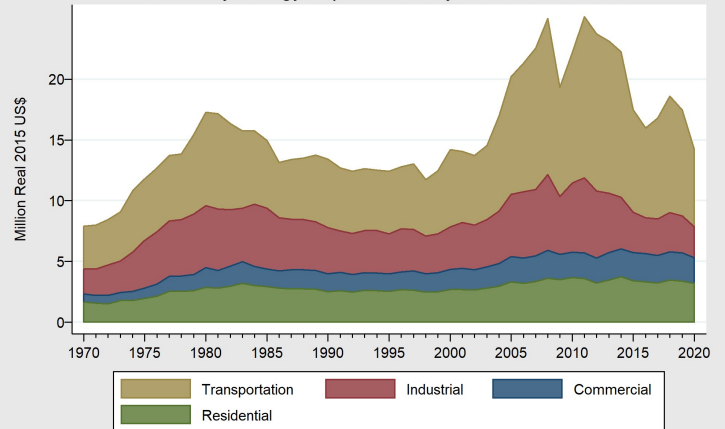
Sector	Million Dollars	1 Year Change
Total	15,508	-20.0%
Transportation	6,905	-30.6%
Industrial	2,732	-18.0%
Residential	3,483	-4.3%
Commercial	2,299	-8.8%

Kentucky Energy Consumption by Sector, 1960-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Kentucky Energy Expenditures by Sector, 1970-2020



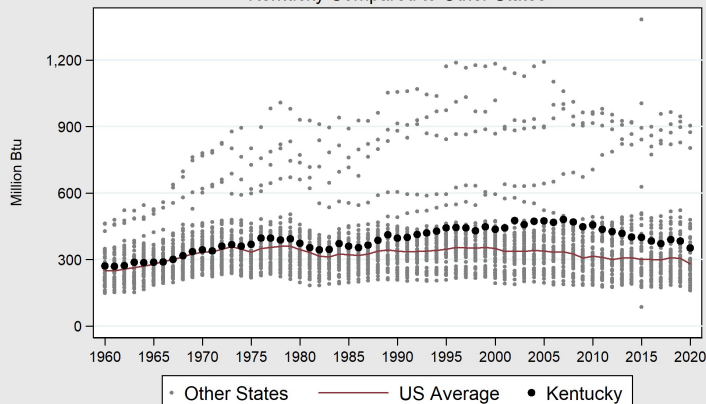
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

During 2020, manufacturing operations in Kentucky consumed 35.6% of all energy consumed within the Commonwealth. Kentucky's industrial energy use was slightly larger than the national average of 34% in 2020. After manufacturing, transportation was the second largest use of energy, with 29% of total energy demand, followed by residential energy use at 21%. The commercial sector accounted for 15% of energy consumption.

The Kentucky transportation energy use was the majority of energy expenditures in the state during the year. A total of \$6.9 billion was spent in 2020 on transportation fuels—primarily on gasoline and diesel. Manufacturers spent \$2.7 billion on various energy commodities, while the residential and commercial sectors spent \$3.4 billion and \$2.3 billion, respectively.

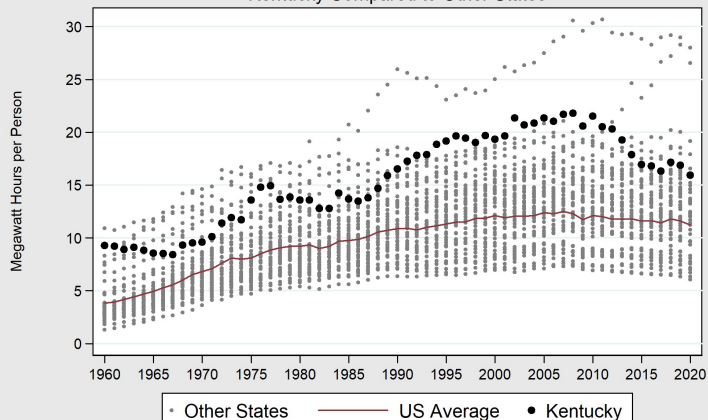
Kentucky Energy Intensity

Kentucky Annual Energy Consumption per Capita, 1960-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS & Census

Electricity Consumption Per Capita, 1960-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023

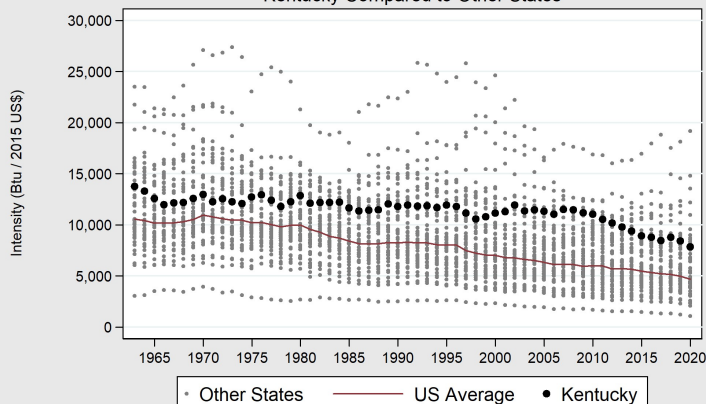
State	MMBtu per Capita	Rank
Louisiana	903.07	1st
Kentucky	351.82	15th
U.S. Average	280.24	-
Hawaii	160.21	52nd

Kentucky total energy consumption per capita decreased by 8.6% compared to 2019, which is 15th highest of all states.

State	MWh per Capita	Rank
North Dakota	28.0	1st
Kentucky	15.93	6th
U.S. Average	11.21	-
Hawaii	6.06	52nd

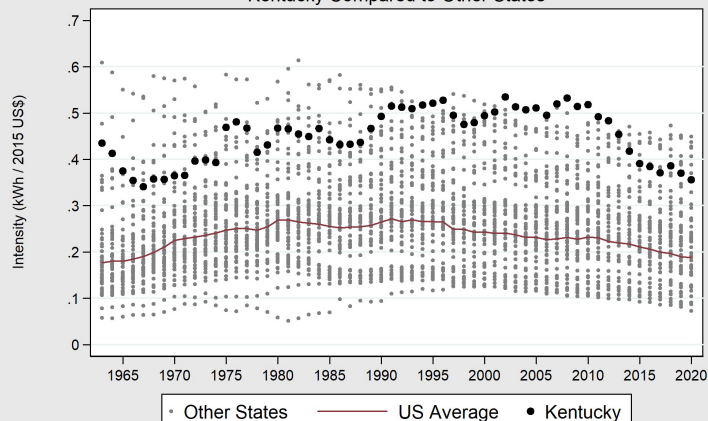
In 2020, Kentucky ranked 6th in terms of total electricity consumption per capita. Total electricity consumption per capita decrease by 5.7% compared with 2019.

Energy Consumption per State GDP Dollar, 1963-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS & BEA

Electricity Consumption per State GDP Dollar, 1963-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023

State	Btu/\$U.S. GDP	Rank
Louisiana	19,165	1st
Kentucky	7,845	13th
U.S. Average	4,700	-
DC	1,060	52nd

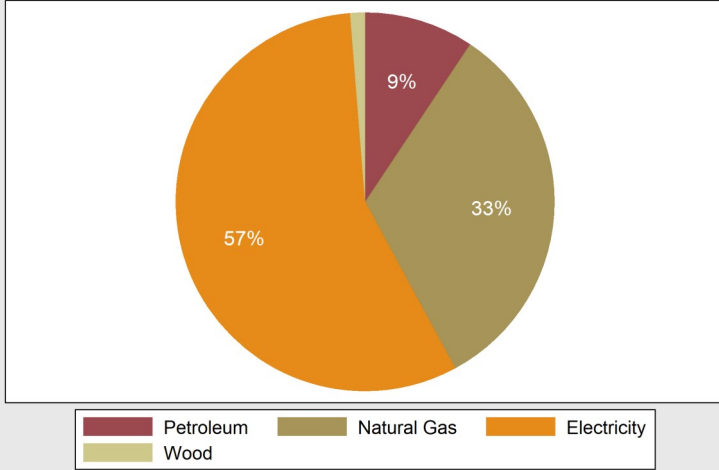
Kentucky ranked 13th in terms of total energy consumption per dollar of state GDP in 2020. Total energy intensity decreased by 7.03% compared with 2019.

State	kWh/\$U.S. GDP	Rank
Wyoming	0.45	1st
Kentucky	0.36	8th
U.S. Average	0.19	-
DC	0.07	52nd

In 2020, Kentucky had the 8th most electricity-intensive economy in the United States, and total electricity intensity decreased by 2.74% compared with 2019.

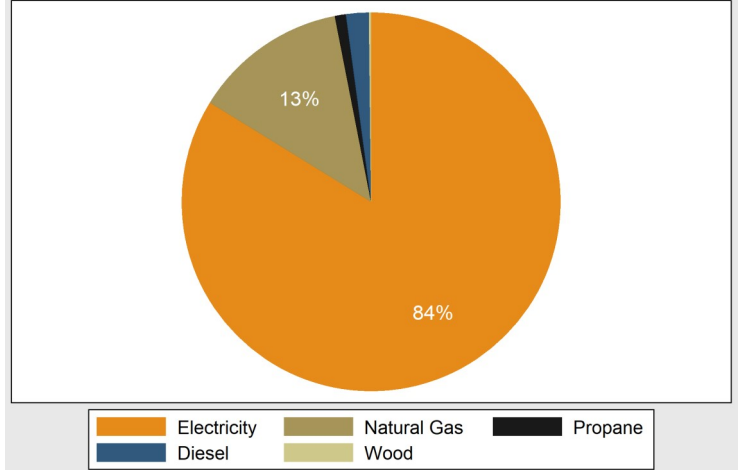
Commercial Energy Consumption

Kentucky Commercial Energy Consumption by Fuel, 2020



Kentucky Energy Database, EEC-OEP, 2023

Kentucky Commercial Energy Expenditures by Fuel, 2020

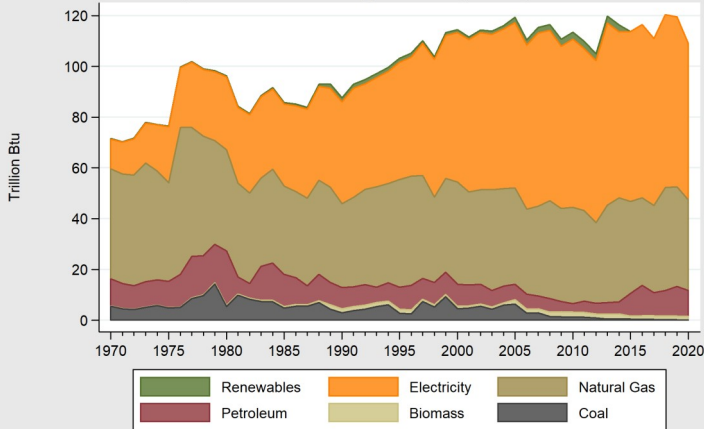


Kentucky Energy Database, EEC-OEP, 2023

Fuel Type	Billion Btu	1 Year Change
Total Net	108,908	-10.5%
Electricity	61,625	-8.2%
Natural Gas	35,647	-9.5%
Petroleum	10,178	-13.8%
Wood	1,390	-6.7%
Coal	68	-79.1%

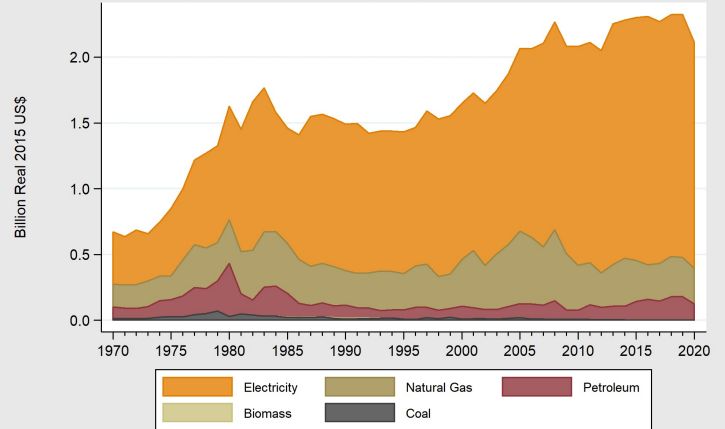
Fuel Type	Million Dollars	1 Year Change
Total	2,299	-8.8%
Electricity	1,867	-6.4%
Natural Gas	293	-9.1%
Diesel	44	-53.3%
Propane	21	-41.5%
Wood	4	-25.3%

Kentucky Commercial Energy Consumption by Fuel, 1970-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Kentucky Commercial Energy Expenditures by Fuel, 1970-2020



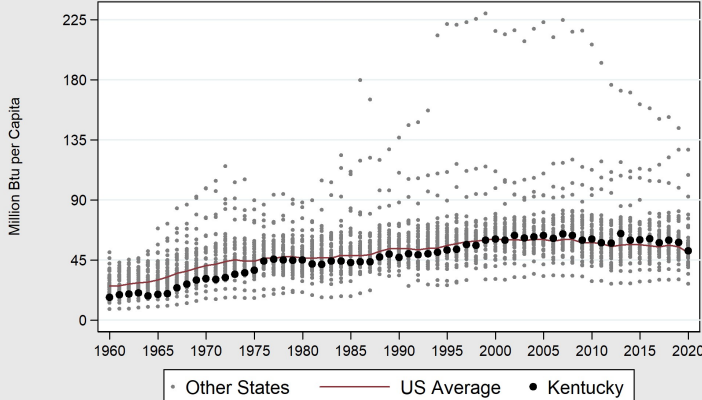
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

In 2020, non-manufacturing businesses in Kentucky consumed 108,908 billion Btu of energy, a 10.5% decrease in net commercial energy consumption compared with 2019. Electricity constituted 57% of commercial energy consumption, followed by natural gas at 33%. Other commodities such as petroleum products, wood, coal, and ethanol accounted for approximately 10% of commercial energy consumption in 2020. The commercial sector, which includes service industries, primarily uses natural gas for heating during the winter and cooking.

In 2020, non-manufacturing businesses in Kentucky spent nearly \$2.3 billion on energy consumption—a 8.8% decrease in commercial energy expenditures compared with 2019. Electricity was the largest energy expenditure, at 84%. Natural gas was 13% of commercial energy expenditures.

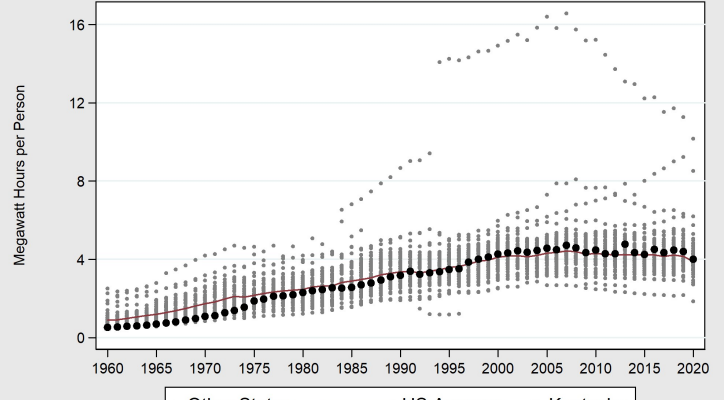
Commercial Energy Intensity

Annual Commercial Energy Consumption Per Capita, 1960-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS & Census

Commercial Electricity Consumption Per Capita, 1960-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023

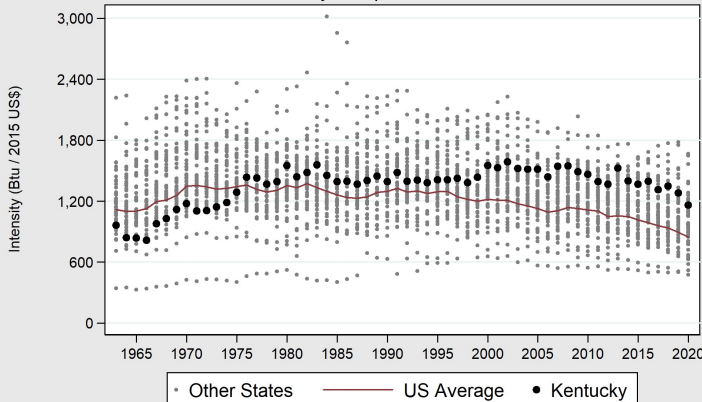
State	MMBtu per Capita	Rank
DC	127.5	1st
Kentucky	57.7	27th
U.S. Average	50.5	-
Hawaii	27.1	52nd

Kentucky commercial energy consumption per capita decreased by 0.86% compared with 2019, and ranks 27th of all states.

State	MWh per Capita	Rank
DC	10.16	1st
Kentucky	4.01	23rd
U.S. Average	3.88	-
Hawaii	1.85	52nd

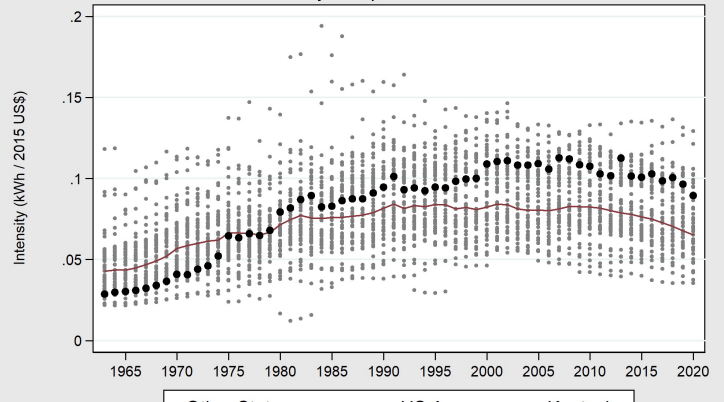
Kentucky ranked 23rd in terms of commercial electricity consumption per capita in 2020, a decrease of 9.05% compared with 2019.

Commercial Energy Consumption per State GDP Dollar, 1963-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS & BEA

Commercial Electricity Consumption per State GDP Dollar, 1963-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023

State	Btu/\$U.S. GDP	Rank
Montana	1,667	1st
Kentucky	1,159	16th
U.S. Average	847	-
California	476	52nd

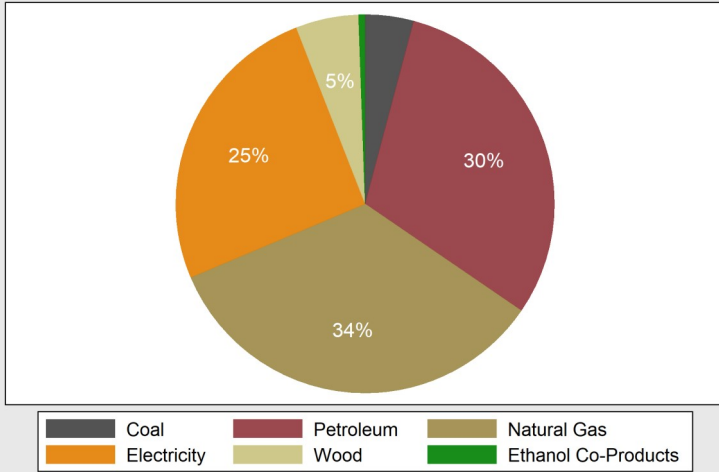
Kentucky ranked 16th highest in terms of commercial energy consumption per dollar of state GDP in 2020. Commercial energy intensity decreased by 9.8% compared with 2019.

State	kWh/\$U.S. GDP	Rank
North Dakota	0.13	1st
Kentucky	0.09	13th
U.S. Average	0.07	-
Hawaii	0.04	52nd

In 2020, Kentucky ranked 13th in terms of commercial electricity use per dollar of state GDP. Commercial electricity intensity decreased by 10.5% compared with 2019.

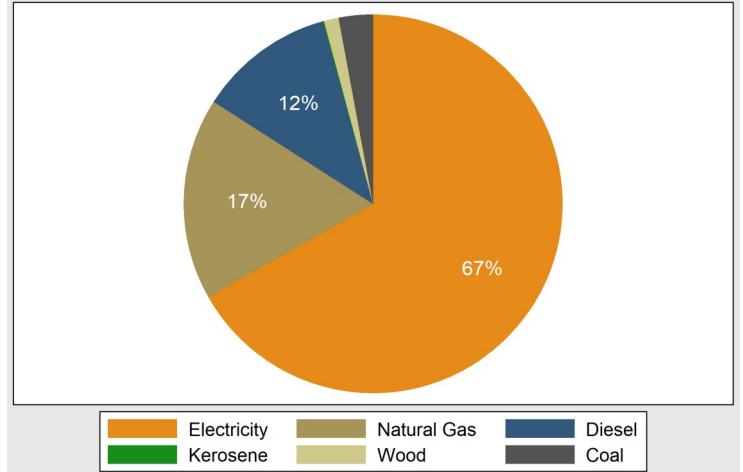
Industrial Energy Consumption

Kentucky Industrial Energy Consumption by Fuel, 2020



Kentucky Energy Database, EEC-OEP, 2023

Kentucky Industrial Energy Expenditures by Fuel, 2020

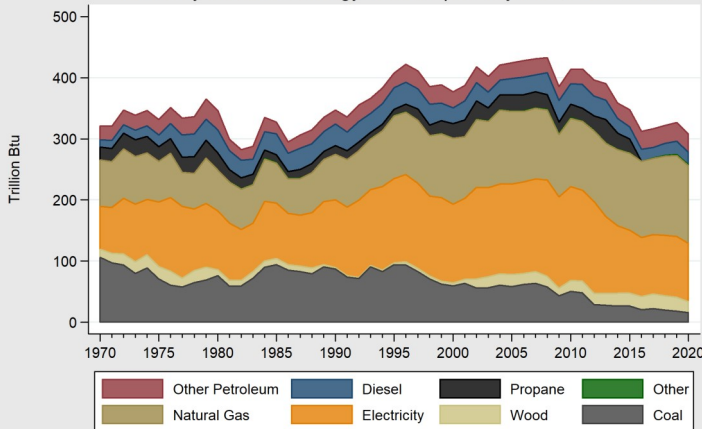


Kentucky Energy Database, EEC-OEP, 2023

Fuel Type	Billion Btu	1 Year Change
Total Net	371,339	-8.1%
Petroleum	113,587	-12.2%
Electricity	94,867	-4.8%
Natural Gas	127,334	-4.2%
Coal	15,430	-15.4%
Wood	20,121	-19.2%

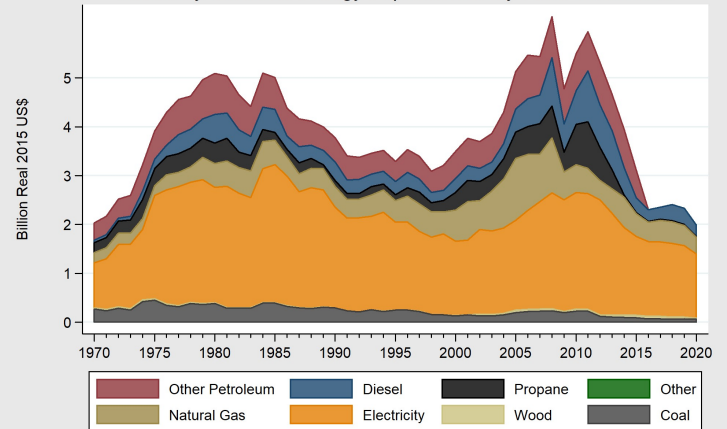
Fuel Type	Million Dollars	1 Year Change
Total	2,113	-18.0%
Electricity	1,430	-9.6%
Diesel	250	-35.5%
Kerosene	2	+20.0%
Natural Gas	369	-19.8%
Coal	62	-13.5%

Kentucky Industrial Energy Consumption by Fuel, 1970-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Kentucky Industrial Energy Expenditures by Fuel, 1970-2020



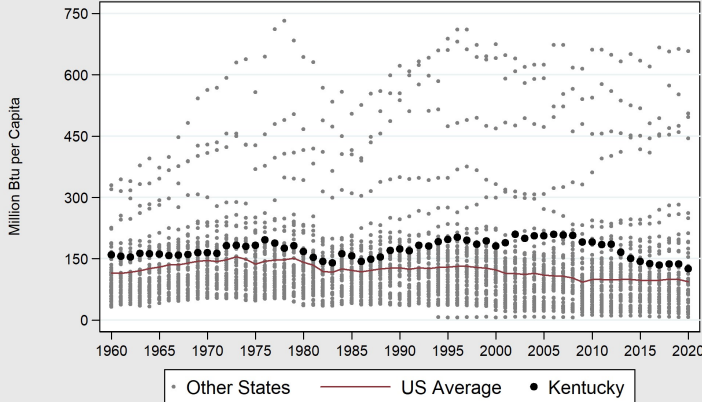
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Kentucky-based manufacturing operations and farms consumed 371 trillion Btu of energy in 2020, a decrease of 8.1% from 2019. Natural gas was the largest component of industrial energy use in 2020, attributing to 34% of total industrial energy consumption. Electricity and petroleum accounted for 25% and 30% of industrial energy consumption, respectively.

Kentucky spent more than \$2.1 billion to fuel factories and farms within the Commonwealth, which was a 18% decrease in industrial energy spending compared with 2019. Electricity was the largest expenditure—67% of industrial energy spending. Diesel and natural gas accounted for 12% and 17% of industrial expenditures, respectively. Coal, wood, and ethanol accounted for the remainder of industrial energy expenditures in 2020.

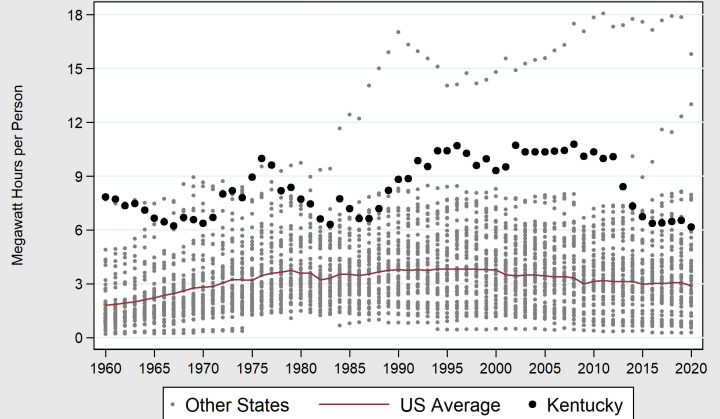
Industrial Energy Intensity

Annual Industrial Energy Consumption Per Capita, 1960-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS & Census

Industrial Electricity Consumption Per Capita, 1960-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023

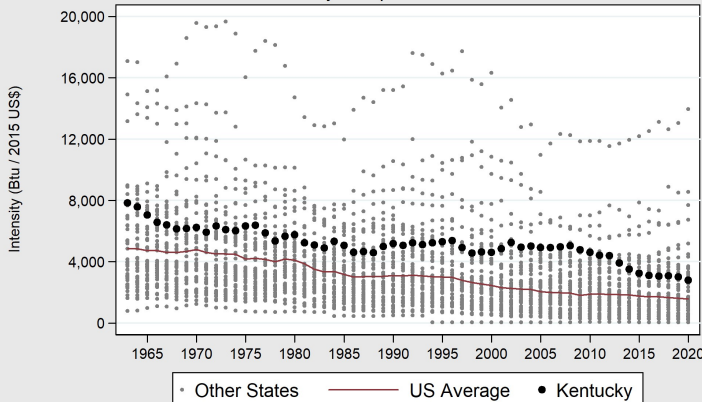
State	MMBtu per Capita	Rank
Louisiana	657.6	1st
Kentucky	125.3	15th
U.S. Average	94.4	-
DC	7.2	52nd

Kentucky industrial energy consumption per capita decreased by 9% in 2020, but remains above average due to energy-intensive manufacturing.

State	MWh per Capita	Rank
Wyoming	15.8	1st
Kentucky	6.2	7th
U.S. Average	2.9	-
DC	0.3	52nd

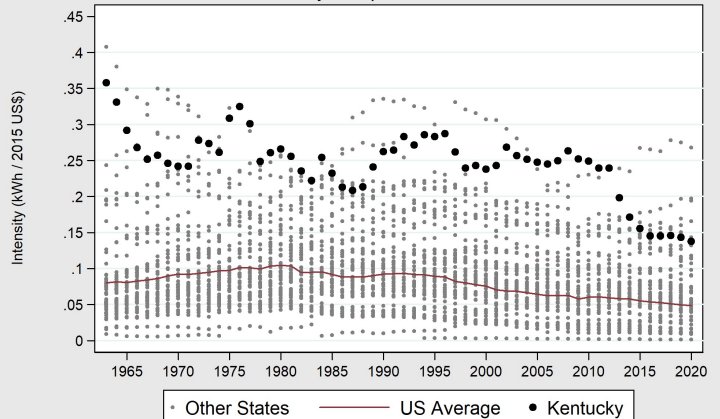
Industrial electricity consumption per capita decreased by 4.7% in 2020, but remains above average due to the presence of energy-intensive manufacturing.

Industrial Energy Consumption per State GDP Dollar, 1963-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS & BEA

Industrial Electricity Consumption per State GDP Dollar, 1963-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023

State	Btu/\$U.S. GDP	Rank
Louisiana	13,955	1st
Kentucky	2,795	15th
U.S. Average	1,583	-
DC	36	52nd

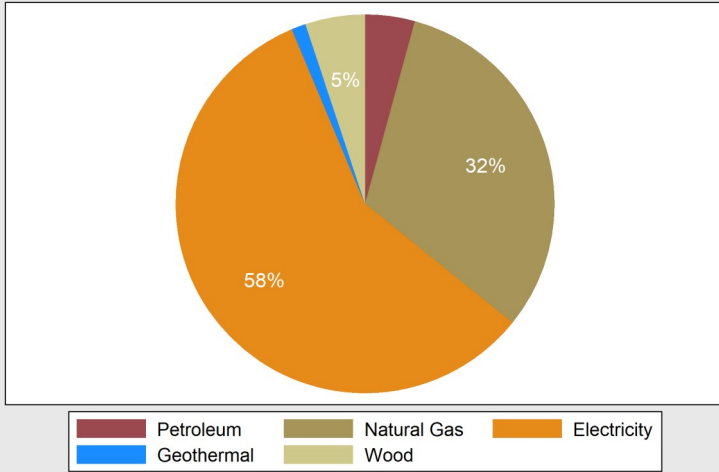
Kentucky industrial energy intensity decreased by 7.4% compared with 2019, and is decreasing significantly faster than the national average.

State	kWh/\$U.S. GDP	Rank
Wyoming	0.27	1st
Kentucky	0.14	7th
U.S. Average	0.05	-
DC	0.001	52nd

In 2020, Kentucky was 7th in terms of industrial electricity use per dollar of GDP, but changed by a negligible amount from 2019.

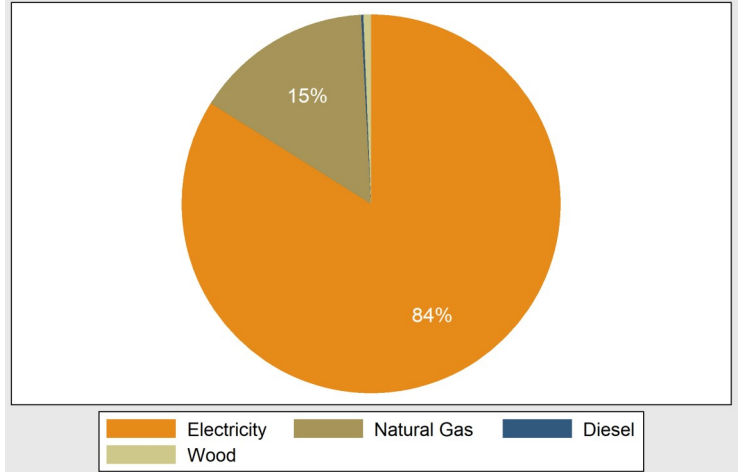
Residential Energy Consumption

Kentucky Residential Energy Consumption by Fuel, 2020



Kentucky Energy Database, EEC-OEP, 2023

Kentucky Residential Energy Expenditures by Fuel, 2020

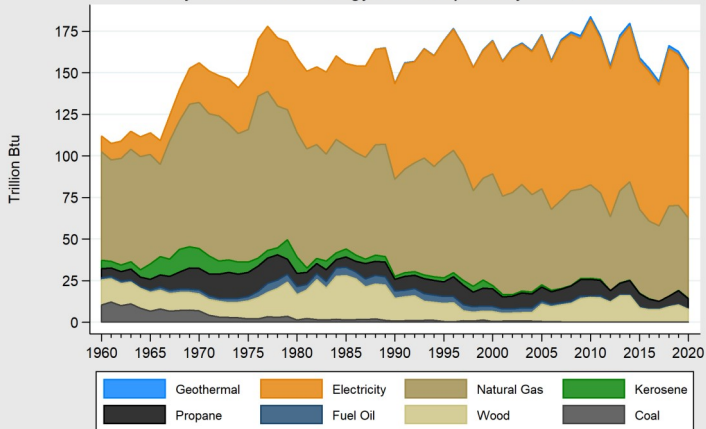


Kentucky Energy Database, EEC-OEP, 2023

Fuel Type	Billion Btu	1 Year Change
Total Net	217,640	-6.1%
Electricity	153,243	-2.4%
Natural Gas	48,259	-7.9%
Wood	7,781	-27.9%
Petroleum	6,497	-30.6%
Geothermal	1,860	+0.0%

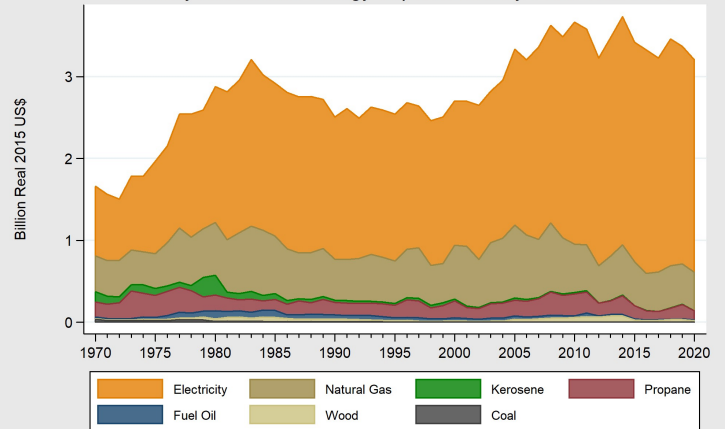
Fuel Type	Million Dollars	1 Year Change
Total	3,357	-4.3%
Electricity	2,818	-1.8%
Natural Gas	512	-3.3%
Wood	21	-46.3%
Diesel	6	-43.6%

Kentucky Residential Energy Consumption by Fuel, 1960-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Kentucky Residential Energy Expenditures by Fuel, 1970-2020



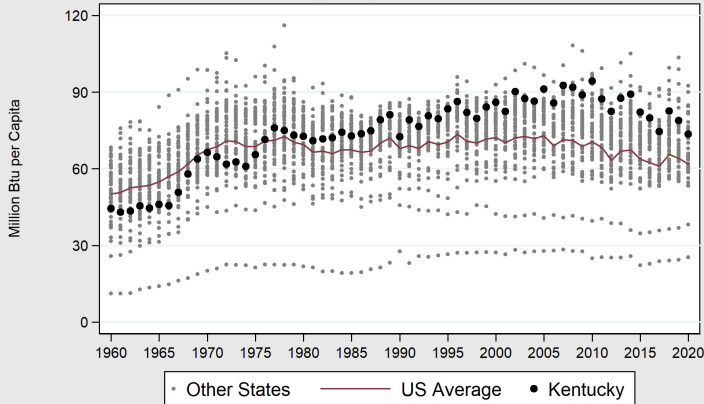
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Households in Kentucky consumed 217 trillion Btu of energy in 2020, a 6.1% decrease in net residential energy consumption compared with 2019. The largest portion of energy used in the residential sector—58%—was through electricity and the second largest was natural gas. Over time, electricity has increased its share of domestic energy consumption while natural gas, primarily used for home heating, has decreased.

Kentucky households spent nearly \$3.4 billion on energy commodities and energy consumption in 2020, a 4.3% decrease in residential energy expenditures compared with 2019. Electricity expenditures comprised 84% of spending, which totaled \$2.8 billion during the year.

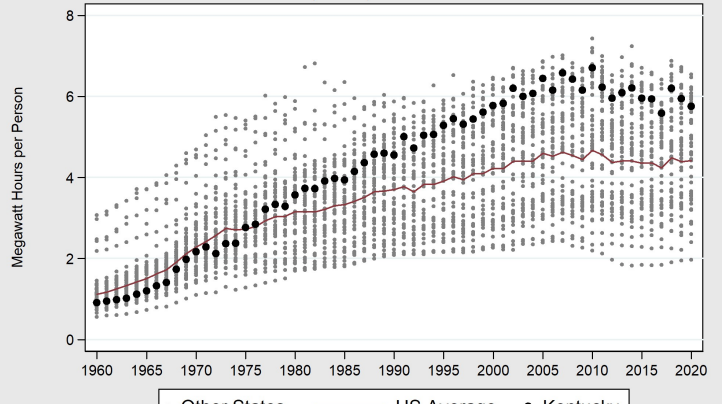
Residential Energy Intensity

Annual Residential Energy Consumption Per Capita, 1960-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS & Census

Residential Electricity Consumption Per Capita, 1960-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023

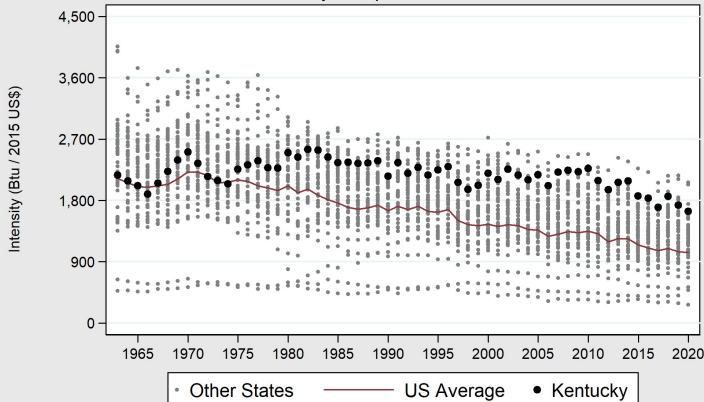
State	MMBtu per Capita	Rank
Montana	92.4	1st
Kentucky	73.5	13th
U.S. Average	61.9	-
Hawaii	25.4	52nd

Kentucky residential energy consumption per capita decreased in 2020 by 7%, and is 13th highest of all states.

State	MWh per Capita	Rank
Louisiana	6.5	1st
Kentucky	5.8	11th
U.S. Average	4.4	-
Hawaii	2.0	52nd

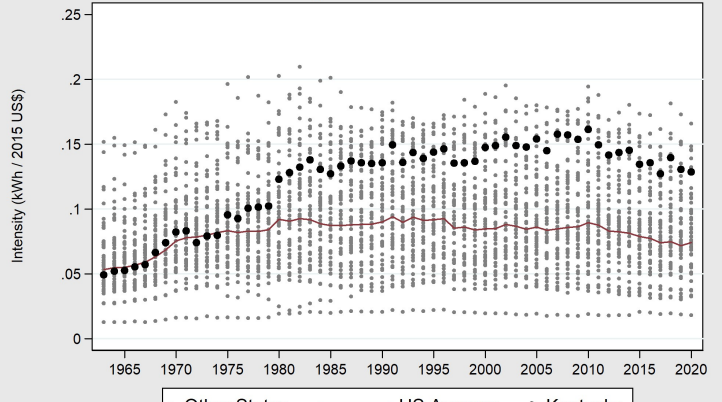
In 2020, Kentucky ranked 11th nationally in terms of residential electricity use per capita, a decrease of 1.7% compared with 2019.

Residential Energy Consumption per State GDP Dollar, 1963-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS & BEA

Residential Electricity Consumption per State GDP Dollar, 1963-2020
Kentucky Compared to Other States



Kentucky Energy Database, EEC-OEP, 2023

State	Btu/\$U.S. GDP	Rank
West Virginia	2,062	1st
Kentucky	1,641	6th
U.S. Average	1,039	-
DC	270	52nd

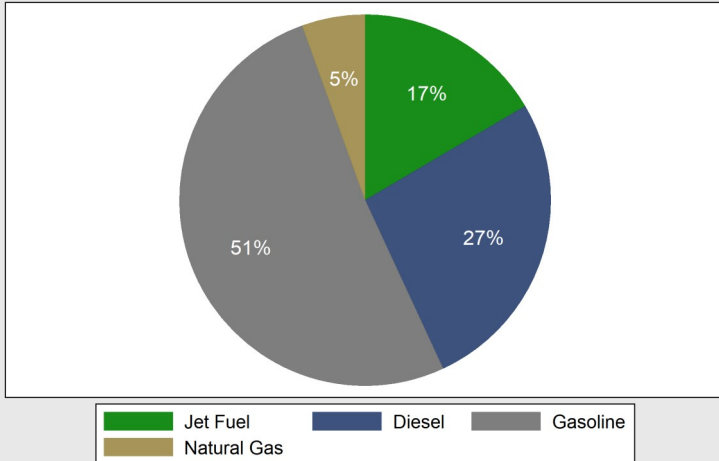
Kentucky ranked 6th in terms of residential energy consumption relative to one dollar of state GDP. Residential energy intensity decreased by 5.3% compared with 2019.

State	kWh/\$U.S. GDP	Rank
Mississippi	0.17	1st
Kentucky	0.13	8th
U.S. Average	0.07	-
DC	0.02	52nd

In 2020, Kentucky ranked 8th in terms of residential electricity use relative to one dollar of state GDP. There was negligible change compared to 2019.

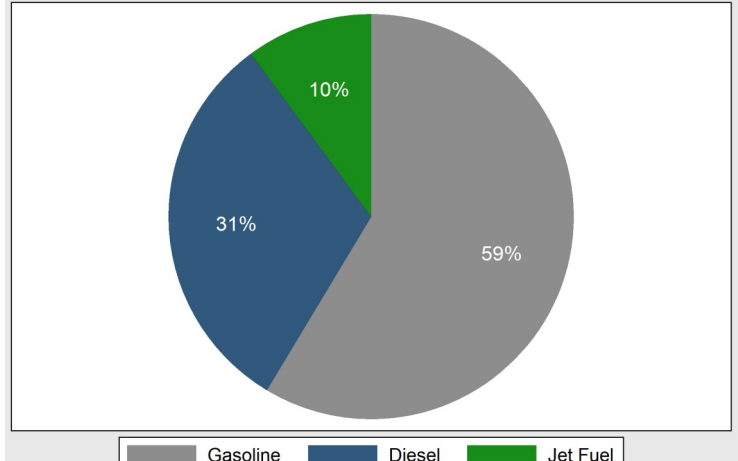
Transportation Energy Consumption

Kentucky Transportation Energy Consumption by Fuel, 2020



DEDI Energy Database, 2017

Kentucky Transportation Energy Expenditures by Fuel, 2020

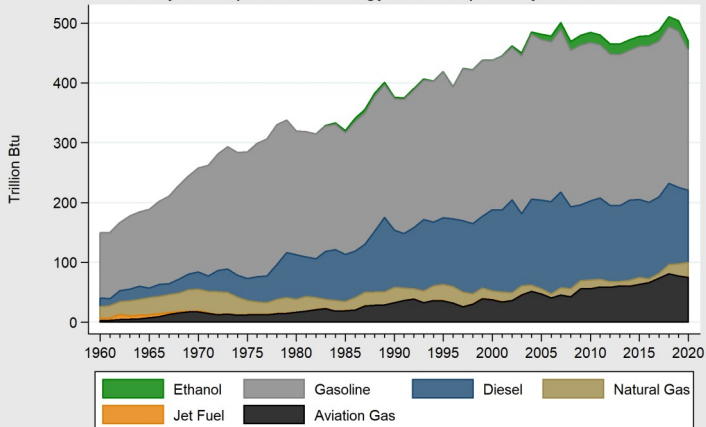


Kentucky Energy Database, EEC-OEP, 2023

Fuel Type	Billion Btu	1 Year Change
Total	455,595	-6.7%
Gasoline	232,948	-10.6%
Diesel	120,545	-5.9%
Jet Fuel	74,919	-2.9%
Natural Gas	24,926	+23.7%

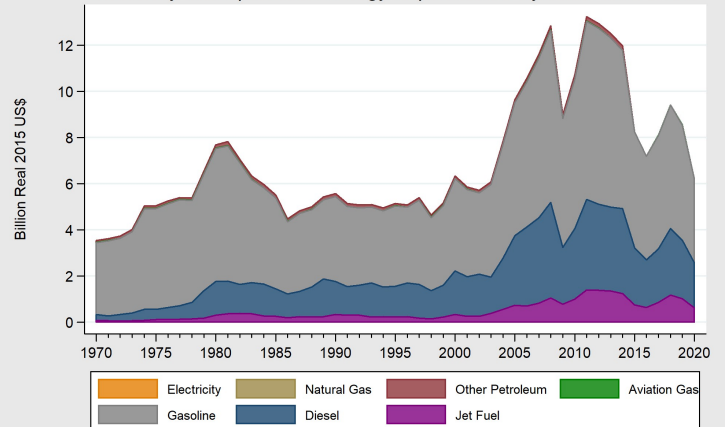
Fuel Type	Million Dollars	1 Year Change
Total	6,836	-30.8%
Gasoline	3,954	-30.7%
Diesel	2,111	-25.6%
Jet Fuel	771	-47.2%

Kentucky Transportation Energy Consumption by Fuel, 1960-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Kentucky Transportation Energy Expenditures by Fuel, 1970-2020

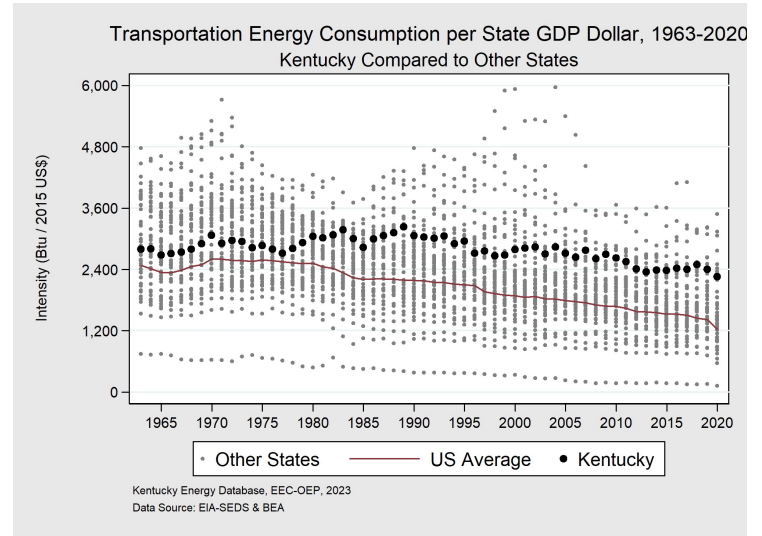
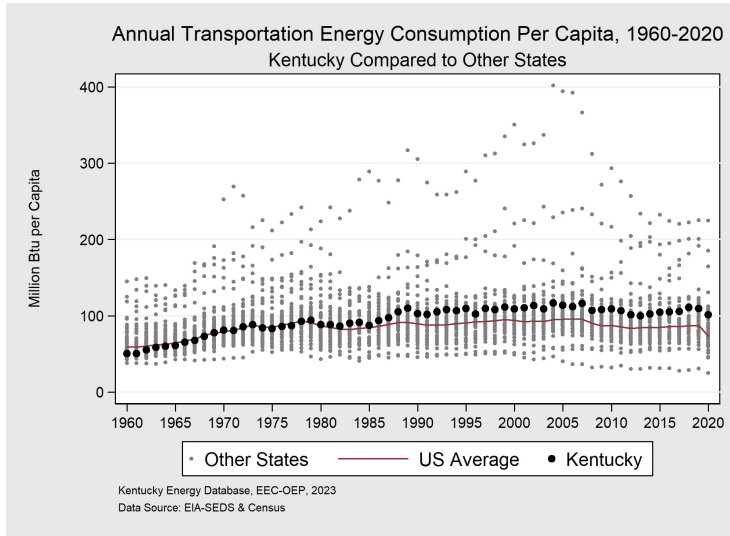


Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Transportation sector energy consumption in Kentucky was 456 trillion Btu in 2020, a 6.7% decrease compared with 2019. Gasoline was 51% of transportation energy consumption in 2020, followed by diesel at 27%. The other 22% of transportation energy consumption came from jet fuel, natural gas and propane.

Transportation energy expenditures were approximately \$6.8 billion in Kentucky in 2020. Compared with 2019, transportation energy expenditures decreased by 31%. Gasoline was the largest component of transportation energy expenditures with 59% of spending in 2020. Diesel expenditures were 31% of transportation energy costs in Kentucky in 2020. (Consumption of natural gas by way of transmission pipelines is not tabulated in terms of transportation sector energy expenditures).

Transportation Energy Intensity



State	MMBtu per Capita	Rank
Alaska	224.75	1st
Kentucky	101.08	10th
U.S. Average	73.48	-
DC	25.05	52nd

In 2020, Kentucky transportation energy consumption per capita decrease by 7.8 compared with 2019, which is 10th highest of all states.

State	Btu/\$U.S. GDP	Rank
Alaska	3,485	1st
Kentucky	2,255	11th
U.S. Average	1,232	-
DC	124	52nd

In 2020, Kentucky ranked 11th in terms of transportation energy consumption per dollar of state GDP. Transportation energy intensity decreased by 6.19% compared with 2019.

Kentucky Coal Production

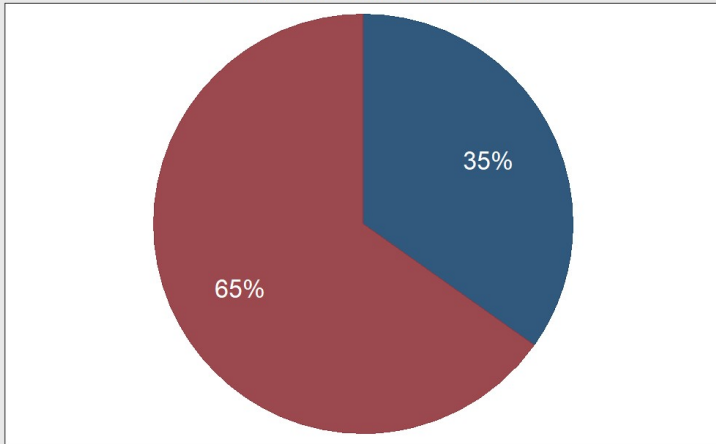
County	Tons	1 Year Change	Percentage
Total	24,483,398	-39.30%	100.00%
Union	9,412,068	-18.60%	38.44%
Hopkins	3,564,441	-2.80%	14.56%
Pike	2,199,587	-26.60%	8.98%
Muhlenberg	2,120,338	-2.50%	8.66%
Perry	1,731,150	-45.30%	7.07%
Harlan	1,192,882	-53.60%	4.87%
Leslie	743,342	-45.20%	3.04%
Knott	644,404	-16.10%	2.63%
Bell	486,636	-37.50%	1.99%
Floyd	404,262	-91.30%	1.65%
Johnson	395,698	-31.80%	1.62%
Daviess	303,557	6.80%	1.24%
McLean	260,370	-130.20%	1.06%
Ohio	251,094	-160.20%	1.03%
Whitley	223,814	-48.50%	0.91%
Martin	189,142	-90.50%	0.77%
Knox	178,228	-45.00%	0.73%
Letcher	105,872	-109.30%	0.43%
Morgan	9,356	-162.40%	0.04%
Breathitt	4,922	-139.00%	0.02%
Magoffin	1,412	-198.10%	0.01%

During 2020, coal production in the Commonwealth decreased to 24.5 million tons. 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.

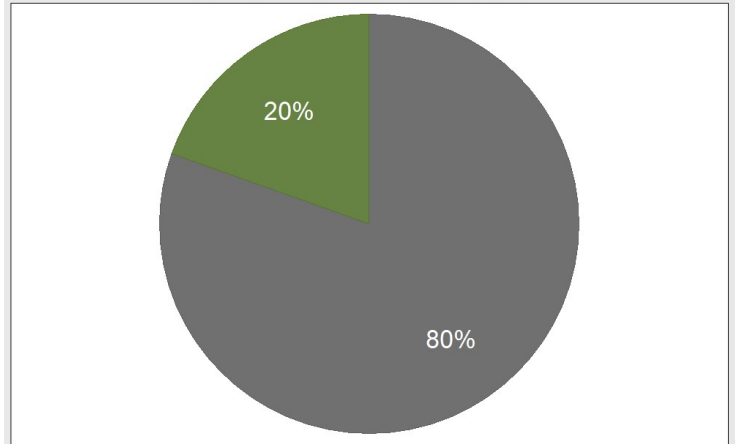
Kentucky Coal Production

Kentucky Total Coal Production, 2020



Eastern Kentucky Western Kentucky

Kentucky Total Coal Production, 2020



Underground Surface

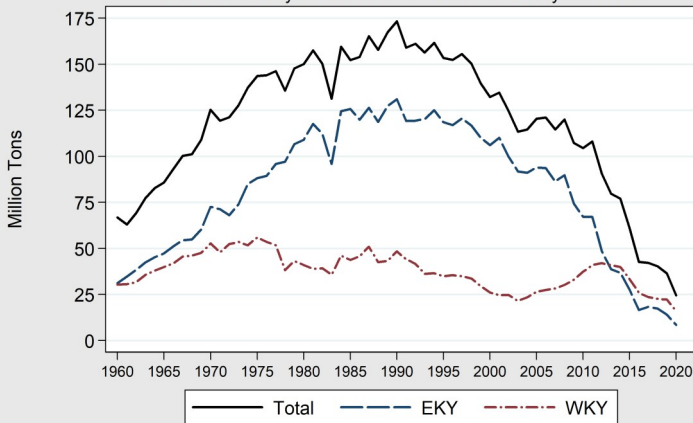
Region	2020 Tonnage	Annual Change
Total	24,483,398	-39.3%
Western Kentucky	15,911,868	-33.2%
Eastern Kentucky	8,571,530	-49.0%

Kentucky coal mines produced 24.5 million tons in 2020, a decrease of 39.3% from 2019. Production decreased in both the eastern and western coalfields in 2020.

Mine Type	2020 Tonnage	Annual Change
Total	24,483,398	-39.3%
Underground	19,693,610	-37.4%
Surface	4,789,788	-46.6%

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.

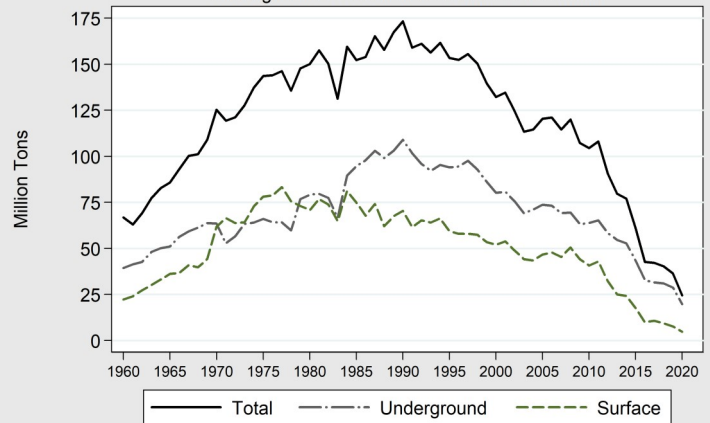
Kentucky Total Coal Production, 1960-2020
Eastern Kentucky Production & Western Kentucky Production



Kentucky Energy Database, EEC-OEP & US-DOL-MSHA-MDRS Queried on: 2 Mar 2023

Eastern Kentucky was the top-producing region in Kentucky between 1912 and 2013. Western Kentucky coal mines have produced the majority of coal in the Commonwealth since the third quarter of 2013.

Kentucky Total Coal Production, 1960-2020
Underground Production vs. Surface Production

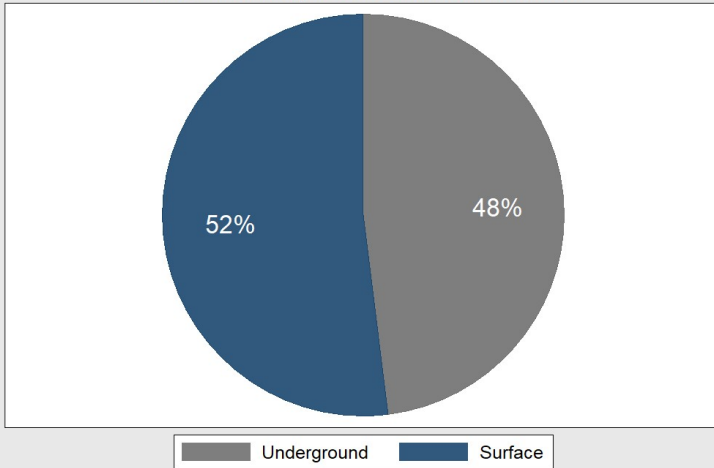


Kentucky Energy Database, EEC-OEP & US-DOL-MSHA-MDRS Queried on: 2 Mar 2023

Underground coal mines produced 19.7 million tons of coal, or 80% of total Kentucky production in 2020, a decrease of 37% from 2019. Surface mining operations, which mined 4.8 million tons of coal, decreased production by 47% since 2019. Production has trended down in both surface and underground mining since 1990 and have been concentrated in the eastern coalfield.

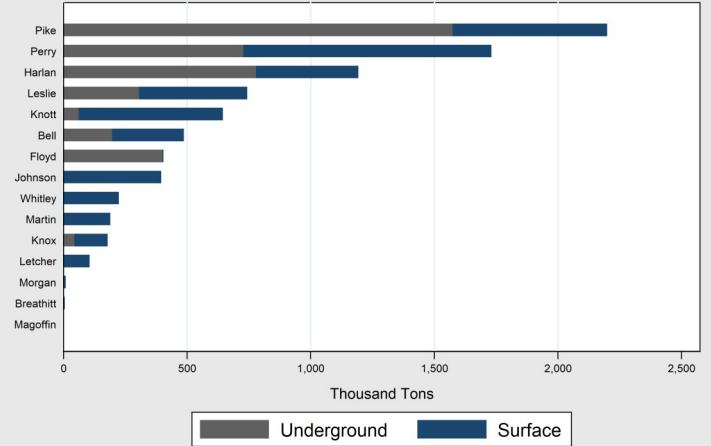
Eastern Kentucky Coal Production

Eastern Kentucky Total Coal Production, 2020



Kentucky Energy Database, EEC-OEP & US-DOL-MSHA-MDRS Queried on: 2 Mar 2023

Eastern Kentucky Total Coal Production by County, 2020



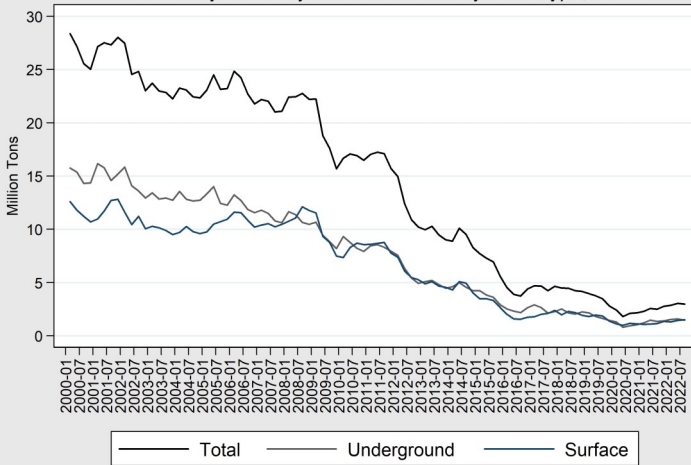
Kentucky Energy Database, EEC-OEP & US-DOL-MSHA-MDRS Queried on: 8 Mar 2023

Mine Type	2020 Tonnage	Annual Change
Total	8,571,530	-49.0%
Surface	4,486,232	-43.4%
Underground	4,085,298	-53.3%

Eastern Kentucky coal production decreased in 2020 by 49% to 8.6 million tons of coal, 48% from underground mines and 52% from surface mines.

Eastern County	2020 Tonnage	Annual Change
Pike	2,199,587	-26.6%
Perry	1,731,150	-45.3%
Harlan	1,192,882	-53.6%
Leslie	743,342	-45.2%
Knott	644,404	-16.1%
Bell	486,636	-37.5%
Floyd	404,262	-91.3%
Johnson	395,698	-31.8%
Whitley	223,814	-48.5%
Martin	189,142	-90.5%
Knox	178,228	-45.0%
Letcher	105,872	-109.3%
Morgan	9,356	-162.4%
Breathitt	4,922	-139.0%
Magoffin	1,412	-198.1%

Eastern Kentucky Quarterly Coal Production by Mine Type, 2000-2020

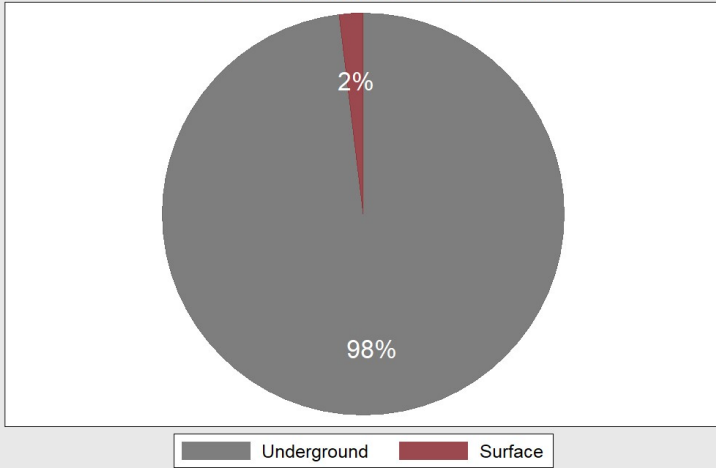


Annual production decreased at both underground and surface mining operations in eastern Kentucky in 2020, by 53.3% and 43.4% respectively.

The largest producing counties experienced increases in production during 2020. Pike County decreased coal production by 26.6% and Perry County decreased by 45.3%. Pike county still remained the highest coal-producing county in eastern Kentucky and third-highest coal producing county in Kentucky.

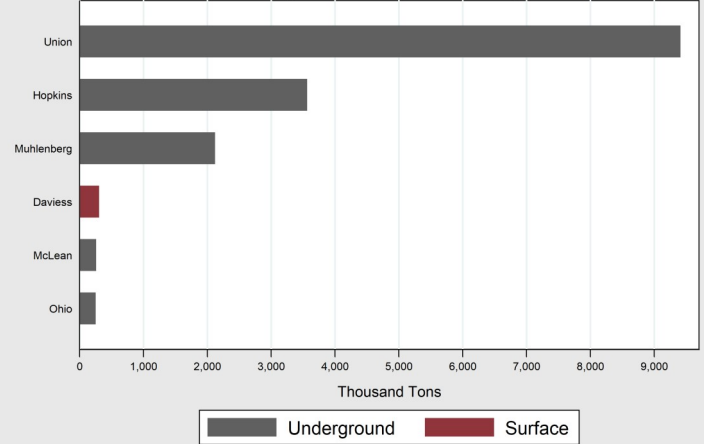
Western Kentucky Coal Production

Western Kentucky Total Coal Production, 2020



Kentucky Energy Database, EEC-OEP & US-DOL-MSHA-MDRS Queried on: 2 Mar 2023

Western Kentucky Total Coal Production by County, 2020

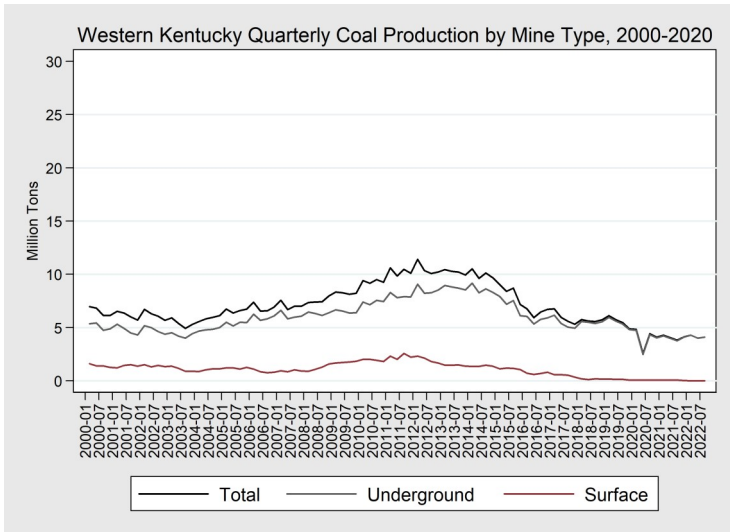


Kentucky Energy Database, EEC-OEP & US-DOL-MSHA-MDRS Queried on: 2 Mar 2023

Mine Type	2020 Tonnage	Annual Change
Total	15,911,868	-33.2%
Underground	15,608,310	-32.6%
Surface	303,558	-57.1%

Western Kentucky mined 15.9 million tons of coal in 2020, a decrease of 33.25% from 2019. Underground mines accounted for 98% of regional production in 2020.

Western County	2020 Tonnage	Annual Change
Union	9,412,068	-18.6%
Hopkins	3,564,441	-2.8%
Muhlenberg	2,120,338	-2.5%
Daviess	303,557	6.8%
McLean	260,370	-130.2%
Ohio	251,094	-160.2%



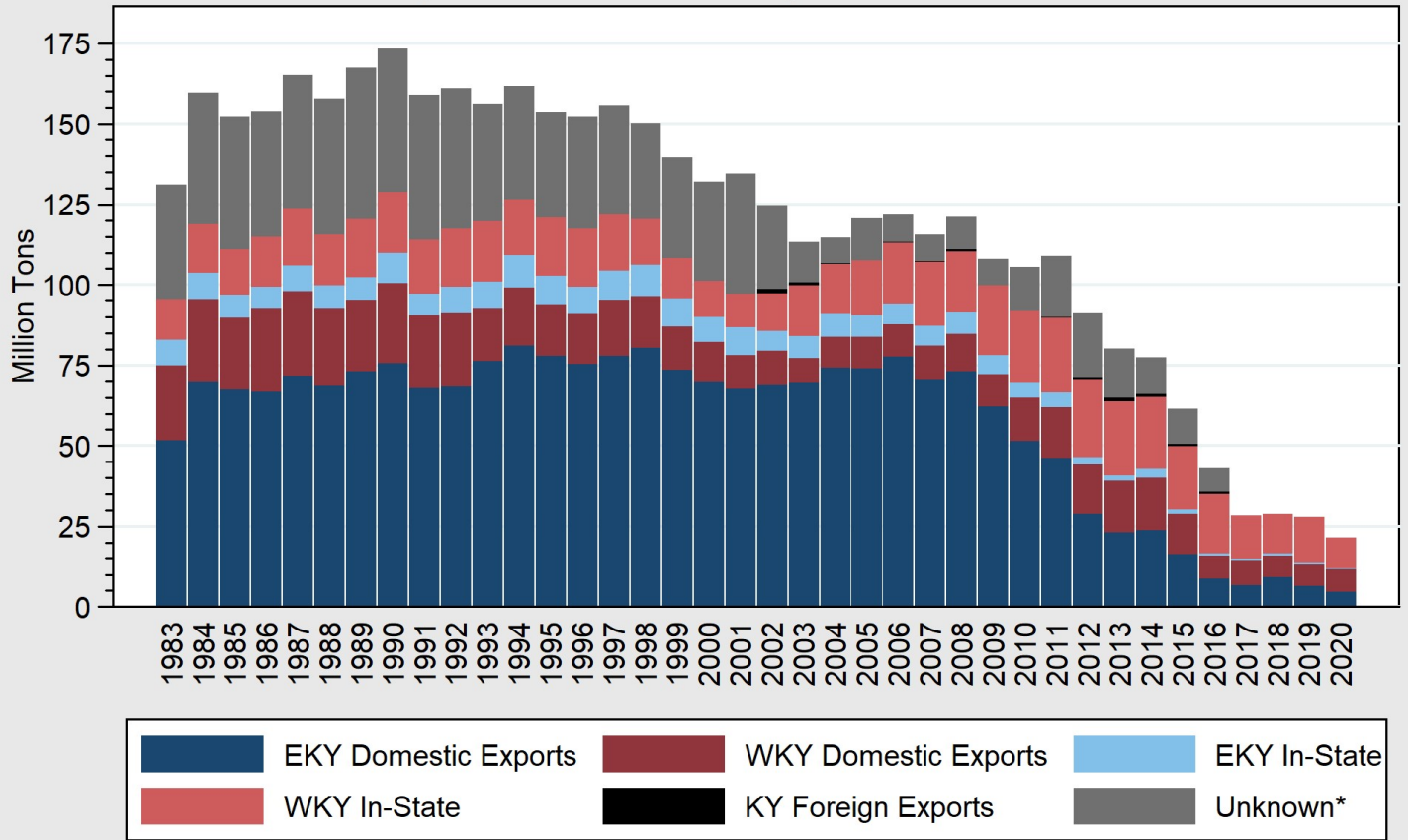
Surface mining made up 2% of coal production in western Kentucky. The majority of western Kentucky coal production was excavated by surface mining until 1985. In fact, Muhlenberg County was the Commonwealth's leading coal producer from 1961 to 1978, predominantly through the utilization of surface mining techniques.

Union County remained Kentucky's leading coal producing county, mining 9.4 million tons during 2020. Production in the county decreased by 18.6% 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.

Kentucky Coal Distribution, 2020

Kentucky Coal Distribution by Destination, 1983-2020



Kentucky Energy Database, EEC-OEP, 2023
 Data Source: EIA-923 & U.S. Census Bureau-Foreign Trade Division
 *Combination of Industrial, Institutional, & Unknown

Coal Distribution by Destination, 2020

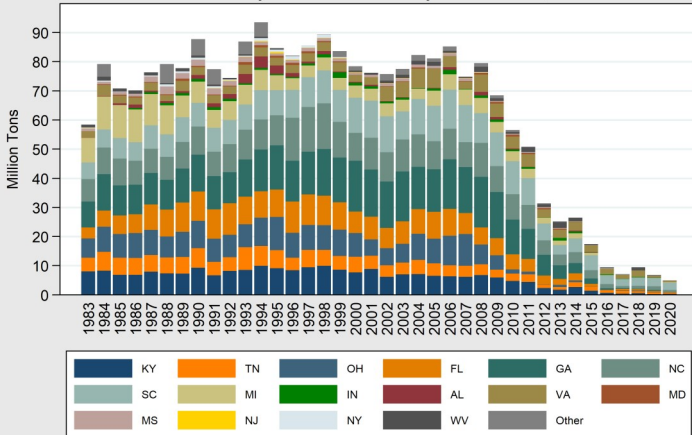
Coal and Destination	Thousand Tons	Percentage
Total Production	21,608	100%
WKY In-State	9,702	45%
WKY Out-of-State	7,032	32.5%
EKY Out-of-State	4,593	21.2%
EKY In-State	283	1.3%

The annual distribution of coal mined in Kentucky is a combination of in-state consumers, out-of-state power plants, factories, and foreign exports.

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. The Cooper, H.L. Spurlock, and Mill Creek were the only power plants that consumed eastern Kentucky coal in Kentucky.

Kentucky Coal Deliveries

Eastern Kentucky Coal Deliveries by Destination, 1983-2020



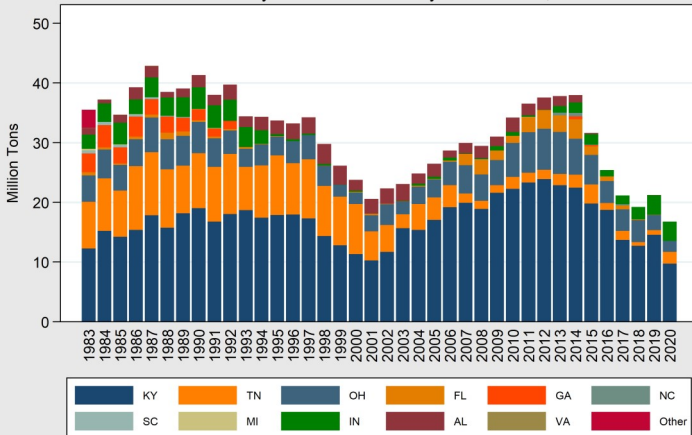
Kentucky Energy Database, EEC-OEP, 2023
Data Source: Form EIA 923

Known shipments of steam coal from eastern Kentucky to power plants within the United States decreased to 4.8 million tons in 2020. The largest markets for eastern Kentucky coal are traditionally located in the southeast, and were led by South Carolina and Virginia. Overall, coal mined in the region was shipped to 10 different states in 2020.

Eastern Kentucky Coal Deliveries, 2020

Destination	Thousand Tons	Percentage
Total	4,842	100%
South Carolina	2,508	51.7%
Virginia	482	10.0%
North Carolina	740	15.3%
Tennessee	489	10.0%
Florida	13	0.3%
Kentucky	287	5.9%
West Virginia	68	1.4%
Ohio	32	0.7%
Georgia	109	2.3%
Michigan	114	2.4%

Western Kentucky Coal Deliveries by Destination, 1983-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: Form EIA 923

Known shipments of steam coal from western Kentucky to power plants within the United States fell to 16.8 million tons in 2020. The largest market for western Kentucky coal is consistently Kentucky, which represented 58.1% of western Kentucky coal deliveries during the year. Overall, coal mined in western Kentucky was shipped to 5 different states in 2020.

Western Kentucky Coal Deliveries, 2020

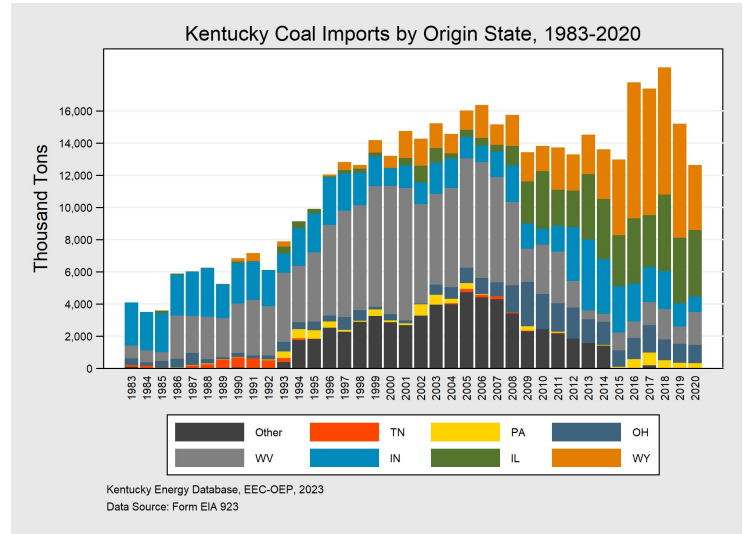
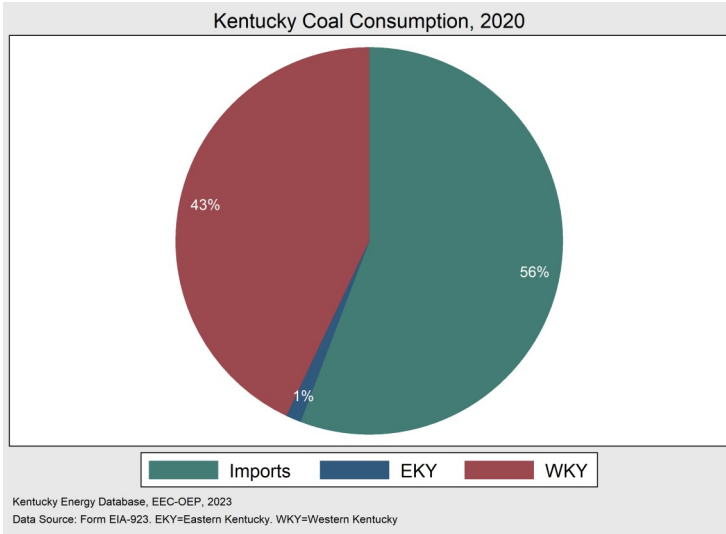
Destination	Thousand Tons	Percentage
Total	16,766	100%
Kentucky	9,733	58.1%
Florida	1,847	11.0%
Indiana	3,198	19.1%
Tennessee	1,973	11.7%
Mississippi	15	0.1%

Kentucky Coal Deliveries, 2020

Origin	Thousand Tons	1 Year Change
Total	21,608	-27.0%
WKY	16,766	-26.3%
EKY	4,482	-29.2%

Total Kentucky coal deliveries have continued to decrease since 2014, primarily because of reduced shipments from eastern Kentucky. Overall, there was a 6.7 million decrease, or 27% since 2019.

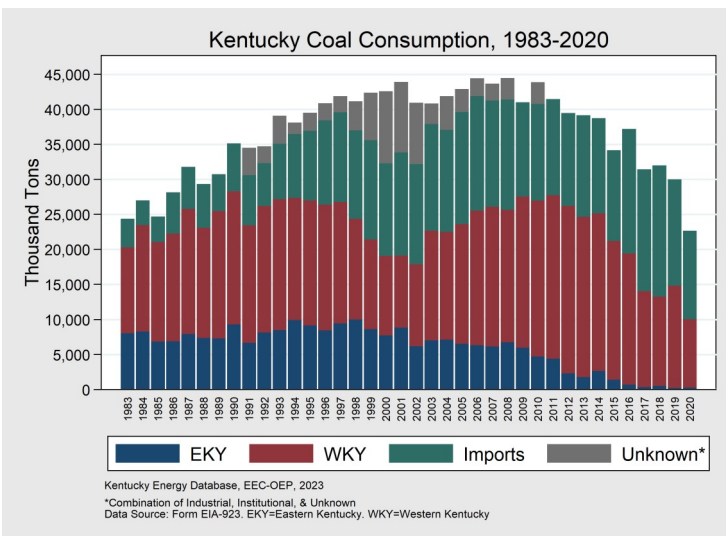
Kentucky In-State Coal Consumption



Origin of Coal	Thousand Tons	1 Year Change
Total	22,668	-27.6%
Western Kentucky	9,733	-39.7%
Imports	12,648	-18.3%
Eastern Kentucky	287	+17.8%

Imported Coal	Thousand Tons	1 Year Change
Total Imports	12,648	-18.2%
Wyoming	4,053	-54.5%
Illinois	4,134	+1.7%
Indiana	965	-41.0%
Ohio	1,150	-3.4%
West Virginia	2,034	+62.9%
Pennsylvania	312	-2.5%

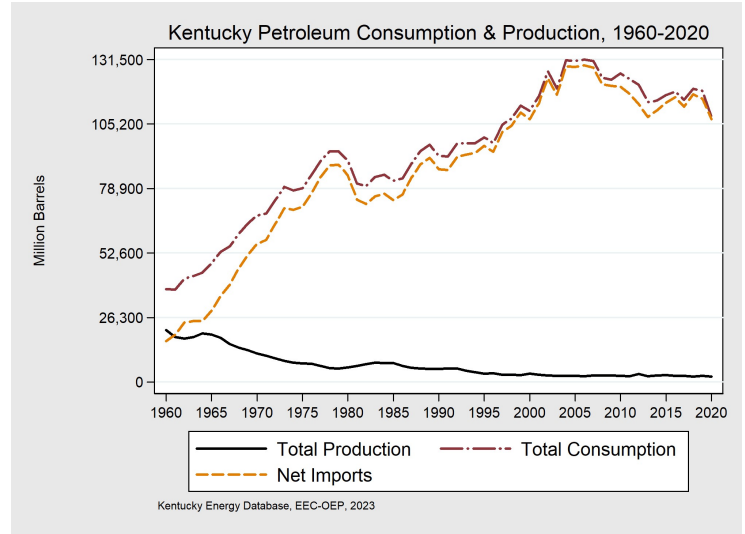
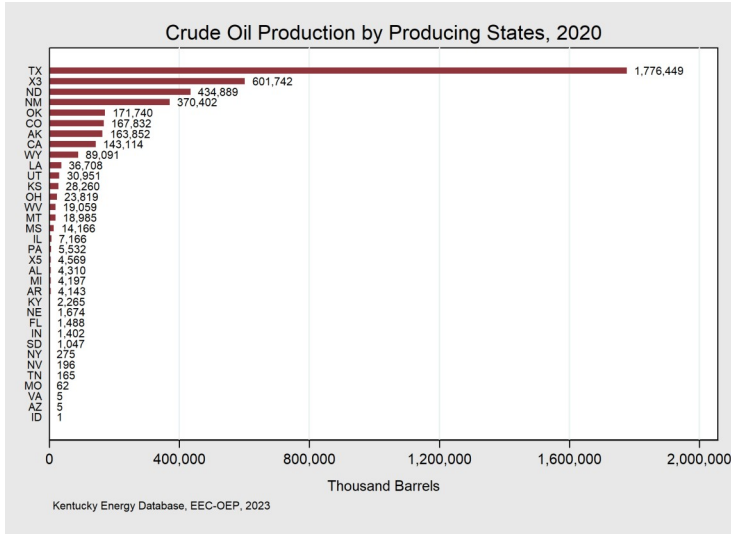
All values have been rounded to the nearest thousand tons.



Coal consumption in Kentucky decreased by 27.6% in 2020 to 22.7 million tons. Coal imports were the largest source of coal used within the Commonwealth, representing 56% of coal consumption. Conversely, coal from eastern Kentucky accounted for 1% of the coal consumed in Kentucky in 2020.

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 Crude Oil Production



Production	2020 Million Barrels	Rank
Texas	1,766	1st
Kentucky	2	21st

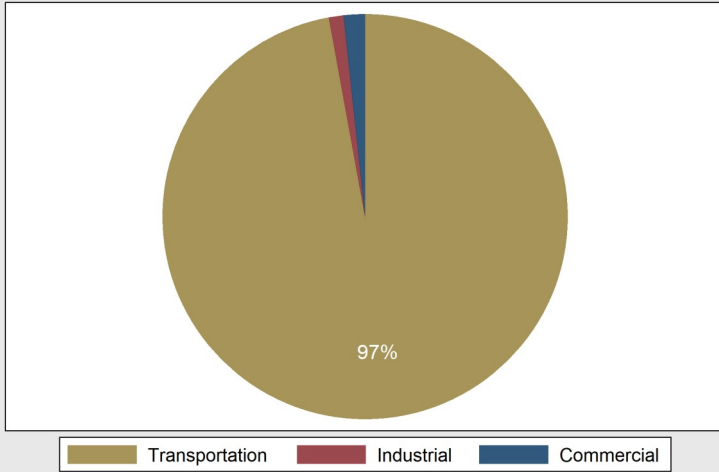
Crude oil production in Kentucky decreased by 10.1% in 2020 to produce 2.3 million barrels. Annual crude oil production in Kentucky had remained between 2.3 and 2.9 million barrels since the year 2000, but has recently increased with more widespread application of horizontal wells and nitrogen foam and hydraulic fracture stimulations. Despite this increase, in-state crude oil production contributes to less than 1% of total U.S. production.

Though Kentucky is a producer of petroleum, statewide consumption has increasingly surpassed production. As a result, Kentucky's petroleum imports have increased from 44% to 98% between 1960 and 2020.

Kentucky has one operating crude oil refinery in the state located in Cattlesburg, KY which has a operating capacity of 291,000 barrels per calendar day. Additional information on the location of oil fields and wells is available from the Kentucky Geological Survey Geologic Map Information Service at: <http://kgs.uky.edu/kgsmap/kgsgeoserver/viewer.asp>

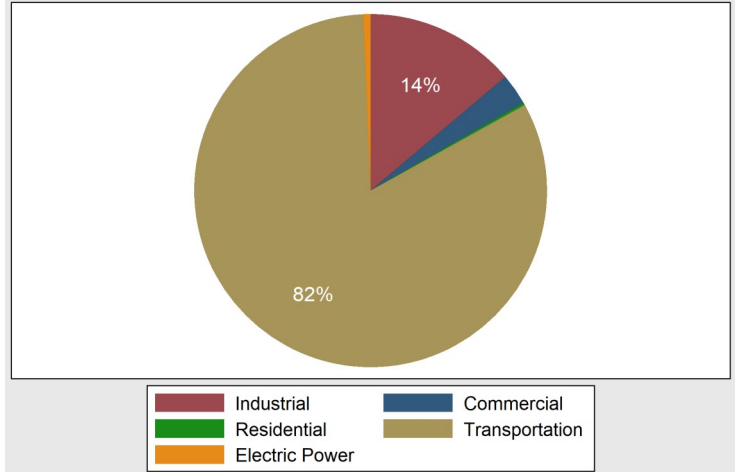
Kentucky Liquid Fuel Consumption

Kentucky Gasoline Consumption by Sector, 2020



Kentucky Energy Database, EEC-OEP, 2023

Kentucky Diesel Consumption by Sector, 2020

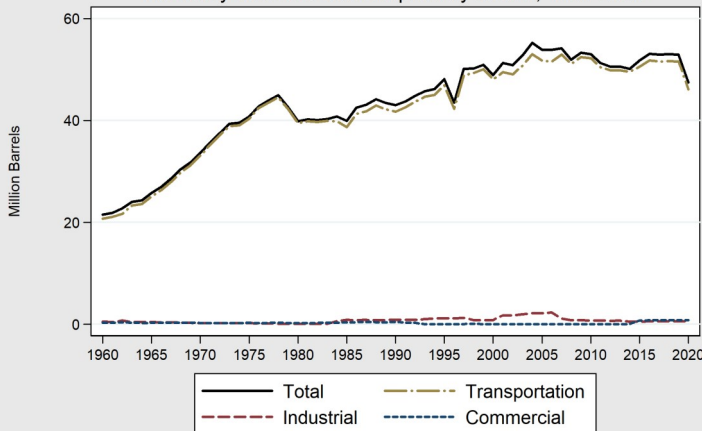


Kentucky Energy Database, EEC-OEP, 2023

Sector	Thousand Barrels	1 Year Change
Total	47,477	-10.9%
Transportation	46,110	-11.2%
Industrial	562	-0.7%
Commercial	805	+0.1%

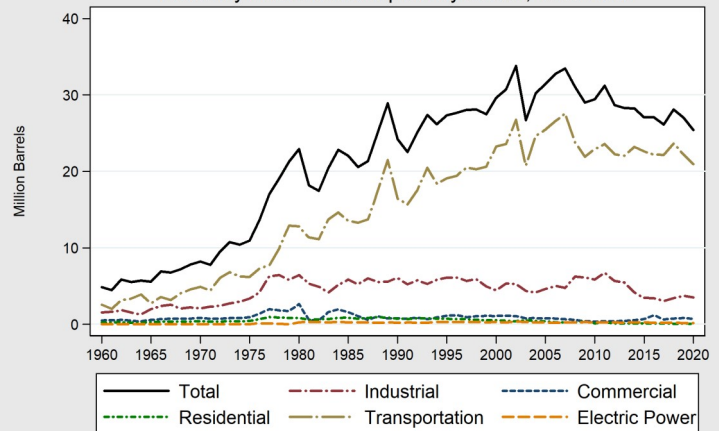
Sector	Thousand Barrels	1 Year Change
Total	25,416	-6.3%
Transportation	20,942	-6.0%
Industrial	3,522	-5.4%
Commercial	719	-15.3%
Electric Power	166	-1.8%
Residential	67	-26.0%

Kentucky Gasoline Consumption by Sector, 1960-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Kentucky Diesel Consumption by Sector, 1960-2020



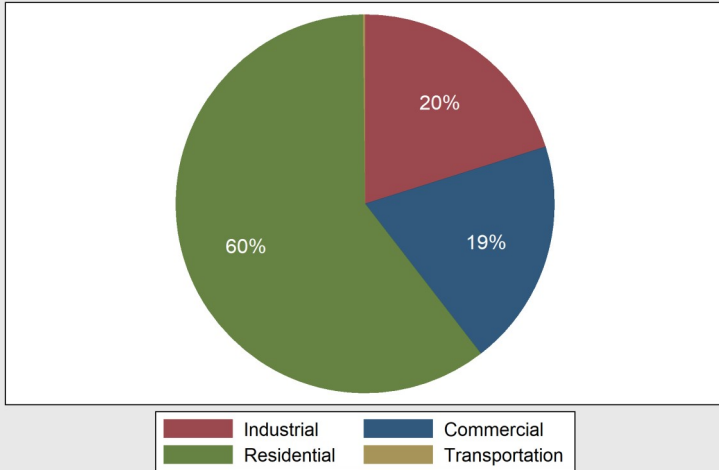
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

In 2020, Kentucky consumed 47.5 million barrels of gasoline, with 97% used for transportation. Compared with 2019, total gasoline consumption in Kentucky decreased by 11%.

In 2020, Kentucky consumed 25.4 million barrels of diesel fuel, a 6.3% decrease in overall consumption from 2019. The vast majority of diesel consumption—82%—was consumed by the transport sector, mostly for trucking on highways, marine vessels, and railroad consumers. Industrial users, predominately manufacturing facilities and farms, consumed 14%. The commercial, residential, and electric power sectors made up the remaining 4% in 2020.

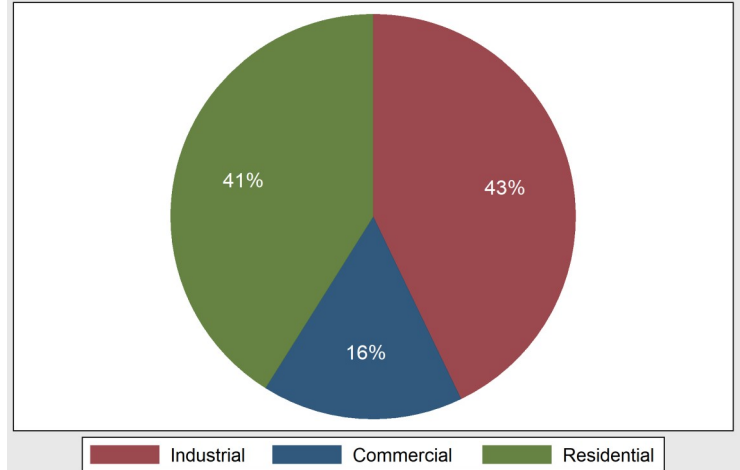
Kentucky Liquid Fuel Consumption

Kentucky Propane Consumption by Sector, 2020



Kentucky Energy Database, EEC-OEP, 2023

Kentucky Kerosene Consumption by Sector, 2020

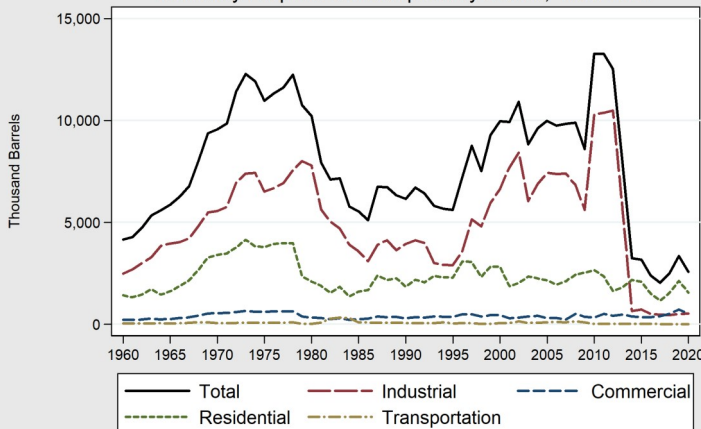


Kentucky Energy Database, EEC-OEP, 2023

Sector	Thousand Barrels	1 Year Change
Total	2,583	-26.0%
Industrial	520	+5.1%
Residential	1,557	-31.2%
Commercial	501	-35.3%
Transportation	5	-50.0%

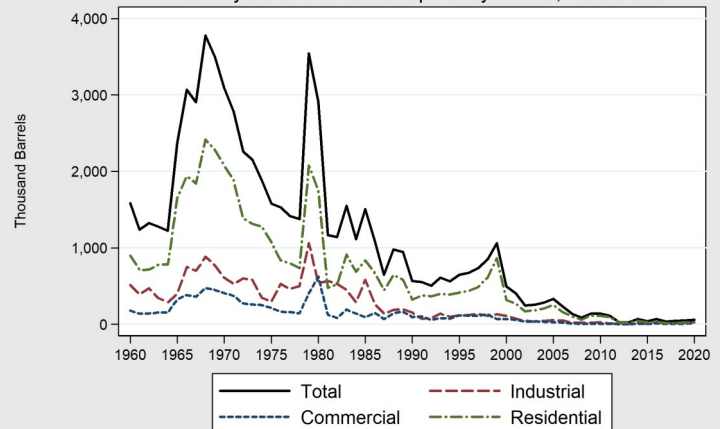
Sector	Thousand Barrels	1 Year Change
Total	57	+14.0%
Residential	23	-11.5%
Industrial	24	+50.0%
Commercial	9	+12.5%

Kentucky Propane Consumption by Sector, 1960-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

Kentucky Kerosene Consumption by Sector, 1960-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

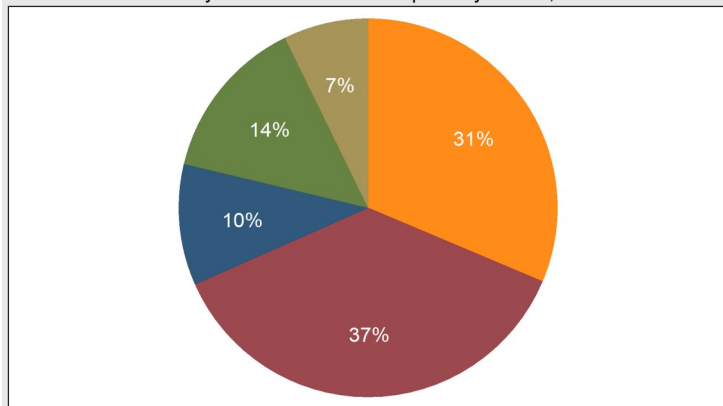
In 2020, more than 2.5 million barrels of liquid petroleum gas (LPG), which is mostly propane, but also includes ethane and butane, was consumed in Kentucky. Since 2019, consumption decreased by 26%. With 60% of total consumption, the residential sector was the largest end-user of LPG, followed by the industrial sector with 20%. The commercial and transportation sectors comprised the remaining 20% of LPG consumption in 2020.

In 2020, Kentucky consumed 57,000 barrels of kerosene. The industrial and residential sectors were the largest consumers of kerosene, consuming 43% and 41%, respectively, of the total for home heating. The industrial sector was the smallest consumer with 16% of consumption. Compared with 2019, Kentucky kerosene consumption increased by 14 percent.

*These quantities exclude kerosene-type jet fuel, which is itemized in transportation energy consumption.

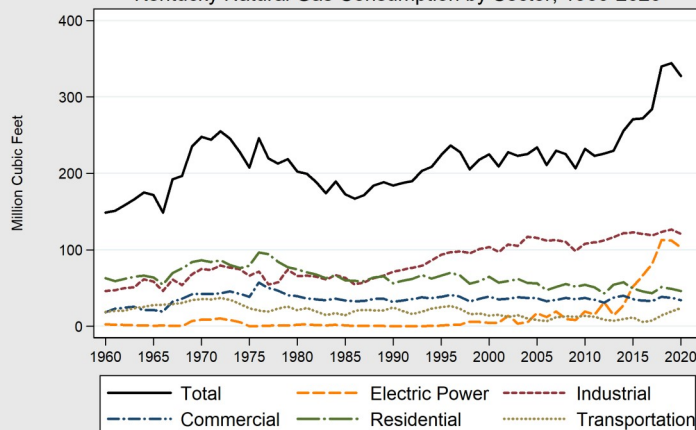
Kentucky Natural Gas Consumption

Kentucky Natural Gas Consumption by Sector, 2020



Kentucky Energy Database, EEC-OEP, 2023

Kentucky Natural Gas Consumption by Sector, 1960-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EIA-SEDS

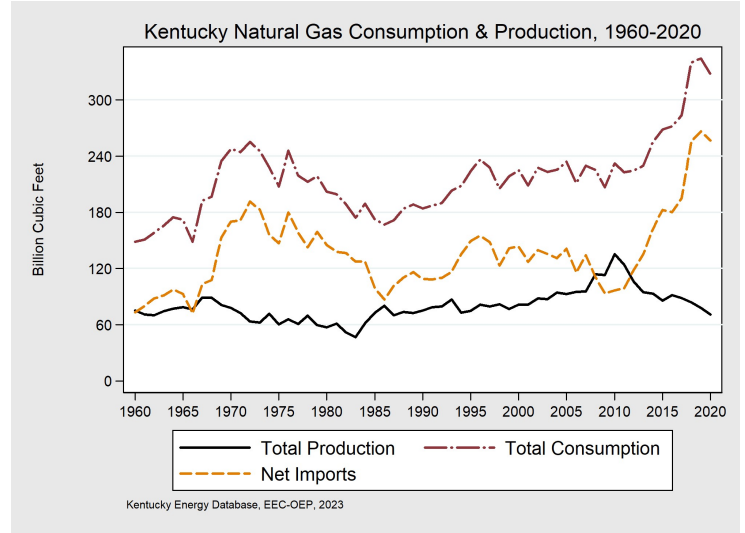
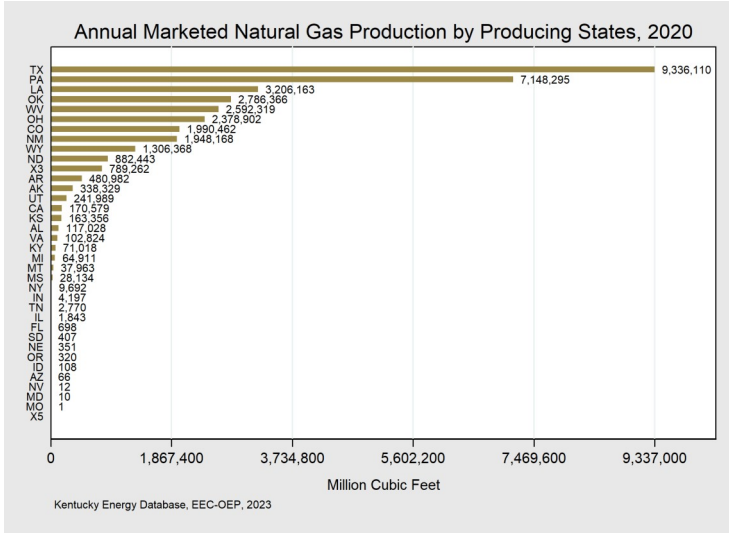
Sector	Million Cubic Feet	1 Year Change
Total	327,731	-4.8%
Industrial	121,272	-4.2%
Residential	45,961	-5.8%
Commercial	33,950	-9.2%
Electric Power	102,809	-8.5%
Transportation*	23,739	+23.5%

*Natural gas consumption by the transportation sector is the summation of vehicle fuel usage and natural gas used in the movement of natural gas resources through transmission and distribution pipelines.

Kentucky's consumption of natural gas fell by 4.8% in 2020 to consume a total of 327,731 million cubic feet, approximately 1% of United States total consumption. The industrial sector was the largest consumer of natural gas, using 37% of the state total. The electric power sector was the second largest sector consumer with 31% of total natural gas consumption. The residential sector accounted for 14% of consumption. Natural gas combined cycle (NGCC) plants have replaced coal-fired boilers at the Cane Run, Big Sandy, Paradise, and Robert Reid power plants. Both, the commercial and transportation sectors, consumed 17% of statewide consumption.

The commercial and residential sectors consume natural gas to generate heat while industrial consumers, which include agriculture, primarily use natural gas as a process feedstock in manufacturing operations. As a result, residential and commercial consumption follows a seasonal pattern, with notable fluctuation due to weather while industrial consumption is more consistent throughout the year. The sizeable consumption by the industrial sector is reflective of the large presence of industrial firms within Kentucky.

Kentucky Natural Gas Production



State	2020 Production	Rank
Texas	9,336	1st
Kentucky	71	18th

Kentucky produced 71 billion cubic feet (Bcf) of natural gas in 2020, a 9.2% decrease in natural gas production from 2019. Given a favorable price of natural gas, statewide production has the capacity to increase substantially, but production is expected to remain less than other states.

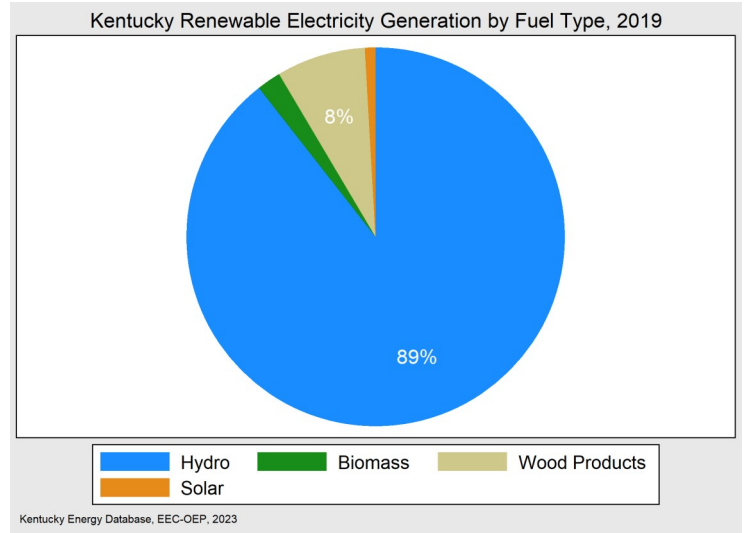
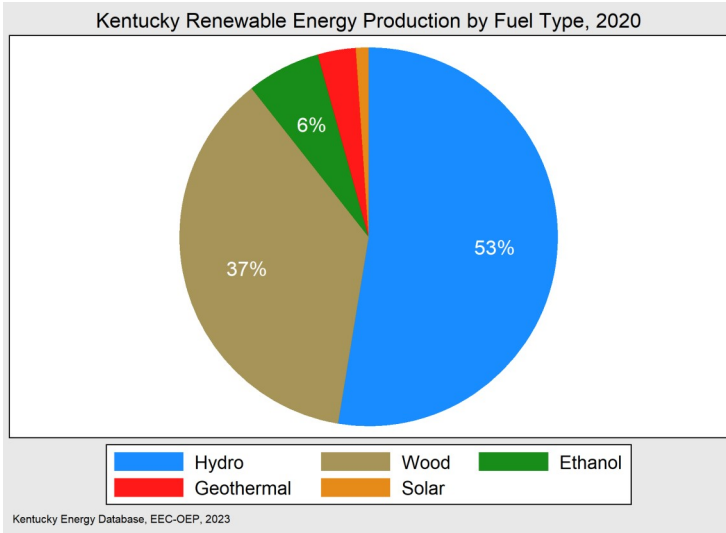
Kentucky has 2 natural gas processing plants located in eastern Kentucky and 22 underground storage locations, mostly located in western Kentucky. Additional information on the location of natural gas fields and wells is available from the Kentucky Geological Survey Geologic Map Information Service at: <http://kgs.uky.edu/kgsmap/kgsgeoserver/viewer.asp>

Kentucky Renewable Energy



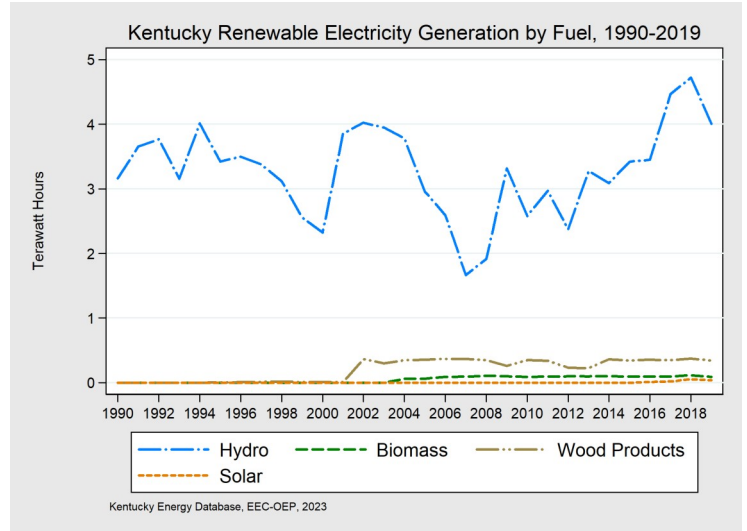
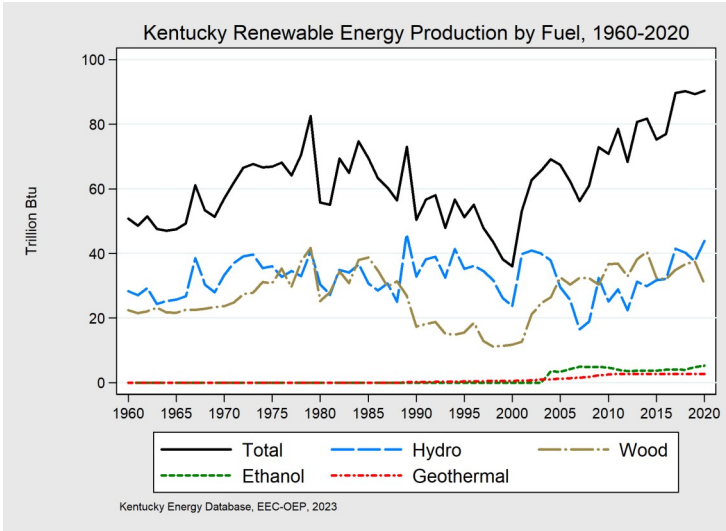
Aerial view of E.W. Brown Solar Facility. Photo courtesy of LG&E-KU.

Kentucky Renewable Energy



Fuel Type	Billion Btu	1 Year Change
Total	83,487	+1.2%
Wood & Biomass	30,698	-18.0%
Hydroelectric*	43,913	+16.5%
Ethanol†	5,270	+9.6%
Geothermal	2,712	+0.0%
Solar	894	+8.1%

Fuel Type	Gigawatt Hours	1 Year Change
Total	4,480,456	-17.5%
Hydroelectric*	4,006,900	-15.2%
Woody Biomass	342,698	-8.6%
Biomass	91,456	-19.6%
Solar	39,402	-26.5%



In 2020, Kentucky produced 83.5 trillion Btu of energy from renewable resources, a 1.2% increase compared with 2019. Year-to-year fluctuations are mostly due to variations in hydroelectric power, which itself is a reflection of rainfall. Hydroelectric, Wood and biomass waste was 90% of all renewable energy produced in Kentucky in 2020.

†Ethanol includes the biomass inputs used in the production of ethanol. These data exclude the energy losses associated with making ethanol and the co-products gleaned during production and thereafter sold.

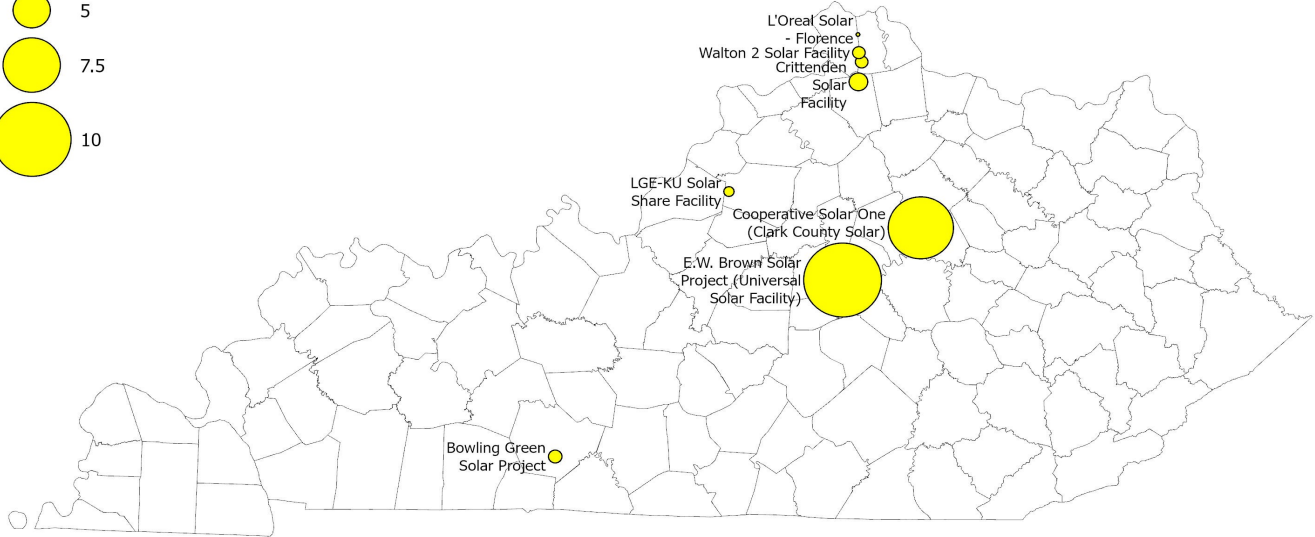
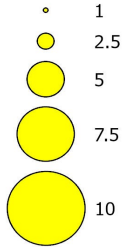
Hydroelectric power generated 89% of renewable electricity in Kentucky in 2019. Total renewable electricity generation decreased by 17.5% compared with 2018.

*Hydroelectric generation is directly accounted through gigawatt-hour consumption, whereas hydroelectric production (billion Btu) is a calculated fossil fuel displacement conversion, or the amount of fossil fuel energy required to generate an equal amount of electricity.

Kentucky Solar Generation

Kentucky 2020 Solar Locations

Operating Capacity (MW)

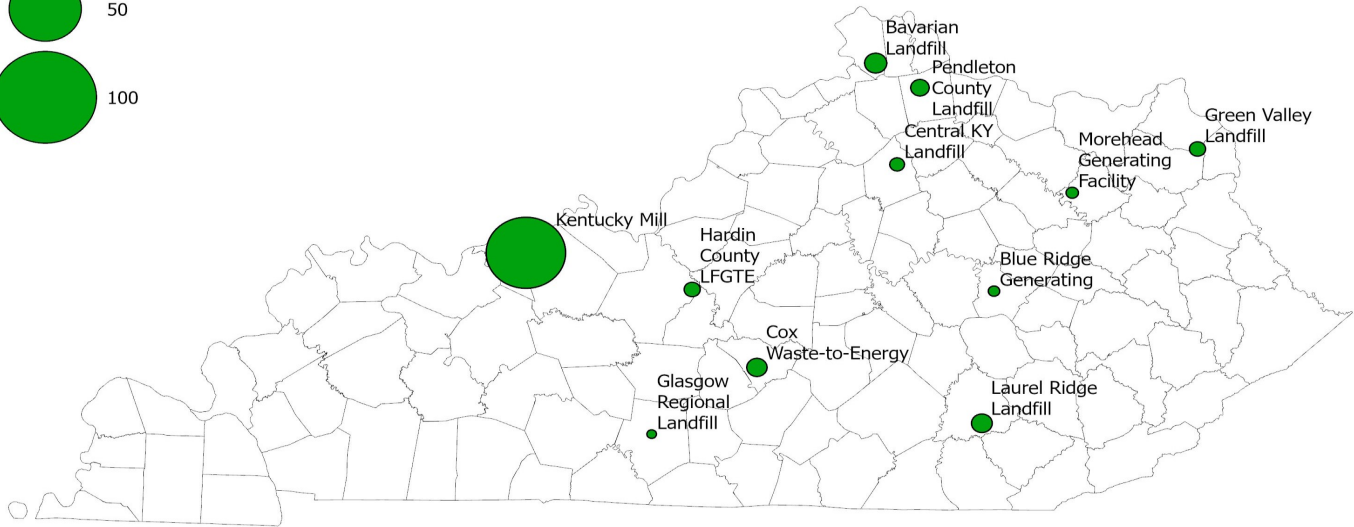
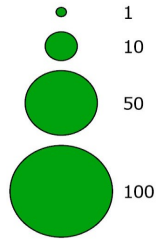


Name	Capacity (MW)
Bowling Green Solar Project	2.1
LGE-KU Solar Share Facility	1.7
Cooperative Solar One (Clark County Solar)	8.5
Crittenden Solar Facility	2.7
E.W. Brown Solar Project (Universal Solar Facility)	10
L'Oreal Solar - Florence	1.1
Walton 1 Solar Facility	2
Walton 2 Solar Facility	2

Kentucky Biomass Generation

Kentucky 2020 Biomass Locations

Operating Capacity (MW)



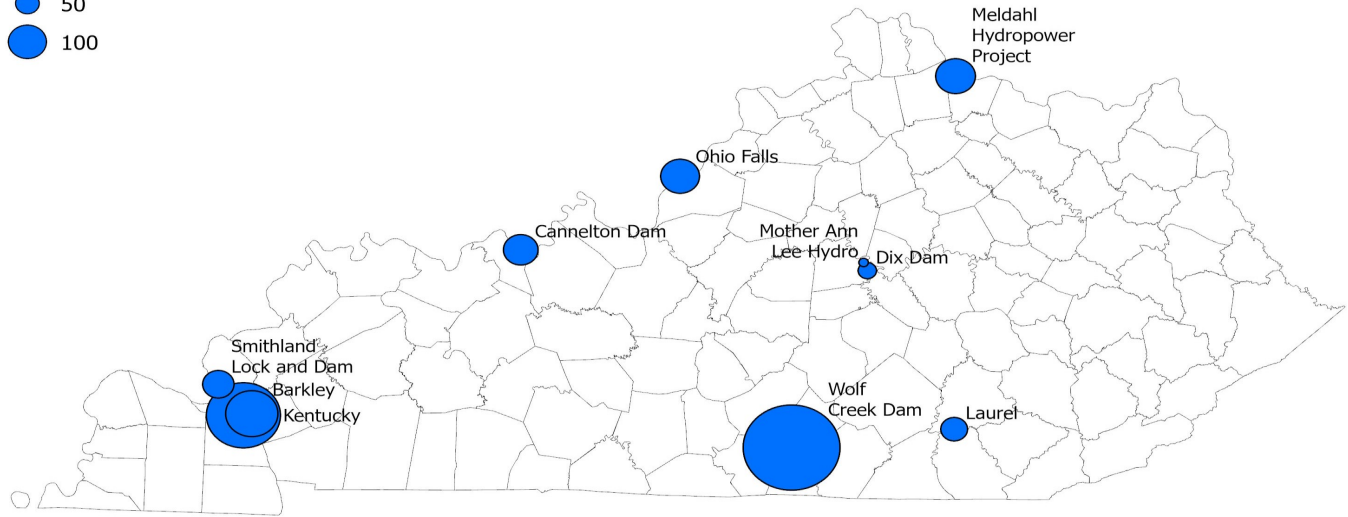
Name	Capacity (MW)
------	---------------

Bavarian Landfill	4.7
Blue Ridge Generating	1.2
Central KY Landfill	2
Cox Waste-to-Energy	3.9
Glasgow Regional Landfill	1
Green Valley Landfill	2.4
Kentucky Mill	60
Laurel Ridge Landfill	4
Hardin County LFGTE	2.4
Pendleton County Landfill	3.2
Morehead Generating Facility	1.4

Hydroelectricity Generation

Kentucky 2020 Hydroelectricity Locations
Operating Capacity (MW)

- 1
- 10
- 50
- 100



Name	Capacity (MW)
Barkley	148
Cannelton Dam	87.9
Dix Dam	31.5
Kentucky	222.5
Laurel	61
Meldahl Hydropower Project	105
Mother Ann Lee Hydro	2.3
Ohio Falls	100.8
Smithland Lock and Dam	75.9
Wolf Creek Dam	312

Distributed Renewable Generation

Distributed Renewable Generation (DG) refers to those distributed renewable energy systems that generate or store electricity for delivery to the electrical grid and includes the eligible electric generating facilities under KRS 278.465 and those connected under utility tariffs filed under the regulation for Small Power Production and Cogeneration.

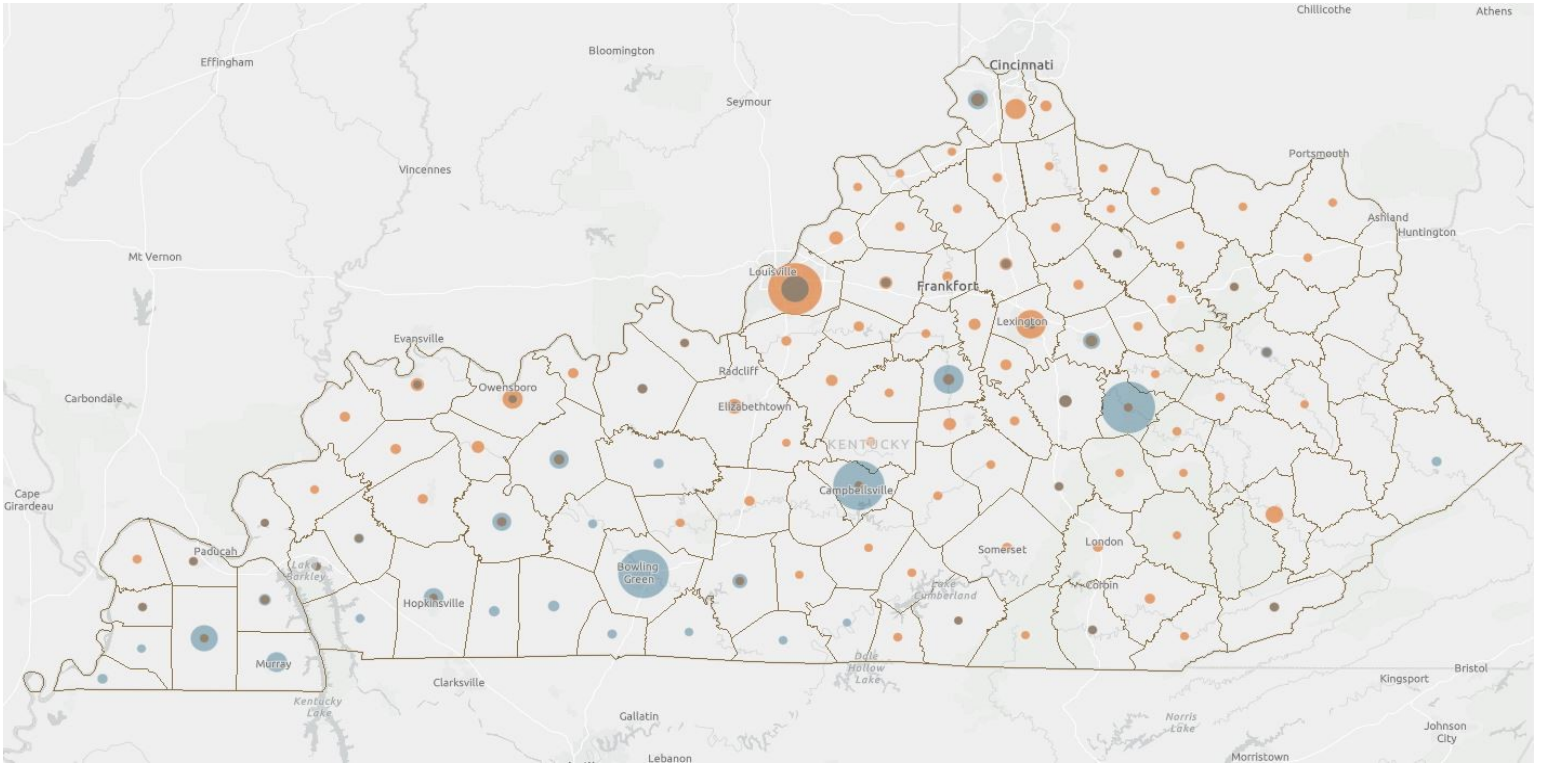
Net Energy Metering or Net Metering refers to a compensation mechanism established in KRS 278.465-468 which allows small renewable generation systems to interconnect to the electric distribution grid.

Distributed renewable generation systems located in areas of Kentucky served by TVA local power companies do not interconnect via net metering.

In addition to Net Metering, larger power generation systems interconnect to the electric grid via tariffs established by utilities under the Public Utility Regulatory Policies Act.

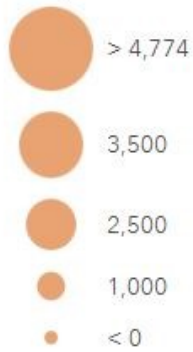
For more information on accessing alternative energy in Kentucky, visit the Consumer Energy Management and Access Guide located at eec.ky.gov/energy.

Distributed Renewable Generation — 2020



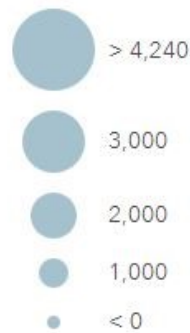
2020 Renewable Net Metering Summary

Sum of Cumulative Installed Net Metered Capacity through December 2020 (kW)



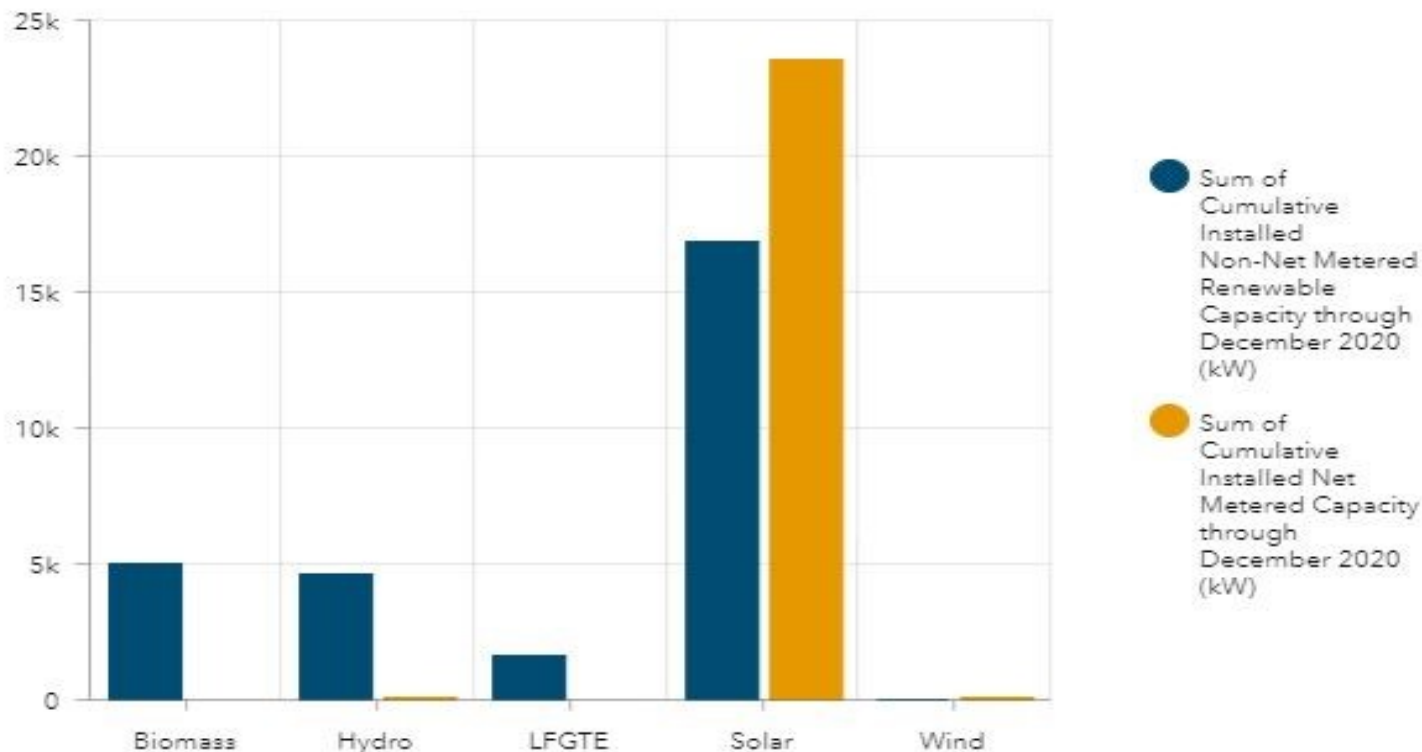
2020 Renewable Non-Net Metering Summary

Sum of Cumulative Installed Non-Net Metered Renewable Capacity through December 2020 (kW)

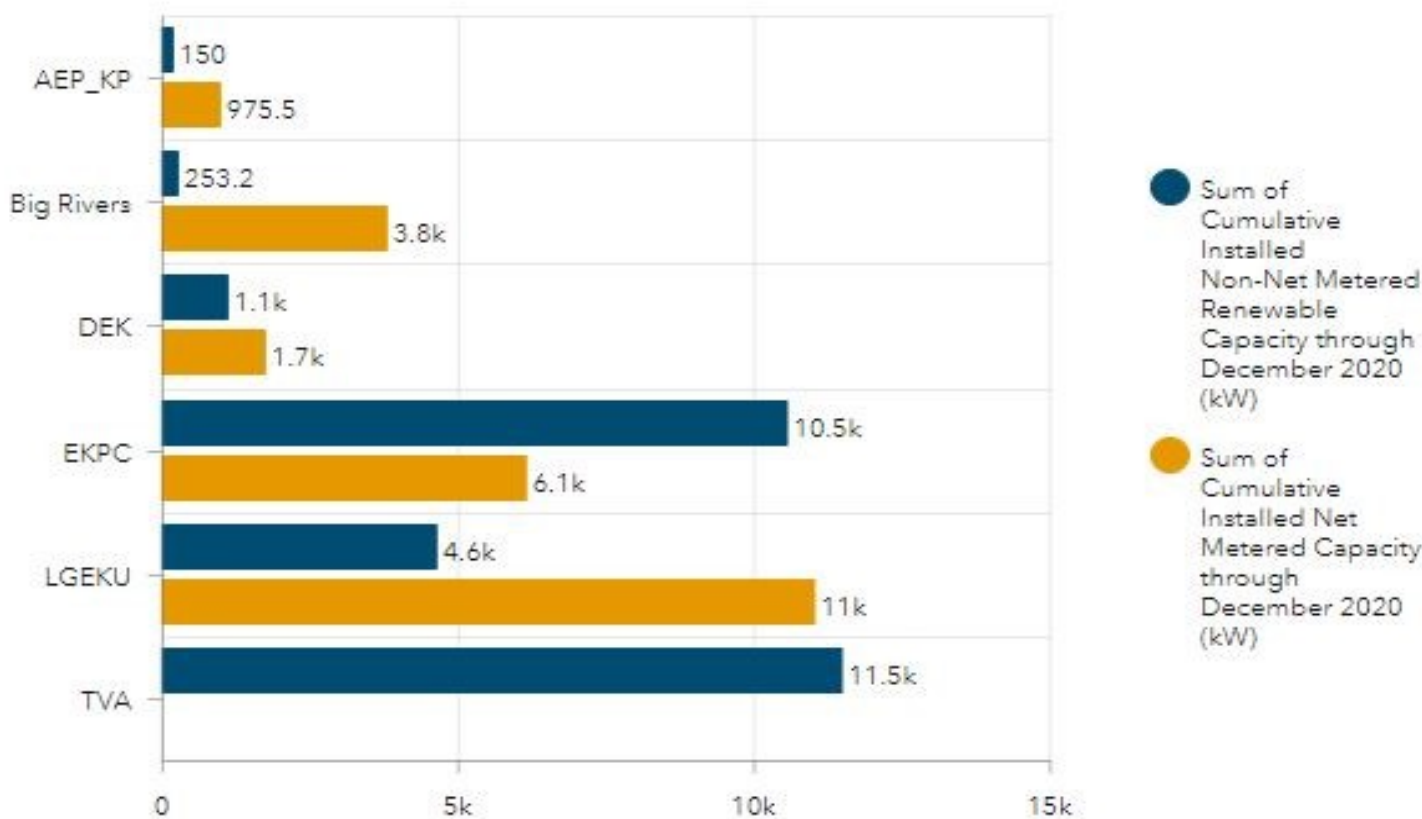


Distributed Renewable Generation — 2020

Renewable Interconnection Data Summary By Resource



Renewable Interconnection Summary By Utility (kW)



Coal-Fired Power Plant Profiles



Trimble County Power Plant, Kentucky's youngest coal-fired power plant. Owned jointly by Louisville Gas & Electric, Illinois Municipal Electric Agency, and Indiana Municipal Power Agency.

Coal-Fired Power Plant Profiles

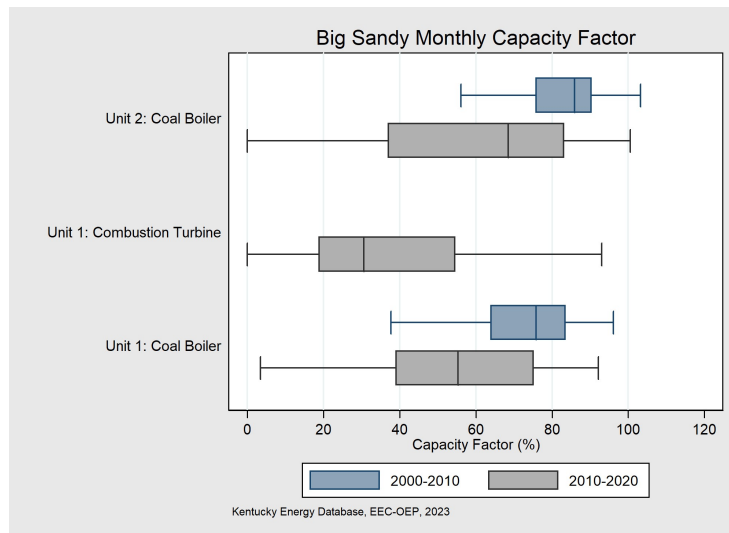
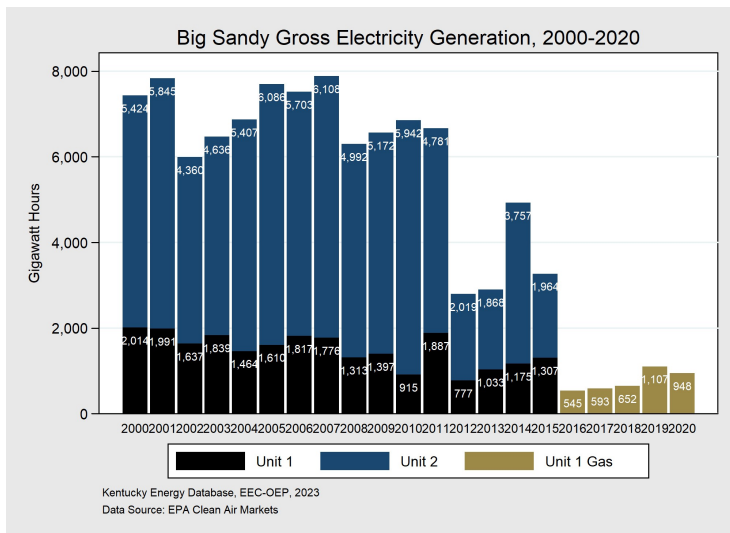
The following pages detail generation and emission statistics for Kentucky's coal fired generating plants. The plants that are profiled represent those that are currently coal fired or were once coal fired and have been converted to another source.

Edits from the previous edition:

The Green River Generation Station¹, Henderson Station¹, and Kenneth C. Coleman² have been removed from the 2023 edition due to retirements¹ or being idle² during the 2019-2020 reporting period.

The reader will note that some power plants are not operational or have significantly reduced generation. Those power plants remain in this edition until they are no longer able to resume operations.

Big Sandy Power Plant



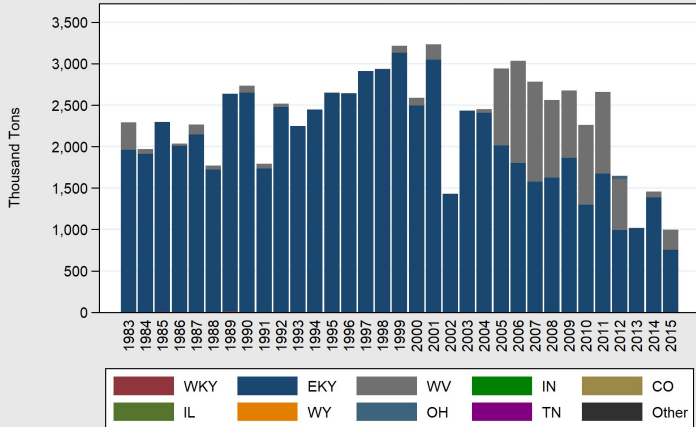
Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant	1963		Natural Gas	281	39%	948	913	1,138	0.05	1.6
1	1963		Natural Gas	281	39%	948	913	1,138	0.05	1.6
2	1969	2016	Coal	816		0	0			

The Big Sandy Power Plant, near Louisa in Lawrence County, is 60 years old and consisted of two coal-fired electricity generating units, which came online in 1963 and 1969, respectively. The plant has a total nameplate capacity of 281 MW and is owned by Kentucky Power, a subsidiary of American Electric Power Co.. In 2020, the plant generated 948 GWh of electricity, up from 652 GWh in 2018. Big Sandy's two coal-fired units were retired in 2016 and Unit 1 was converted to a natural gas combined cycle unit in 2016. Big Sandy's plant-wide capacity factor was 39% in 2020.

*2020

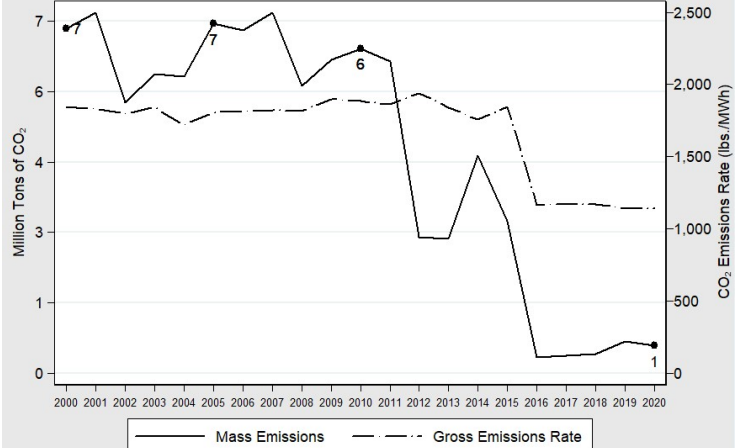
Big Sandy Power Plant

Big Sandy Coal Consumption by Origin, 1983-2015



Kentucky Energy Database, EEC-OEP, 2023
Data Source: FERC-423 & EIA-923

Big Sandy Carbon Dioxide Emissions, 2000-2020



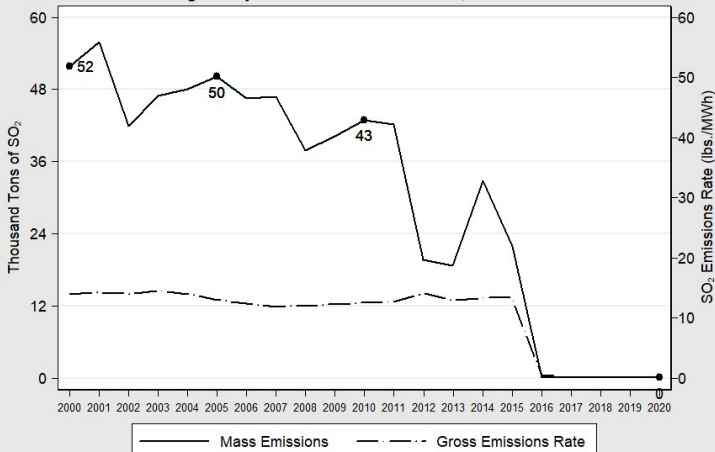
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

State	2015 Tons	Percentage
Total	1,457,580	100%
Eastern Kentucky	1,387,116	95%
West Virginia	70,464	5%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	539,187	-91.7%
Rate (lbs./MWh)	1,138	-39.6%

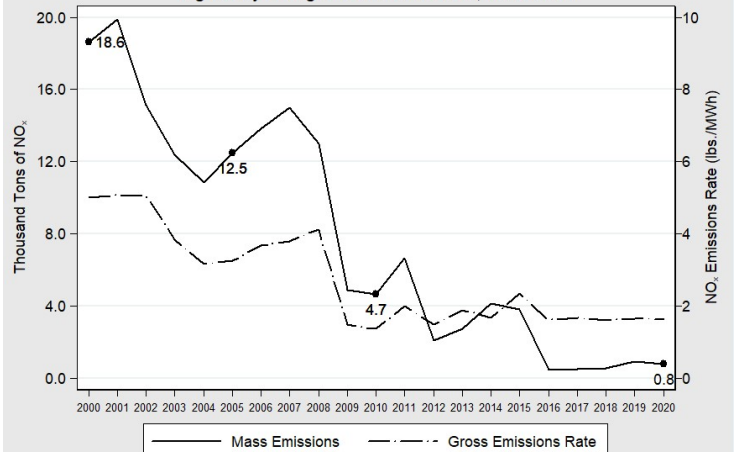
The Big Sandy Power Plant emitted 539 thousand tons of CO₂ in 2020, a decrease of 92% since 2010. The rate of CO₂ emissions has decreased by 40% during that time.

Big Sandy Sulfur Dioxide Emissions, 2000-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

Big Sandy Nitrogen Oxide Emissions, 2000-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

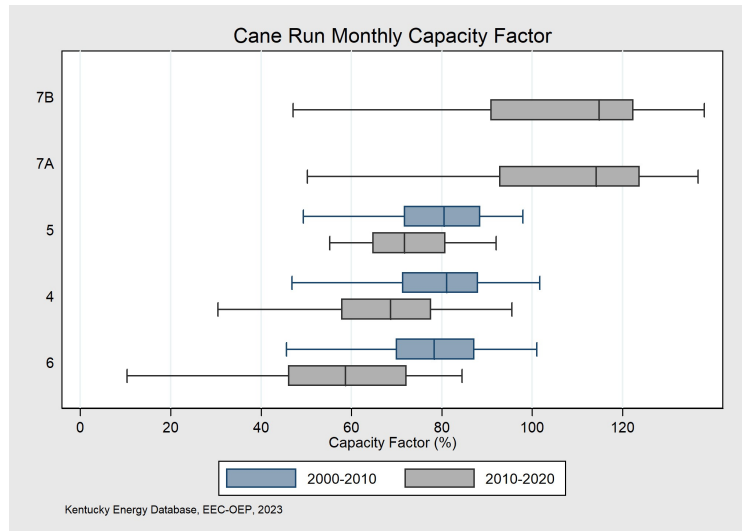
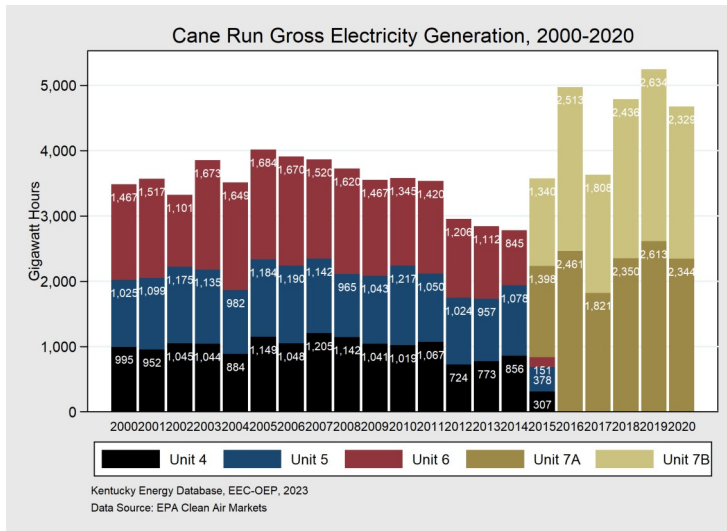
Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	23	-99.9%
Rate (lbs./MWh)	0.05	-99.9%

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	772	-83%
Rate (lbs./MWh)	1.6	-66.0%

The Big Sandy Power Plant emitted 23 tons of SO₂ in 2020. The SO₂ emissions rate has decreased at the plant by almost 100% after the closure of the plant's coal units in 2016.

The Big Sandy Power Plant emitted 772 tons of NO_x in 2020, a reduction of 83% since 2010. The rate of NO_x emissions decreased by 66% during that period.

Cane Run Station



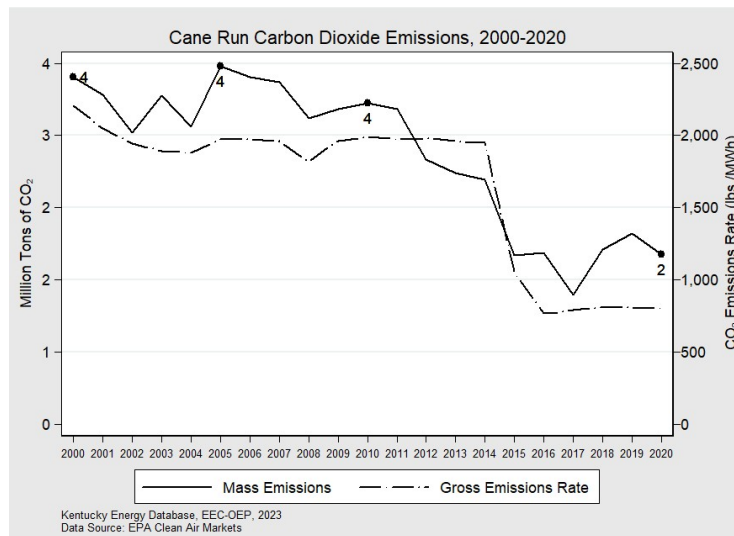
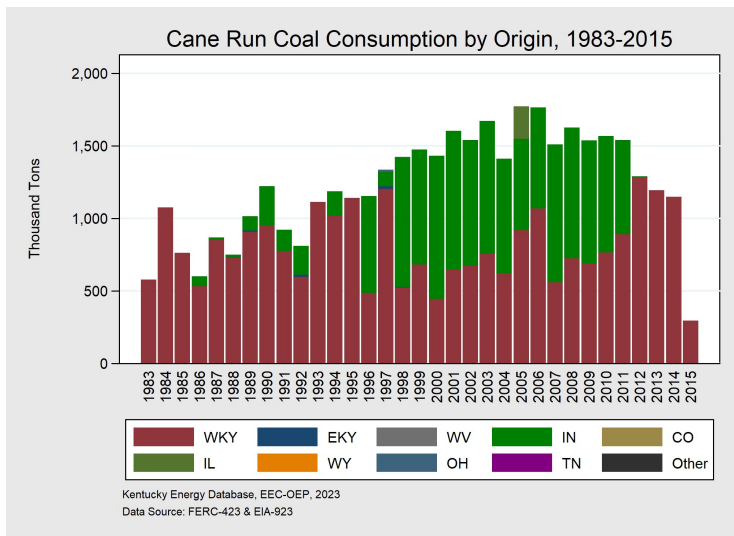
Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant	1954		Natural Gas	807	79%	4,673	4,590	804	0.004	0.18
4	1962	2015	Coal	155	-	-	-	-	-	-
5	1966	2015	Coal	168	-	-	-	-	-	-
6	1969	2015	Coal	240	-	-	-	-	-	-
7A	2015		Natural Gas	260	77%	2,344	1,477	806	0.004	0.18
7B	2015		Natural Gas	260	79%	2,329	1,470	802	0.004	0.17
7S	2015		Natural Gas	287	-	-	1,643	-	-	-

Cane Run Station, located southwest of Louisville in Jefferson County, began operation in 1954. The plant had six units at one time, but the three oldest coal units were retired by 1987. Units 4, 5, and 6 came online in 1962, 1966, and 1969, respectively. Units 4, 5, and 6 were retired in 2015 and replaced by 807 MW of natural gas combined cycle generation. In 2020, the plant generated 4.7 TWh of electricity, up from 3.5 TWh in 2015.

In their last full year of operation, Cane Run's coal units generated 2.7 TWh of electricity with an average capacity factor of 56%. Units 4, 5, and 6 generated 71.1 GWh for the Commonwealth over their lifetime with an average capacity factor of 59%. The coal units were demolished in June 2019.

*2020

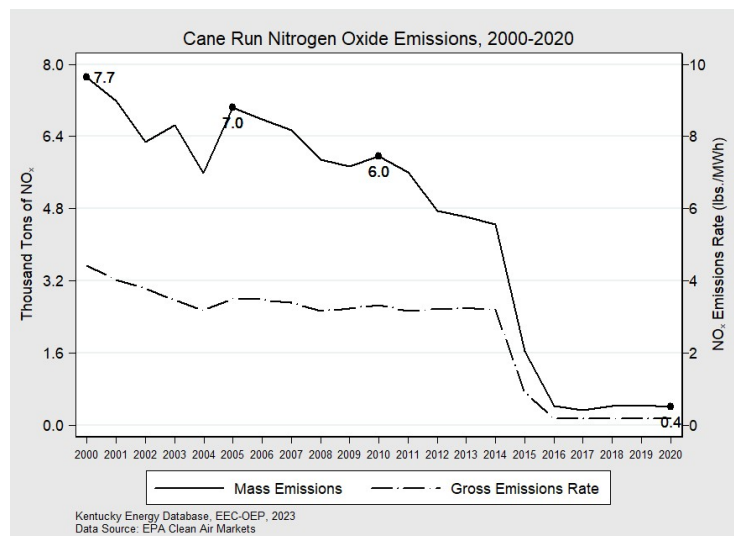
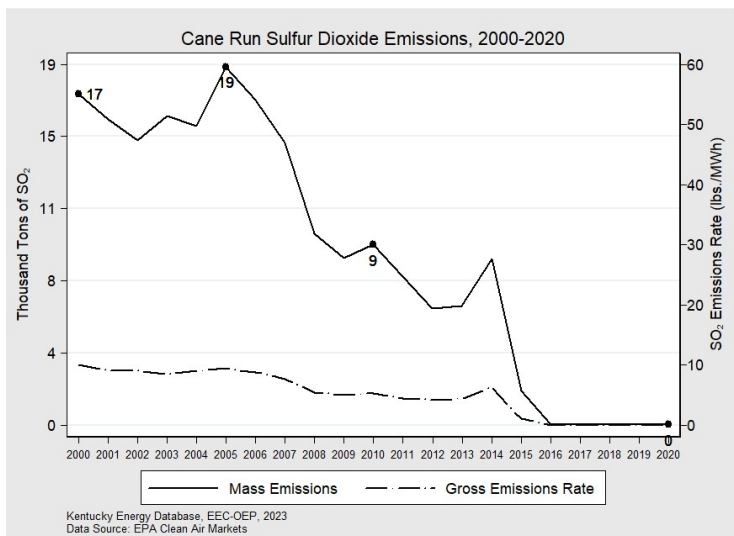
Cane Run Station



State	2015 Tons	Percentage
Total	1,147,537	100%
Western Kentucky	1,147,537	100%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	1,878,988	-47%
Rate (lbs./MWh)	804	-60%

Cane Run Station emitted 1.9 million tons of CO₂ in 2020, a decrease of 47% from 2010 levels. The rate of CO₂ emissions decreased by 60% over the same period.



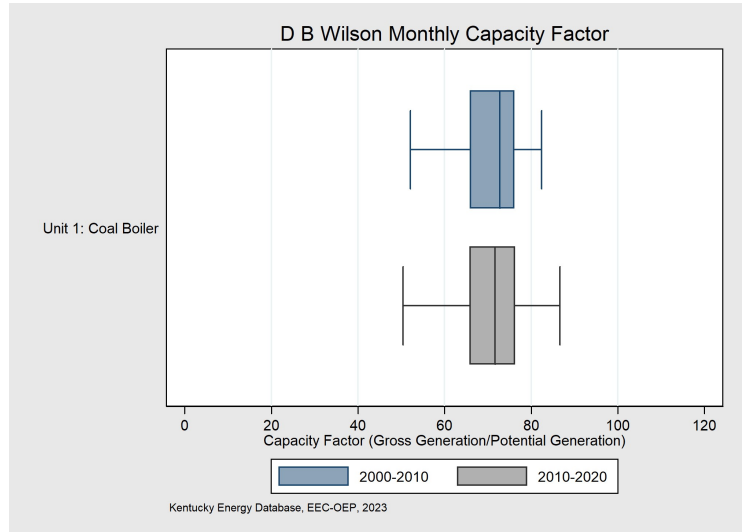
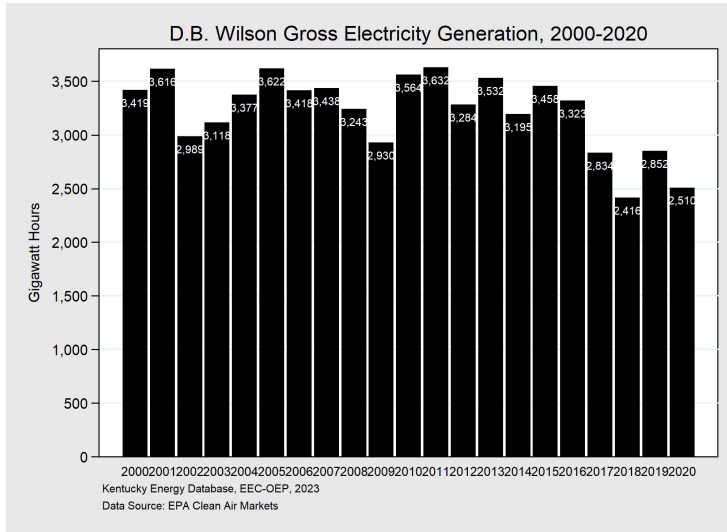
Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	10	-99%
Rate (lbs./MWh)	0.004	-99%

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	412	-93%
Rate (lbs./MWh)	0.18	-95%

Cane Run Station emitted 10 tons of SO₂ in 2020, a decrease of 99.8% since 2010. The rate of SO₂ emissions decreased by the same amount during that period.

Cane Run Station emitted 412 tons of NO_x in 2020, a reduction of 93% since 2010. The rate of NO_x emissions decreased by nearly 95% during that period.

D. B. Wilson Station



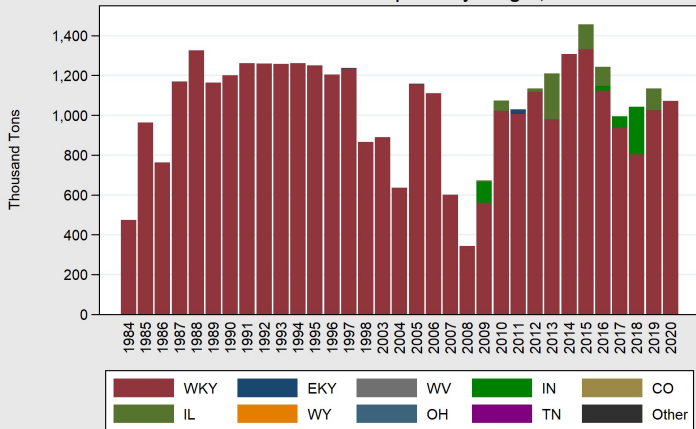
Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant 1	1984		Coal	510	72%	2,510	2,317	2,118	3.57	0.93
	1984		Coal	510	72%	2,510	2,317	2,118	3.57	0.93

D. B. Wilson Station, located in Ohio County, is 39 years old and consists of one coal-fired electricity generating unit. The unit came online in 1984 and has a nameplate capacity of 510 MW. In 2020, the plant generated 2.4 TWh of electricity and had a plant-wide capacity factor of 72%. Wilson only burned western Kentucky coal in 2020. Wilson Station is owned by Big Rivers Electric Corporation.

*2020

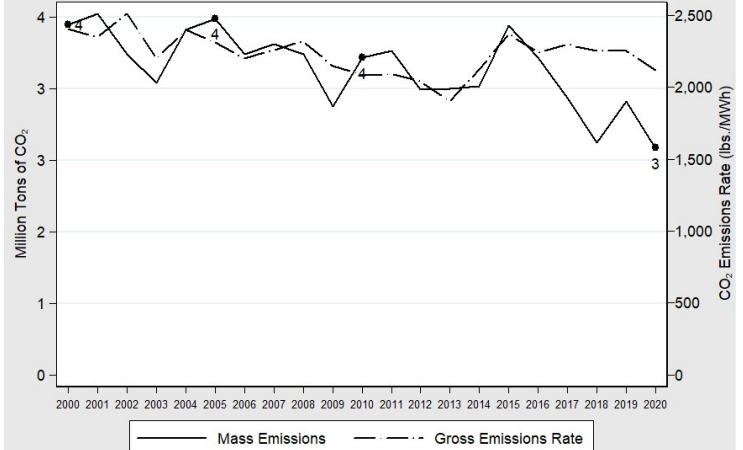
D. B. Wilson Station

D B Wilson Coal Consumption by Origin, 1984-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: FERC-423 & EIA-923

D B Wilson Carbon Dioxide Emissions, 2000-2020



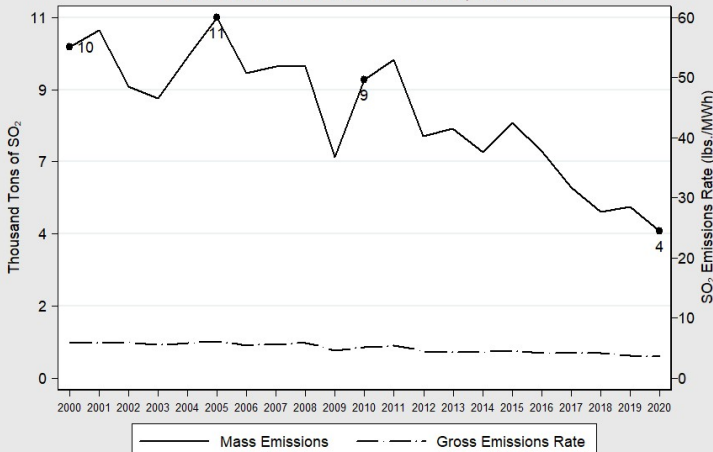
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

State	2020 Tons	Percentage
Total	1,071,141	100%
Western Kentucky	1,071,141	100%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	2,657,885	-29%
Rate (lbs./MWh)	2,118	+2%

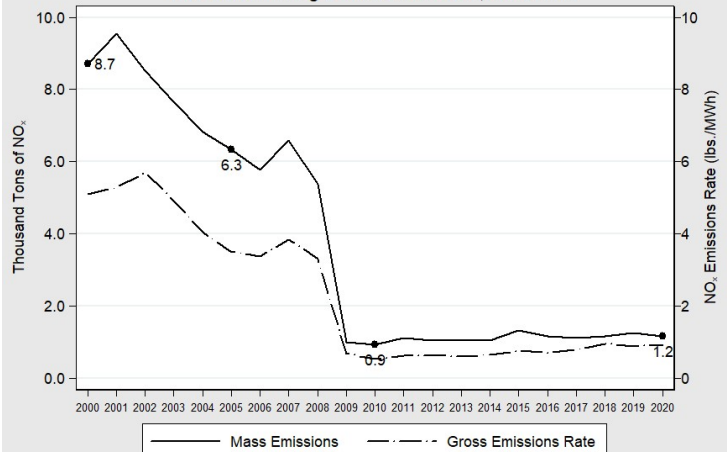
The D. B. Wilson Station emitted 2.7 million tons of CO₂ in 2020, a decrease of 29% from 2010 levels. The rate of CO₂ emissions increased by 2% during that period.

D B Wilson Sulfur Dioxide Emissions, 2000-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

D B Wilson Nitrogen Oxide Emissions, 2000-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

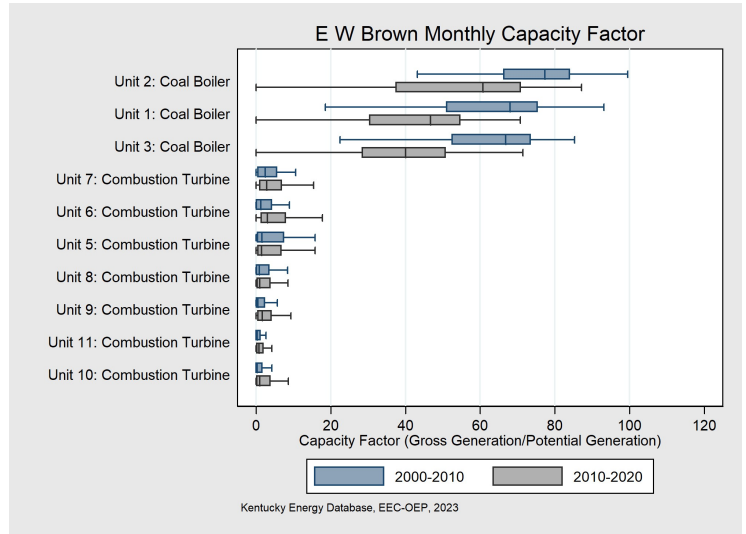
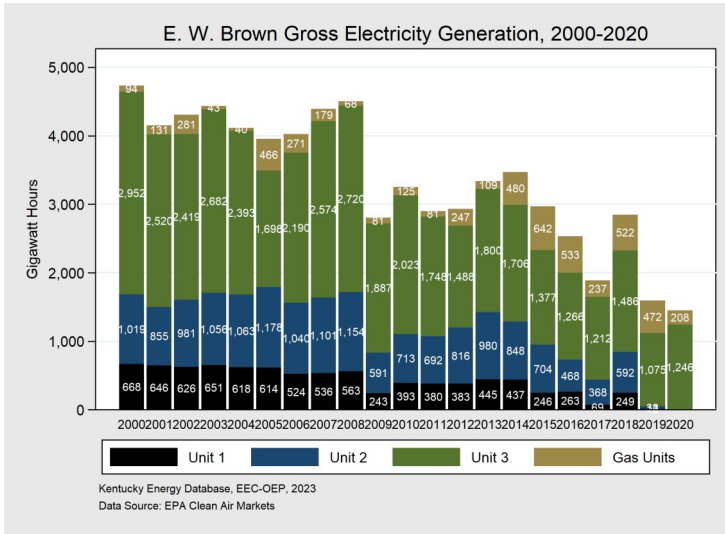
Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	4,481	-51%
Rate (lbs./MWh)	3.57	-30%

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	1,162	+24%
Rate (lbs./MWh)	0.93	+79%

The D. B. Wilson Station emitted 4,481 tons of SO₂ in 2020, a decrease of 51% since 2010. The rate of SO₂ emissions reduced by 30% during that period.

The D. B. Wilson Station emitted 1,162 tons of NO_x in 2020, an increase of 24% since 2010. The rate of NO_x emissions increased by 79% during that period.

E. W. Brown Generating Station

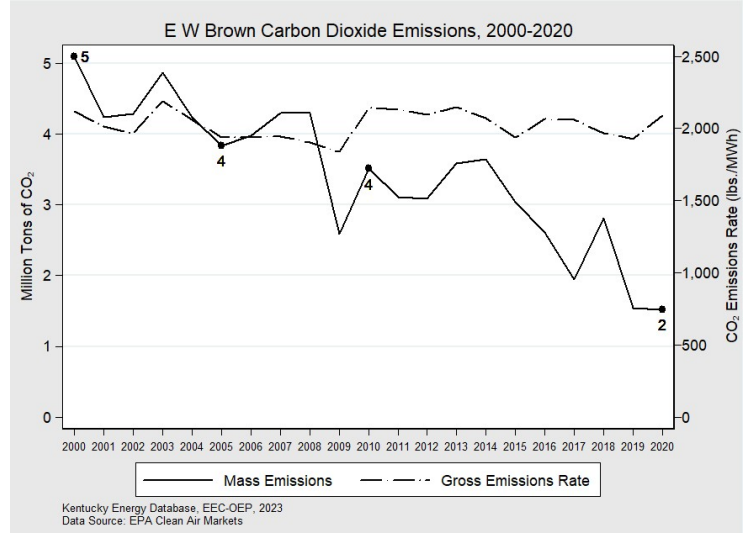
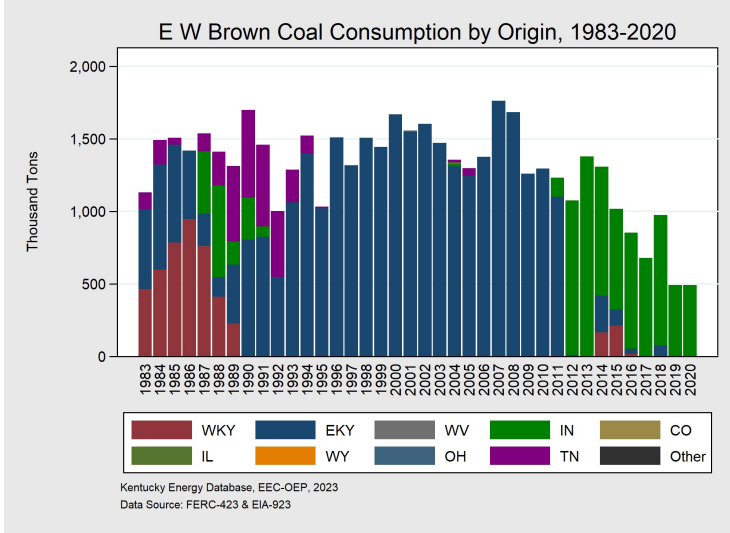


Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant	1957		Coal & NG	1,420	8%	1,453	1,307	2,087	0.32	0.51
1	1957	2019	Coal	106	-	-	-	-	-	-
2	1963	2019	Coal	166	-	-	-	-	-	-
3	1971		Coal	464	54%	1,246	1,307	2,203	0.37	0.45
5	2001		Natural Gas	123	2%	27		1,539	0.008	0.9
6	1999		Natural Gas	177	2%	74		1,263	0.006	0.5
7	1999		Natural Gas	177	3%	50		1,300	0.007	0.78
8	1995		Natural Gas	126	1%	11		1,513	0.02	1.43
9	1994		Natural Gas	126	1%	21		1,506	0.02	1.50
10	1995		Natural Gas	126	1%	16		1,761	0.45	1.76
11	1996		Natural Gas	126	1%	8		1,523	0.02	1.63

The E. W. Brown Generating Station, owned and operated by Kentucky Utilities Co., is located in Mercer County. The plant now consists of three coal-fired electricity generating units as well as seven natural gas combustion turbines used to meet peak demand. The plant is 66 years old, and the coal units came online in 1957, 1963, and 1971, respectively. Units 1 and 2 were retired in 2019; unit 3 has an operating capacity of 464 MW. In 2020, the plant generated 1.5 TWh of electricity and its coal-unit had a capacity factor of 54% while the average capacity factor for the natural gas units was 2%. The plant wide capacity factor was 8%.

*2020

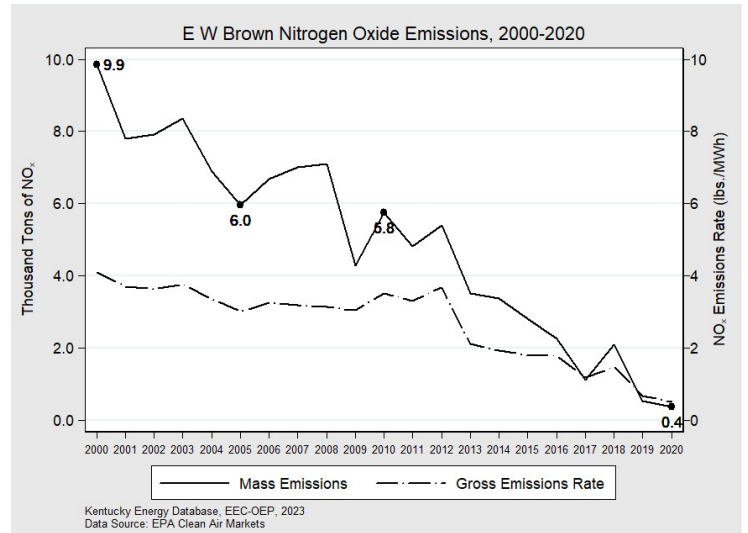
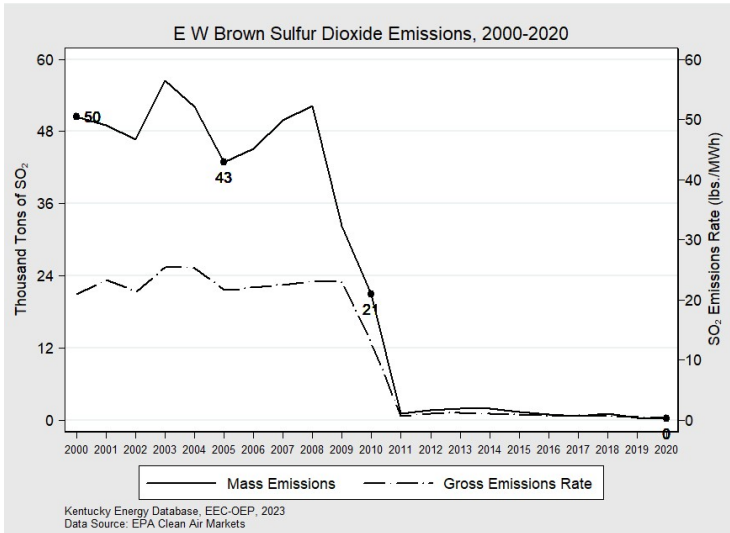
E. W. Brown Generating Station



State	2020 Tons	Percentage
Total	492,787	100%
Indiana	492,787	100%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	1,516,835	-57%
Rate (lbs./MWh)	2,087	-3%

The E. W. Brown Generating Station emitted 1.5 million tons of CO₂ in 2020, a decrease of 57% since 2010. The rate of CO₂ emissions has remained relatively unchanged during that period and is the second highest of Kentucky coal plants.



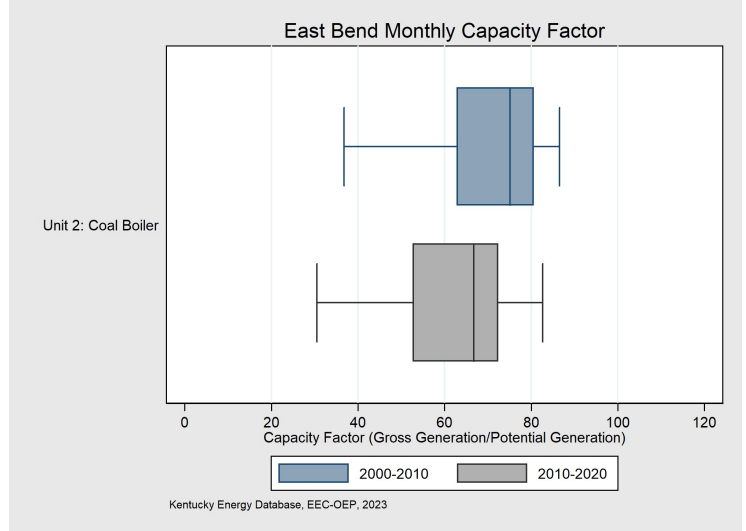
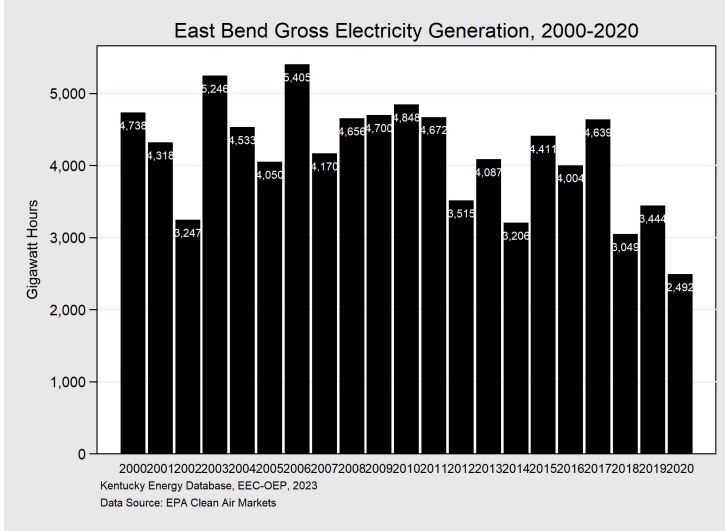
Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	233	-99%
Rate (lbs./MWh)	0.32	-98%

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	373	-94%
Rate (lbs./MWh)	0.51	-86%

The E. W. Brown Generating Station emitted 465 tons of SO₂ in 2020, a decrease of 98% since 2010. The rate of SO₂ emissions decreased by 98% during that period.

The E. W. Brown Generating Station emitted 373 tons of NO_x in 2020, a reduction of 94% since 2010. The rate of NO_x emissions decreased by 86% during that period.

East Bend Generating Station



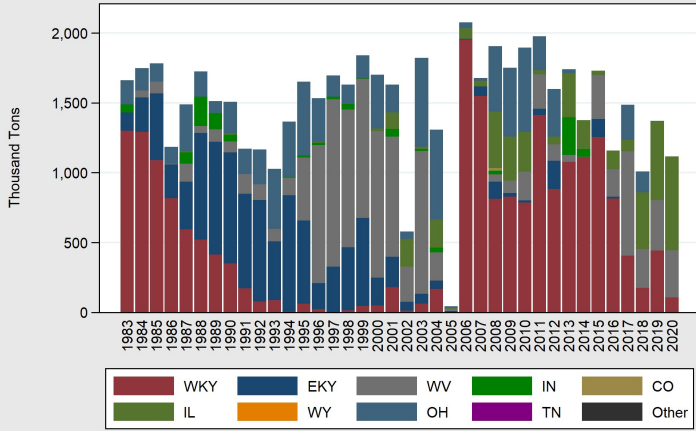
Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant 2	1981		Coal	600	70%	2,492	2,274	2,191	1.55	1.06
	1981		Coal	600	70%	2,492	2,274	2,191	1.55	1.06

The East Bend Generating Station, located in Boone County, is 42 years old and consists of one coal-fired electricity generating unit. The unit came online in 1981 and has a nameplate capacity of 600 MW. The coal plant is owned by Duke Energy, but was originally constructed and owned jointly by Cincinnati Gas & Electric and Dayton Power & Light. In 2020, the plant generated 2.5 TWh of electricity and had a capacity factor of 70%. After the installation of sulfur dioxide scrubbers in 2005, East Bend began shifting its consumption of low-sulfur coal from West Virginia to that of western Kentucky, which has relatively higher sulfur content but a lower cost. In 2020, East Bend used a mix of coal from western Kentucky, Illinois, and West Virginia.

*2020

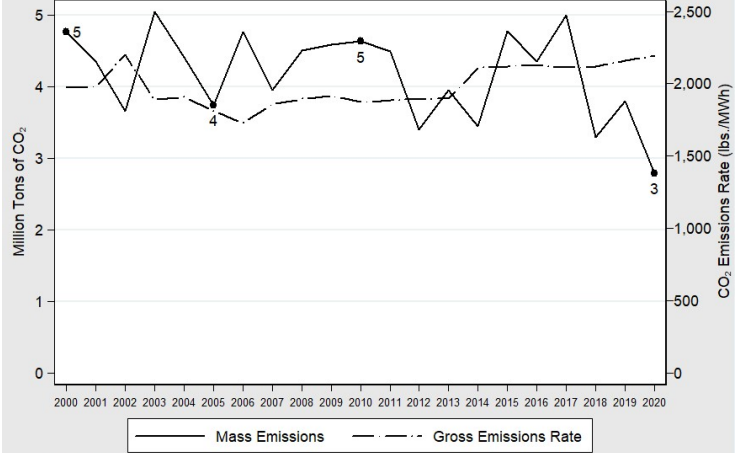
East Bend Generating Station

East Bend Coal Consumption by Origin, 1983-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: FERC-423 & EIA-923

East Bend Carbon Dioxide Emissions, 2000-2020



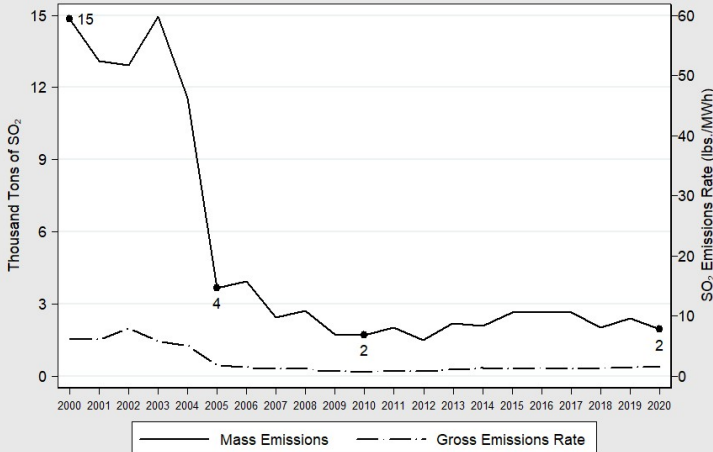
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

State	2020 Tons	Percentage
Total	1,115,715	100%
Western Kentucky	107,839	9.7%
Illinois	670,821	60.1%
West Virginia	337,055	30.2%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	2,730,063	+40%
Rate (lbs./MWh)	2,191	+17%

The East Bend Generating Station emitted 2.7 million tons of CO₂ in 2020, an increase of 40% from 2010 levels. The rate of CO₂ emissions increased by 17% during that period.

East Bend Sulfur Dioxide Emissions, 2000-2020

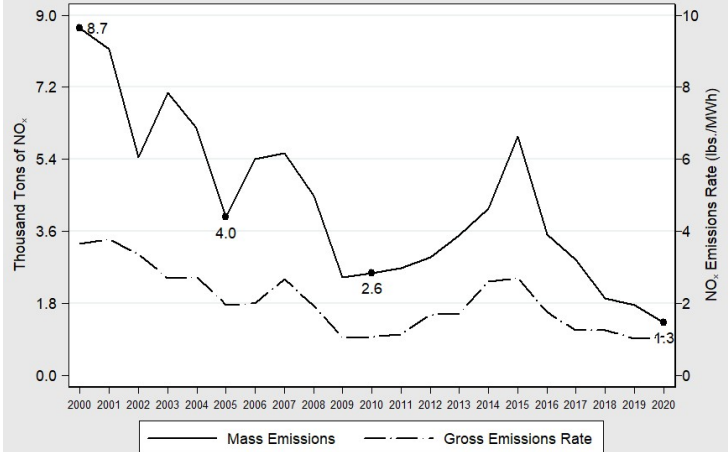


Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	1,932	+13%
Rate (lbs./MWh)	1.55	+118%

The East Bend Generating Station emitted 1,932 tons of SO₂ in 2020, an increase of 13% since 2010. The rate of SO₂ emissions increased by 118% during that period.

East Bend Nitrogen Oxide Emissions, 2000-2020

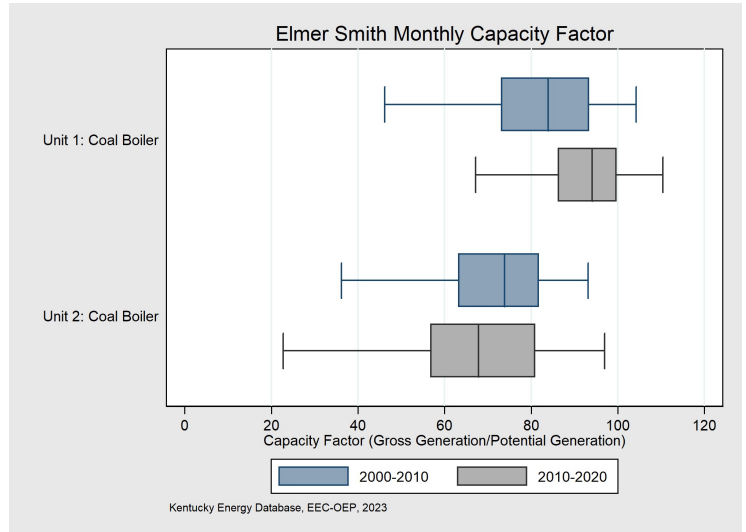
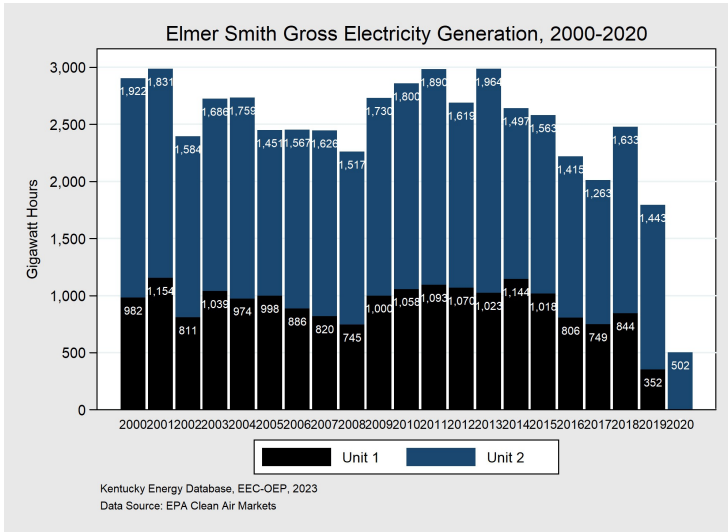


Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	1,320	-49%
Rate (lbs./MWh)	1.06	0%

The East Bend Generating Station emitted 1,320 tons of NO_x in 2020, a decrease of 49% since 2010. The rate of NO_x emissions returned to the same rate as 2010.

Elmer Smith Station

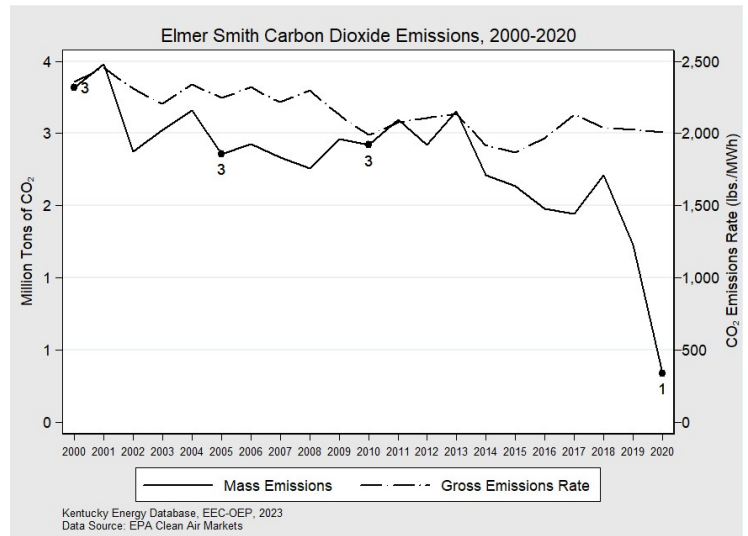
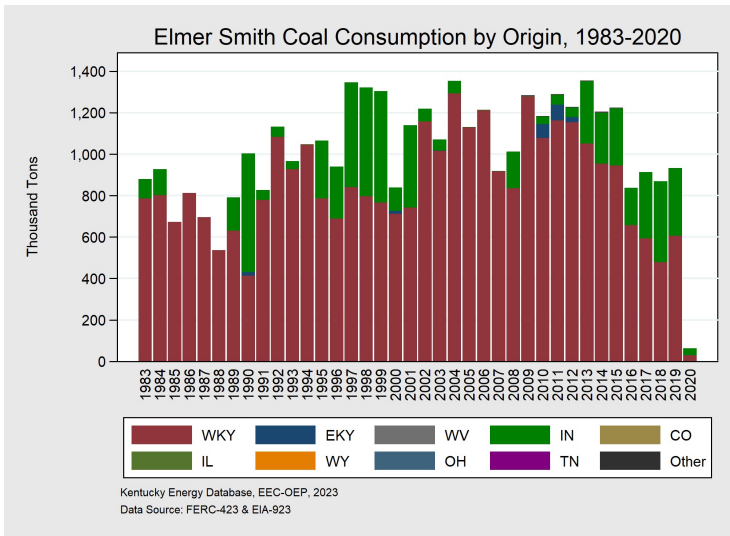


Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant	1964		Coal	263	74%	502	451	2,010	2.34	2.83
1	1964	2019	Coal	139	-	-	-	-	-	-
2	1974	2020	Coal	263	74%	502	451	2,010	2.34	2.83

Elmer Smith Station, located in Henderson County, is 59 years old and consists of two coal-fired electricity generating units, which began operating in 1964 and 1974, respectively. The plant has a total nameplate capacity of 401 MW. In 2020, the plant generated 502 GWh of electricity and had a plant-wide capacity factor of 74%. The coal used at Elmer Smith in 2020 was trucked from western Kentucky and Indiana. Both units have been retired, Unit 1 in 2019 and Unit 2 in 2020. Elmer Smith Station is owned and operated by Owensboro Municipal Utilities.

*2020

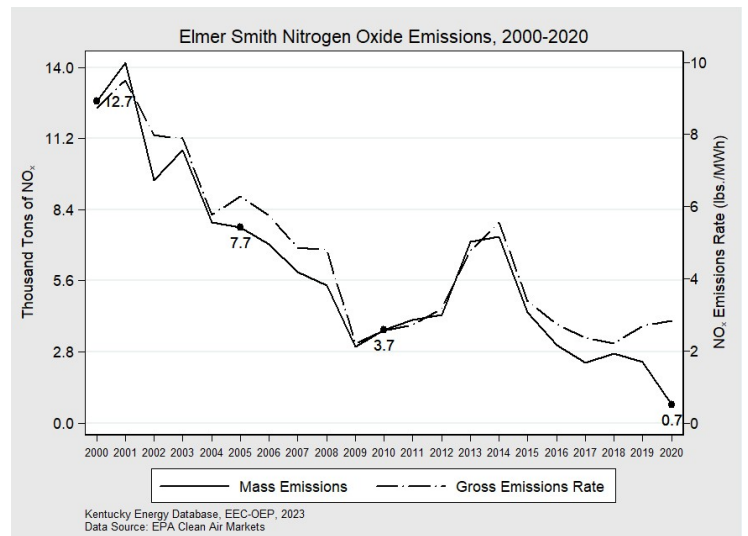
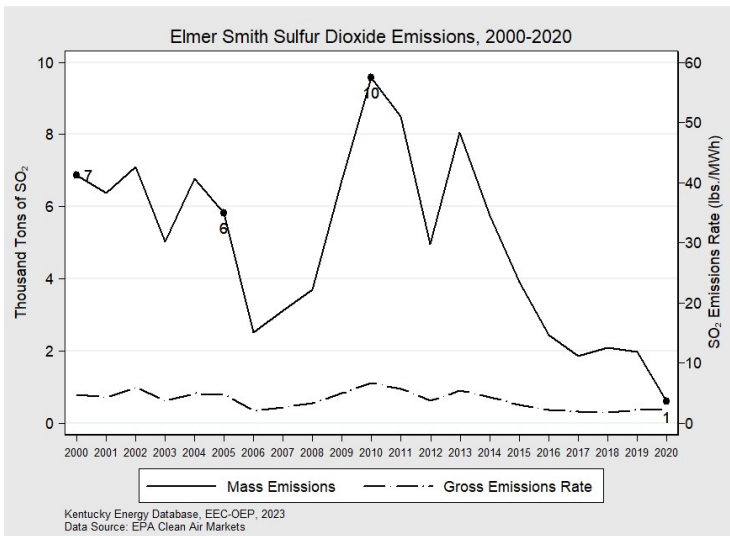
Elmer Smith Station



State	2020 Tons	Percentage
Total	63,120	100%
Western Kentucky	29,056	46%
Indiana	34,064	54%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	504,217	-82%
Rate (lbs./MWh)	2,010	+1%

Elmer Smith Station emitted 0.5 million tons of CO₂ in 2020, a decrease of 82% from 2010 levels. The rate of CO₂ emissions increased by 1% during that period.



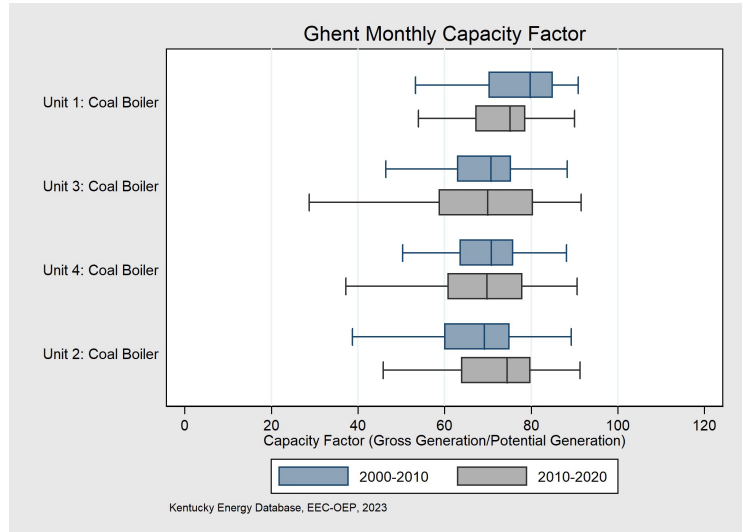
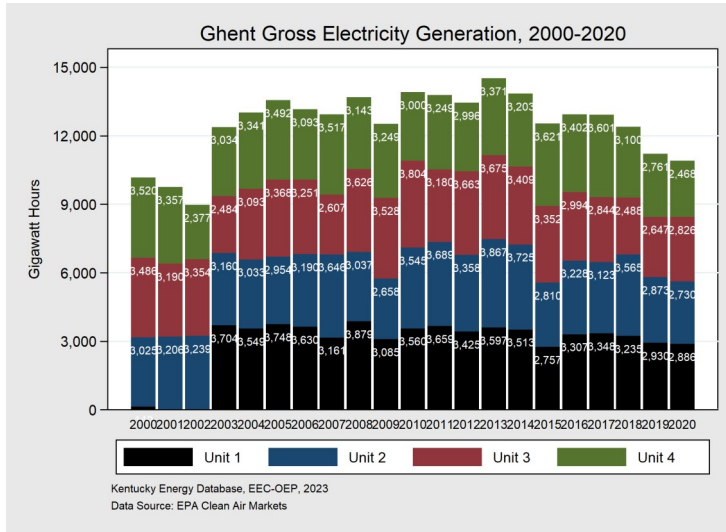
Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	587	-94%
Rate (lbs./MWh)	2.34	-65%

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	710	-81%
Rate (lbs./MWh)	2.83	-5%

Elmer Smith Station emitted 587 tons of SO₂ in 2020, a decrease of 94% since 2010. The rate of SO₂ emissions reduced by 65% during that period.

Elmer Smith Station emitted 710 tons of NO_x in 2020, a reduction of 81% since 2010. The rate of NO_x emissions decreased by 5% during the same period.

Ghent Generating Station



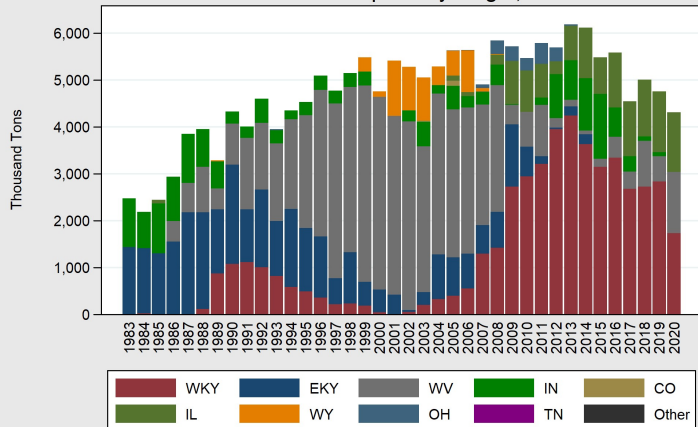
Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant	1973		Coal	1,943	72%	10,910	9,910	1,933	1.57	0.98
1	1974		Coal	479	75%	2,886	2,652	1,984	0.91	0.57
2	1977		Coal	495	70%	2,730	2,498	1,874	2.59	1.51
3	1981		Coal	489	71%	2,826	2,533	1,879	2.10	1.26
4	1984		Coal	469	70%	2,468	2,227	2,002	0.64	0.54

The Ghent Generating Station, located in Carroll County, began operation in 1973 and consists of four coal-fired electricity generating units. The units came online in 1974, 1977, 1981, and 1984, respectively. The plant is owned by Kentucky Utilities Co. and has a total nameplate capacity of 1,943 MW, making it the largest of Kentucky Utilities' electricity plants. In 2020, the plant had a plant-wide capacity factor of 72% and generated 10.9 TWh of electricity. All four units at Ghent underwent retrofits to control for sulfur dioxide emissions from 2007 to 2009. The majority of coal consumed by Ghent in 2018 was transported by river barge from western Kentucky, Illinois, and West Virginia. The plant burned smaller amounts of coal from Indiana, Illinois, West Virginia, and Perry County, in eastern Kentucky. This is a significant change from the 2000s, when it used mostly coal from West Virginia.

*2020

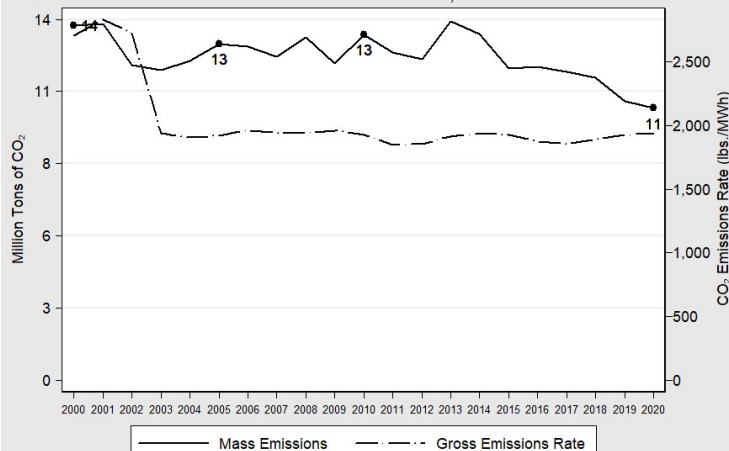
Ghent Generating Station

Ghent Coal Consumption by Origin, 1983-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: FERC-423 & EIA-923

Ghent Carbon Dioxide Emissions, 2000-2020



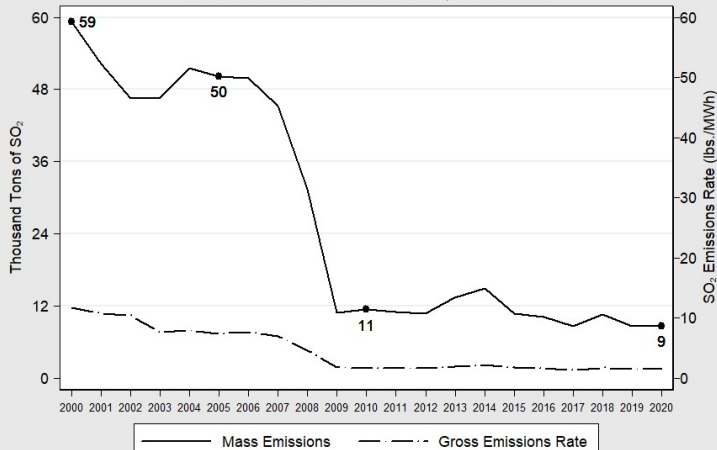
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

State	2020 Tons	Percentage
Total	4,313,047	100%
Western Kentucky	1,727,871	40.1%
Illinois	1,274,615	29.6%
West Virginia	1,310,561	30.3%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	10,547,019	-21%
Rate (lbs./MWh)	1,933	0%

The Ghent Generating Station emitted 11 million tons of CO₂ in 2020, a decrease of 21% from 2010 levels. The rate of CO₂ emissions has remained relatively constant during that time.

Ghent Sulfur Dioxide Emissions, 2000-2020

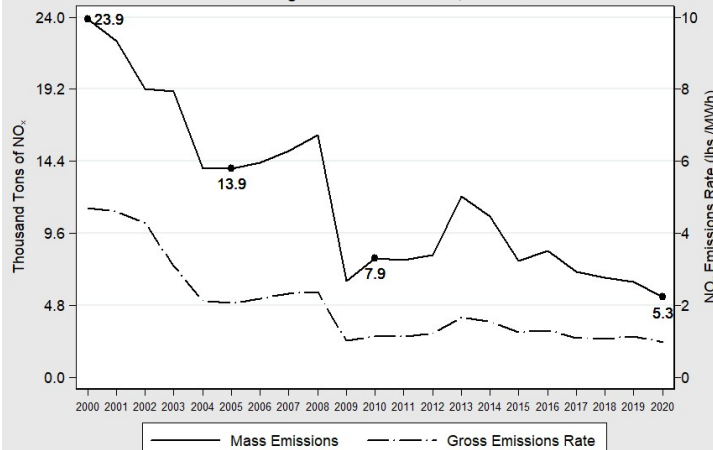


Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	8,601	-24%
Rate (lbs./MWh)	1.57	-4%

The Ghent Generating Station emitted 8,601 tons of SO₂ in 2020, a decrease of 24% since 2010. The rate of SO₂ emissions decreased by 4% during that period.

Ghent Nitrogen Oxide Emissions, 2000-2020

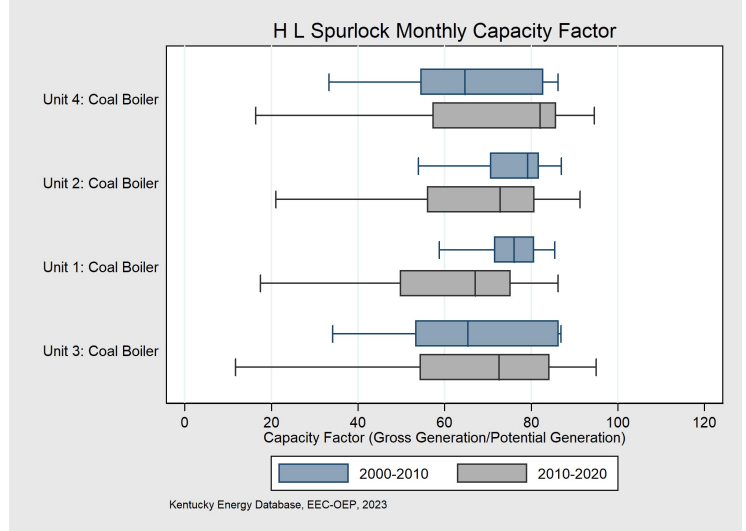
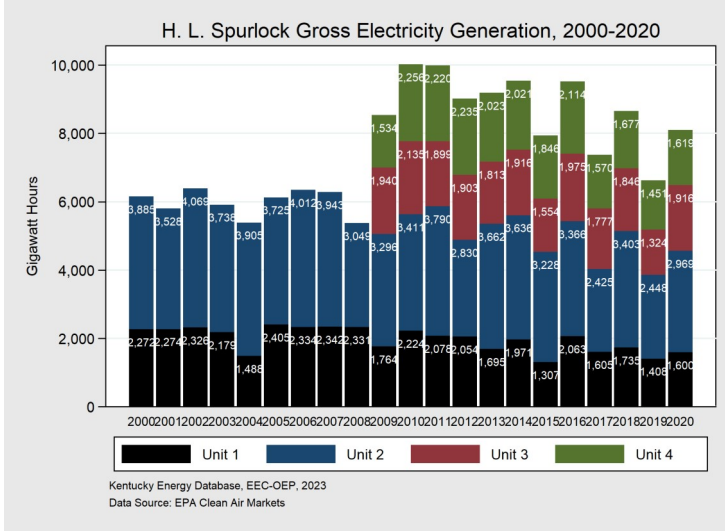


Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	5,337	-33%
Rate (lbs./MWh)	0.98	-14%

The Ghent Generating Station emitted 5,337 tons of NO_x in 2020, a decrease of 33% since 2010. The rate of NO_x emissions decreased by 14% since 2010.

H. L. Spurlock Power Station



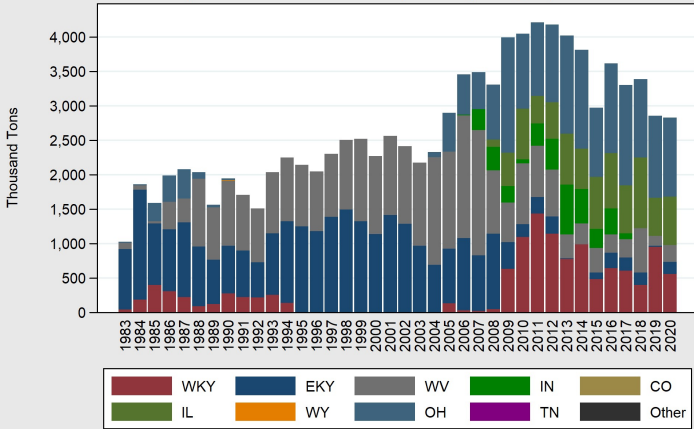
Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant	1977		Coal	1,346	76%	8,104	7,294	1,869	0.95	0.71
1	1977		Coal	300	74%	1,600	1,448	1,918	0.69	0.84
2	1981		Coal	510	77%	2,969	2,721	1,948	1.00	0.85
3	2005		Coal	268	71%	1,916	1,701	1,808	1.19	0.56
4	2008		Coal	268	82%	1,619	1,424	1,752	0.81	0.52

The H. L. Spurlock Power Station, located in Mason County, is 46 years old and consists of four coal-fired electricity generating units. The units came online in 1977, 1981, 2005, and 2009, respectively. Spurlock has a total nameplate capacity of 1,346 MW. In 2020, the plant generated 8.1 TWh of electricity and had a plant-wide capacity factor of 76%. To lower sulfur dioxide emissions, desulfurization scrubbers were installed on Unit 3 in 2004, on Unit 2 in 2008, and on Units 1 and 4 in 2009. Spurlock used a mix of coal from Ohio and Union counties in western Kentucky, and from the states of Illinois, Eastern Kentucky and West Virginia in 2020. From the 1990s through the mid-2000s, Spurlock used a mix of mostly eastern Kentucky and West Virginia coal. Spurlock Power Station is owned and operated by East Kentucky Power Cooperative.

*2020

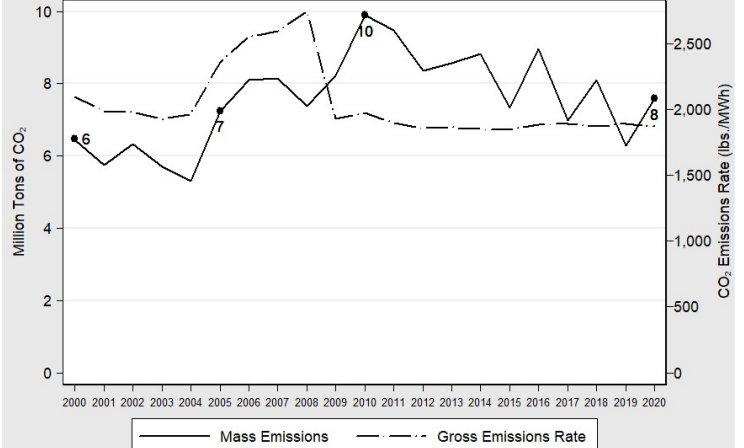
H. L. Spurlock Power Station

H L Spurlock Coal Consumption by Origin, 1983-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: FERC-423 & EIA-923

H L Spurlock Carbon Dioxide Emissions, 2000-2020



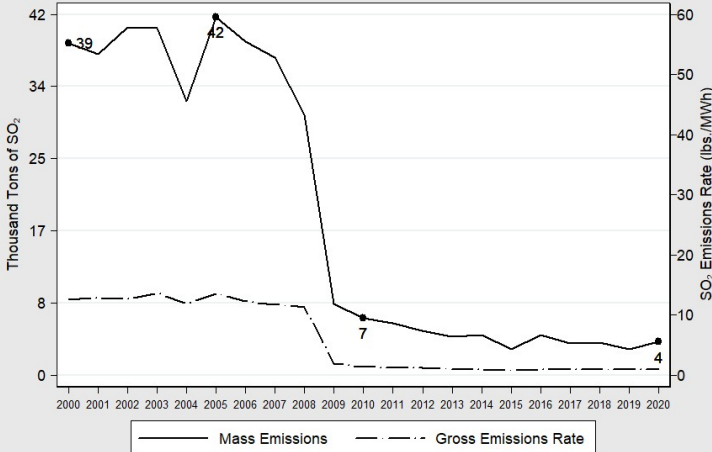
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

State	2020 Tons	Percentage
Total	2,829,772	100%
Ohio	1,149,563	40.5%
Western Kentucky	558,970	19.8%
Illinois	703,878	24.9%
Eastern Kentucky	171,475	6.1%
West Virginia	245,886	8.7%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	7,577,185	-23%
Rate (lbs./MWh)	1,869	-5%

The H. L. Spurlock Power Station emitted 7.6 million tons of CO₂ in 2020, a decrease of 23% from 2010 levels. The rate of CO₂ emissions decreased by 5% during that period.

H L Spurlock Sulfur Dioxide Emissions, 2000-2020

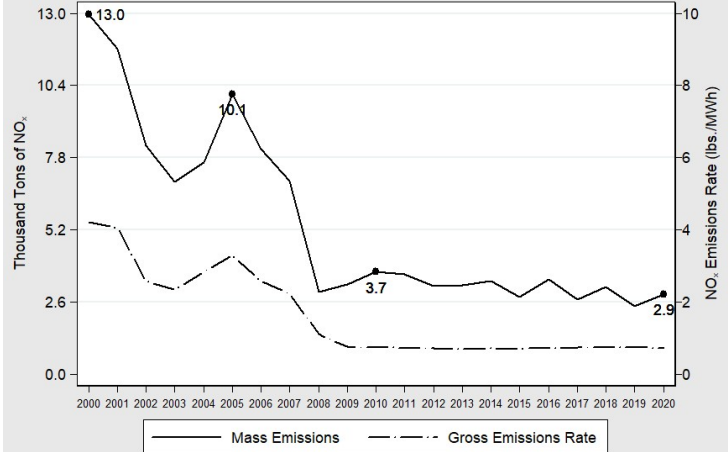


Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	3,831	-42%
Rate (lbs./MWh)	0.95	-28%

The H. L. Spurlock Power Station emitted 3,831 tons of SO₂ in 2020, a decrease of 42% since 2010. The rate of SO₂ emissions reduced by 28% during that period.

H L Spurlock Nitrogen Oxide Emissions, 2000-2020

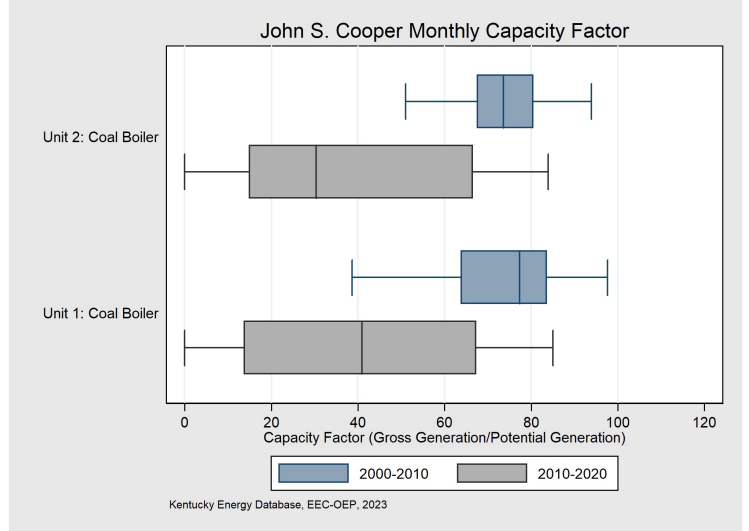
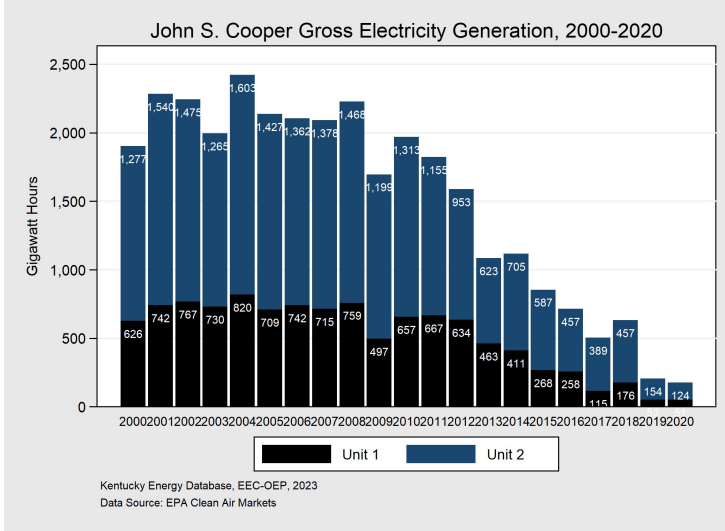


Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	2,884	-22%
Rate (lbs./MWh)	0.71	-3%

The H. L. Spurlock Power Station emitted 2,884 tons of NO_x in 2020, a decrease of 22% since 2010. The rate of NO_x emissions decreased by 3% during that period.

John S. Cooper Power Station

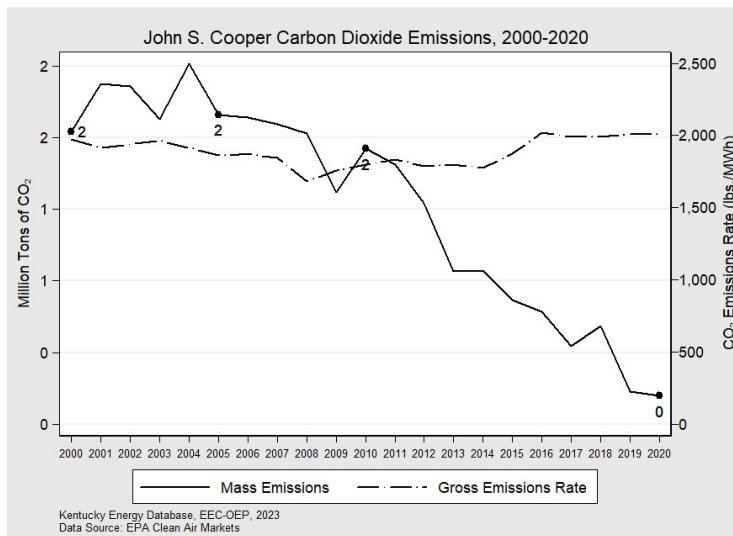
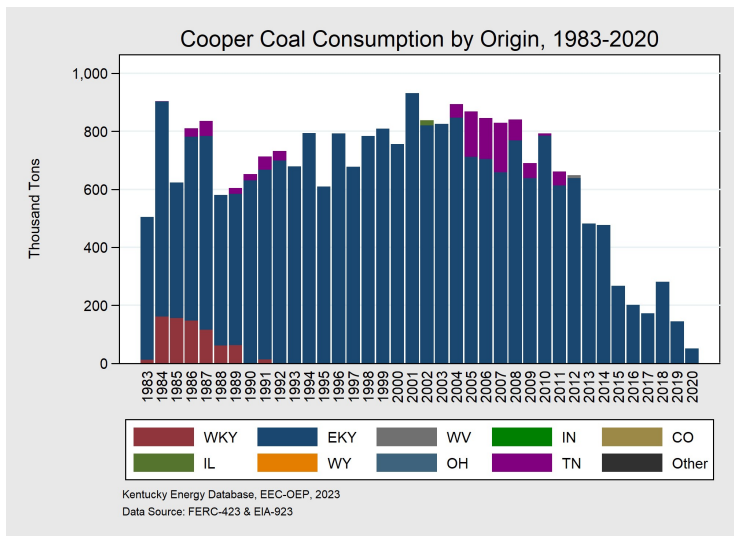


Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant	1965		Coal	341	36%	175	142	2,009	0.53	1.36
1	1965		Coal	116	42%	51	41	2,036	0.96	1.95
2	1969		Coal	225	31%	124	101	1,998	0.36	1.12

The John Sherman Cooper Power Station, located in Pulaski County, is 58 years old and consists of two coal-fired electricity generating units. The units came online in 1965 and 1969, respectively. The plant has a total nameplate capacity of 341 MW. In 2020, the plant generated 175 GWh of electricity and had a plant-wide capacity factor of 36%. A scrubber was installed on Unit 2 in 2012 to lower sulfur dioxide emissions and a baghouse. Cooper sourced all of its coal from eastern Kentucky in 2020. John S. Cooper Power Station is owned and operated by East Kentucky Power Cooperative.

*2020

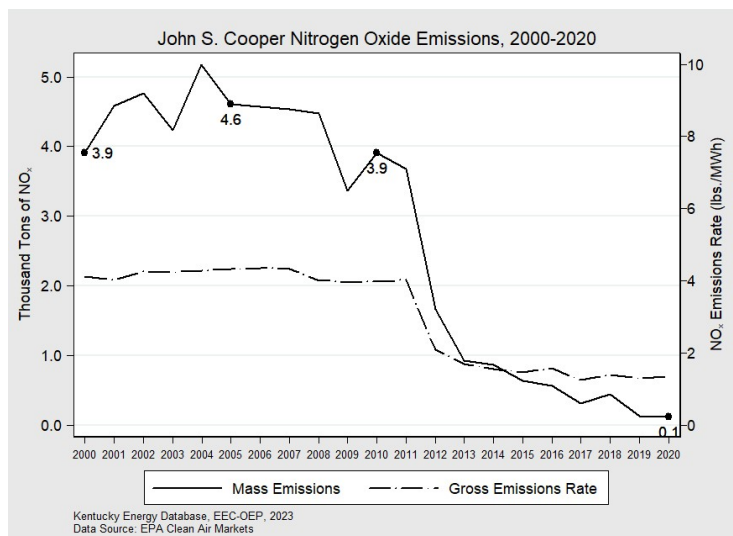
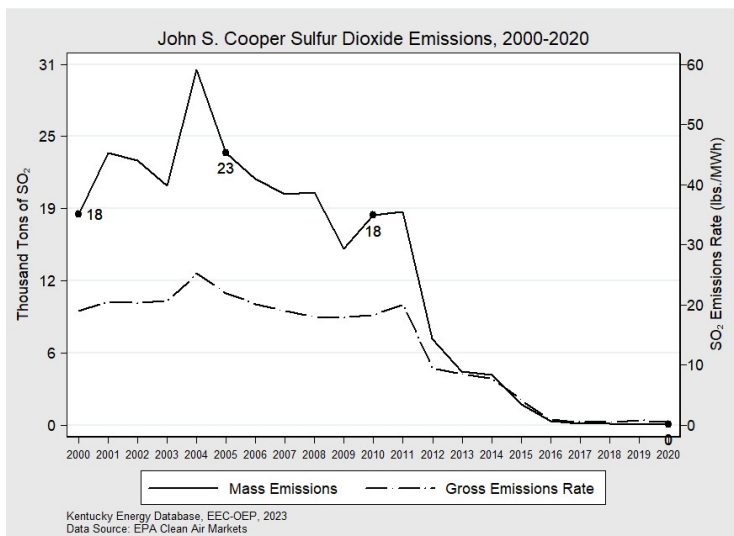
John S. Cooper Power Station



State	2020 Tons	Percentage
Total	51,772	100%
Eastern Kentucky	51,772	100%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	176,679	-90%
Rate (lbs./MWh)	2,009	+12%

The John S. Cooper Power Station emitted 177 thousand tons of CO₂ in 2020, a decrease of 90% from 2010 levels. The rate of CO₂ emissions increased by 12% during that period.



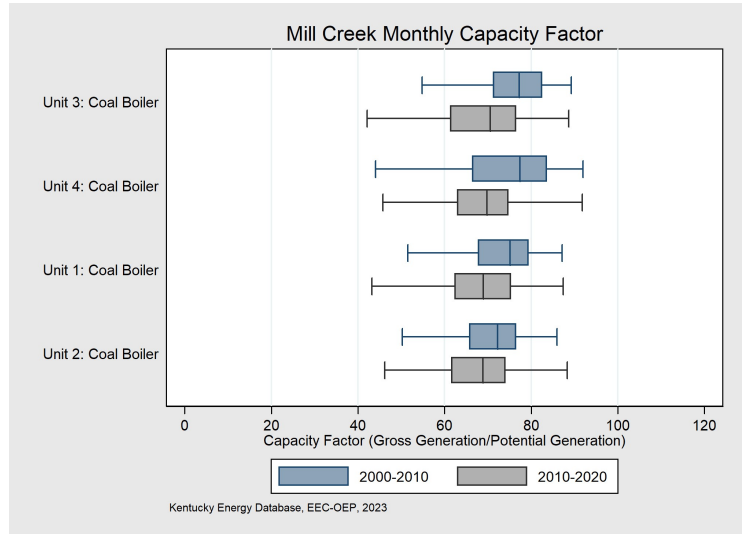
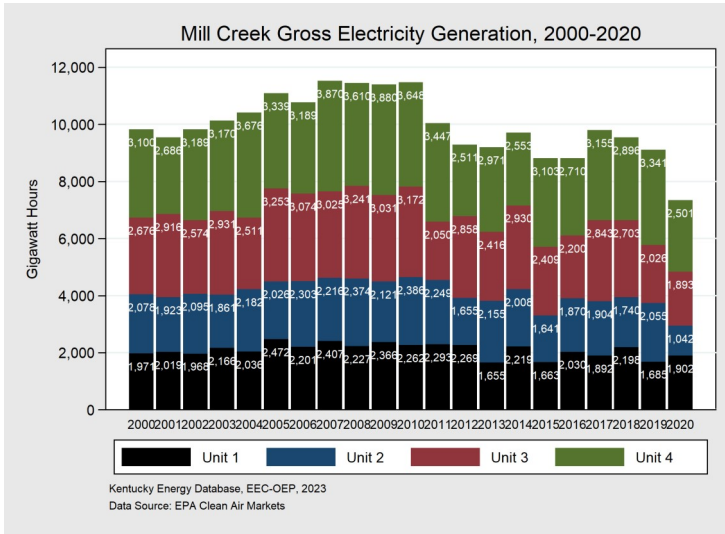
Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	47	-99%
Rate (lbs./MWh)	0.53	-97%

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	120	-97%
Rate (lbs./MWh)	1.36	-66%

The John S. Cooper Power Station emitted 47 tons of SO₂ in 2020, a decrease of 99% since 2010. The rate of SO₂ emissions reduced by 97% during that period.

The John S. Cooper Power Station emitted 120 tons of NO_x in 2020, a reduction of 97% since 2010. The rate of NO_x emissions decreased by 66% during that period.

Mill Creek Generating Station



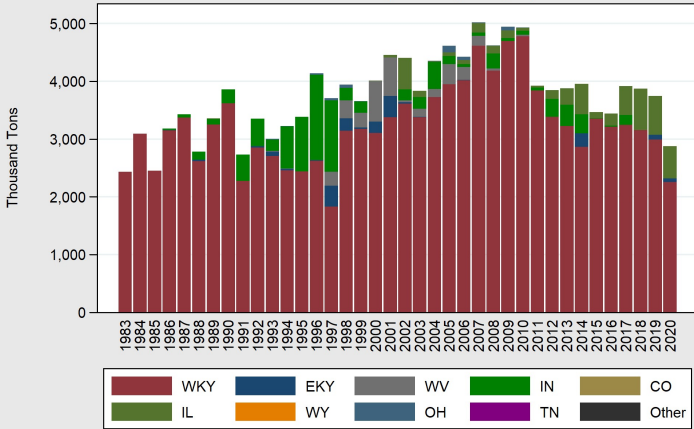
Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant	1972		Coal	1,477	72%	7,338	8,640	1,906	0.79	1.43
1	1972		Coal	300	71%	1,902	1,691	1,810	0.61	2.46
2	1974		Coal	297	69%	1,042	9,21	1,806	0.73	2.58
3	1978		Coal	391	74%	1,893	1,731	1,975	0.50	0.74
4	1982		Coal	477	72%	2,501	2,305	1,970	1.16	0.70

The Mill Creek Generating Station, located in Jefferson County, is 51 years old and consists of four coal-fired electricity generating units. The units came online in 1972, 1974, 1978, and 1982, respectively and are owned by Louisville Gas & Electric. The plant has a total nameplate capacity of 1,477 MW and is the third-largest power plant in Kentucky by capacity. In 2020, Mill Creek had a plant-wide capacity factor of 72% and generated 7.3 TWh of electricity. The majority of Mill Creek's coal came from western Kentucky in 2020.

*2020

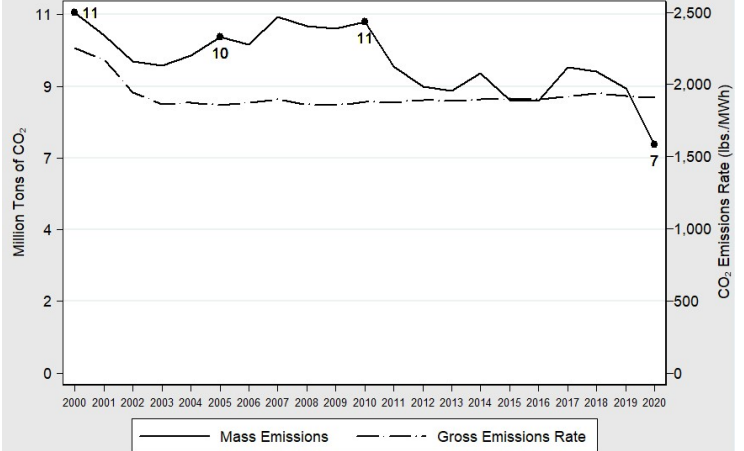
Mill Creek Generating Station

Mill Creek Coal Consumption by Origin, 1983-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: FERC-423 & EIA-923

Mill Creek Carbon Dioxide Emissions, 2000-2020



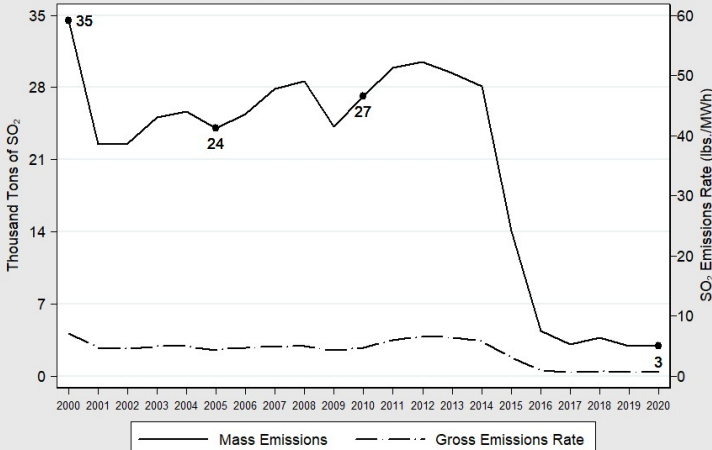
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

State	2020 Tons	Percentage
Total	2,875,945	100%
Western Kentucky	2,257,435	78.5%
Illinois	555,240	19.3%
Eastern Kentucky	63,270	2.2%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	6,995,651	-35%
Rate (lbs./MWh)	1,906	+2%

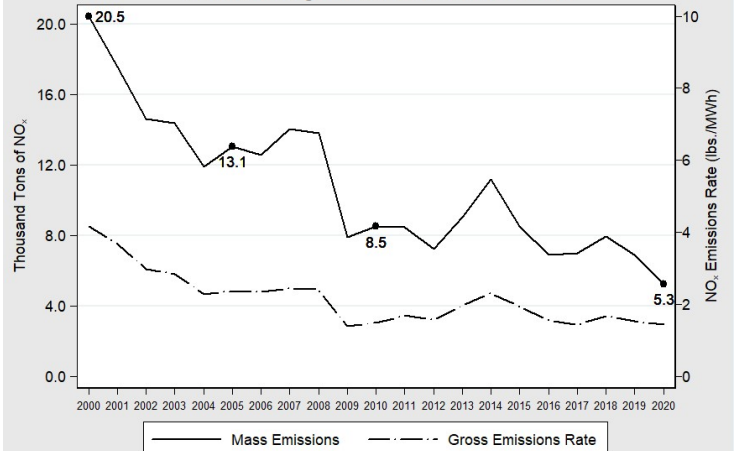
The Mill Creek Generating Station emitted 7 million tons of CO₂ in 2020, a decrease of 35% from 2010 levels. The rate of CO₂ emissions increased by 2% during that period.

Mill Creek Sulfur Dioxide Emissions, 2000-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

Mill Creek Nitrogen Oxide Emissions, 2000-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

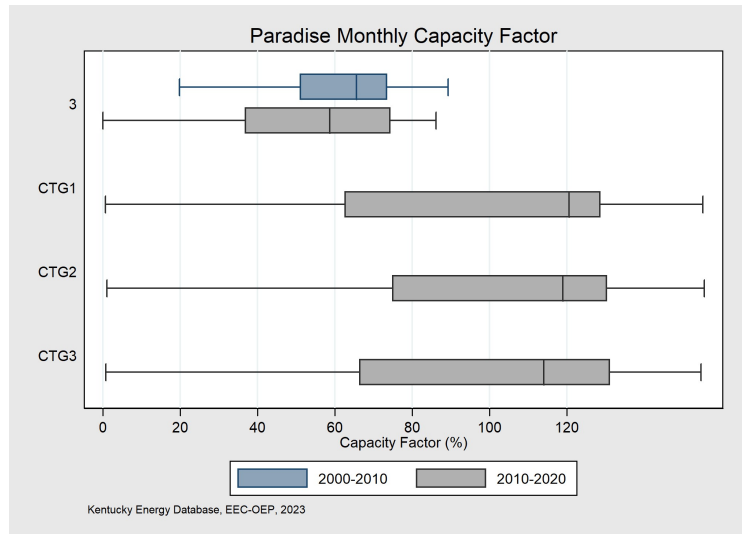
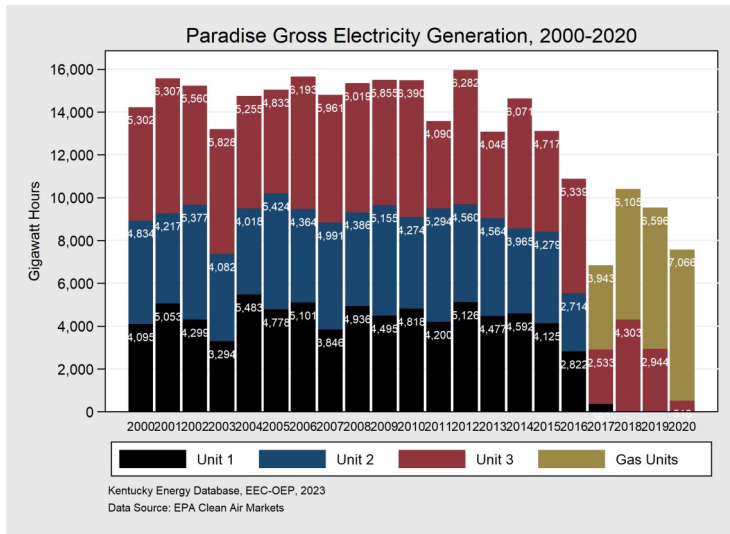
Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	2,889	-89%
Rate (lbs./MWh)	0.79	-83%

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	5,253	-38%
Rate (lbs./MWh)	1.43	-3.4%

The Mill Creek Generating Station emitted 2,889 tons of SO₂ in 2020, a decrease of 89% since 2010. The rate of SO₂ emissions reduced by 83% during that period.

The Mill Creek Generating Station emitted 5,253 tons of NO_x in 2020, a reduction of 38% since 2010. The rate of NO_x emissions decreased by 3.4% during that period.

Paradise Fossil Plant

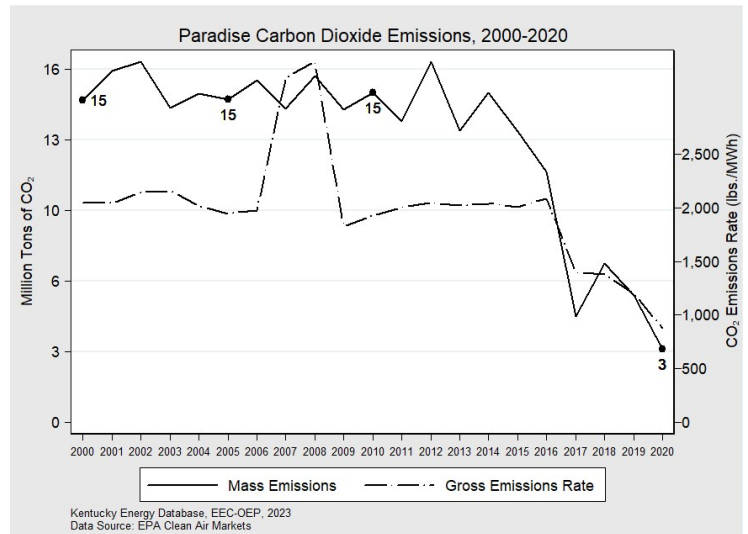
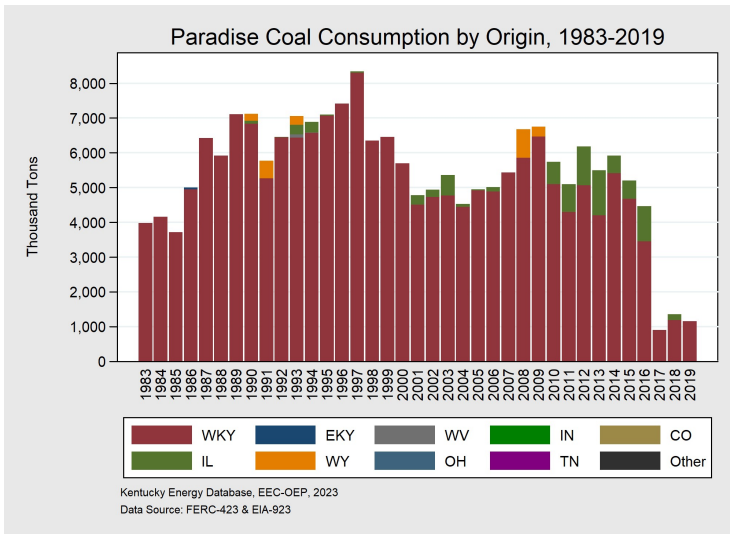


Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant	1963		Coal	1,160	105%	7,584	7,365	875	0.1	0.4
1	1963	2017	Coal	628	-	-	-	-	-	-
2	1963	2017	Coal	602	-	-	-	-	-	-
3	1970	2020	Coal	971	36%	518	457	2,013	1.47	3.27
CTG1	2017		Natural Gas	211	120%	2,343	1,474	792	0.004	0.20
CTG2	2017		Natural Gas	211	119%	2,343	1,359	788	0.004	0.18
CTG3	2017		Natural Gas	211	114%	2,380	1,494	791	0.004	0.19
STG1	2017		Natural Gas	467	-	-	2,581	-	-	-

The Paradise Fossil Plant, located in Muhlenberg County on the former site of Paradise, Kentucky, is 60 years old and consisted of three coal-fired electricity generating units. The plant is owned by the Tennessee Valley Authority and its units came online in 1963, 1963, and 1970, respectively. The plant has a total nameplate capacity of 1,160 MW. Units 1 and 2 at Paradise were retired in 2017 and unit 3 was retired in 2020. In 2017, three natural gas combined cycle combustion turbine units and one combined cycle combustion steam unit began operating.

*2020

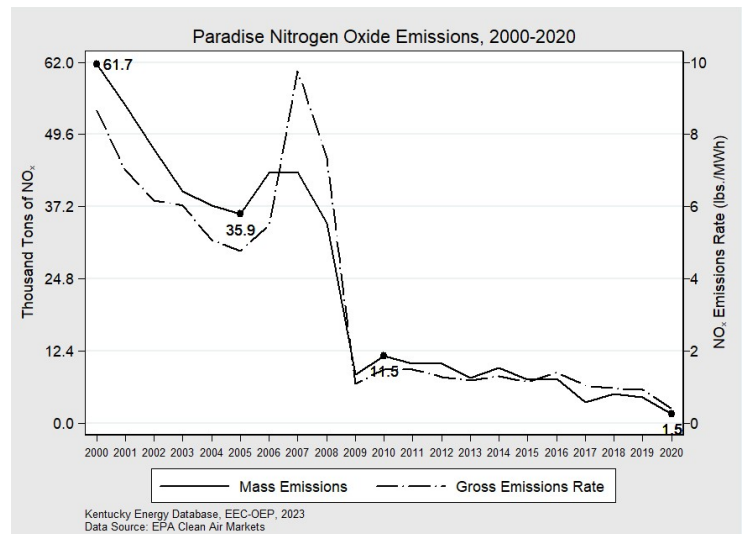
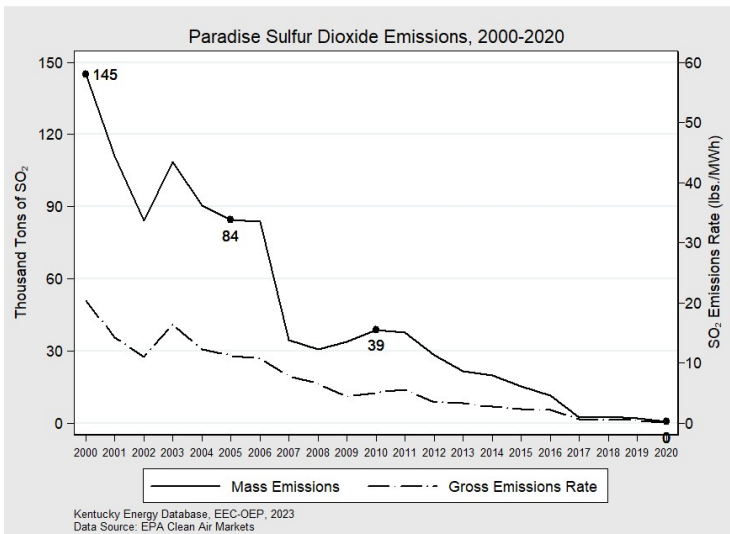
Paradise Fossil Plant



State	2019 Tons	Percentage
Total	1,158,863	100%
Western Kentucky	1,158,863	100%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	3,316,502	-78%
Rate (lbs./MWh)	875	-55%

The Paradise Fossil Plant emitted 3.3 million tons of CO₂ in 2020, a decrease of 78% from 2010 levels. The rate of CO₂ emissions decreased 55% from the year 2010.



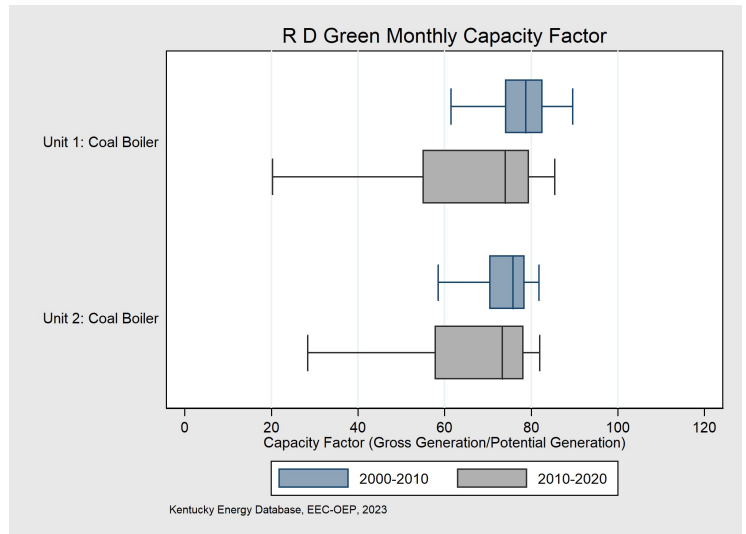
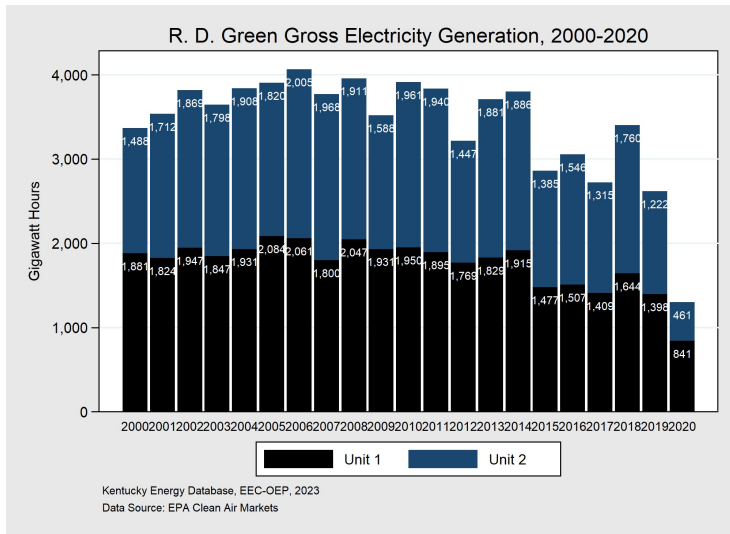
Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	395	-99%
Rate (lbs./MWh)	0.1	-98%

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	1,526	-87%
Rate (lbs./MWh)	0.4	-73%

The Paradise Fossil Plant emitted 395 tons of SO₂ in 2020, a decrease of 99% since 2010. The rate of SO₂ emissions reduced by 98% during that period.

The Paradise Fossil Plant emitted 1,526 tons of NO_x in 2020, a reduction of 87% since 2010. The rate of NO_x emissions decreased by 73% during that period.

R. D. Green Station

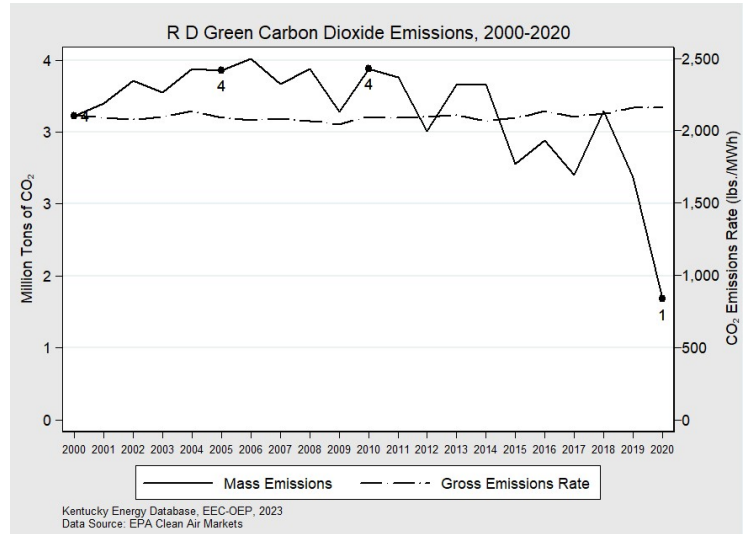
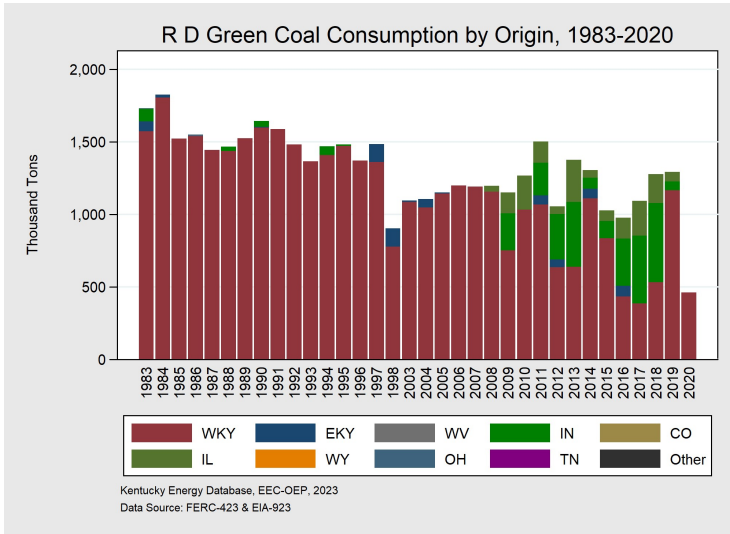


Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant	1979		Coal	586	75%	1,302	1,113	2,162	3.34	2.36
1	1979		Coal	293	76%	841	719	2,158	3.18	2.01
2	1981		Coal	293	73%	461	394	2,170	3.63	3.01

The R. D. Green Station, located in Webster County, is 44 years old and consists of two coal-fired electricity generating units. The units came online in 1979 and 1981, respectively. The plant is owned by Big Rivers Electric Corporation and has a total nameplate capacity of 586 MW. In 2020, the plant generated 1.3 TWh of electricity and had a plant-wide capacity factor of 75%. All of the plant's coal came from western Kentucky in 2020.

*2020

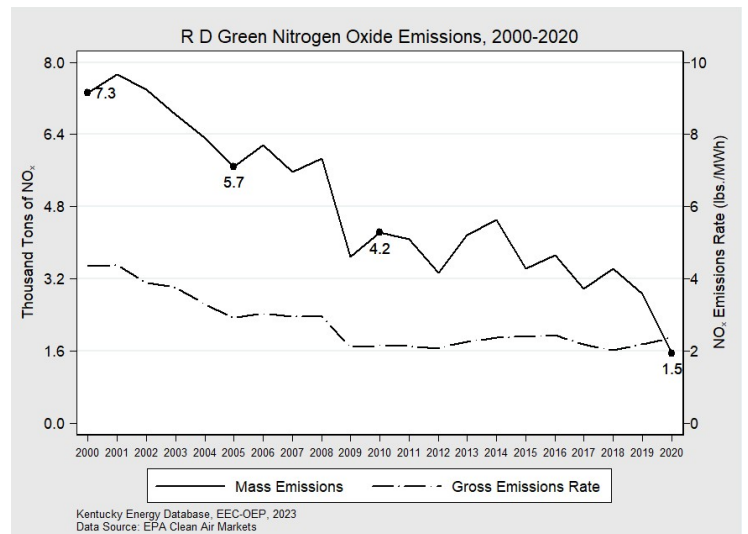
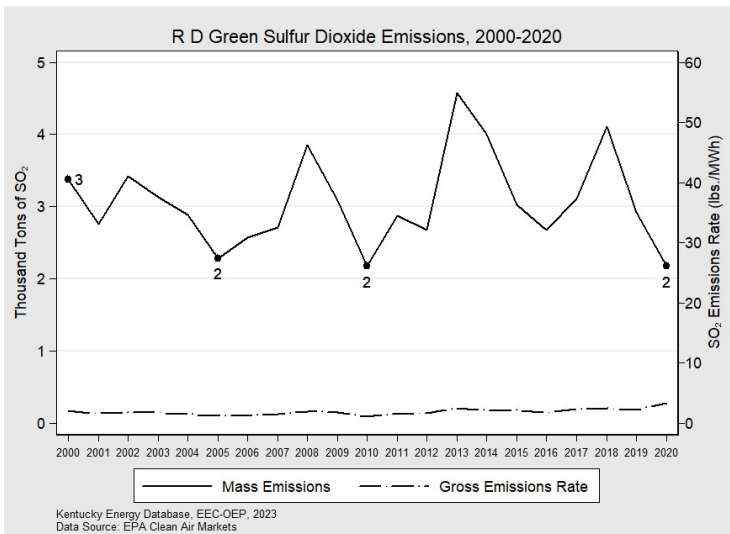
R. D. Green Station



State	2020 Tons	Percentage
Total	460,383	100%
Western Kentucky	460,383	100%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	1,407,377	-66%
Rate (lbs./MWh)	2,162	+3%

The R.D. Green Station emitted 1.4 million tons of CO₂ in 2020, a decrease of 66% from 2010 levels. The rate of CO₂ emissions increased 3% during that period.



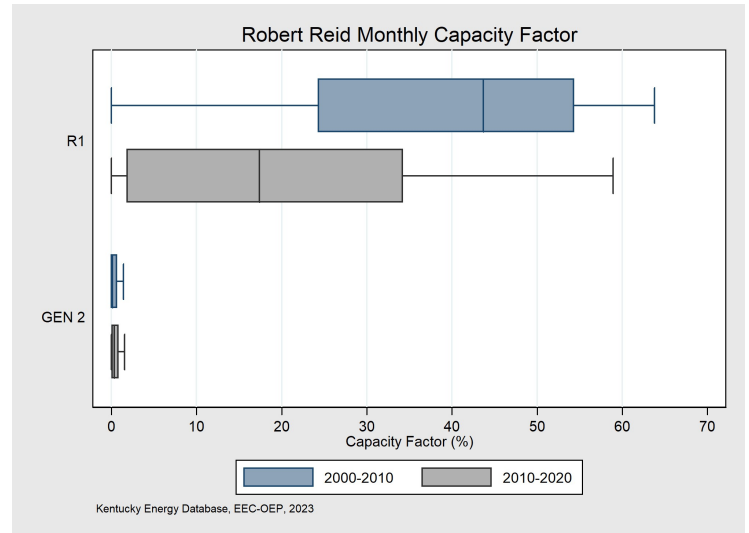
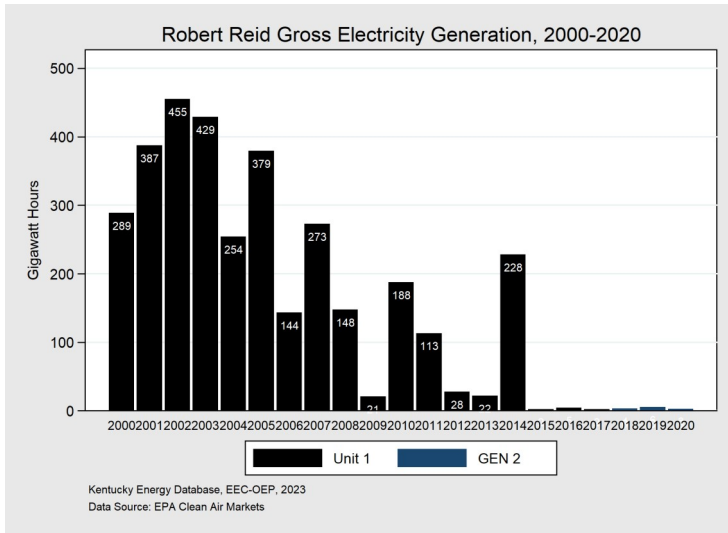
Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	2,173	+0.3%
Rate (lbs./MWh)	3.34	+201%

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	1,539	-64%
Rate (lbs./MWh)	2.36	+9.3%

The R.D. Green Station emitted 2,173 tons of SO₂ in 2020, an increase of 0.3% since 2010. The rate of SO₂ emissions increased by 201% during that period.

The R.D. Green Station emitted 1,539 tons of NO_x in 2020, a reduction of 64% since 2010. The rate of NO_x emissions increased by 9% during that period.

Robert Reid Power Plant

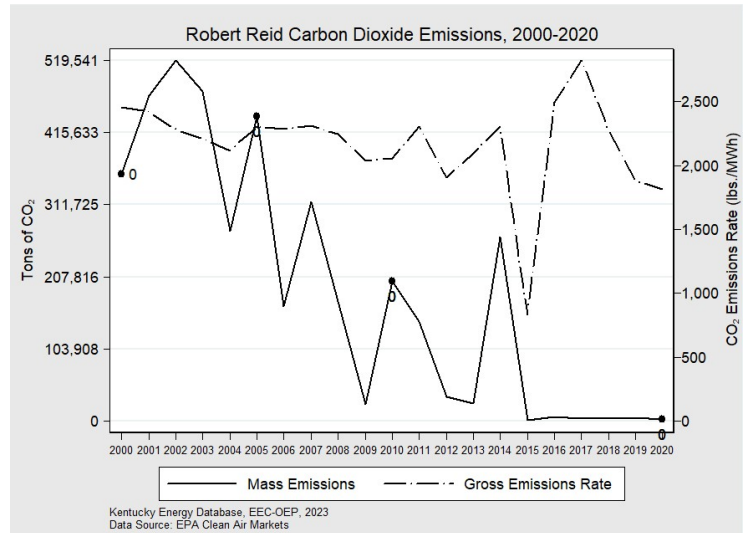
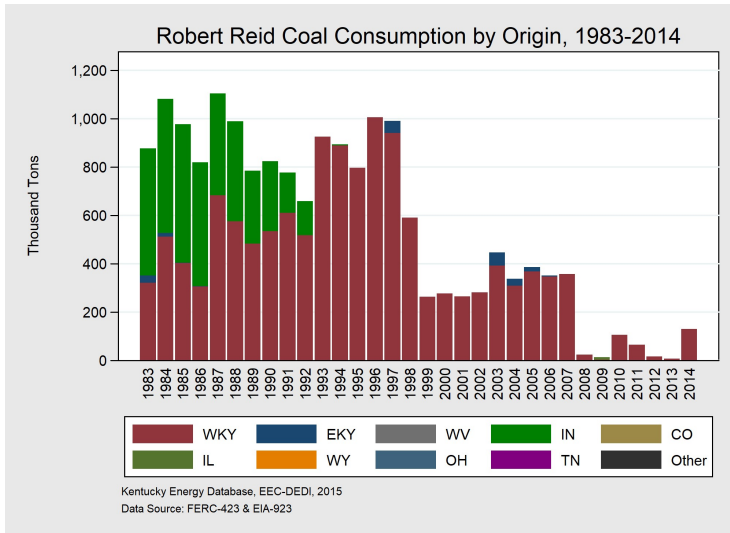


Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation*	Net Generation*	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant 1	1966	2017	Coal	99	.27%	3.1	2.8	2,327	50.37	4.72
	1966	2017	Coal	-	-	-	-	-	-	-
GEN 2	2017		Natural Gas	99	.27%	3.1	2.8	1,817	0.06	11.25

The Robert Reid Power Plant, located in Webster County, is 57 years old and consisted of one coal-fired electricity generating unit up until 2017 when it was converted to a gas turbine natural gas unit . The plant has a nameplate capacity of 99 MW, and is the original generating unit for Big Rivers Electricity Corporation. In 2020, the plant generated 3.1 GWh of electricity, down from around 188 GWh in 2010. This decline in generation is consistent with announced retirement of the coal unit in 2017. Robert Reid’s plant-wide capacity in 2020 was only .27%.

*2020

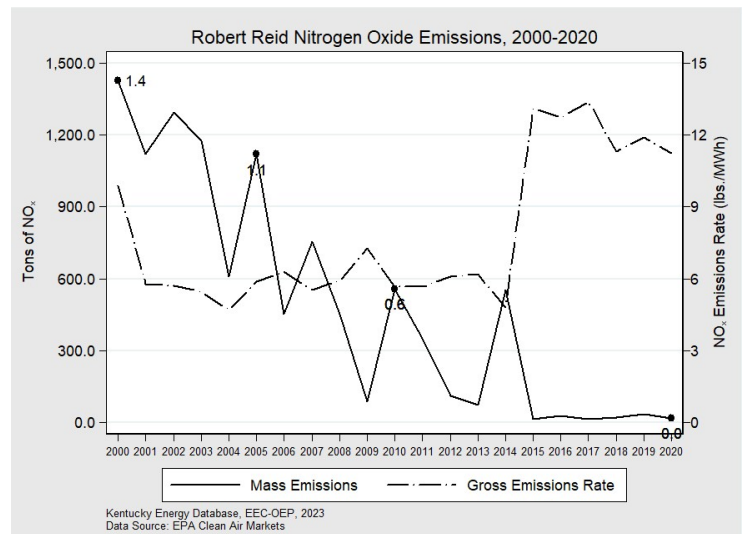
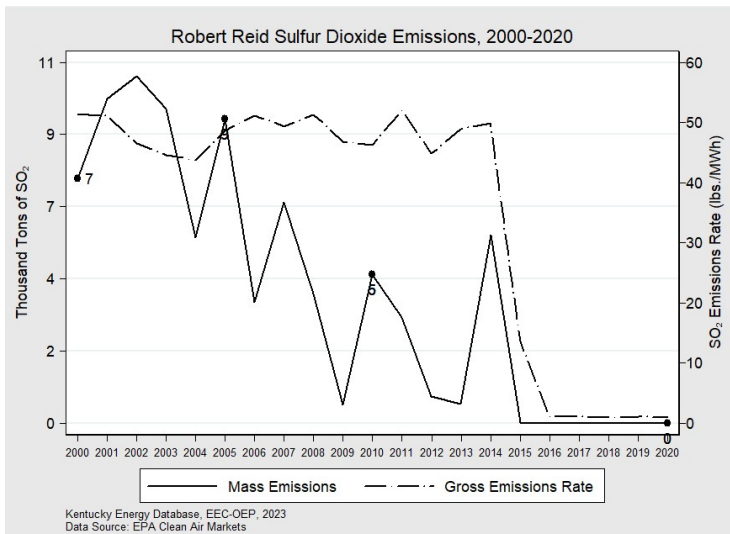
Robert Reid Power Plant



State	2014 Tons	Percentage
Total	12,643	100%
Illinois	9,664	76%
Western Kentucky	2,979	24%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	2,831	-99%
Rate (lbs./MWh)	1,817	-12%

The Robert Reid Power Plant emitted almost 3 thousand tons of CO₂ in 2020, a decrease of 99% from 2010 levels. The rate of CO₂ emissions decreased by 12% during that period, but remains the highest of operating Kentucky power plants.



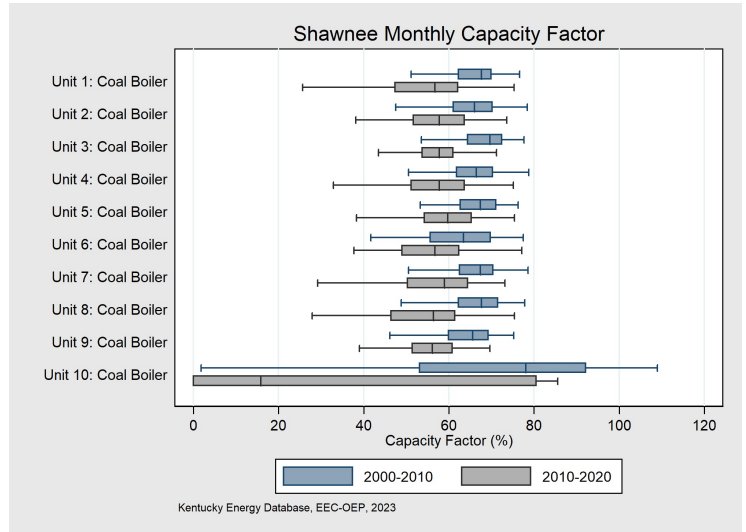
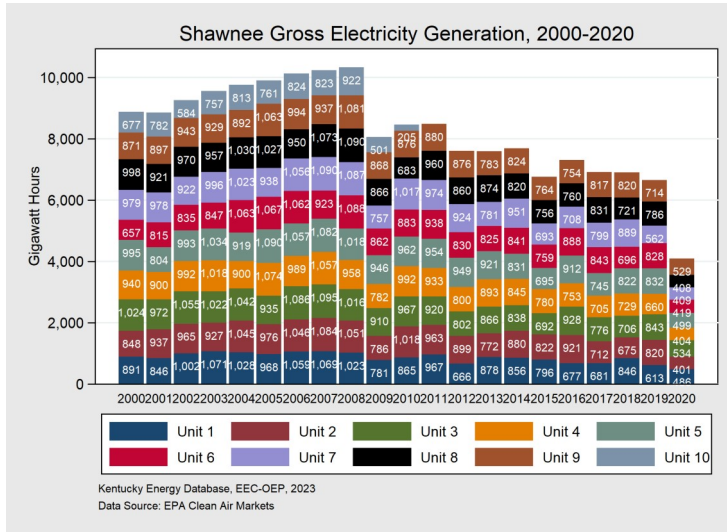
Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	1	-99%
Rate (lbs./MWh)	0.06	-99%

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	16	-97%
Rate (lbs./MWh)	11.25	+98%

The Robert Reid Power Plant emitted 1 tons of SO₂ in 2020, a decrease of 99% since 2010. The rate of SO₂ emissions reduced by 99% as well during that period.

The Robert Reid Power Plant emitted 16 tons of NO_x in 2020, a reduction of 97% since 2010. The rate of NO_x emissions increased by 98% during that period.

Shawnee Fossil Plant



Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant	1953		Coal	1,206	61%	4,089	3,660	2,302	4.41	2.25
1	1953		Coal	134	61%	486	434	2,272	3.52	1.86
2	1956		Coal	134	63%	401	352	2,274	3.61	1.86
3	1953		Coal	134	62%	534	483	2,277	3.65	1.97
4	1953		Coal	134	62%	404	363	2,268	3.48	1.79
5	1954		Coal	134	64%	499	445	2,297	3.92	2.18
6	1954		Coal	134	58%	419	375	2,341	5.49	2.69
7	1954		Coal	134	63%	409	364	2,333	5.40	2.67
8	1954		Coal	134	62%	408	366	2,340	5.47	2.68
9	1955		Coal	134	61%	529	477	2,320	5.37	2.60
10	1955	2010	Coal	124	-	-	-	-	-	-

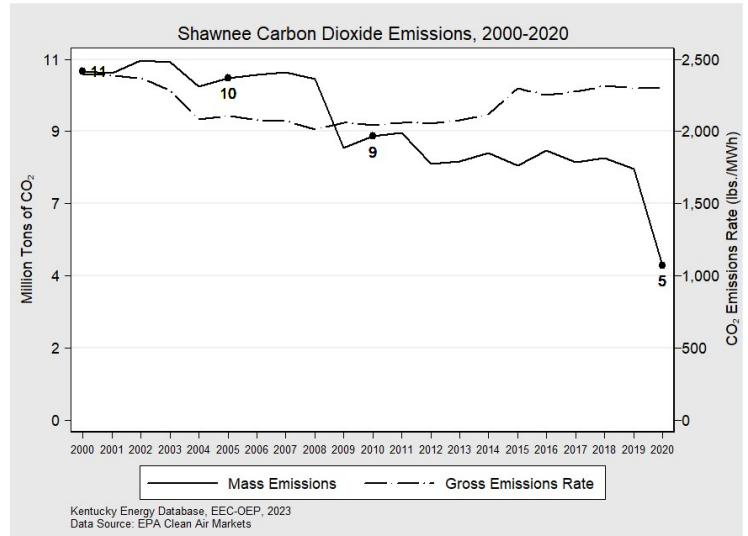
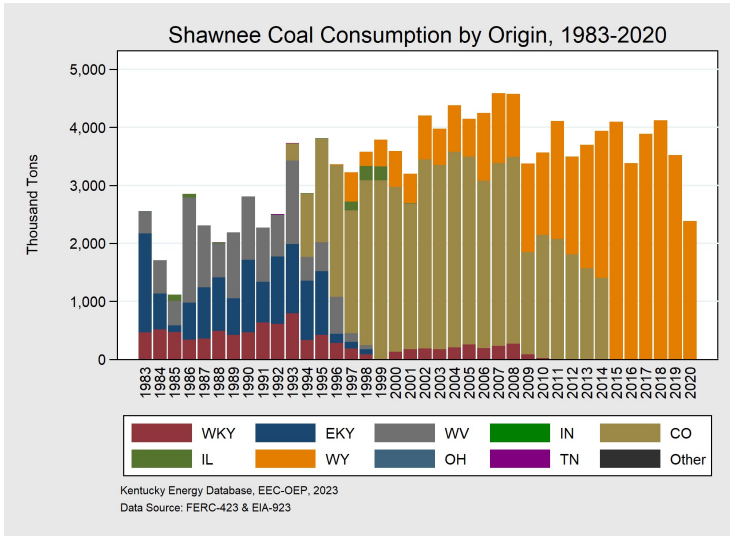
The Shawnee Fossil Plant, located in McCracken County, is 70 years old and consists of 10 coal-fired electricity generating units, though Unit 10 has not been used since August 2010. The plant is owned by the Tennessee Valley Authority and the units came online in 1953, 1954, 1955, and 1956. The plant has a total nameplate capacity of 1,206 MW of operable units. In 2020, the plant generated 4.1 TWh of electricity and had a plant-wide capacity factor of 61%.

Shawnee burned coal solely from Wyoming in 2020. Shawnee had been utilized to generate electricity for the United States Enrichment Corporation Paducah Gaseous Diffusion Plant until its closure in 2013, but now largely serves Tennessee's electricity demand.

TVA has announced that they plan to retire eight of their steam turbine units with an estimated completion data of 2033.

*2020

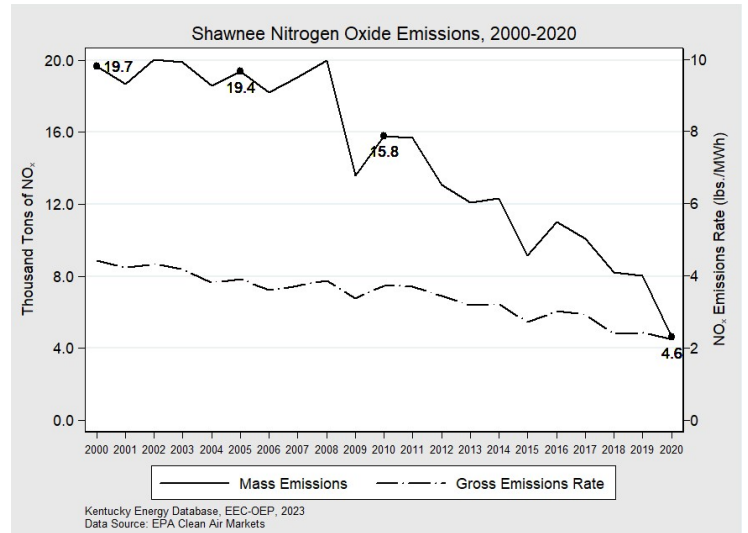
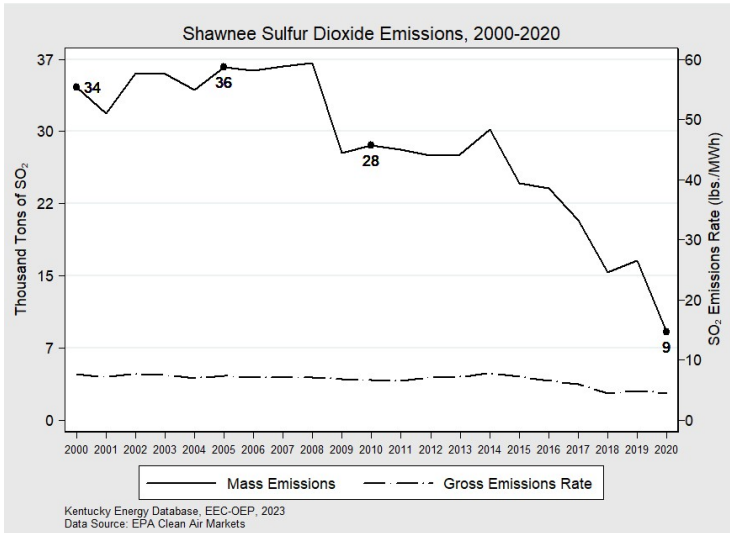
Shawnee Fossil Plant



State	2020 Tons	Percentage
Total	2,382,441	100%
Wyoming	2,382,441	100%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	4,705,547	-46%
Rate (lbs./MWh)	2,302	+13%

The Shawnee Fossil Plant emitted 4.7 million tons of CO₂ in 2020, a decrease of 46% from 2010 levels. The rate of CO₂ emissions increased by 13% during that period.



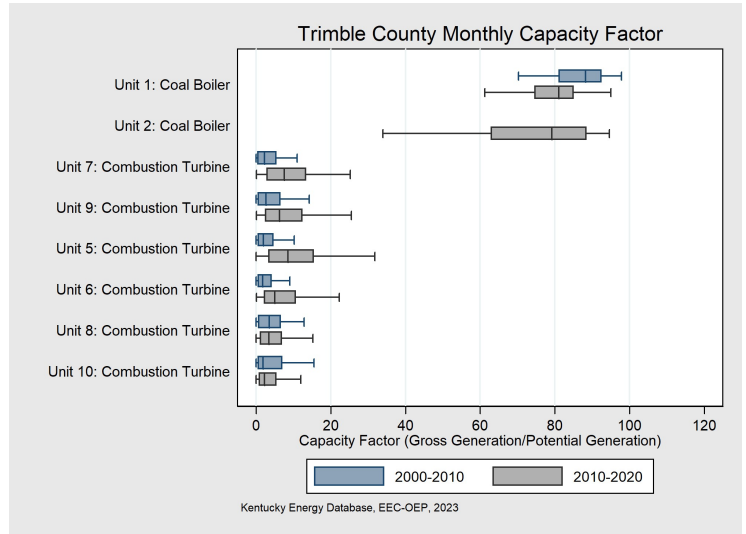
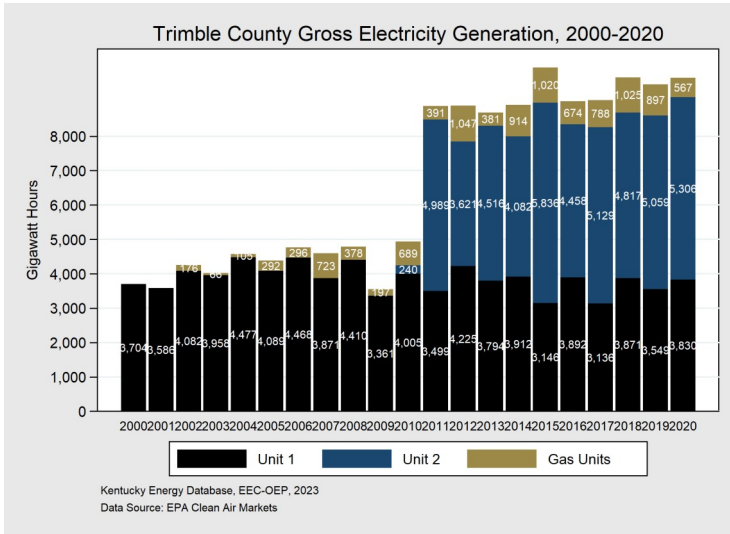
Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	9,024	-68%
Rate (lbs./MWh)	4.41	-34%

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	4,600	-71%
Rate (lbs./MWh)	2.25	-40%

The Shawnee Fossil Plant emitted 9,024 tons of SO₂ in 2020, a decrease of 68% since 2010. The rate of SO₂ emissions has decreased by 34% since 2010.

The Shawnee Fossil Plant emitted 4,600 tons of NO_x in 2020, a reduction of 71% since 2010. The rate of NO_x emissions decreased by 40% since 2010.

Trimble County Generating Station



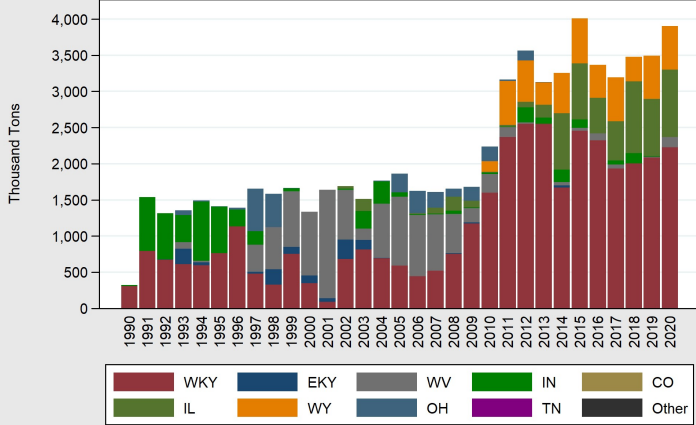
Unit Number	Online Year	Retire Year	Fuel	Capacity (MW)	Capacity Factor* (%)	Gross Generation* (GWh)	Net Generation* (GWh)	CO ₂ Rate* (lbs./MWh)	SO ₂ Rate* (lbs./MWh)	NO _x Rate* (lbs./MWh)
Plant	1990		Coal & NG	2,345	24%	9,703	8,460	1,748	0.77	0.48
1	1990		Coal	511	83%	3,830	3,508	1,786	1.00	0.72
2	2010		Coal	732	79%	5,306	4,952	1,769	0.69	0.32
5	2002		Natural Gas	159	5%	191	-	1,273	0.006	0.36
6	2002		Natural Gas	159	4%	34	-	1,317	0.007	0.36
7	2004		Natural Gas	159	6%	101	-	1,296	0.006	0.39
8	2004		Natural Gas	159	4%	79	-	1,308	0.006	0.36
9	2004		Natural Gas	159	5%	143	-	1,273	0.006	0.38
10	2004		Natural Gas	159	2%	19	-	1,274	0.006	0.36

The Trimble County Generating Station, near Bedford, consists of two coal-fired electricity generating units and six natural gas combustion turbines. The combustion turbines are used only to meet peak demand because they are more expensive to run, but are easily dispatched with electricity demand changes. The plant is 33 years old, making it the youngest coal-fired electricity generation plant in Kentucky. The coal units came online in 1990 and 2010, respectively. Trimble County Generating Station’s coal units have a total nameplate capacity of 2,345 MW. In 2020, the plant generated 9.7 TWh of electricity, 9,136 GWh from coal and 567 GWh from natural gas. The plant had a combined capacity factor of 24%. Trimble County Generating Station is owned jointly by Louisville Gas & Electric, Kentucky Utilities, Illinois Municipal Electric Agency, and Indiana Municipal Power Agency.

*2020

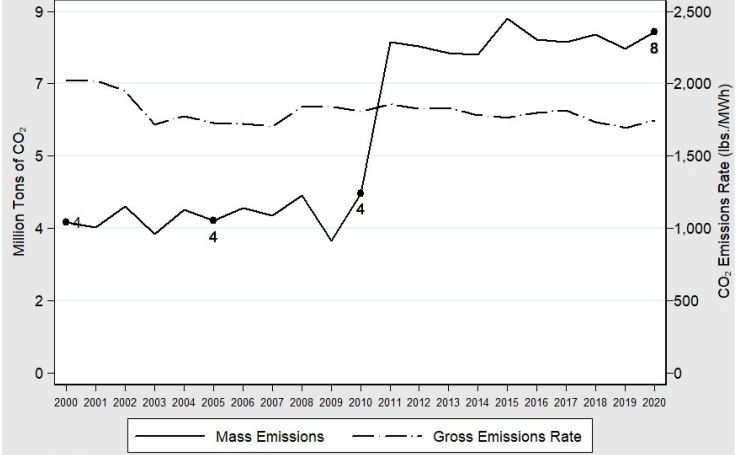
Trimble County Generating Station

Trimble County Coal Consumption by Origin, 1990-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: FERC-423 & EIA-923

Trimble County Carbon Dioxide Emissions, 2000-2020



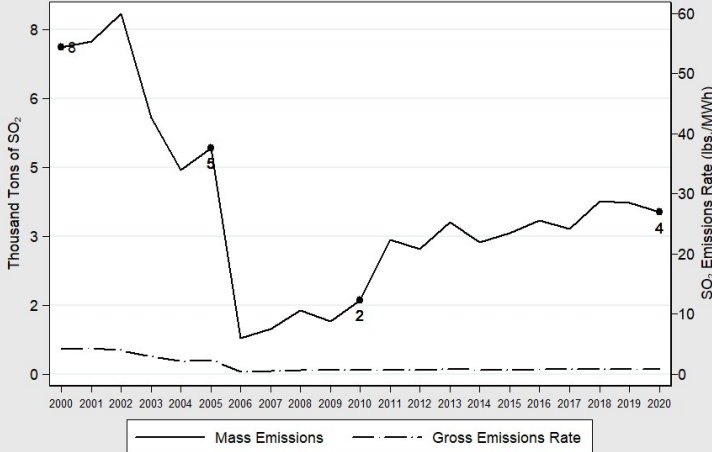
Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

State	2020 Tons	Percentage
Total	3,904,570	100%
Western Kentucky	2,228,986	57.1%
Illinois	929,450	23.8%
Wyoming	605,446	15.5%
West Virginia	140,688	3.6%

Carbon Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	8,478,734	+90%
Rate (lbs./MWh)	1,748	-3%

The Trimble County Generating Station emitted 8.5 million tons of CO₂ in 2020, an increase of 90% since 2010. However, the rate of CO₂ emissions decreased by 3% during that period as Unit 2 started in 2010.

Trimble County Sulfur Dioxide Emissions, 2000-2020

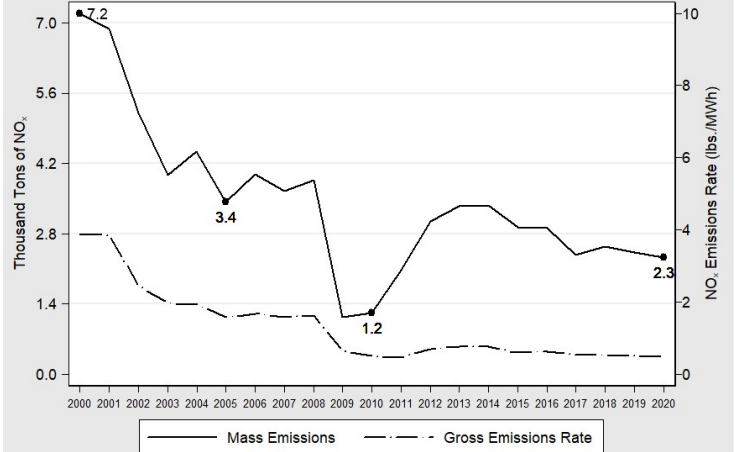


Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

Sulfur Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	3,748	+119%
Rate (lbs./MWh)	0.77	+12%

The Trimble County Generating Station emitted 3,748 tons of SO₂ in 2020, an increase of 119% since 2010. The rate of SO₂ emissions increased by 12% during that period.

Trimble County Nitrogen Oxide Emissions, 2000-2020



Kentucky Energy Database, EEC-OEP, 2023
Data Source: EPA Clean Air Markets

Nitrogen Dioxide	2020 Value	Since 2010
Emissions (Tonnage)	2,335	+92%
Rate (lbs./MWh)	0.48	-2%

The Trimble County Generating Station emitted 2,335 tons of NO_x in 2020, an increase of 92% since 2010. The rate of NO_x emissions decreased by 2% during that period.

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