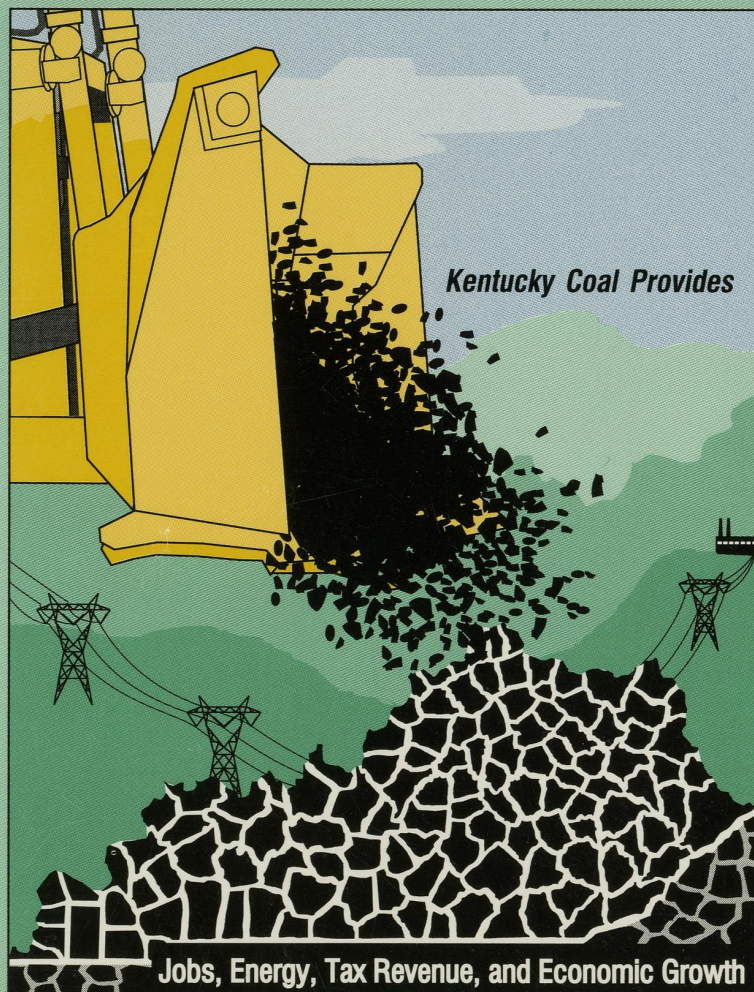


2001-2002 POCKET GUIDE

KENTUCKY COAL FACTS



Prepared by the
Kentucky Coal Council
and the
Kentucky Coal Association

Highlights

Electricity

Average electricity costs in Kentucky were 4.1 cents/kilowatt-hour in 2001, the lowest in the United States.

Production

Kentucky produced 131.8 million tons of coal in 2000, compared to the record production of 179.4 million tons set in 1990. Kentucky has been one of the top three coal producers in the United States for the last 50 years.

Employment

The Kentucky coal industry paid \$678.4 million in direct wages in 2000, directly employing 14,812 persons and indirectly providing 3 additional jobs for every miner employed. The average weekly wage for coal miners in Kentucky was \$880 during 2000.

Economy

The Kentucky coal industry brought over \$2.5 billion into Kentucky from out-of-state during Fiscal Year 2000-01 through coal sales to customers in 27 other states and 11 foreign countries. Kentucky coal companies paid \$141.2 million in coal severance taxes in Fiscal Year 2001.

Coal Markets

Electric power plants, located in 27 states, accounted for almost 79% of the Kentucky coal sold during 2000.

Approximately 80% of the coal produced in Kentucky is sold out-of-state each year.

There are 22 major coal-burning electric generating plants in Kentucky, and almost all (97%) of Kentucky's electricity is generated from coal.

Environment

All surface-mined land today is reclaimed equal to or better than it was prior to mining. Kentucky mining companies have received five national reclamation awards in 1999 thru 2001 for outstanding achievement in surface mining and received a total of 27 awards in the past 16 years.

Coal mining creates valuable lands such as wildlife habitats, gently rolling mountaintops, wetlands, and industrial sites where only steep, unproductive hillsides had once existed.

Kentucky operators have paid over \$783.97 million into the Federal Abandoned Mine Land Fund since 1978 to reclaim abandoned coal mines. Nationwide, operators have paid over \$5.82 billion into this fund. However, \$1.51 billion remains unallocated for AML reclamation.

Coal Resources

Kentucky has two distinct coal fields, one in Western Kentucky and one in Eastern Kentucky. Kentucky's 88.5 billion tons of coal resources remaining represent 84% of the original resource.

Teacher Resources

Coal education resource materials are now available to teachers and students on the Internet at the web site www.coaleducation.org. Additionally, a coal education multimedia library kit with interactive learning tools is now available in every public elementary, middle school, and county library in Kentucky.

December 2001. This publication is for informational use only. It includes some extrapolative second and third party data as well as some broad estimates, and should not necessarily be construed as official source data or be construed as advocating or reflecting any policy position of the Kentucky Coal Council or the Kentucky Coal Association.

Changes and Trends

Three centuries after it was discovered in America, coal is still providing power for the nation. As we begin a new century, coal faces many challenges to its premier status, but its importance can never be questioned. The fuel that enabled the United States to become the wealthiest industrialized nation in the world is still responsible for over half the nation's electrical power.

Coal provides 51.8% of the electricity in this country, and in Kentucky 97% of our electricity comes from coal. (see page 47)

Average electricity costs in Kentucky were 4.1 cents per kilowatt-hour during 2001, the lowest in the United States. Kentucky's electric rates were 12% below the regional average and 23% below the national average in 2000. **These low rates are largely due to our reliance on coal-fired generation**, sold at cost-based rates, as well as sound utility management and excellent public policy.

What Changes are Occurring?

Kentucky's share of the steam coal market to U.S. electric utilities declined from 23.5% of the market in 1975 to 11.7% in 2000. (see page 46)

As Kentucky coal companies consolidated into a globally competitive industry the number of mines decreased. The number of mines currently in Kentucky is down to almost one-fifth of the 2,063 mines which existed in 1984. (see page 8)

The amount of sulfur dioxide emitted from burning coal in Kentucky has been reduced by more than one-half since 1976. (see page 28)

Post-mining land use changes are providing long term economic, social, and environmental benefits to Kentucky, and the benefits are increasing. (see pages 30 and 31)

Is there a Trend?

Kentucky ships over 2.6 times as much coal to its neighboring states as it receives from them, but Kentucky's positive coal flow ratio has been cut in half since 1990. (see page 26)

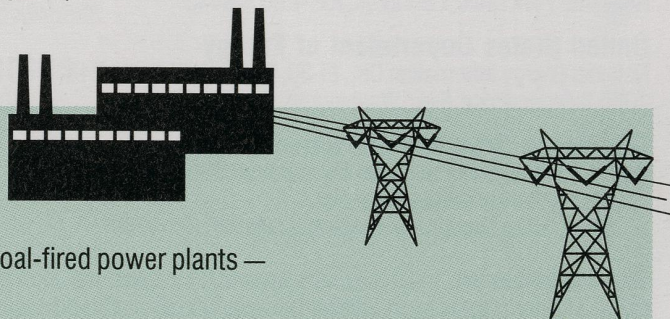
Natural gas costs to U.S. electric utilities in 1993, 1998, and again in 1999 increased higher than petroleum, while coal costs continued to decrease. (see page 43)

Underground mining in Kentucky continues to show steady safety improvements. (see page 12)

Over \$2.5 billion continues to be brought into Kentucky each year from coal sales to 27 other states and 11 foreign countries. (see page 17)

The number of successful mining reclamation bond releases in Kentucky continues to grow each year. (see page 29)

On the Horizon?



Kentucky permits two coal-fired power plants — the first in 20 years.

Cover: The cover depicts a new coal-fired power plant on a reclaimed mountaintop surface mine. New plants are now cleaner burning and can co-fire waste coal, waste products, natural gas, or biomass with the coal. Some have new clean coal technology fuel cells.

Source: See individual reference pages as listed.

References

Governor's Office

700 Capitol Ave., State Capitol Building, Frankfort, KY 40601

Phone: 502/564-2611

Fax: 502/564-2517

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1024 Capital Center Drive, Ste. 340, Frankfort, KY 40601-8204

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Department of Mines and Minerals

P.O. Box 2244, 1025 Capital Ctr. Dr., Ste. 201, Frankfort, KY 40601

Phone: 502/573-0140

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Kentucky Geological Survey

228 Mining & Mineral Resources Bldg., Lexington, KY 40506-0107

Phone: 859/257-5500

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700 Capitol Ave., Capitol Bldg., Rm. 300, Frankfort, KY 40601

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Natural Resources and Environmental Protection Cabinet

Capital Plaza Tower, 5th Floor, Frankfort, KY 40601

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Revenue Cabinet

Department of Tax Administration

Division of Compliance and Tax Payer Assistance

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Fax: 502/564-2906

Department of Property Valuation

Division of Technical Support, Mineral Valuation Section

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Transportation Cabinet

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Phone: 502/564-7183

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UK - Center for Applied Energy Research

Research Park Drive, Lexington, KY 40511-8433

Phone: 859/257-0305

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United States Department of Energy

National Energy Information Ctr., EI-30, Forrestal Bldg., IE-248

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Phone: 202/586-8800

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Workforce Development Cabinet

Dept. for Employment Services, Research and Statistics Branch

Employment and Wages Section

275 E. Main Street, CHR Building, Frankfort, KY 40621

Phone: 502/564-7976

Fax: 502/564-2937

Web site addresses: most reference sources have a web site address listed at the bottom of each page. Additional data can be obtained at these web sites. All addresses are world wide web (www), except as otherwise noted (i.e., ftp://ftp.), and the (http://) is implied on each address although not listed due to space limitations.

Example - [<http://www.coaleducation.org>]

Acknowledgment

Tears Francis, Desktop Publishing

Krina Fry, Graphic Designer

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History of Coal

- 1701 Coal discovered in Virginia.
- 1748 First recorded U.S. coal production.**
- 1750 April 13th - Dr. Thomas Walker was the first recorded person to discover and use coal in Kentucky.
- 1755 Lewis Evan's map showing coal in what is now the Greenup County and Boyd County area of Kentucky.
- 1758 First commercial U.S. coal shipment.
- 1792 Issac Shelby becomes the first Governor of Kentucky (1792-1796).**
- 1820 First commercial mine, known as the "McLean drift bank" opened in Kentucky, near the Green River and Paradise in Muhlenberg County. 328 short tons mined and sold in Kentucky.
- 1830 2,000 tons of Kentucky production.
- 1837 10,000 tons of Kentucky production.
- 1843 100,000 tons of Kentucky production.**
- 1850 150,000 tons of Kentucky production.
Lexington and Big Sandy Railroad proposed.
Kentucky Geological Survey established.
- 1860 Pre-Civil War Kentucky production record of 285,760 tons.
- 1861 Kentucky-born Abraham Lincoln becomes the 16th President of the United States (1861-65).**
- 1866 Surface mining begins near Danville, Illinois.
- 1870 Post-Civil War Kentucky production decline to 150,582 tons.
St. Louis & Southern Railroad completed from Henderson to Earlinton, Ky.
- 1872 First train off the Big Sandy Railroad.
- 1877 Coal mined with steam-powered shovel.
- 1879 One million tons of Kentucky production.**
- 1880 Mechanical stokers introduced.
First coke ovens in west Kentucky.
Mine Ventilation Law.
First train from Williamson, West Virginia to Pike County, Kentucky.
Coal mining machines come into general use.
- 1890 N&W Railroad's first mine at Goody in Pike County.
Hopkins County in west Kentucky leading coal producer in the state for 18 straight years.
Miner Pay Law.
United Mine Workers of America formed.
Machines developed to undercut coalbeds.
5,000 kilowatt steam turbine generates electricity.
- 1900 Child Labor Law.
Edgewater Coal Company's first production in Pike County.
First train off the Lexington and Eastern Railroad.
Independent Geological Survey established.
- 1910 First train from the Cumberland Valley Railroad.
Fordson Coal Company's first production at Pond Creek.
Pike-Floyd Coal Company's first production at Betsy Layne.
- 1914 World War I increases demand for coal; Kentucky production 20.3 million tons.**
Short-flame or "permissible" explosives developed.
Mine Safety Law.
- 1918 First pulverized coal firing in electric power plants.
- 1920 Federal Mineral Leasing Act.
42.1 million tons of Kentucky production.
- 1923 All-time high U.S. employment of 704,793 bituminous coal and lignite miners.
First dragline excavators built especially for surface mining.
- 1929 Stock market crashes beginning the Great Depression.
- 1932 Walking dragline excavators developed.
- 1936 47.7 million tons of Kentucky production .
- 1940 World War II - coal production in Kentucky rises to 72.4 million tons for the war effort.**

History of Coal

- 1940 Auger surface mining introduced.
- 1942 Republic Steel Company's first production at Road Creek, Kentucky.
Post-War Marshall Plan - production rises to 88.7 million tons in Kentucky.
Continuous underground mining systems developed.
Kentucky Water Contamination Legislation.
- 1947 Kentucky Coal Association founded.**
- 1950 82.2 million tons of Kentucky production.**
- 1956 Fish and Wildlife Coordination Act.
Railroads converting from coal to diesel fuel.
Roof bolting introduced in underground mines.
- 1960 Railroads began using unit coal trains.
First longwall mining with powered roof supports.
Kentucky Surface Mining Legislation.
- 1963 Kentucky coal production exceeded 100 million tons.**
- 1966 National Historic Preservation Act.
C&O Railroad to John's Creek constructed in Pike County.
- 1969 Federal Coal Mine Health and Safety Act.
- 1970 Federal Clean Air Act.
- 1972 Kentucky Coal Severance Tax established.
Federal Water Pollution Control Act.
Kentucky becomes the leading coal production state.
- 1973 Endangered Species Act.
OPEC oil embargo: Coal production and prices rise.
- 1976 Federal Coal Leasing Amendments Act.
- 1977 Federal Surface Mine Control and Reclamation Act.
- 1980 Congress enacts the National Acid Precipitation Assessment Program (NAPAP) Study, a 10 year research program.
- 1983 OPEC cuts oil prices for first time.**
Martha Layne Collins becomes Kentucky's first woman governor (1983-87).
U.S. Clean Coal Technology Demonstration Program established.
- 1988 Kentucky Supreme Court rules that the unmined minerals tax on coal is subject to the same state and local property tax rates as other real estate.
TVA 160-MW Atmospheric Fluidized Bed Combustion Unit on line.
Wyoming displaces Kentucky as the leading coal producing state.
- 1990 Federal Clean Air Act Amendments of 1990.
Kentucky record production - 179.4 million tons.
U.S. coal production exceeds 1 billion tons.
- 1992 U.S. Energy Policy Act of 1992.
- 1993 CEDAR, Inc. (Coal Education Development & Resources) formed in Pike County.
- 1994 Western Kentucky CEDAR, Inc. formed in Webster and Union counties.
- 1996 Federal Energy Regulatory Commission (FERC) issues Order 888, addressing the issues of open access to encourage wholesale competition in the electric utility industry and FERC Order 889, requiring utilities to share information about available transmission capacity.
- 1996 Workers' Comp Reform Laws passed in Kentucky.
- 1997 The Kentucky Fish and Wildlife Commission re-introduced free ranging elk into East Kentucky on post-mined lands.
- 1997 Kentucky Coal Association celebrates 50 years of service.**
- 1998 Mountaintop mining comes under attack.
- 1998 Federal synthetic fuel tax credit for use of coal fines begins.
- 2001 Natural gas prices increase over 50% in one year.
Electricity shortages result in rolling blackouts in California.
Kentucky permits two coal-fired electric power plants, first in 20 years.
September 11, 2001 - America is attacked.
AMERICA'S SECURE FUEL FOR ELECTRIC ENERGY — COAL

Sources: Energy Information Administration, *Coal Data: A Reference*, 1989, Kentucky Department of Mines and Minerals, *Annual Reports*, and Willard Rouse Jillson, *Coal Industry in Kentucky*, 1922.

Types of Mining

Kentucky has two distinct coal fields, each containing numerous deposits of bituminous coal of various characteristics and mines of every type and size. By the use of large draglines and shovels, the excavation of two or more coal seam deposits (multi-seam mining) is possible in the large area surface mines of the gently rolling **Western Kentucky** coal field and in the large mountaintop removal mines in the steeper terrain of the **Eastern Kentucky** coal field. Both the Eastern and Western Kentucky coal fields have large, modern, and efficient underground mines (of various entry types) utilizing improved mining methods with increased mechanization including continuous miners, longwall mining panels, or both.

Of Kentucky's 130.7* million tons of 2000 coal production, 80.2 million tons were produced by underground mining methods and 50.5 million tons were produced by surface mining methods.

***NOTE:** This is the official U.S. DOE number for Kentucky. State and Federal numbers will differ. Please see page 8 for details.

A breakdown of the different types of surface and underground mining methods used in Kentucky is as follows:

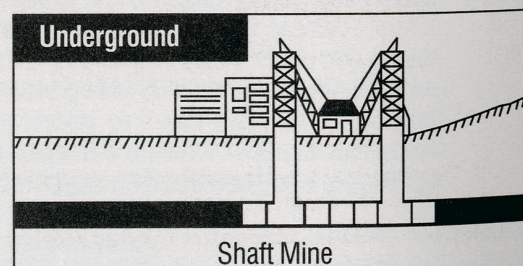
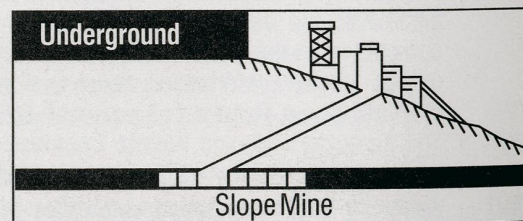
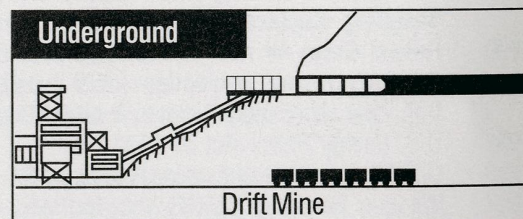
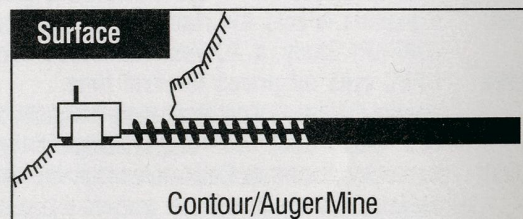
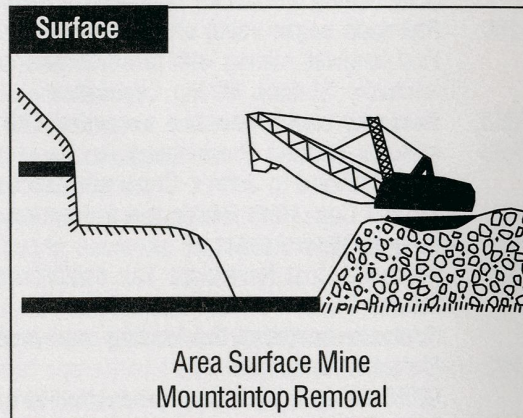
2000 Mining Type Estimates

Mine Type	No. of Mines	Production (million tons)
Surface	162	50.5
Surface Only*	-	12.6
Surface & Auger*	-	36.3
Auger Mining*	-	1.6
Underground	246	80.2
Continuous**	-	68.3
Conventional**	-	1.7
Longwall**	-	10.0
Other**	-	0.2
State Totals	408	130.7

***NOTE:** Surface mining type estimates are based upon Kentucky Department of Mines and Minerals' License data.

****NOTE:** Underground mine type and production estimates are determined by the U.S. DOE-EIA when mines produce greater than 50 percent of their output by one of the underground mine types listed above.

Sources: Kentucky Department of Mines and Minerals, *Annual Report*, 2000. U.S. DOE - EIA, *Coal Industry Annual*, 2000.



Source: U.S. DOE - EIA *Coal Data: A Reference*, 1989.

U.S. Coal Production

KY and U.S. Coal Production* 1970-2000 (millions of tons)

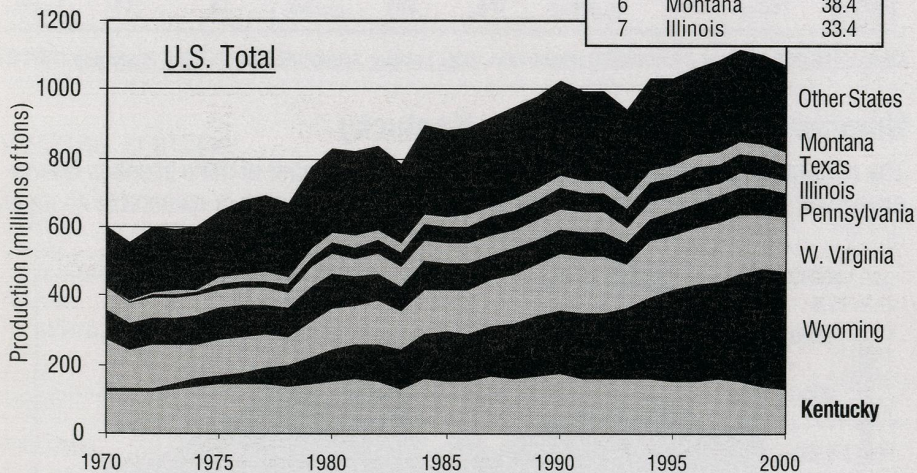
Year	Kentucky			United States	Kentucky as % of U.S.
	Eastern	Western	Total		
1970	72.5	52.8	125.3	602.9	20.8
1971	71.6	47.8	119.4	552.2	21.6
1972	68.9	52.3	121.2	595.4	20.4
1973	74.0	53.7	127.6	591.7	21.6
1974	85.4	51.8	137.2	603.4	22.7
1975	87.3	56.4	143.6	648.4	22.1
1976	91.1	52.8	144.0	678.7	21.2
1977	94.0	52.3	146.3	691.3	21.2
1978	96.2	39.5	135.7	665.1	20.4
1979	104.1	42.5	146.5	777.9	18.8
1980	109.2	41.0	150.1	829.7	18.1
1981	117.9	39.7	157.6	823.8	19.1
1982	111.2	39.0	150.2	838.1	17.9
1983	95.6	35.6	131.2	782.1	16.8
1984	117.3	42.3	159.5	895.9	17.8
1985	113.3	39.0	152.3	883.6	17.2
1986	112.7	41.2	153.9	890.3	17.3
1987	119.9	45.3	165.2	918.8	18.0
1988	117.5	40.3	157.9	950.3	16.6
1989	125.7	41.6	167.4	980.7	17.1
1990	128.4	44.9	173.3	1,029.1	16.8
1991	117.2	41.8	159.0	996.0	16.0
1992	119.4	41.7	161.1	997.5	16.2
1993	120.2	36.1	156.3	945.4	16.5
1994	124.4	37.2	161.6	1,033.5	15.6
1995	118.5	35.2	153.7	1,033.0	14.9
1996	117.0	35.5	152.4	1,063.9	14.3
1997	120.9	34.9	155.9	1,089.9	14.3
1998	116.7	33.6	150.3	1,118.1	13.4
1999	110.0	29.6	139.6	1,100.4	12.7
2000	105.0	25.8	130.7	1,073.6	12.2

*NOTE: This is the official U.S. DOE number for Kentucky. State and Federal numbers will differ. Please see page 8 for details.

U.S. Leading Coal Producers**

Kentucky ranked third in the United States in coal production during 2000.

2000*** Rank	State	Millions of Tons
1	Wyoming	338.9
2	West Virginia	158.3
3	Kentucky	130.7
4	Pennsylvania	74.6
5	Texas	49.5
6	Montana	38.4
7	Illinois	33.4



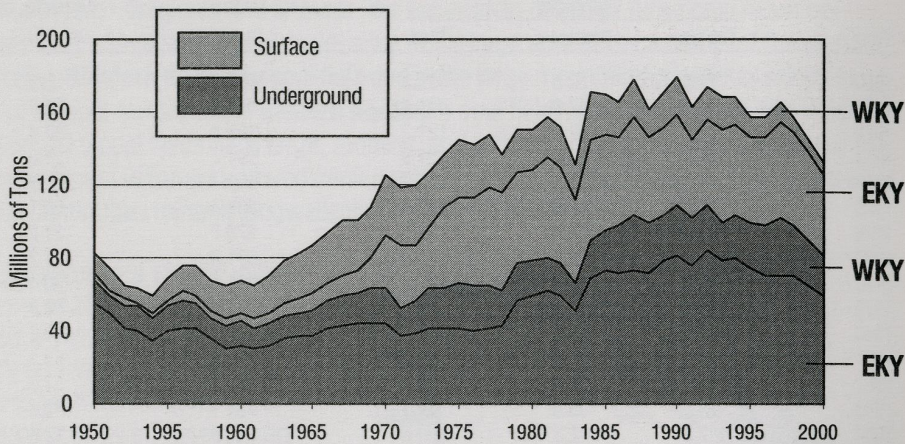
**NOTE: Wyoming, Texas, and Montana were not among the top seven coal producers in 1970, but are included to show their rise to be among the leading coal-producing states.

***NOTE: See page 34, U.S. Comparisons - Production.

Sources: U.S. DOE - Energy Information Administration; *Coal Industry Annual*, 1993-2000, *Coal Production*, 1977-1992. U.S. Bureau of Mines, *Minerals Yearbook*, 1970-1976.

Kentucky Production

Kentucky produced 131.8* million tons of bituminous coal in 2000, down from the record of 179.4 million tons set in 1990.



*NOTE: State production numbers differ slightly from yearly federal U.S. DOE - Energy Information Administration (EIA) production numbers, due to minor differences in their methodology (i.e., clean coal versus raw). Please note whether Federal or State numbers are referenced when using a value.

Source: Kentucky Department of Mines and Minerals, Annual Reports, 1950-2000.

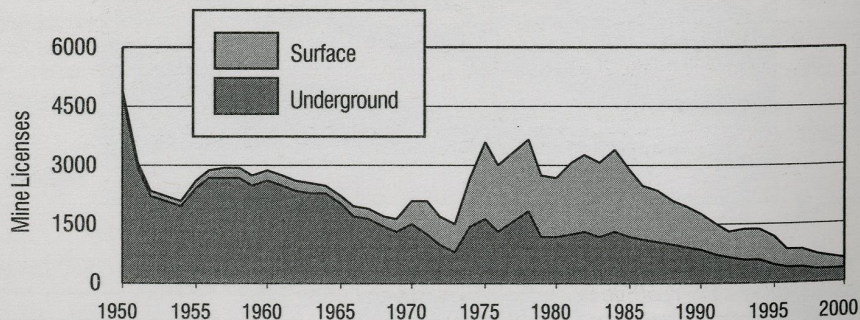
Number of Mines, 1984-2000

Year	Kentucky			Eastern Kentucky			Western Kentucky		
	Surface	Underground	Total	Surface	Underground	Total	Surface	Underground	Total
1984	1,137	926	2,063	1,026	900	1,926	111	26	137
1985	937	921	1,858	836	897	1,733	101	24	125
1986	723	830	1,553	633	802	1,435	90	28	118
1987	612	816	1,428	532	791	1,323	80	25	105
1988	492	738	1,230	426	714	1,140	66	24	90
1989	429	670	1,099	358	644	1,002	71	26	97
1990	360	627	987	301	601	902	59	26	85
1991	296	542	838	243	513	756	53	29	82
1992	270	482	752	225	459	684	45	23	68
1993	250	446	696	197	425	622	53	21	74
1994	248	425	673	206	401	607	42	24	66
1995	237	361	598	201	339	540	36	22	58
1996	237	307	544	197	287	484	40	20	60
1997	221	308	529	193	289	482	28	19	47
1998	205	277	482	186	259	445	19	18	37
1999	198	260	458	178	243	421	20	17	37
2000	162	246	408	148	234	382	14	12	26

Source: U.S.DOE - Energy Information Administration, Coal Industry Annual 1993-2000, Coal Production 1984-92.

Number of Mine Licenses in Kentucky

The number of actual mines is smaller than the final number of mine licenses issued each year. A new license is required when the company name or ownership changes.



Source: Kentucky Department of Mines and Minerals, Annual Reports, 1950-2000.

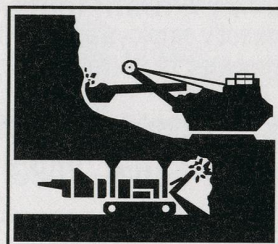
County Production

There were 408 mines in Kentucky during 2000. These 408 mines were issued 605 Kentucky mine licenses and produced 131.8 million tons.

246 underground mines (323 licenses) accounted for 62% of Kentucky's production and 162 surface mines (282 licenses) accounted for 38% of Kentucky's production.

78% of Western Kentucky and 57% of Eastern Kentucky's coal production was from underground mines during 2000.

28 Kentucky counties produced coal in 2000: nine Western Kentucky counties and 19 Eastern Kentucky counties.



2000 Production by County and Type of Mine License*

County	Underground		Surface		Total	
	Licenses	Tonnage	Licenses	Tonnage	Licenses	Tonnage
EASTERN KENTUCKY						
Bell	16	2,608,541	15	1,254,240	31	3,862,781
Breathitt	-	-	8	1,021,686	8	1,021,686
Clay	-	-	2	22,118	2	22,118
Estill	-	-	1	42,074	1	42,074
Floyd	38	2,099,604	2	849	40	2,100,453
Harlan	40	7,746,358	18	2,474,757	58	10,221,115
Johnson	4	500,162	3	371,898	7	872,060
Knott	35	6,176,318	25	5,559,184	60	11,735,502
Knox	10	378,100	5	1,000	15	379,100
Laurel	-	-	4	63,369	4	63,369
Lawrence	2	529,869	3	134,457	5	664,326
Leslie	9	5,231,327	1	1,310,293	10	6,541,620
Letcher	31	5,275,874	41	4,745,885	72	10,021,759
Martin	15	4,786,070	10	5,142,267	25	9,928,337
Morgan	1	7,760	3	52,812	4	60,572
Owsley	-	-	2	22,357	2	22,357
Perry	14	5,869,601	17	6,547,400	31	12,417,001
Pike	91	18,731,242	87	15,351,814	178	34,083,056
Whitley	3	15,800	9	216,903	12	232,703
EKY Total	309	59,956,626	256	44,335,363	565	104,291,989
WESTERN KENTUCKY						
Butler	-	-	1	16,665	1	16,665
Christian	-	-	1	197,900	1	197,900
Daviess	-	-	3	769,963	3	769,963
Henderson	1	746,827	1	1,114,335	2	1,891,162
Hopkins	4	4,269,713	11	1,980,922	15	6,250,635
Muhlenberg	3	1,939,881	5	1,331,184	8	3,271,065
Ohio	-	-	2	274,061	2	274,061
Union	2	5,738,248	-	-	2	5,738,248
Webster	4	8,848,474	2	295,826	6	9,144,300
WKY Total	14	21,543,143	26	6,010,856	40	27,553,999
KY Totals	323	81,499,769	282	50,346,219	605	131,845,988

*NOTE: The number of licenses is greater than the number of mines because a mine may be relicensed if the company changes name or ownership.

Source: Kentucky Department of Mines and Minerals, Annual Report, 2000.

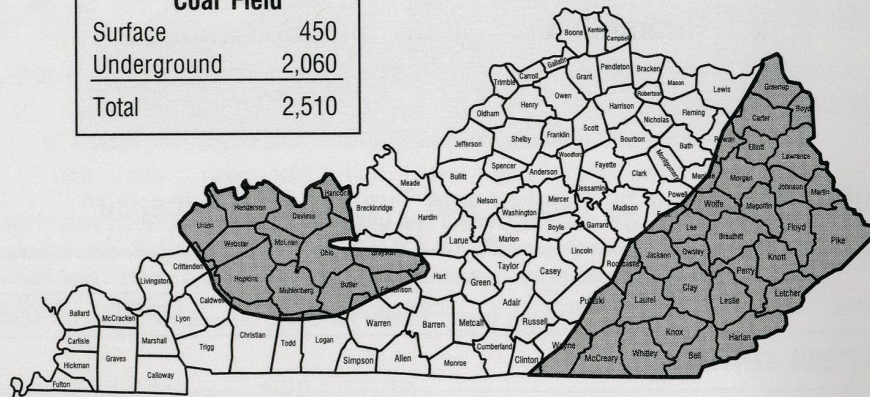
Employment

The Kentucky coal mining industry has a current work force of approximately 15,500* people directly employed in coal mining jobs. The Western Kentucky coal field directly employs approximately 2,510 persons, while the Eastern Kentucky coal field provides 12,990 direct mining jobs.

Kentucky's Coal Mining Work Force, 2000

Western Kentucky Coal Field	
Surface	450
Underground	2,060
Total	2,510

Eastern Kentucky Coal Field	
Surface	4,162
Underground	8,828
Total	12,990



Eastern Kentucky averaged 84% of Kentucky's coal mining work force and accounted for about 80% of Kentucky's total coal production in 2000.

Western Kentucky averaged 16% of Kentucky's coal mining work force and accounted for about 20% of Kentucky's total coal production in 2000.

Kentucky produced 130.7 million tons during 2000 while direct mining employment continued to decline.

Kentucky Coal Mining Employment, 1979-2000

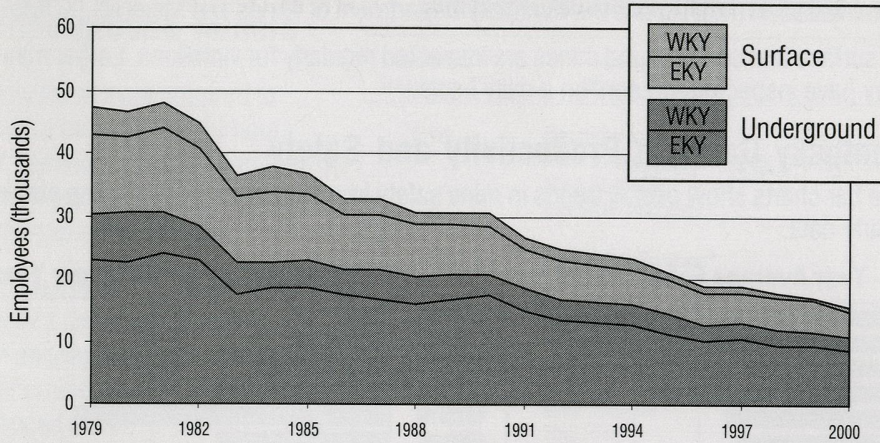
Year	Western Kentucky			Eastern Kentucky			Kentucky Totals
	Surface	Underground	Total	Surface	Underground	Total	
1979	4,343	6,945	11,288	12,838	23,064	35,902	47,190
1980	3,995	7,879	11,874	11,819	22,702	34,521	46,395
1981	4,056	6,489	10,545	13,473	24,032	37,505	48,050
1982	4,120	5,639	9,759	12,319	22,782	35,101	44,860
1983	3,415	4,918	8,333	10,485	17,615	28,100	36,433
1984	4,022	4,053	8,075	11,327	18,474	29,801	37,876
1985	3,421	4,294	7,715	10,516	18,583	29,099	36,814
1986	2,327	4,297	6,624	8,718	17,312	26,030	32,654
1987	2,345	4,605	6,950	8,740	16,900	25,640	32,590
1988	1,825	4,388	6,213	8,261	16,085	24,346	30,559
1989	1,870	4,166	6,036	8,034	16,586	24,620	30,656
1990	2,095	3,491	5,586	7,505	17,407	24,912	30,498
1991	1,910	3,603	5,513	6,251	14,878	21,129	26,642
1992	1,722	3,483	5,205	6,014	13,405	19,419	24,624
1993	1,887	3,465	5,352	5,683	13,028	18,711	24,063
1994	1,803	2,988	4,791	5,728	12,849	18,577	23,368
1995	1,109	3,176	4,285	5,474	11,366	16,840	21,125
1996	1,095	2,601	3,696	4,855	10,275	15,130	18,826
1997	937	2,578	3,515	5,053	10,369	15,422	18,937
1998	747	2,763	3,510	5,493	9,924	15,417	18,927
1999	615	2,309	2,924	4,973	9,314	14,287	17,211
2000	450	2,060	2,510	4,162	8,828	12,990	15,500

*NOTE: State employment numbers (page 14) differ from federal EIA numbers.

Source: U.S. DOE - EIA; *Coal Industry Annual*, 1993-2000, *Coal Production*, 1979-1992.

Employment/Productivity

Kentucky Coal Mine Employment, 1979-2000

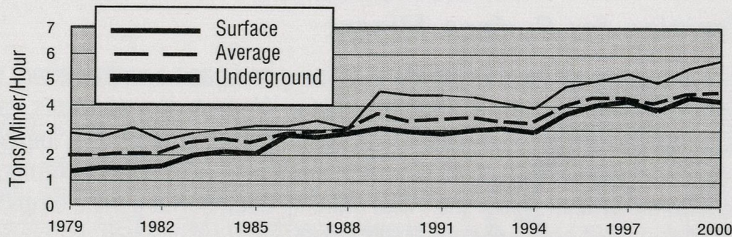


*State employment numbers (page 14) differ from federal EIA numbers.

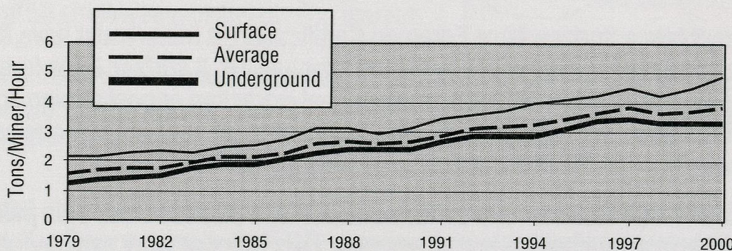
Mine Productivity, 1977-2000 (tons/miner/hour)

Year	Eastern Kentucky	Western Kentucky	Kentucky Average	Appalachian Coal Field	Interior Coal Field	Western U.S. Coal Field	U.S. Average
1977	1.71	2.22	1.86	1.36	2.42	5.85	1.82
1978	1.62	1.97	1.71	-	-	-	1.79
1979	1.54	1.94	1.64	1.33	2.21	5.47	1.81
1980	1.67	1.96	1.74	1.39	2.30	5.64	1.93
1981	1.76	2.12	1.84	1.51	2.35	6.15	2.10
1982	1.79	2.01	1.84	1.51	2.38	6.26	2.11
1983	1.98	2.43	2.08	1.75	2.69	7.60	2.50
1984	2.13	2.61	2.24	1.86	2.80	8.30	2.64
1985	2.13	2.57	2.23	1.90	2.81	8.55	2.74
1986	2.31	2.94	2.45	2.09	3.14	9.27	3.01
1987	2.59	2.98	2.69	2.30	3.33	10.42	3.30
1988	2.68	2.95	2.74	2.44	3.45	11.01	3.55
1989	2.58	3.62	2.78	2.49	3.84	11.63	3.70
1990	2.66	3.46	2.83	2.60	3.88	11.82	3.83
1991	2.90	3.37	3.01	2.74	3.98	12.42	4.09
1992	3.10	3.49	3.20	2.95	4.18	12.73	4.36
1993	3.18	3.49	3.25	3.00	4.43	13.53	4.70
1994	3.24	3.28	3.25	3.20	4.43	14.58	4.98
1995	3.47	3.97	3.57	3.32	4.97	15.68	5.38
1996	3.68	4.29	3.80	3.48	5.39	17.41	5.69
1997	3.83	4.38	3.94	3.76	5.54	17.75	6.04
1998	3.70	4.16	3.79	3.78	5.39	18.03	6.20
1999	3.74	4.57	3.89	3.84	5.64	19.05	6.61
2000	3.86	4.46	3.96	4.10	5.81	19.63	7.02

Western Kentucky Coal Mine Productivity 1979-2000



Eastern Kentucky Coal Mine Productivity 1979-2000



Source: U.S. Department of Energy - EIA; Coal Industry Annual, 1993-2000, Coal Production, 1977-1992.

Safety and Training

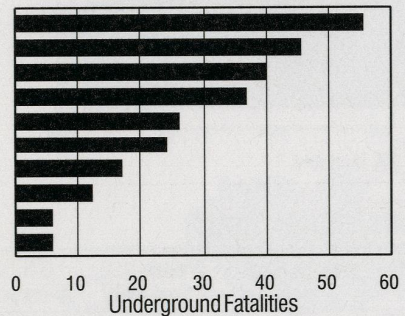
Safety and health standards are highly regulated by the federal Mine Safety and Health Administration (MSHA) and the Kentucky Department of Mines and Minerals (KDMM).

All surface and underground mines are inspected regularly for violations. Larger mines may have inspectors present on a daily basis.

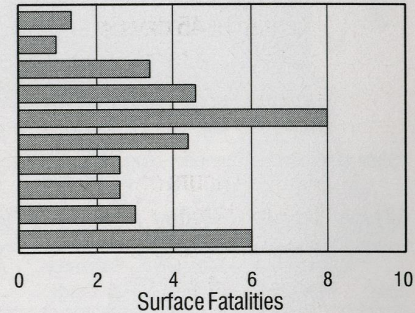
Kentucky Gains in Productivity and Safety

The bar charts show overall trends in mine safety improvements by averaging erratic yearly data.

5 - Year Average Fatalities per Year

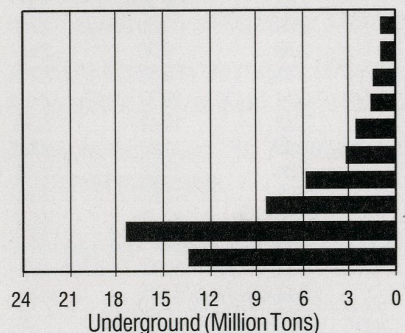


5 - Year Average Fatalities per Year

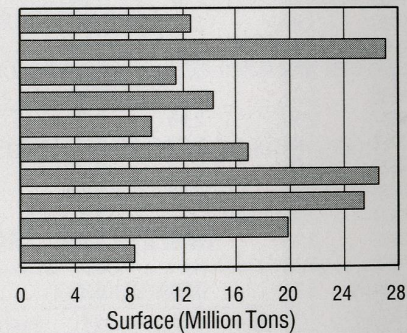


The underground bar chart indicates overall safety improvements in underground mines in Kentucky.

5 - Year Average Tons Per Fatality



5 - Year Average Tons Per Fatality



Source: Developed from Kentucky Department of Mines and Minerals data.

Miners are highly skilled technicians who receive extensive general safety and job-specific training.

Training for Surface Miners

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

To obtain a Surface Mine Foreman Certification, a miner must have three years of surface mining experience achieved after age 18. A surface mine foreman obtaining certification must specialize in either coal extraction or post mining activities (coal preparation or coal handling). The applicant must have at least one year of practical experience in the specialty class he designates.

To become a blaster in a surface coal mine, a 30 hour class plus passing a license test and a certification test is required. Two years of work experience under a licensed blaster is also required.

Safety and Training

Training for Underground Miners

New miners are required to have a minimum of 40 hours of training and pass a written exam prior to starting work as an inexperienced miner.

An inexperienced miner must work a minimum of 45 days in an underground mine before becoming a certified experienced miner.

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

A newly hired miner (experienced or inexperienced) must receive up to eight hours of mine site-specific training.

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

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

To maintain certification and qualifications, satisfactory completion of an electrical retraining class for certified electrical workers is required annually.

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

Underground Miner Classifications

Experience Required	Underground Mining Position
5 Yrs.	Electrical Inspector* Mine Inspector/Mine Safety Analyst* Mine Foreman* Electrical Instructor*
3 Yrs.	Asst. Mine Foreman* Instructor
1 Yr.	Electrical Worker* Hoisting Engineer*
45 days	Mine Rescue Shot Firer* Certified Miners

SPECIAL TRAINING

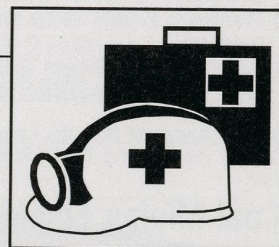
MET EMT First Aid	Mine Emergency Technician or Emergency Medical Technician
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*Tests are required in addition to years of experience.

NOTE: Over 20,000 persons are trained or retrained annually for one or more surface and/or underground miner classification by the KDMM to maintain the current Kentucky miner workforce of approximately 15,000 miners.

Source: Kentucky Department of Mines and Minerals (KDMM).

MET/EMT - A Mine Emergency Technician (MET) or Emergency Medical Technician (EMT) is required at every coal mine on every shift with a work force of up to 50 employees. An additional MET or EMT must be employed for every additional 50 employees, or any portion thereof.



METs are certified through training and examination as administered by KDMM under regulations established by the KDMM. The MET certification requires 40 hours of initial training, a current CPR certification, and eight hours of annual retraining.

All certifications and mining specialties, as established by the Kentucky Mining Board, must be signed by the Commissioner (KDMM) verifying the holder has completed the requirements for certification.

Employment/Wages by County

Coal County Employment and Wages, 2000

County ¹	Direct Mining Employment	% of Labor Force	Miners as % of Total Employed	Mining Wages	% of Total County Wages	Average Weekly Mining Earnings ³
EASTERN KENTUCKY						
Bell	661	6.3%	6.7%	\$27,181,200	12.5%	\$790.79
Boyd	160	0.7%	0.8%	\$5,487,416	0.7%	\$659.55
Clay	56	0.8%	0.8%	\$1,485,453	1.7%	\$510.11
Floyd	604	4.5%	4.8%	\$17,721,310	6.7%	\$564.23
Harlan	1,146	12.4%	13.9%	\$46,829,016	23.9%	\$785.83
Johnson	118	1.3%	1.4%	\$4,682,376	3.4%	\$763.10
Knott	908	15.6%	17.0%	\$42,796,390	46.2%	\$906.40
Knox	113	1.0%	1.1%	\$2,638,615	1.6%	\$449.05
Laurel	54	0.2%	0.2%	\$1,610,781	0.3%	\$573.64
Lawrence	78	1.4%	1.5%	\$2,680,705	3.8%	\$660.92
Leslie	1,044	24.0%	25.2%	\$53,895,183	58.4%	\$992.76
Letcher	724	8.9%	10.0%	\$31,139,987	20.5%	\$827.14
Magoffin	139	2.7%	3.2%	\$5,633,798	10.6%	\$779.44
Martin	862	27.5%	29.9%	\$41,341,302	48.6%	\$922.30
Perry	1,164	10.2%	10.9%	\$52,505,107	17.4%	\$867.45
Pike	3,932	14.7%	15.7%	\$182,346,491	28.8%	\$891.83
Pulaski	62	0.2%	0.2%	\$2,206,612	0.4%	\$684.43
Whitley	88	0.6%	0.6%	\$2,660,061	1.0%	\$581.31
Subtotal	11,913	-	-	\$524,841,803	-	\$847.24
EKY Total²	12,011	-	-	\$529,947,517	-	\$848.50

Fayette
Jefferson

Note: The direct mining employment classification does not include most of the administrative/professional employees of coal companies located in these two Kentucky metropolitan areas and does not include any private services or indirect employment.

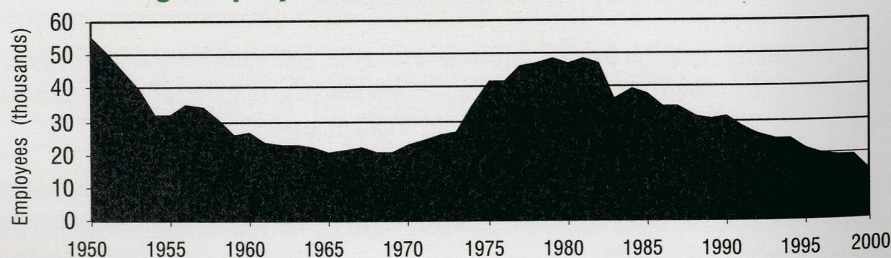
WESTERN KENTUCKY

Daviess	74	0.2%	0.2%	\$4,221,479	0.4%	\$1,097.06
Henderson	177	0.7%	0.8%	\$9,546,537	1.6%	\$1,037.22
Hopkins	632	3.2%	3.5%	\$28,987,566	6.6%	\$882.05
Muhlenberg	277	2.2%	2.4%	\$15,101,766	7.0%	\$1,048.44
Webster	731	13.5%	14.5%	\$38,013,426	36.1%	\$1,000.04
Subtotal	1,891	-	-	\$95,870,774	-	\$974.97
WKY Total²	2,683	-	-	\$144,480,176	-	\$1,035.58
State Total²	14,812	-	-	\$678,426,718	-	\$880.82

- Counties with less than three employers or one employer with 80% of the total county miner workforce were withheld to avoid disclosure of individual company data. These counties are as follows: Breathitt, Butler, Carter, Christian, Estill, Ohio, Union. It is suspected that multi-county mining employment attributes to some counties being under reported and others being over reported.
- Columns do not add to the totals due to withheld data.
- Variation in average weekly mining income affected greatly by hours worked per week as well as hourly wage rate.
- Values and methodologies used in this table may not be consistent with LGEDF regulations (see page 16). Do not use these values for LGEDF estimates.

Source: Developed from the Kentucky Workforce Development Cabinet, Employment and Wages Section Data by the Kentucky Coal Council.

Coal Mining Employees in Kentucky, 1950-2000



Severance Tax by County

Coal Severance Tax Revenue by County, FY 2000-01

County	Gross Value of Severed Coal	Tax on Severed Coal	Gross Value of Processing	Total Tax Receipts
EASTERN KENTUCKY (Greenup, Lee, Magoffin, Menifee, Owsley, and Pulaski County data withheld)				
Bell	\$91,098,412	\$4,048,731	\$13,249,864	\$4,625,347
Boyd	54,246	2,441	4,748,481	213,558
Breathitt	25,691,599	1,156,832	587,270	1,183,259
Clay	410,059	19,464	125,181	25,098
Floyd	82,290,752	3,725,446	9,774,035	4,149,183
Harlan	244,443,025	10,929,466	16,519,430	11,672,841
Johnson	14,496,047	652,323	2,061,597	745,096
Knott	279,780,080	12,603,418	11,907,262	13,137,277
Knox	17,529,169	791,318	3,015,821	926,327
Laurel	401,203	18,054	1,357,461	79,141
Lawrence	1,687,177	62,266	128,790	68,221
Leslie	130,171,424	5,857,270	20,040,348	6,759,086
Letcher	224,897,034	10,541,666	30,996,602	11,928,864
Martin	192,521,919	8,725,431	21,160,878	9,679,481
Morgan	1,332,260	56,620		56,620
Perry	235,565,250	10,596,238	40,944,986	12,438,763
Pike	775,838,329	35,039,739	121,152,428	40,334,808
Whitley	3,740,053	163,649	1,703,430	235,535
EASTERN KY Total*	\$2,324,931,828	\$105,124,837	\$299,875,804	\$118,411,055
WESTERN KENTUCKY (Butler, Daviess, McLean, Ohio, Union, and Webster County data withheld)				
Christian	9,636,268	458,802	93,853	488,195
Henderson	36,609,383	1,638,954	4,192,211	1,826,440
Hopkins	93,764,816	4,244,588	9,751,407	4,708,572
Muhlenberg	61,822,555	2,782,015	953,969	2,824,944
WESTERN KY Total*	\$472,021,951	\$20,552,568	\$50,642,392	\$22,819,620
STATE TOTALS*	\$2,796,953,779	\$125,677,405	\$350,518,196	\$141,230,675

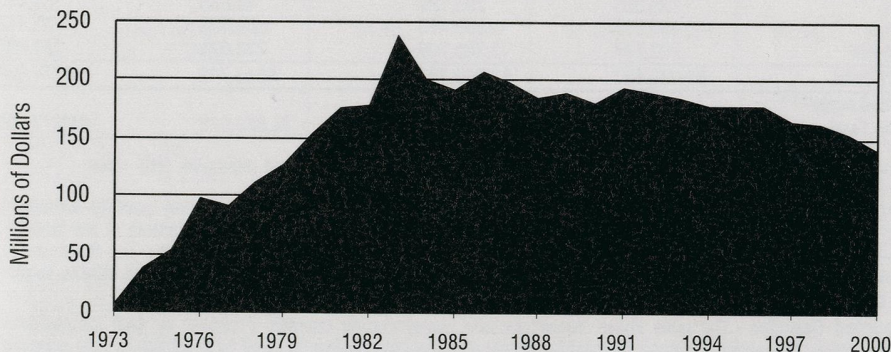
*Columns do not add to State Totals because Butler, Daviess, Greenup, Jefferson, Lee, McLean, Magoffin, Menifee, Ohio, Owsley, Pulaski, Union, and Webster counties' information is withheld to avoid disclosure of individual company data.

Source: Kentucky Revenue Cabinet

Severance Tax Revenues (millions of dollars)

The gross value of coal mined and processed in Kentucky during Fiscal Year 2000-01 was \$3.15 billion.

The Kentucky coal industry paid \$141.2 million in coal severance taxes in Fiscal Year 2000-01.



Coal Taxes Returned

Coal Severance Taxes Returned to Counties, FY 1992-2001

Fiscal Year	Local Government Assistance Fund (LGEAF)*	Economic Fund (LGEAF)*	Local Government Development Fund (LGEDF)**	Economic Fund (LGEAF)**	Total Percent Returned
1991-92	\$22,120,783	12%	—	—	12%
1992-93	\$21,559,445	12%	\$5,389,862	3%	15%
1993-94	\$21,537,099	12%	\$10,768,550	6%	18%
1994-95	\$21,359,598	12%	\$15,218,716	9%	21%
1995-96	\$19,805,628	12%	\$20,383,293	13%	25%
1996-97	\$19,574,470	12%	\$24,806,340	16%	28%
1997-98	\$18,674,360	13%	\$24,260,750	18%	31%
1998-99	\$18,615,839	14%	\$25,627,772	21%	35%
1999-00	\$17,373,579	14%	\$27,081,883	24%	38%
2000-01	\$15,279,384	13%	\$29,105,903	27%	40%
2001-02	—	14%	—	30%	44%

*Established by the General Assembly; however, this column only includes fiscal years 1992 through 2000, and includes coal severance taxes only.

**Does not include interest.

Coal Taxes Returned to Coal Producing Counties

PRODUCING COUNTIES	LGEAF* (FY 01)	LGEDF** Single County (FY 01)	Unmined Minerals Tax (FY00) County Estimate**** Average (83.9%)	Total Tax Billed
EASTERN KY				
Bell	\$459,486	\$758,245	\$108,244	\$130,396
Boyd	—	115,847	2,302	2,726
Breathitt	204,286	616,438	210,411	253,037
Carter	—	127,057	339	418
Clay	119,061	198,461	5,158	6,296
Elliott	—	—	291	345
Floyd	576,267	736,512	421,395	486,518
Greenup	—	80,043	—	—
Harlan	933,537	1,436,687	992,141	1,175,245
Jackson	—	58,630	366	434
Johnson	234,037	245,465	22,156	26,823
Knott	977,601	1,764,305	698,603	859,293
Knox	160,045	225,526	16,863	20,235
Laurel	—	90,090	662	833
Lawrence	319,277	236,148	17,304	20,820
Lee	—	120,120	—	—
Leslie	561,164	1,626,764	460,459	538,966
Letcher	849,763	1,241,618	753,088	897,104
McCreary	—	103,924	648	772
Magoffin	119,004	309,498	46,616	54,276
Martin	759,723	1,870,433	379,711	451,769
Menifee	24,987	72,424	—	—
Morgan	95,828	136,271	21	25
Owsley	78,277	202,264	—	—
Perry	911,042	1,031,720	652,098	778,224
Pike	2,832,886	3,354,977	1,548,991	1,835,615
Pulaski	—	—	8	10
Whitley	140,097	167,156	1,996	2,455
Wolfe	—	66,232	14	17
EKY Total	\$10,356,368	\$16,992,854	\$6,339,884	\$7,542,651
WESTERN KY				
Butler	—	\$52,233	\$80	\$102
Christian	\$206,318	67,845	700	890
Daviess	—	95,528	6,222	7,516
Hancock	—	—	1,327	1,651
Henderson	236,203	233,764	74,947	92,415
Hopkins	517,441	614,758	129,261	154,042
McLean	83,968	154,964	3,964	4,942
Muhlenberg	339,656	399,507	146,109	175,700
Ohio	133,385	239,189	48,586	59,477
Union	409,819	969,495	29,525	36,417
Webster	702,747	1,265,709	203,021	241,497
WKY Total	\$2,629,537	\$4,092,992	\$643,742	\$774,649
Multi-County***		\$10,542,923		
State Total	\$12,985,906	\$31,628,769	\$6,983,626	\$8,317,299

*County and municipal totals for FY 2000-01. Twenty-seven (27) counties and eighty-six (86) cities.

**Includes interest and taxes collected.

***Counties may jointly apply for multi-county LGEDF Funds. State Allocation Total is only partially authorized.

****Revenue generated from the Unmined Minerals Tax for some coal counties was unavailable at the time of this publication. The *ad valorem* tax rates on real property vary greatly from county to county. The Revenue Cabinet estimates the counties receive 83.9%, with the remainder being the state share. Not all billable taxes are collected. Columns do not add due to individual rounding.

Impacted Counties - The table above doesn't include non-producing counties impacted by coal transportation, referred to as "impacted counties." These 42 counties and the cities within received **\$2.3 million** in coal severance taxes during FY01.

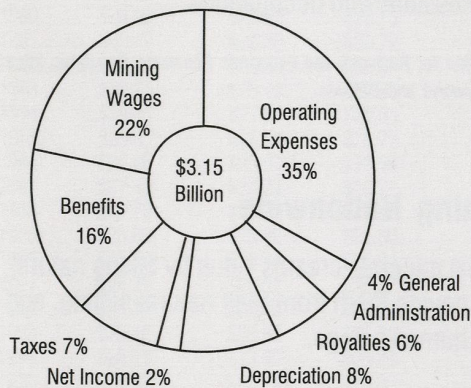
Economic Impact

The Kentucky coal industry:

- employed 14,812 miners earning over \$678.4 million in wages during 2000.
- created a total of 56,219 jobs statewide.
- paid over \$141.23 million in severance taxes during FY 2000-01 and generated total state tax revenues of about \$403.2 million.
- was a \$3.15 billion industry which brought into Kentucky receipts totaling about \$2.5 billion from approximately 27 states and 11 countries in 2000.
- created economic activity throughout Kentucky totaling \$6.84 billion.

*NOTE: Estimated values of coal sold out of state are based upon average per ton gross value of coal produced and processed.

2000 Estimated Distribution of \$3.15 Billion



Of the \$3.15 billion in receipts from coal produced and processed, the largest part, 38 percent, went to miners' wages and benefits. Another 35 percent went to operating costs, including fuel, materials, maintenance, etc., and the remaining 27 percent went to depreciation (8%), taxes (7%), royalties (6%), net income (2%), and general administration (4%).

2000 Estimated Impact of \$3.15 Billion

The \$3.15 billion in receipts from coal produced and processed in Kentucky in 2000 generated additional economic activity totaling \$3.69 billion and 41,407 jobs. This additional economic activity plus coal production and processing yielded total economic activity in Kentucky of \$6.84 billion and 56,219 jobs.

	Coal Industry		Indirect		Coal Industry and Indirect	
	Output (billion \$)	Jobs	Output (billion \$)	Jobs	Output (billion \$)	Jobs
Mining Wages and Benefits (38%)	\$1.20	14,812	\$1.17	14,365	\$2.37	29,177
Operating Costs (35%)	\$1.10	N/A*	\$1.54	14,674	\$2.64	14,674
Other** (27%)	\$0.85	N/A*	\$0.98	12,368	\$1.83	12,368
Total	\$3.15	14,812	\$3.69	41,407	\$6.84	56,219

*NOTE: Not Applicable.

**NOTE: Royalties, net income, depreciation, general administration, taxes.

Source: Updated from the University of Kentucky Center for Business and Economic Research, Economic Impact Analysis of Coal in Kentucky, (1995) for 2000 by Haywood and Baldwin.

Economic Impact

Benefits Throughout the Kentucky Economy

Due to the economic impact of the coal industry throughout Kentucky in 2000, in addition to 14,812 persons working at the mines, 5,403 persons worked in factories making everything from mining equipment to home appliances; 2,348 persons drove coal trucks and cargo trucks, worked at rail yards, etc.;

11,400 persons worked in warehouses, sold clothing, appliances, furniture in retail stores, etc.; 11,190 persons worked in banks, law offices, engineering firms, accounting firms, and other service businesses; 3,918 persons built homes, offices, factories, and highways; and 7,148 others were teachers, government officials, and a wide variety of other professions and occupations.

Industry	Employment	Product Value
Coal mining, processing	14,812 jobs	\$3.15 billion
Manufacturing	5,403 jobs	.98 billion
Transportation	2,348 jobs	.23 billion
Wholesale/retail trade	11,400 jobs	.55 billion
Services	11,190 jobs	.57 billion
Construction	3,918 jobs	.32 billion
Other	7,148 jobs	1.03 billion
Total	56,219 jobs	\$6.84 billion

Source: Updated from the University of Kentucky Center for Business and Economic Research, Economic Impact Analysis of Coal in Kentucky, (1995) to 2000 by Haywood and Baldwin.

Economic Impacts of All Mining Nationwide

The mining of coal, metals, and industrial minerals creates value by taking natural resources found in the Earth's crust, removing them from their natural setting, and converting them into products useful to human beings.

Mining literally takes a part of nature that has little or no economic value and creates something of value from it. The output of mining, therefore, constitutes *created value*. The payments made by others, by which the mining industry disburses that created value, form a net addition to the stream of income in the economy.

A study for the National Mining Association found that in 1995, the American mining industries (coal mining, metal mining, and industrial minerals mining) had a combined direct and indirect impact on the economy of the United States. That sum included combined direct and indirect contributions to personal income, business income, federal government revenues, and state and local government revenues.

The total benefit to the nation's economy was nearly nine times the value of the solid minerals that were mined in the United States that year. The total number of American jobs created both directly and indirectly by the domestic mining industry was more than 15 times the number of workers directly involved in mining. And the total personal income generated from mining was enough to pay the wages of nearly five million American workers, only six percent of whom were actually employed in mining.

A major finding of the study was that people don't have to live in a mining state or work directly in the mining industry to benefit from mining. All 50 states benefit from mining.

Source: National Mining Association, Mining and the American Economy - Everything Begins with Mining, July, 1997

Coal Prices

Coal Prices

There are as many coal price averages as there are coal qualities (i.e., sulfur, Btu), market types (i.e., steam coal, metallurgical or coking, industrial, export), sales conditions (i.e., spot market, extended spot market, short-term contract, long-term contract), sales location and included costs (i.e., FOB - Free on Board the mine, railcar, river terminal, export terminal, FAS - Free Along Side, CIF - Cargo Cost/ Insurance Freight, total delivered cost). Within each of these ways to sell coal, there are wide ranges of price.

Average Value of KY Coal FOB Mine, 2000 (dollars per ton)

Year	Eastern Kentucky			Western Kentucky			KY Average
	Underground	Surface	Average	Underground	Surface	Average	
1976	\$26.37	\$20.36	\$23.03	\$15.12	\$13.41	\$14.18	\$19.79
1977	\$25.98	\$18.71	\$21.67	\$19.88	\$14.80	\$17.07	\$20.02
1978	\$28.86	\$22.58	\$25.30	\$22.78	\$18.35	\$20.36	\$23.86
1979	\$30.18	\$24.85	\$27.62	\$26.26	\$18.79	\$22.17	\$26.04
1980	\$30.98	\$26.23	\$28.73	\$27.40	\$22.28	\$24.72	\$27.62
1981	\$32.47	\$28.86	\$30.72	\$30.92	\$25.03	\$27.66	\$29.95
1982	\$32.71	\$28.85	\$30.87	\$32.50	\$26.53	\$29.25	\$30.44
1983	\$30.71	\$28.43	\$29.63	\$30.72	\$25.97	\$28.09	\$29.20
1984	\$29.29	\$27.84	\$28.61	\$28.68	\$25.50	\$26.81	\$28.13
1985	\$29.83	\$27.41	\$28.77	\$26.79	\$26.68	\$26.73	\$28.24
1986	\$26.89	\$25.67	\$26.38	\$24.25	\$26.56	\$25.31	\$26.09
1987	\$27.48	\$25.74	\$26.71	\$25.06	\$24.16	\$24.68	\$26.15
1988	\$27.72	\$25.92	\$26.97	\$24.89	\$22.32	\$23.96	\$26.20
1989	\$25.69	\$25.96	\$25.80	\$23.03	\$21.79	\$22.48	\$24.97
1990	\$25.49	\$26.44	\$25.84	\$24.42	\$22.01	\$23.32	\$25.19
1991	\$26.29	\$26.51	\$26.37	\$24.83	\$20.26	\$22.88	\$25.45
1992	\$25.32	\$24.49	\$25.00	\$24.75	\$20.94	\$23.10	\$24.50
1993	\$25.42	\$25.63	\$25.50	\$23.84	\$20.45	\$22.36	\$24.77
1994	\$26.19	\$23.92	\$25.25	\$25.95	\$20.07	\$23.63	\$24.88
1995	\$26.52	\$25.24	\$26.00	\$21.33	\$19.46	\$20.75	\$24.79
1996	\$25.98	\$23.53	\$24.98	\$21.04	\$18.79	\$20.38	\$23.91
1997	\$26.26	\$22.45	\$24.65	\$20.67	\$19.92	\$20.49	\$23.72
1998	\$25.36	\$23.57	\$24.59	\$21.23	\$20.24	\$21.01	\$23.82
1999	\$24.59	\$23.51	\$24.14	\$21.71	\$19.25	\$21.15	\$23.50
2000	\$25.32	\$23.59	\$24.58	\$21.42	\$17.91	\$20.69	\$23.80

Sources: U.S. Bureau of Mines, *Minerals Yearbook*, 1976, U.S. DOE, *Bituminous Coal and Lignite Production and Mine Operations*, 1977-1978, and *Coal Production*, 1979-1992, DOE-EIA, *Coal Data: A Reference*, May, 1989, and *Coal Industry Annual*, 1993-2000.

Electric Utility Coal Purchases, 2000

The U.S. electric power plants that are regulated as "utilities" reported purchases of 790.3 million tons of coal during 2000. Approximately 80% (635.1 million tons) of these coal purchases were by contract, with the remaining 20% being purchased on the spot market. The spot coal purchases averaged four cents per million Btu less than the contract price during 2000. Also, Kentucky's electric power plants that were regulated as a "utility" reported that they purchased 25% of their coal on the spot market.

Electric Utility Coal Purchases, 2001

The first part of 2001 saw an increase in the spot market price and volume.

The cost of U.S. electric utility shipments rose 3.5 cents per mBTU (or about 3%) during the first seven months of 2001.

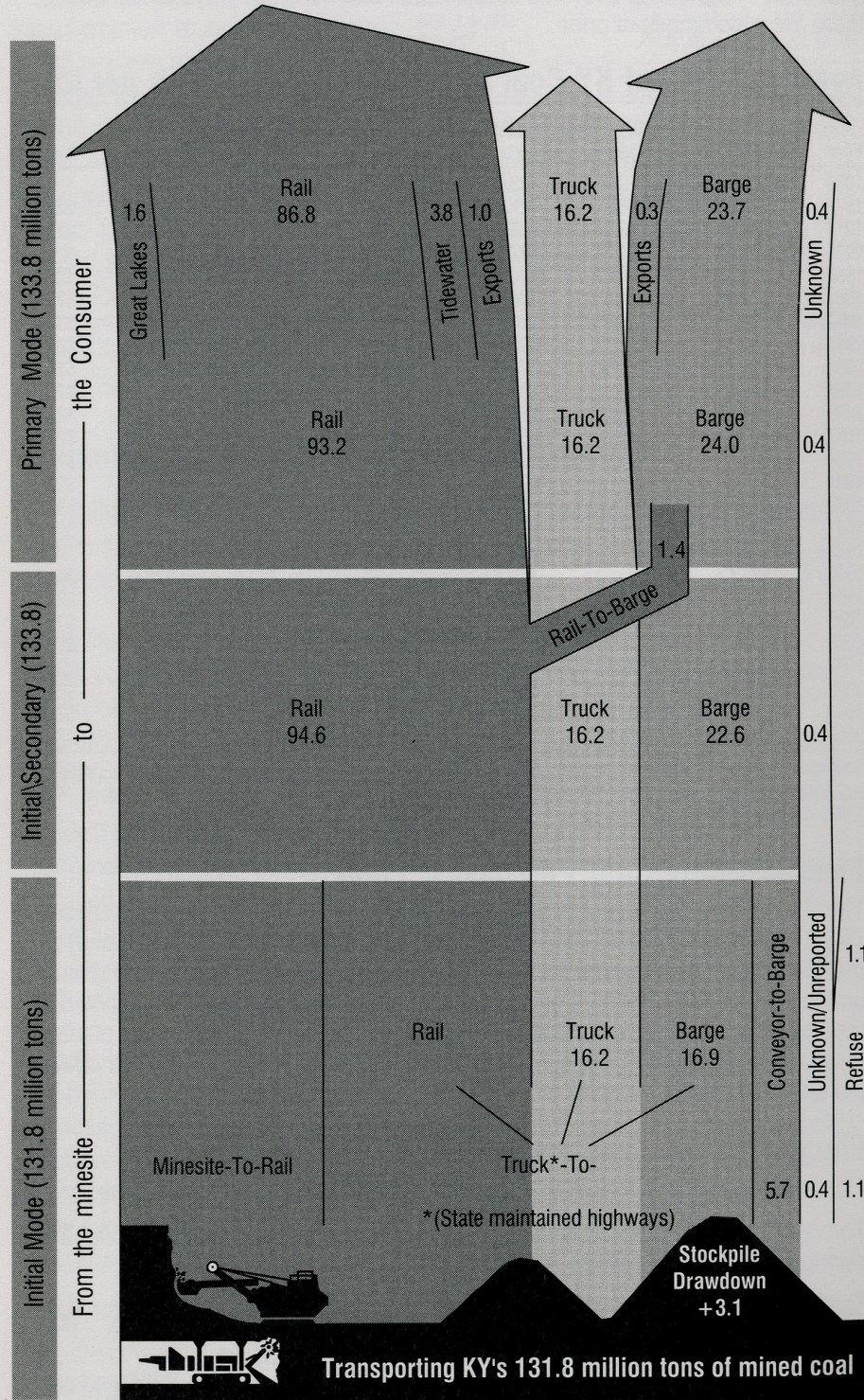
The cost of Kentucky electric utility shipments rose 6.8 cents per mBTU (or about 6.6%) during the first seven months of 2001.

Coal spot market prices started rising in November and December, 2000 and some coals had doubled in price by mid-February, 2001. However, the electric utility market only rose from 3% to 7% during the same time period due in large part to 80% of the U.S. and 75% of Kentucky electric utility coal being purchased under term-contracts, and not on the open spot market.

Transportation

Most Kentucky coal is transported by more than one mode of transportation because of cost considerations, the location of the minesite, and/or the customer. Kentucky coal is transported by rail, truck, and/or barge, and transportation can comprise more than one-third of the cost of delivered coal.

Kentucky Coal Transportation Distribution Modes (Estimates)



Sources: Kentucky Coal Council estimates based on data from: Kentucky Transportation Cabinet's Coal Haul Highway System; U.S. DOE-EIA, Quarterly Coal Report October-December, 2000; Coal Industry Annual, 2000; Kentucky Department of Mines and Minerals, Annual Report, 2000.

Transportation

In multimodal coal transportation the “initial” transportation mode from the mine-site is not always the “primary” mode of coal transportation due to the following:

Shipments of coal moved to consumers primarily by rail can include coal hauled to or away from a railroad siding by truck.

Shipments of coal moved to consumers via river by barge include coal hauled to or away from coal river terminals by truck, rail, or conveyor.

Coal Transportation by Rail in Kentucky

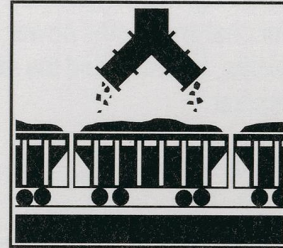
Kentucky has over 2,650 miles of railroad lines, over which 94.6 million tons of Kentucky coal were transported in 2000.

There are two Class I railroads, one regional railroad, and two short line railroads that operate totally in Kentucky or originate coal in Kentucky.

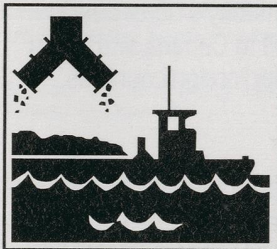
These railroads, along with privately owned cars of electric power companies, have over 50,000 hopper cars dedicated to the transport of coal.

Kentucky has approximately 117 coal rail loading facilities.

Almost all (90+%) rail shipments of Kentucky coal move by unit train service.



Coal Transportation by Barge in Kentucky



Kentucky has more than 1,000 miles of navigable rivers over which approximately 24 million tons of Kentucky coal were shipped in 2000.

Statewide, 48 coal river terminals on the Ohio River and its tributaries serve Kentucky coal shippers (34 within Kentucky). In total, 19 coal river terminals are located near Eastern Kentucky, 6 in Central Kentucky, and 23 near Western Kentucky.

Of these, 19 of the coal river terminals have rail access, 38 have truck access, 14 have barge off-loading access, and 7 have conveyor access. Automated blending is found in 34 of the coal river terminals with 29 having automatic sampling, 19 having some coal crushing equipment, and 9 having stoker preparation equipment.

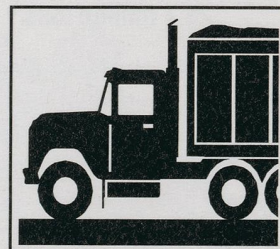
Source: Kentucky Coal Council, [Kentucky Coal Marketing Updates - Coal River Terminals](#), 2000.

Coal Transportation by Truck in Kentucky

Approximately 3,400 miles of state-maintained highways are used for transporting coal.

Truck shipments are a very important mode of coal transportation in Kentucky. In 2000, approximately 1.94 billion ton-miles of coal transportation by truck were reported in at least one leg of the many different types of multimodal coal transportation market routes.

Over 2,971 coal trucks were registered during 2000 in Kentucky, indicating that over 2,971 coal truck drivers were employed in Kentucky. The sale of extended weight coal decals generated \$753,242 in 2000.



Sources: Kentucky Transportation Cabinet, [Official Coal Haul Highway System](#); Department of Vehicle Regulation - Division of Motor Vehicle Licensing.

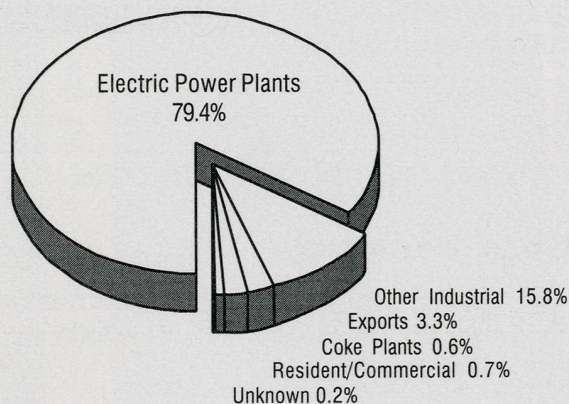
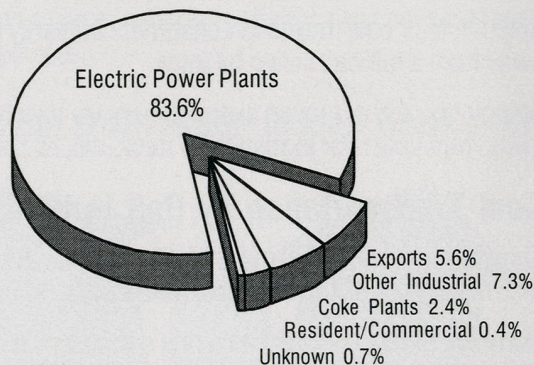
Uses of Coal

Distribution of Coal by Consuming Sector, 2000

U.S. TOTAL
1,082.0 million tons *

Electric power plants represent the largest market for U.S. and Kentucky coal.

The three major markets for coal are electric power plants, industry, and the export market.



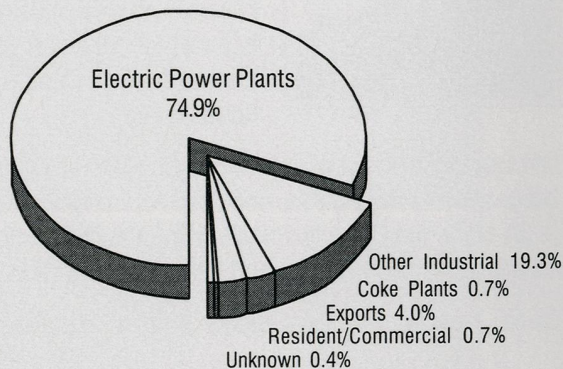
KENTUCKY TOTAL
133.8 million tons *

Combining market sectors shows 95.4% of Kentucky's coal goes to the domestic market in approximately 27 states.

Kentucky's other coal is sold to Canada and to ten other foreign countries.

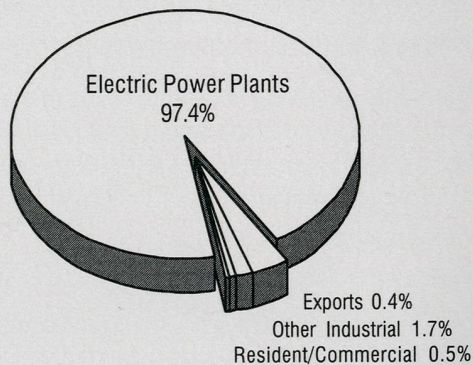
Eastern Kentucky
107.1 million tons *

Eastern Kentucky's market, much like the U.S. market, has a strong industrial (19.3%), a small export (4.0%) sector, small coking coal market, and a predominate electric power plant market at 74.9%.



Western Kentucky
26.7 million tons *

Western Kentucky is almost totally dependent on the electric power market with 97.4% of its coal going to electric power plants.

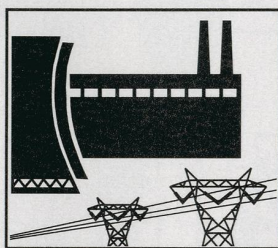


Source: U.S. DOE - Energy Information Administration, Coal Industry Annual, 2000.

*Includes drawdown of stockpiled coal.

Quality-Utility Shipments

Kentucky coal was shipped to electric power plants in 27 states in 2000. The chart at right shows the average quality shipped from Eastern and Western Kentucky to 23 of the states. Quality data on shipments to the remaining four states is unavailable.



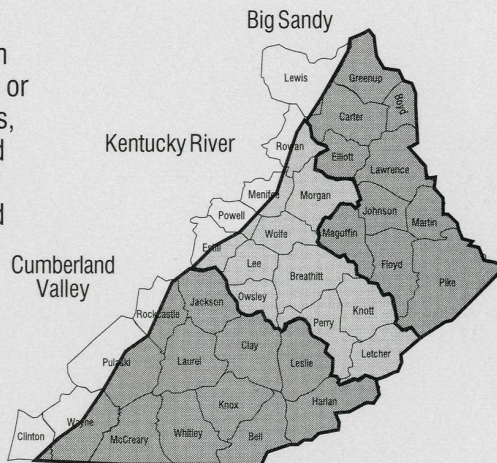
*NOTE: Table does not include coal shipments to electric power plants classified as non-utility and independent power producers.

Coal Field	Destination (State)	Receipts (1,000) Tons	Average Btu/lb	Average %	
				Sulfur	Ash
EASTERN KENTUCKY	Alabama	386	12,377	.91	10.71
	Florida	7,314	12,778	1.06	8.67
	Georgia	17,463	12,496	.93	10.05
	Illinois	154	12,909	1.31	8.54
	Indiana	925	11,792	.85	11.15
	Iowa	2	12,490	1.30	7.66
	Kentucky	7,739	12,160	1.10	10.58
	Maryland	109	13,035	.73	7.76
	Massachusetts	240	13,106	.79	7.22
	Michigan	4,149	12,876	.90	8.06
	Minnesota	*	12,800	.80	6.00
	Mississippi	795	12,332	.94	10.05
	Missouri	30	13,306	1.08	6.79
	New Hampshire	1	13,019	.65	6.70
	New Jersey	241	12,906	.88	8.73
	North Carolina	9,527	12,458	.91	10.08
	Ohio	8,187	11,728	.87	13.28
	Pennsylvania	27	12,084	1.05	13.65
	South Carolina	12,126	12,698	1.09	8.67
	Tennessee	5,349	12,486	1.10	9.92
	Virginia	2,255	12,822	1.21	8.57
	West Virginia	435	11,955	.88	11.47
	Wisconsin	47	13,284	1.04	6.55
EKY Utility Shipments	77,501	12,456	.99	9.95	
WESTERN KY	Alabama	1,832	12,004	2.35	11.33
	Florida	1,916	12,316	2.86	8.15
	Indiana	195	11,304	1.60	8.35
	Kentucky	11,320	10,932	3.80	15.59
	Ohio	56	12,144	2.10	10.05
	Pennsylvania	52	12,742	.96	10.64
	Tennessee	8,392	11,795	2.70	9.72
WKY Utility Shipments	23,763	11,441	3.19	12.51	

Sources: U.S. DOE, Energy Information Administration, Form 423 Data, 2000, with computer assistance from Kenneth McCleavy, EIA.

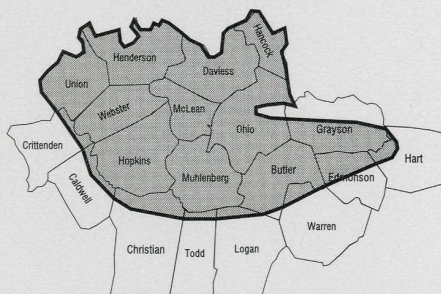
The Eastern Kentucky coal field is often referred to by three different sub-areas or market sheds based upon coal markets, transportation access, coal quality, and other factors. North to south they are: the Big Sandy, the Kentucky River, and the Cumberland Valley counties.

The Eastern Kentucky coal field shipped approximately 80.18 million tons of coal to electric power plants located in 25 states during 2000.



The Western Kentucky coal field sold approximately 26.0 million tons of coal to electric power plants in nine states during 2000. Electric power plants purchased almost all (97.4%) of Western Kentucky's coal during 2000.

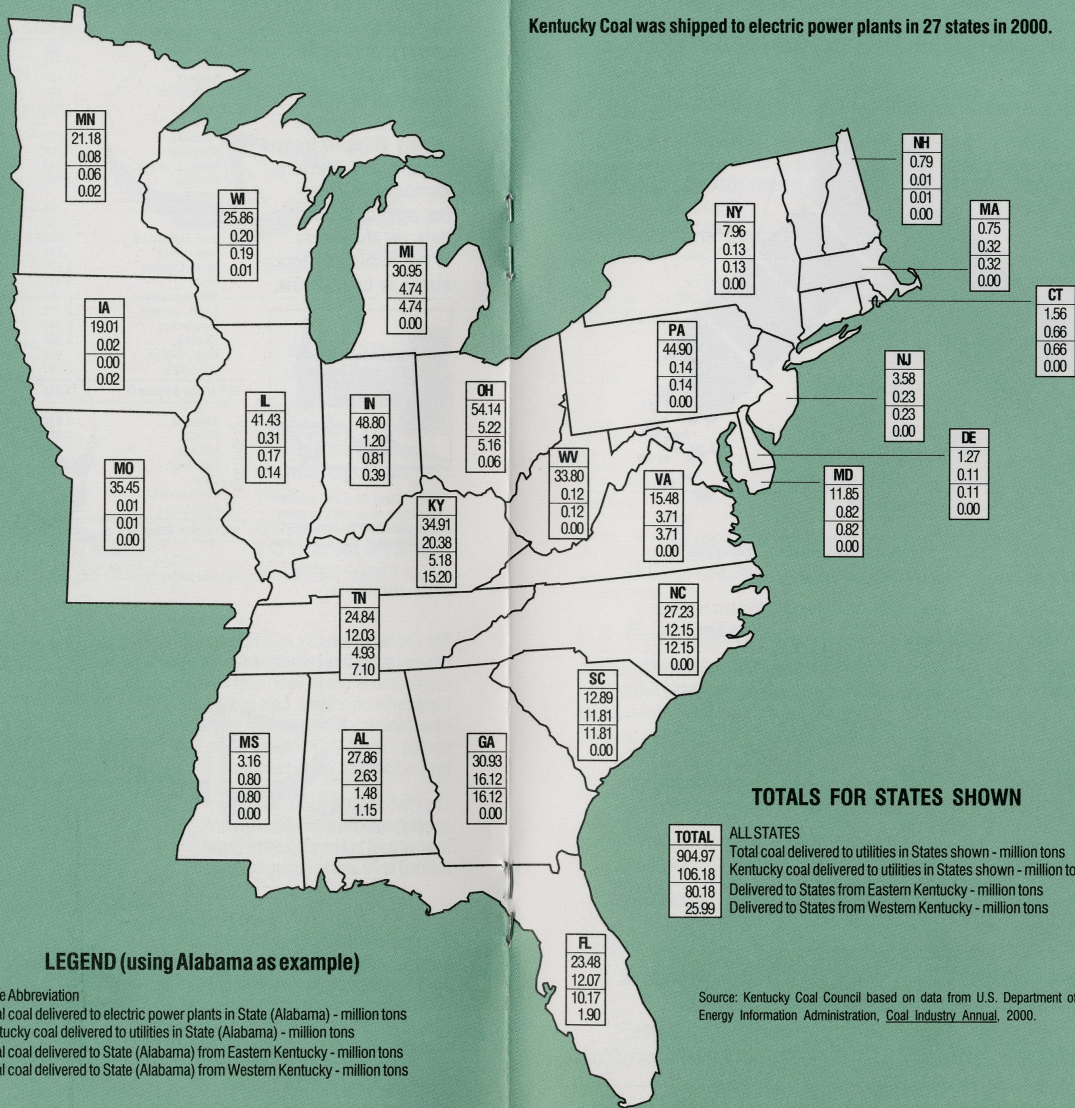
Electric power plants located in 27 states purchased 106.2 million tons of Kentucky coal during 2000.



Source: Analysis from U.S. DOE - Energy Information Administration, Coal Industry Annual, 2000.

Kentucky Coal Shipments to Electric Power Plants by State in 2000

Kentucky Coal was shipped to electric power plants in 27 states in 2000.



TOTALS FOR STATES SHOWN

TOTAL	ALL STATES
904.97	Total coal delivered to utilities in States shown - million tons
106.18	Kentucky coal delivered to utilities in States shown - million tons
80.18	Delivered to States from Eastern Kentucky - million tons
25.99	Delivered to States from Western Kentucky - million tons

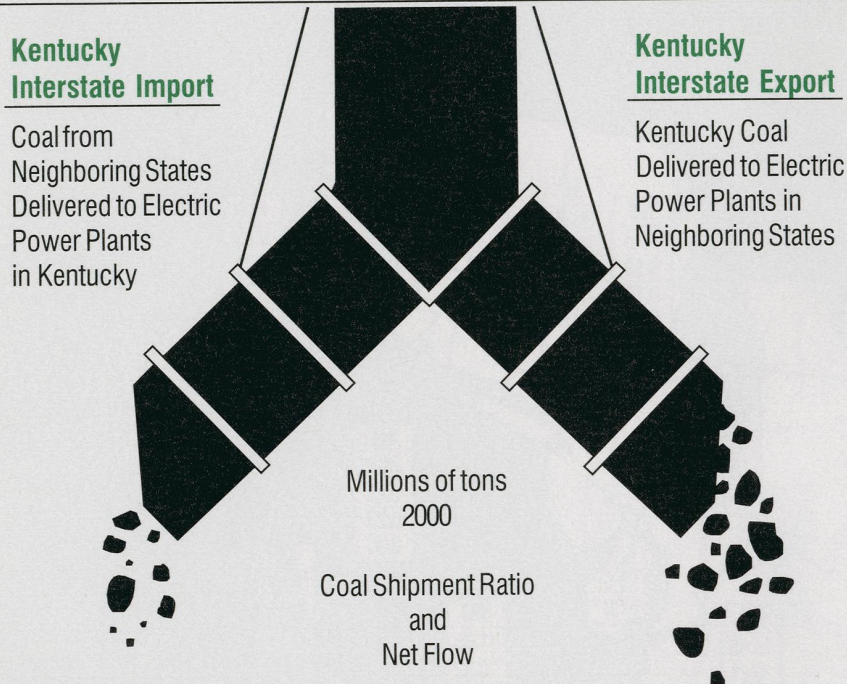
LEGEND (using Alabama as example)

AL	State Abbreviation
27.86	Total coal delivered to electric power plants in State (Alabama) - million tons
2.63	Kentucky coal delivered to utilities in State (Alabama) - million tons
1.48	Total coal delivered to State (Alabama) from Eastern Kentucky - million tons
1.15	Total coal delivered to State (Alabama) from Western Kentucky - million tons

Source: Kentucky Coal Council based on data from U.S. Department of Energy, Energy Information Administration, *Coal Industry Annual*, 2000.

Distribution - State to State

Kentucky exports over 2.6 tons of electric power plant coal to neighboring states for every ton imported. The chart below shows the *Interstate Imports and Exports* of electric power plant coal between Kentucky and its neighboring states.*



Millions of tons
2000

Coal Shipment Ratio
and
Net Flow

Kentucky receives from Illinois 0.15	KY : IL 2.1 : 1	→	Illinois receives from Kentucky 0.31
Kentucky receives from Indiana 1.19	← KY : IN 1 : 1	→	Indiana receives from Kentucky 1.20
Kentucky receives from Missouri 0.0	KY : MO N/A	→	Missouri receives from Kentucky 0.01
Kentucky receives from Ohio 0.07	KY : OH 75 : 1	→	Ohio receives from Kentucky 5.22
Kentucky receives from Tennessee 0.11	KY : TN 109 : 1	→	Tennessee receives from Kentucky 12.03
Kentucky receives from Virginia 0.05	KY : VA 74 : 1	→	Virginia receives from Kentucky 3.71
Kentucky receives from West Virginia 6.98	← KY : WV 1 : 58		West Virginia receives from Kentucky 0.12

Kentucky's Utilities Import from Neighboring States 8.55 Million Tons of Coal*

2.6 : 1
→

Kentucky Exports to Utilities in Neighboring States 22.60 Million Tons of Coal

*Does not include metallurgical or industrial coal shipments, or Kentucky's imports of coal from Colorado (2.5 million tons), Pennsylvania (1.9 million tons), and Wyoming (1.62 million tons).

Source: U.S. DOE - Energy Information Administration, *Coal Industry Annual*, 2000.

Coal Exports/Imports



In 2000, the U.S. exported 60.3 million tons of coal (22.3 million steam coal and 38.0 million metallurgical coal). Metallurgical coal remained the majority of U.S. exports, with its share at 63% in 2000. U.S. coal exports in 2000 were down by almost 18 million tons from 1998. U.S. coal imports totaled 12.5 million tons in 2000.

Kentucky's 2000 exports of 4.3 million tons were 7.3% of total U.S. exports. Kentucky exported coal to 11 foreign countries during 2000 at an estimated value of \$169.1 million.

Kentucky Coal Exports, 2000

Country of Destination	KY Steam Export Coal (tons)	Estimated* Value KY Steam Export Coal (\$)	KY Metallurgical Export Coal (tons)	Estimated* Value KY Metallurgical Export Coal (\$)	Total KY Export Coal (tons)	Estimated* Value KY Export Coal (\$)
Canada	-	-	1,630,000	52,665,300	1,630,000	52,665,300
France	-	-	48,000	1,924,320	48,000	1,924,320
Germany	-	-	48,000	1,605,120	48,000	1,605,120
Iceland	-	-	87,000	4,528,350	87,000	4,528,350
India	-	-	23,000	1,206,350	23,000	1,206,350
Italy	-	-	518,000	23,237,480	518,000	23,237,480
Japan	-	-	228,000	8,684,520	228,000	8,684,520
Netherlands	-	-	977,000	40,291,480	977,000	40,291,480
Norway	-	-	46,000	2,400,280	46,000	2,400,280
Sweden	-	-	20,000	874,000	20,000	874,000
United Kingdom	-	-	757,000	31,680,450	757,000	31,680,450
KENTUCKY	-	-	4,382,000	169,097,650	4,382,000	169,097,650

*NOTE: The value of Kentucky export coal (in current dollars) is estimated by using published U.S. free alongside ship (FAS) average values/ton/coal type/country of destination.

Source: Estimated by the Kentucky Coal Council using data from the Energy Information Administration, Coal Industry Annual, 2000.

U.S. Coal Imports*

Columbia (7.6 million tons), Venezuela (2.0 million tons), Canada (1.9 million tons), and Indonesia (0.7 million tons) were the largest suppliers of imported coal in 2000.

U.S. Coal Imports*

Year	Quantity (millions)	Average Price/Ton
1981	1.043	\$28.47
1982	0.742	\$30.40
1983	1.271	\$33.59
1984	1.286	\$35.37
1985	1.952	\$36.04
1986	2.212	\$36.02
1987	1.747	\$32.04
1988	2.134	\$29.96
1989	2.851	\$34.14
1990	2.699	\$34.45
1991	3.390	\$33.12
1992	3.803	\$34.46
1993	7.309	\$29.89
1994	7.584	\$30.21
1995	7.201	\$34.13
1996	7.127	\$33.45
1997	7.487	\$34.32
1998	8.724	\$32.18
1999	9.089	\$30.77
2000	12.513	\$30.10

*NOTE: Includes Puerto Rico and Virginia Islands.

Source: U.S. DOE Energy Information Administration, Coal Industry Annual, 2000.

Petroleum Coke

Since 1984, petroleum coke received by electric power plants increased 10 fold, from 335,200 tons to 4,153,000 tons in 2000. The average delivered cost of petroleum coke at electric utilities declined by 55%, from 128.6 cents per million Btu in 1984 to 58.5 cents per million Btu in 2000.

Petroleum Coke - Electric Utilities

Year	Tons (000)	Cents per Million Btu
1984	335	128.6
1986	359	105.5
1988	355	97.2
1990	554	80.3
1992	687	75.0
1994	1,263	68.9
1996	1,410	78.2
1998	6,216 *	71.2
1999	4,690 *	65.4
2000	4,153 *	58.5

*NOTE: Includes utility and non-utility plants.

Source: U.S. DOE Energy Information Administration, Petroleum Coke Tables.

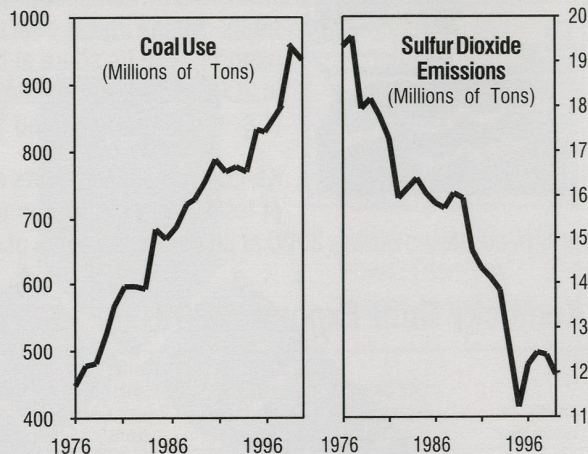
Air Quality/By-Products

Coal Use and Sulfur Dioxide Emissions from Electric Power Plants

Coal is being burned more cleanly today than ever before. Air pollution from coal is decreasing, while coal use is increasing.

Coal-fired power plants in the U.S. have reduced their sulfur dioxide emission rate (the amount of pollution produced for each ton of coal burned) by 71% from 1976 to 1999.

U.S. sulfur dioxide emissions have decreased by 39% from 1976 to 1999, even though power plants increased their coal use by 112% between 1976 and 1999.



Kentucky's 1997 sulfur dioxide emissions of 796,000 tons have been reduced by 47% from the 1976 sulfur dioxide emissions level of 1,495,622 tons.

These achievements are the result of using lower-sulfur coal and pollution control equipment such as scrubbers. The use of flue gas desulfurization equipment (FGD or scrubbers) has increased dramatically. Kentucky is second in the nation in installed scrubber capacity. Utilities in Kentucky during 1999 had scrubbers on 48% of their coal-fired generating capacity, compared to the national average of 27%.

Sources: Environmental Quality Commission (EQC), *The State of Kentucky's Environment: 2000-01 Air Quality*; U.S. DOE - EIA; *Electric Power Annual, 1989-2000*; *Cost and Quality of Fuels for Electric Utility Plants, 2000*.

Coal Combustion By-Products

There are currently 16 ash landfills permitted totaling 6,062 acres of land for disposal of ash from existing power plants. Approximately one acre of landfill space is required to dispose of 100,000 tons of ash. At the current rate, 1,000 acres of permitted area will accommodate the existing volume of ash being landfilled for the next 20 years, the average life expectancy of a landfill. Coal combustion in Kentucky produced 3.2 million tons of fly ash, 1.1 million tons of bottom ash, and 3.2 million tons of flue gas desulfurization (FGD) materials during 1996. According to a 1996 University of Kentucky Center for Applied Energy Research survey, 10.3% (0.8 million tons) of the 7.5 million tons coal combustion by-products produced within Kentucky were reused. Combustion materials generated within Kentucky do not include the coal combustion material generated from the combustion of Kentucky coal in 27 other states during 2000.

2000 U.S. Coal Combustion By-Product Production and Consumption (million tons)

	Production	Consumption	% Used
Fly Ash	62.9	20.1	31.9
Bottom Ash	16.9	4.9	29.2
Boiler Slag	2.7	2.3	86.5
Subtotal	82.5	27.3	33.1
FGD Material	25.7	4.8	18.8
Total	108.2	32.2	29.7

Source: American Coal Ash Association, Inc.

Existing Consumption

- Cement and concrete products
- Road base/subbase
- Snow and ice control
- Grouting/wallboard
- Coal mining applications
- Structural fill/flowable fill
- Mineral filler in asphalt
- Blasting grit/roofing granules
- Waste stabilization

Source: UK - Center for Applied Energy Research, *Kentucky Natural Resources and Environmental Protection Cabinet Report*, December, 2001.

Reclamation

Mined land must be returned to its approximate original contour, with the exception of mountaintop removal operations, in accordance with the federal Surface Mining Control and Reclamation Act of 1977.

According to the 1977 law, mountaintops may be reclaimed as flat land, which leaves the land more valuable for development. Reclaimed land must be as useful as the land was before mining. Often the land is more useful.

Stringent regulations govern the design, operation, and environmental impact of every mine. Mining and reclamation sites are inspected on a regular basis by state inspectors. Federal inspectors also conduct random oversight inspections.

Kentucky coal operators have paid over \$783.97 million to date into a federal program to reclaim land mined prior to August 3, 1977.

Before surface mining begins, Kentucky coal operators must post bonds to ensure proper reclamation.

Under Kentucky's 1984 Permanent Program or "Primacy Program," bonds are not fully released until a coal operator has demonstrated five years of consecutive successful reclamation (see chart below).

As of December 2001, the Kentucky mining industry had a total of 7,991 outstanding bonds, valued at \$809.5 million, to assure timely and successful reclamation.

Bond Release Phase	Reclamation Release Type	% of Bond Released	Time/Phase Requirement
Phase I	Backfilling, grading, seeding, and drainage	60%	Complete landscaping
Phase II	Vegetation	25%	Approximately two years of successful reclamation
Phase III	Final	15%	Five years of consecutive successful reclamation

Successful Mining Reclamation/Primacy Bond Releases, 1984-2000

Year	Phase I			Phase II			Phase III		
	# of Releases	Acres* Released	Bond Amount	# of Releases	Acres* Released	Bond Amount	# of Releases	Acres* Released	Bond Amount
1984	4	123	\$277,886	-	-	-	-	-	-
1985	40	767	\$1,946,323	2	84	\$79,841	1	8	\$11,600
1986	248	6,361	\$16,781,470	-	-	-	1	14	\$16,800
1987	332	8,379	\$21,390,109	11	253	\$289,767	4	155	\$284,300
1988	561	15,583	\$38,194,394	57	1,303	\$1,261,810	-	-	-
1989	446	16,777	\$32,058,350	60	1,632	\$1,967,811	3	21	\$38,500
1990	533	15,383	\$28,108,146	260	7,298	\$6,221,870	51	1,697	\$1,569,147
1991	626	14,642	\$28,373,662	428	12,667	\$11,200,897	130	2,958	\$6,890,877
1992	670	18,278	\$33,822,612	477	13,338	\$11,489,035	255	8,101	\$6,811,872
1993	498	13,893	\$25,386,134	416	12,661	\$11,242,965	448	15,986	\$8,629,089
1994	452	15,933	\$27,423,038	319	10,828	\$9,768,647	406	14,098	\$8,709,946
1995	525	16,650	\$32,343,224	427	13,141	\$12,399,017	517	18,419	\$16,338,524
1996	619	23,968	\$47,602,996	419	14,784	\$17,378,599	784	27,018	\$22,365,232
1997	393	13,179	\$23,571,000	373	13,323	\$13,463,098	806	30,768	\$29,923,783
1998	351	12,646	\$28,589,902	255	8,104	\$9,370,064	747	21,387	\$18,859,893
1999	357	11,259	\$20,644,178	192	5,971	\$6,719,383	602	19,774	\$23,043,414
2000	285	10,237	\$18,529,971	206	6,380	\$9,449,942	587	20,678	\$17,215,050
Total	6,940	214,058	\$425,043,395	3,902	121,767	\$122,302,746	5,342	181,082	\$160,708,027

*NOTE: Includes surface acreage over underground mines.

Source: Kentucky Natural Resources and Environmental Protection Cabinet, Department for Surface Mining, Reclamation and Enforcement.

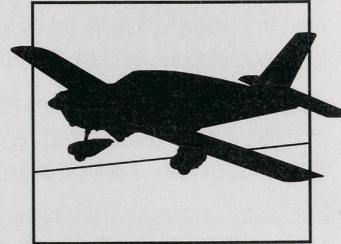
Post-Mining Land Uses

Post-mining land use changes go hand-in-hand with economic development in Kentucky, especially in many parts of Eastern Kentucky where much needed level to gently rolling land for development is still at a premium.

Post-Mining Land Use and County

Regional Airports

Big Sandy Regional Airport	Martin
Hatcher Field Airport	Pike
Carroll Field Airport	Breathitt
Ford Airport	Perry
Ohio County Airport	Ohio



Correctional Facilities

Federal Correctional Institute	Clay, Martin
East Kentucky Correctional Complex	Morgan
Medium Security Prison	Muhlenberg, Knott (in development)
Otter Creek Correctional Center	Floyd
Juvenile Boot Camp	Breathitt

Government Facilities

Earle C. Clements Job Corps Ctr.	Muhlenberg
Army National Guard Training Ctr.	Muhlenberg
U.S. Postal Service	Laurel
County Park	Ohio
Madisonville South By-Pass	Hopkins
Solid Waste Landfills	Daviess, Greenup, Ohio, Hopkins, Perry, Lee
Hazard Armory	Perry
Jail and State Police Barricks	Perry
Veterans' Nursing Home	Perry

Fish & Wildlife

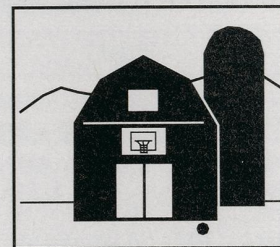
Duck Refuge Areas	Ohio, Perry, Breathitt, Knott, Martin, Muhlenberg
Catfish Farming	McLean
Wildlife Management Area	Muhlenberg, Ohio, Perry
Wetland Development	Muhlenberg

Elk in the Mountains of East Kentucky Again

Free-ranging elk returned to the mountains of East Kentucky, with reclaimed mountaintop removal areas, old reclaimed mine benches, and hardwood forests serving as their home once again. The first hunter in more than 150 years to legally kill an elk in Kentucky did so in 2001.

Farms

Starfire Project	Perry
MAPCO/Morehead Agriculture Ctr.	Martin
Martin County Coal Corp. Farm	Martin
D&R Brangus Farm	Perry
Hog Farm	Hopkins, Knox
Avian Farms	Wayne
Agricultural Project	Pike
Chicken/Broiler Houses	Hopkins, Muhlenberg
Livestock Feed	Greenup, Harlan, Lee, Johnson, Wolfe, Whitley



Industrial/Commercial

Electrical Construction Office/Shop	Hopkins
Electric Utility Operations Center	Hopkins
Industrial Scrubber Sludge Disposal	Ohio, Daviess, Webster
Explosive Manufacturing	Muhlenberg
Wood Fabrication Plant	Breathitt, Perry, Pike (proposed)
Apparel Manufacturing	Perry, Boyd
Mine Shops/Welding/Machine/Equip.	Johnson, Hopkins, Knox, Muhlenberg, Ohio, Union, Whitley
Truck/Equipment Sales	Butler
Trucking Company	Muhlenberg, Boyd
Explosive Company	Perry, Hopkins
Farm Equipment	Hopkins
Sawmill/Logs/Lumber	Bell, Butler, Clay, Jackson, Laurel, Pike, Whitley, Wolfe
Recycling Facility	Letcher
Blacktop/Concrete Facilities	Laurel, Perry
Oil/Gas Facilities	Clay, Lee, Elliott

(continued on next page)

Post-Mining Land Uses

Post-Mining Land Use and County (continued)

Industrial /Commercial (continued)

Cabinet Factory	Perry
Clay-Leslie Regional Industrial Park	Clay, Leslie
Coalfields Regional Industrial Park	Breathitt, Harlan, Leslie, Perry
Corbin Tri-County Industrial Park	Knox
East Park Regional Industrial Park	Boyd, Carter, Elliott, Greenup, Lawrence
Equipment Rental/Sales	Boyd
Gateway Regional Business Park	Floyd, Knott, Letcher, Pike
Honey Branch Regional Business Park	Floyd, Johnson, Magoffin, Martin, Pike
Little Goose Industrial Site	Clay
Maggie Mountain Industrial Park	Floyd
Paul Coffey Industrial Park	Boyd
Pine Mountain Regional Business Park	Bell, Harlan, Knox, Letcher, Whitley
Retail Outfitters	Clay
South McCreary Industrial Park	McCreary (in development)
Tooling Company	Clay
Uniform Rental Services	Carter
Utility	Boyd, Knott, Perry
Wireless Communications	Carter
Plastic Injection Molding Company	Perry
Mine/Electronics Supply	Martin
Industrial Parkway	Greenup
United Parcel Services	Perry, Boyd
Unified Power Distribution	Martin

Rail-to-Trails: Old coal haul rails have been removed to make walking trails in Muhlenberg, Union, and Webster counties.

R&R/Sport

Baseball Fields	Boyd
Coal Hollow Park	Floyd
Elkhorn Educational Recreation Park	Floyd
Golf Courses	Clay, Laurel, Letcher, Floyd, McLean, Owsley (proposed)
Recreational Area	Lee, Greenup
Red Fox Resort	Knott (in development)
Stonecrest Golf Course	Floyd
Wayland Park	Floyd
Golf (drive & putt)	Webster
Recreational Area & Fishing Lake	Pike
Athletic Facilities	Letcher
Fairgrounds	Morgan
Riding Stables & Trails	Muhlenberg
Campground (proposed)	Hopkins

Mountaintop Mining: Mining is only a temporary land use. Mountaintop mining has created several sites for new schools, hospitals, shopping centers, parks, golf courses, housing, airports, industry, agriculture and timber in Eastern Kentucky.

Structural Building Sites

High Schools	Pike
Elementary School	Boyd
Flea Market	Perry
Athletic Complexes	Letcher, Pike
Appalachian Regional Hospital	Perry
Housing Developments	Bell, Boyd, Clay, Floyd, Greenup, Harlan, Johnson, Knox, Laurel, Lee, Leslie, Letcher, Martin, Perry, Pike
Church, Daycare	Laurel, Perry
Mobile Home Sales	Laurel
Shopping Centers	Breathitt, Clay, Knox, Laurel, Leslie, Letcher, Pike, Perry
Car/Truck/Equipment Sales	Perry
Motel/Hotel	Laurel, Perry
Office Complex	Morgan, Martin, Perry, Pike (proposed)
Storage Rental Facility	Hopkins, Perry
Off Track Betting	Perry
Telecommunications Call Center	Perry

Numerous small businesses in Eastern Kentucky

Sources: Natural Resources and Environmental Protection Cabinet - DSMRE, Area Development Districts, Kentucky Coal Council.

AML Reclamation

Abandoned Mine Land (AML) Reclamation

The federal Surface Mining Control and Reclamation Act of 1977 established authority for the AML Fund. Contributions to this fund are made by each mining company at the rate of \$0.35 per ton for surface-mined coal and \$0.15 per ton for underground-mined coal. These funds reclaim pre-law (1977) and certain interim program (1977-1982) sites left abandoned, unreclaimed, or insufficiently reclaimed.

The Kentucky coal industry has contributed \$783.97 million to the Abandoned Mine Land (AML) Reclamation Fund since 1978. Nationally, over \$5.82 billion has been paid by coal operators across the United States.

50% of the total Kentucky AML fees go directly to the state share account. However, \$108.0 million (September, 2000) is unallocated due to the federal appropriation process (see Kentucky State Share Balance column in table below).

\$1,507,745,199 of AML taxes remain unallocated for reclaiming abandoned mines across the United States.

Abandoned Mine Land (AML) Reclamation Fund (millions)

Fiscal Year	Kentucky Collection	Kentucky State Share*	KY AML Grant Disbursement	KY State Share Balance**
1978	\$20.38	\$14.98	\$ 0	\$15.0
1979	31.18	16.85	0.6	31.8
1980	34.64	17.51	0	49.3
1981	36.52	17.91	1.4	67.2
1982	38.60	18.29	16.4	69.6
1983	31.46	15.56	28.9	56.7
1984	38.12	18.87	36.8	44.8
1985	36.91	17.30	32.3	31.4
1986	35.29	17.25	19.7	31.6
1987	35.02	17.61	16.4	36.7
1988	26.34	13.17	15.3	37.5
1989	35.39	17.69	27.6	38.5
1990	38.40	19.41	6.4	43.3
1991	37.04	18.45	11.0	47.8
1992	35.60	17.82	28.2	54.9
1993	36.18	18.04	11.5	62.8
1994	36.82	18.24	18.7	70.7
1995	35.49	17.61	15.5	77.1
1996	33.98	16.90	16.0	83.6
1997	34.66	17.24	16.1	90.1
1998	35.04	17.45	15.7	97.4
1999	32.38	16.15	16.5	103.4
2000	30.49	15.19	17.0	108.0
Totals	\$783.97	\$395.49	\$368.0	

*NOTE: Includes reclamation fees, interest, and audit adjustments and will not equal exactly 50%.

**NOTE: Adding across table will not equal balance, due to all adjustments not being included in table.

AML Reclamation Accomplishments in Kentucky (through 2000)

Kentucky AML Projects

585 Multi-site State AML Projects
 \$368 million in expenditures
 14,600 acres reclaimed
 (plus various projects currently under construction)

Federal AML Projects

1,010 Multi-site AML Projects
 \$123 million in expenditures
 Rural Abandoned Mine Program,
 Emergency and Non-Emergency

From 1978-2000, 1,595 multi-site AML projects have been undertaken in Kentucky by both the state and federal programs reclaiming thousands of acres and spending \$491 million in AML reclamation funds.

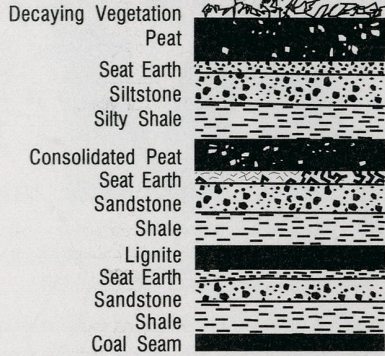
Some accomplishments to date of the state's AML Projects in Kentucky are:

51 water line projects - \$52 million.	1,560 mine portal closures.
Over 26,700 feet of highwall eliminated.	120 vertical shafts sealed.
Over 200 hazardous structures removed.	43 miles of stream restoration.
Over 1,960 acres of landslide projects stabilized.	297 acres of mine fires controlled.

Today's coal industry in Kentucky is reclaiming the land to uses as good or better than before mining, and through contributions to the AML fund, is helping to restore previously mined lands to today's reclamation standards.

Sources: Natural Resources and Environmental Protection Cabinet, Division of Abandoned Lands; U.S. Office of Surface Mining (OSM); U.S. Department of Agriculture, RAMP.

Coal Origin and Properties



It is generally accepted that coal originated from plant debris including ferns, trees, bark, leaves, roots and seeds some of which accumulated and settled in swamps.

This unconsolidated accumulation of plant remains is called peat. Peat is being formed today in marshes and bogs.

Layers of peat, covered by sediment receiving heat and pressure from the subsidence of the swamps, went through a metamorphic process called coalification to form coal.

The metamorphic process is thought to have occurred in several stages. The conditions of the metamorphic process and the swamps and bogs greatly affected the formation of the coal.

Several factors which greatly affected the content, makeup, quality, and rank of the coal were:

- | | |
|------------------|-------------------------|
| Temperature | Fresh water/sea water |
| Pressure | Swamp acidity |
| Time | Types of plant debris |
| Layering process | Types of sediment cover |

Coal first formed from peat has a high moisture content and a relatively low heating value.

Coal Rank

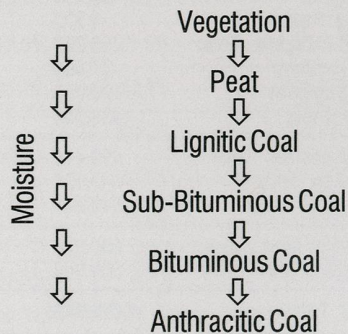
Coal usually is divided into two main classes - anthracite (hard coal) and bituminous (soft coal). When anthracite was formed, it was squeezed under greater heat and pressure than was bituminous. As a result, anthracite contains the highest percentage of carbon and the lowest percentage of moisture. Anthracite makes up only a small part of the world's supply of coal. About half of the world's coal resource is bituminous coal. (See U.S. Coal Reserves map.) Remaining coal resources are even softer (lignite and sub-bituminous).

Moisture decreases, rank increases.

Rank increases, fixed carbon increases.

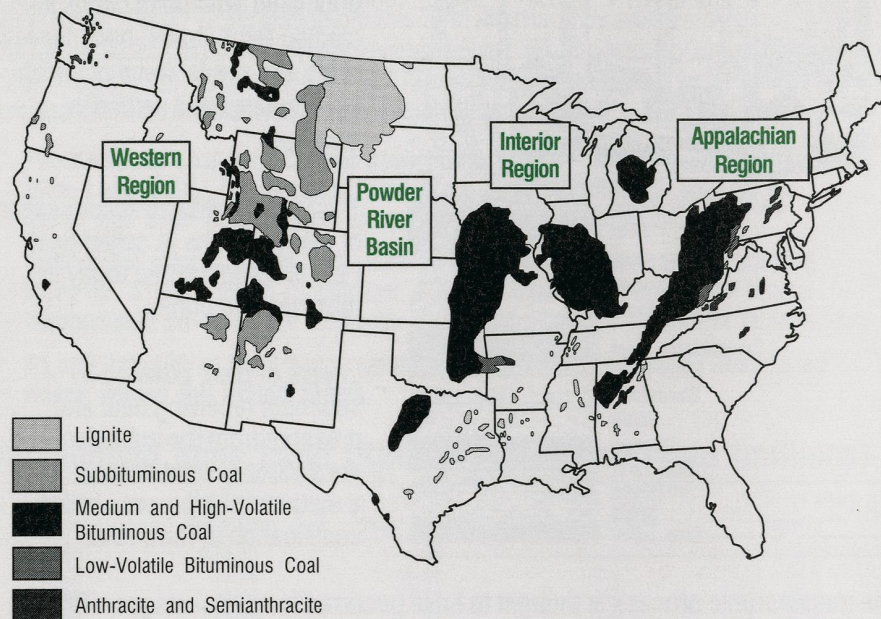
Rank increases, volatile matter decreases.

Rank increases, heating value increases (optimum Btu at low-volatile bituminous).



U.S. Comparisons-Production

U.S. Coal Fields and Coal Producing Areas



Source: Developed from the U.S. Geological Survey

Coal Production by State, 2000 (thousand tons)

State and Region	Total	Anthracite	Bituminous	Sub-Bituminous	Lignite
Alabama	19,324	--	19,324	--	--
Alaska	1,641	--	--	1,641	--
Arizona	13,111	--	13,111	--	--
Arkansas	12	--	12	--	--
Colorado	29,137	--	21,907	7,230	--
Illinois	33,444	--	33,444	--	--
Indiana	27,965	--	27,965	--	--
Kansas	201	--	201	--	--
Kentucky, Total	130,688	--	130,688	--	--
Eastern	104,901	--	104,901	--	--
Western	25,787	--	25,787	--	--
Louisiana	3,699	--	--	--	3,699
Maryland	4,546	--	4,546	--	--
Mississippi	902	--	--	--	902
Missouri	436	--	436	--	--
Montana	38,352	--	--	37,980	372
New Mexico	27,323	--	6,156	21,167	--
North Dakota	31,270	--	--	--	31,270
Ohio	22,269	--	22,269	--	--
Oklahoma	1,588	--	1,588	--	--
Pennsylvania	74,619	4,572	70,046	--	--
Tennessee	2,669	--	2,669	--	--
Texas	49,498	--	180	--	49,319
Utah	26,656	--	26,656	--	--
Virginia	32,834	--	32,834	--	--
Washington	4,270	--	--	4,270	--
West Virginia, Total	158,257	--	158,257	--	--
Northern	37,601	--	37,601	--	--
Southern	120,656	--	120,656	--	--
Wyoming	338,900	--	1,985	336,915	--
Appalachian Total	419,419	4,572	414,847	--	--
Interior Total	143,531	--	89,612	--	53,919
Western Total	510,661	--	69,816	409,203	31,641
East of Miss. River	507,517	4,572	502,043	--	902
West of Miss. River	566,094	--	72,233	409,203	84,659
U.S. Total	1,073,612	4,572	574,276	409,203	85,561

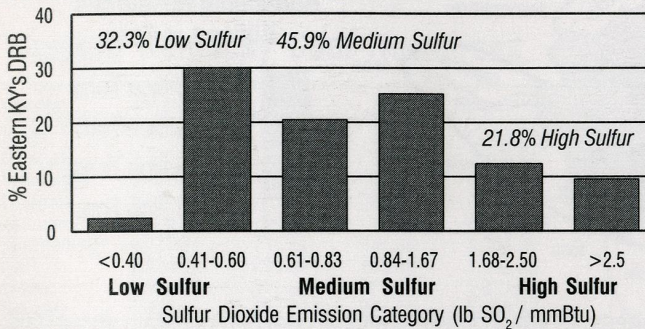
Source: U.S. DOE - Energy Information Administration, *Coal Industry Annual*, 2000.

U.S. Coal Reserves

Eastern Kentucky Low-Sulfur Coal

The U.S. DOE estimates over 32.3% of Eastern Kentucky's Demonstrated Reserve Base (DRB) would meet a 0.6 pounds of sulfur dioxide per million Btu emissions limit (low sulfur), and 45.9% would meet a 1.67 lb/mm Btu emissions limit (medium sulfur).

Summary Sulfur Content Categories*



Converting "Percent Sulfur" to "lb SO₂ per million Btu"

$$\text{lb SO}_2 / \text{mmBtu} = \frac{\%S \times 19,500}{\text{Btu/lb of coal}}$$

Examples for
12,500 Btu coal:

% Sulfur	lb/mm Btu
1.0%	1.56
0.9%	1.40
0.8%	1.25
0.7%	1.09

NOTE: Change % sulfur to Sulfur Dioxide Emission Category (lb SO₂ / mmBtu) comparisons.

*EIA uses 6 sulfur content ranges. For general discussion and summary data, however, those 6 ranges are combined into 3 qualitative ratings of low, medium, and high-sulfur content.

1997 U.S. Demonstrated Coal Reserve Base (millions of tons)

The U.S. Demonstrated Coal Reserve Base is an estimate of the tonnage of economically available coal.**

Coal Producing Region and State	Anthracite	Bituminous	Sub-Bituminous	Lignite	Total** (millions of tons)
Appalachian Total	6.9%	92.1%		1.0%	106,475.4
Alabama		75.7%		24.3%	4,460.3
Georgia		100.0%			3.6
Kentucky, Eastern		100.0%			11,686.5
Maryland		100.0%			701.8
North Carolina		100.0%			10.7
Ohio		100.0%			23,568.7
Pennsylvania	25.4%	74.6%			28,370.8
Tennessee		100.0%			806.4
Virginia	6.0%	94.0%			2,075.9
West Virginia		100.0%			34,790.7
Interior Total	<0.1%	91.5%		8.4%	159,090.9
Arkansas	24.9%	69.0%		6.1%	416.8
Illinois		100.0%			104,915.2
Indiana		100.0%			9,820.9
Iowa		100.0%			2,189.5
Kansas		100.0%			974.1
Kentucky, Western		100.0%			19,829.5
Louisiana			100.0%		454.2
Michigan		100.0%			127.7
Missouri		100.0%			5,993.1
Oklahoma		100.0%			1,570.6
Texas				100.0%	12,799.4
Western Total	<0.1%	10.5%	77.1%	12.4%	238,744.4
Alaska		11.4%	88.4%	0.2%	6,122.4
Arizona		100.0%			101.6
Colorado	0.1%	52.0%	22.9%	25.0%	16,656.4
Idaho		100.0%			4.4
Montana		1.2%	85.7%	13.1%	119,571.7
New Mexico	<0.1%	29.7%	70.3%		12,394.7
North Dakota				100.0%	9,320.6
Oregon			100.0%		17.5
South Dakota				100.0%	366.1
Utah		>99.9%	<0.1%		5,744.9
Washington		22.0%	77.4%	0.6%	1,378.4
Wyoming		6.4%	93.6%		67,065.7
U.S. Total	1.5%	53.3%	36.5%	8.7%	504,310.7

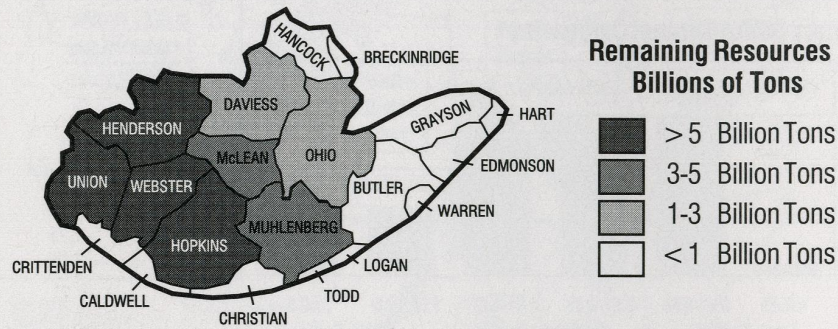
**Kentucky coal resource values are considered by some to be too high, while the Eastern Kentucky "Demonstrated Coal Reserve Base" value being increased by 4 billion tons is still openly rejected by many others as being too low.

Source: U.S. DOE - EIA, U.S. Coal Reserves: 1997 Update (February 1999).

Kentucky Coal Resources

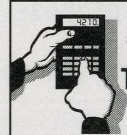
Western Kentucky Coal Field

The Western Kentucky coal field covers 6,400 square miles and contains over 35.8 billion tons of remaining resources. (Part of this cannot be mined economically using today's technology). The remaining resources and their locations are illustrated below.



There are 35 named coal beds, of which seven principal coal beds contain about 94% of the resources in Western Kentucky.

Over 5 billion tons of coal have been mined or lost due to mining, amounting to only about 12.5% of total Western Kentucky coal resources.



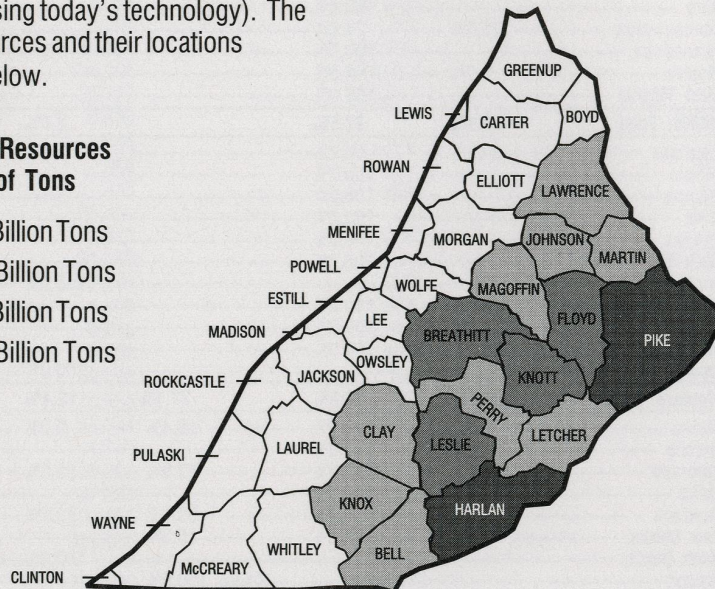
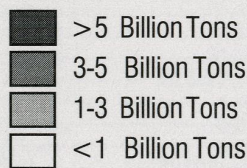
How To Calculate Tons of Coal

$$\text{Total Tons} = \text{Acres} \times \text{Inches} \times 135 \text{ tons per acre-inch} \\ (\text{acres of coal}) \times (\text{height of coal}) \times (\text{density of coal})$$

Eastern Kentucky Coal Field

The Eastern Kentucky coal field covers 10,500 square miles and contains approximately 52.7 billion tons of remaining resources. (Part of this cannot be mined economically using today's technology). The remaining resources and their locations are illustrated below.

Remaining Resources Billions of Tons



There are more than 80 named coal beds in the Eastern Kentucky coal field which covers parts of 37 counties.

Approximately 11.3 billion tons of coal have been mined or lost due to mining, amounting to only about 17.8% of total Eastern Kentucky coal resources.

Source: Updated from Brant and Other, *Coal Resource Series*, 1980-1983.

Kentucky Coal Resources

Original resource estimates for Western and Eastern Kentucky were 41 and 64 billion tons respectively. The resources currently remaining after 200 years of mining are estimated to be 35.8 billion tons in Western Kentucky and 52.7 billion tons in Eastern Kentucky. As shown in the Demonstrated Reserve Base (DRB) tables on page 35, assumptions on the percentage available for development reduce those values even further.

Western Kentucky Coal Resources

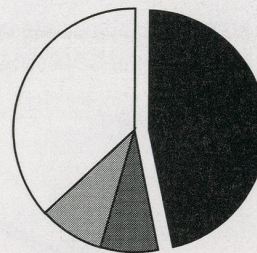
County	Original	Mined	Lost	Remaining
Butler	413.69	30.20	30.20	353.29
Daviess	1,330.32	61.84	61.84	1,206.64
Henderson	6,852.78	64.86	64.86	6,723.06
Hopkins	8,814.80	751.37	751.37	7,312.06
McLean	3,576.41	19.16	19.16	3,538.09
Muhlenberg	4,723.84	731.02	731.02	3,261.80
Ohio	1,824.55	263.66	263.66	1,297.23
Union	6,506.98	317.65	317.65	5,871.68
Webster	6,322.95	294.79	294.79	5,733.37
Other*	623.08	24.92	24.92	573.24
WKY Total	40,989.40	2,559.47	2,559.47	35,870.46

*NOTE: "Other" includes Breckinridge, Caldwell, Christian, Crittenden, Edmonson, Grayson, Hancock and Warren Counties.

**NOTE: Kentucky coal resource values are considered by some to be too high of a value, while the Eastern Kentucky "DRB" value is rejected by many others as being too low. Three-fourths of the remaining coal resources in EKy are not considered to be part of the "DRB".

Caution: coal reserve estimates affected by static terms like "today's technology" and "economically recoverable" may not continue to apply tomorrow.

Original Coal Resources Estimate (41 Billion Tons)



- 19.83 billion tons in DRB**
- 2.6 billion tons lost due to mining 1790-2000
- 2.6 billion tons mined 1790-2000
- 16.04 billion tons remaining, but not in DRB**

Eastern Kentucky Coal Resources

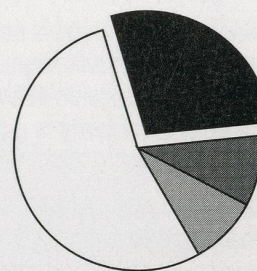
County	Original	Mined	Lost	Remaining
Bell	3,194.70	292.80	292.80	2,609.10
Boyd	630.68	19.93	19.93	590.82
Breathitt	4,112.20	203.52	203.52	3,705.16
Carter	501.96	18.61	18.61	464.74
Clay	1,536.11	61.04	61.04	1,414.03
Elliott	316.32	9.83	9.83	296.66
Floyd	4,168.08	447.80	447.80	3,272.48
Greenup	204.87	10.41	10.41	184.05
Harlan	7,881.12	871.71	871.71	6,137.70
Jackson	375.87	11.21	11.21	353.45
Johnson	1,419.44	94.10	94.10	1,231.24
Knott	4,385.10	280.00	280.00	3,825.10
Knox	1,381.93	73.35	73.35	1,235.23
Laurel	408.04	35.75	35.75	336.54
Lawrence	2,024.68	21.78	21.78	1,981.12
Lee	363.98	8.40	8.40	347.18
Leslie	3,554.65	236.75	236.75	3,081.15
Letcher	3,692.80	521.62	521.62	2,649.56
McCreary	444.97	55.34	55.34	334.29
Magoffin	1,969.10	54.82	54.82	1,859.46
Martin	3,319.97	357.68	357.68	2,604.61
Morgan	849.40	15.14	15.14	819.12
Owsley	574.14	9.67	9.67	554.80
Perry	3,596.70	542.57	542.57	2,511.56
Pike	11,391.70	1,296.69	1,296.69	8,798.32
Whitley	987.44	90.85	90.85	805.74
Wolfe	443.92	7.16	7.16	429.60
Other***	334.89	33.18	33.18	268.53
EKY Total	64,064.76	5,681.71	5,681.71	52,701.34

**NOTE: Kentucky coal resource values are considered by some to be too high of a value while the Eastern Kentucky "DRB" value was increased from 8.6 to 11.7 billion tons but is still rejected by some as being too low (see page 35).

***NOTE: "Other" includes Clinton, Estill, Pulaski, Rockcastle, and Wayne Counties.

Sources: Smith and Brant (1980), Mined and Lost and Remaining Resources updated by the Kentucky Coal Council from Kentucky Department of Mines and Minerals Annual reports.

Original Coal Resources Estimate (64.1 billion tons)



- 11.69 billion tons in DRB**
- 5.7 billion tons lost due to mining 1790-2000
- 5.7 billion tons mined 1790-2000
- 41.01 billion tons remaining, but not in DRB**

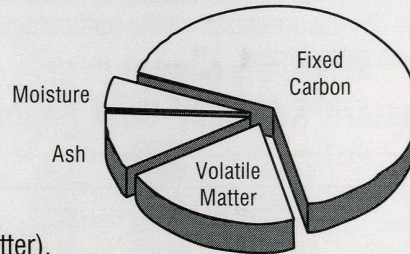
Source for DRB: U.S. DOE-EIA, U.S. Coal Reserves, August, 1999.

Coal Properties/Improvements

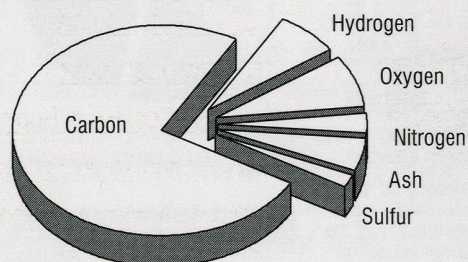
There are two different types of analyses used to determine the nature of bituminous coal: proximate and ultimate analysis. Proximate analysis determines (on an as-received basis):

- **Moisture content**
- **Volatile matter** (gases released when coal is heated).
- **Fixed carbon** (solid fuel left after the volatile matter is driven off).
- **Ash** (impurities consisting of silica, iron, alumina, and other incombustible matter).

Proximate Analysis



Ultimate Analysis



Ultimate analysis determines the amount of carbon, hydrogen, oxygen, nitrogen, and sulfur.

Btu - Heating value is determined in terms of Btu both on an as-received basis (including moisture) and on a dry basis.

Source: U.S. DOE - EIA, *Coal Data: A Reference*, 1989.

Improving the Properties of Mined Coal

Kentucky coal is improved by the partial removal of the impurities —sulfur and ash. The cleaning process to remove impurities from the coal is often called *beneficiation, coal preparation, or coal washing*.

In general, coal cleaning is accomplished by separating and removing inorganic impurities from organic coal particles. The inorganic ash impurities are predominantly more dense than the coal particles. This property is generally the basis for separating the coal particles from the ash impurities.

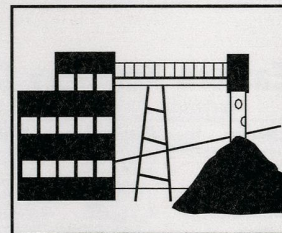
Western Kentucky had 14,015 tons per hour of coal preparation design capacity at approximately 24 coal preparation plants during 2001. Eastern Kentucky had 48,995 tons per hour of coal preparation design capacity at approximately 73 sites during 2001.

Each coal seam has a different washability characteristic. The range of improvement to a particular seam by mechanical washing varies from plant to plant and location to location.

In Western Kentucky, sulfur (inorganic sulfur) and ash are the two main impurities removed. Considering the seven principal mined seams in this area, 0.5% to 2.5% can be subtracted from the average sulfur content and 9% to 13% can be subtracted from the ash content after the coal washing process.

In Eastern Kentucky, coals with very high ash contents are washed. High ash content results from seam impurities, splits or partings in the seam, or ash accumulating mining methods. In these seams the ash is the main impurity removed — 10% to 15% can be subtracted from the ash content after the coal washing process and with only a slight reduction in the sulfur content.

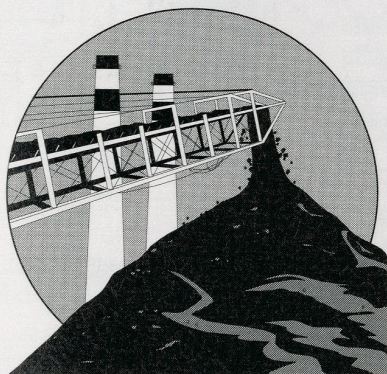
Source: Kentucky Coal Council.



Visit Our Educational Web Site at www.coaleducation.org

Welcome to the
Kentucky Coal Council

Coal Education



Web Site

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Energy Geography: Electricity

Who delivers your electricity?

Where is your electricity made?
Who generates it?

How is your electricity made?

What forms of energy are being converted?

What fuel is used to make your electricity? Why?

How was coal formed and what energy transfer was involved?

Geographic Regions of Kentucky

Kentucky Coal Council

The Kentucky Energy Geography: Electricity Map is a 24" x 36" color wall poster kit for the classroom. Here are just a few of the questions you can explore with this classroom resource.

- Where's your electricity made? Who generates it?
- How's your electricity made? What forms of energy are being converted?
- What fuel is used to make your electricity? Why?
- How was coal formed and what energy transfer was involved?

A classroom map/poster kit, for 4th - 12th grades, college classes, student teachers, and teachers detailing Kentucky geography to physical science, can be ordered online at www.coaleducation.org.

PCs + www. = kWh^{Coal}

The typical PC and its peripherals (printers, scanners, modems, etc.) accessing the Internet require about 1,000 watts of power. A lump of coal is burned every time a book is ordered on-line.

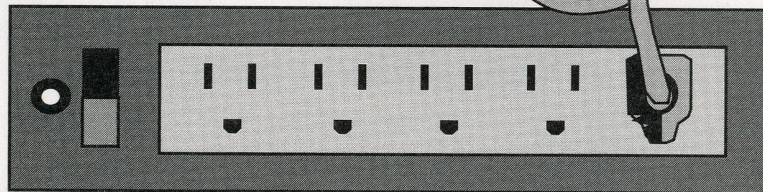
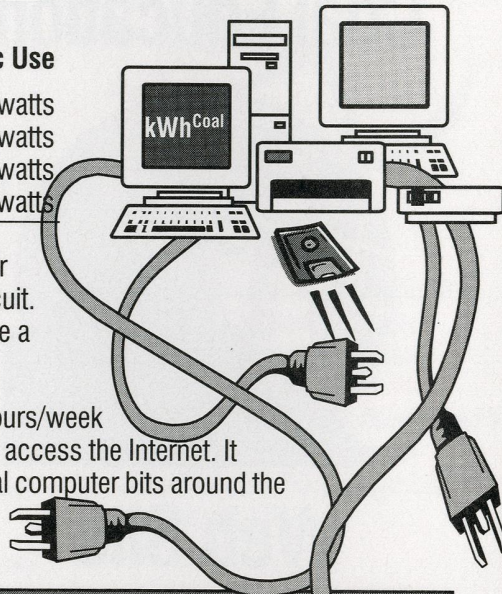
It takes about 1 pound of coal to create, package, store and move 2 megabytes of data.

Power - Watts

Computer Devices	Electric Use
Integrated Circuit	90 watts
PCs + attachments	1,000 watts
Routers	500 - 1,500 watts
Servers	1,000 - 2,000 watts

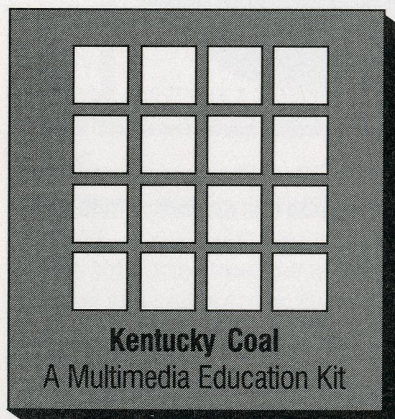
To Build - It takes 9 kilowatt-hours per square inch to make an Integrated circuit. The amount of electricity used to make a simple PC is about 1,500 kWh.

The average home user is online 12 hours/week and consumes 1,000 kWh per year to access the Internet. It takes kilowatt-hours to transport digital computer bits around the Internet just as it takes gasoline to transport you around town.



The total electrical demand from PCs on the Internet today equals 8% of the U.S. electric supply.

Coal Education Interactive Multimedia Library Kit



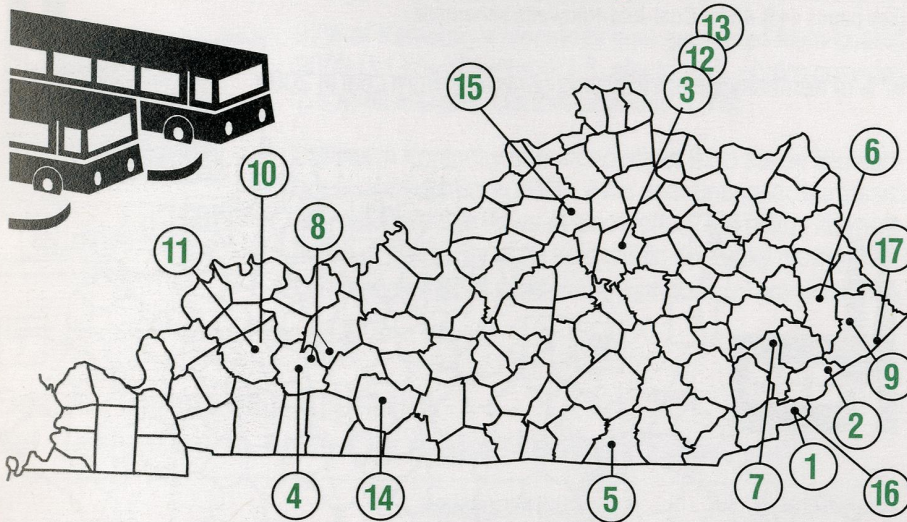
Kentucky Coal - A Multimedia Education Kit with interactive learning tools is available in every public elementary, middle school, and county library in Kentucky.

Explore the world of Kentucky coal and see how we get coal out of the ground and use it to make electricity.

Three coal education classroom videos, a production of Western Kentucky University in cooperation with the Kentucky Authority for Educational Television with partial funding from the Kentucky Coal Council, are included in the kit.

Coal Education Field Trip Sites

Coal Education Field Trip Sites in Kentucky



Field Trip Site	City/County	Phone	Age Group
Museums			
1 <i>Kentucky Coal Museum</i>	Benham/Harlan	606-848-1530	all ages
2 <i>Coal & Rail Museum</i>	Jenkins/Letcher	606-832-4676	all ages
3 <i>Lexington Children's Museum</i>	Lexington/Fayette	859-258-3253	all ages
15 <i>Kentucky History Center</i>	Frankfort/Franklin	502-564-1792	all ages
17 <i>Elkhorn City Railroad Museum</i> Open Tuesday and Friday	Elkhorn City/Pike	606-754-4554	all ages
Parks			
4 <i>Paradise Park Complex</i> <i>Duncan Cultural Center</i>	Greenville/Muhlenberg Greenville/Muhlenberg	270-338-5422 270-338-2605	all ages all ages
5 <i>Big South Fork Scenic Railway</i>	Stearns/McCreary	800-GO-ALONG	all ages
Interpretive Center			
6 <i>Jenny Wiley State Resort Park</i> Contact: Ron Vanover	Prestonsburg/Floyd	606-886-2711	all ages
Wildlife Reclamation			
7 <i>Cyprus-Amax WMA (Elk)</i>	Ary/Perry	606-378-3474	all ages
8 <i>Peabody Wildlife Mgmt. Area</i> Contact: Joyce L. Fitzgerald, KDFWR	Muhlenberg & Ohio	270-273-3568	4th grade & up
Annual Events			
9 <i>CEDAR's Regional Coal Fair</i> Contact: John Justice	Pikeville/Pike	606-433-4053	all ages
10 <i>West Kentucky CEDAR's Coal Fair</i> Contact: Phil Edmondson	Madisonville/Hopkins	270-333-9807	all ages
Underground Mine Tour*			
16 <i>Portal 31 UG Mine</i> *Planned opening date: 2003	Lynch/Harlan	606-848-1530	all ages
Simulated Underground Mine			
11 <i>Madisonville Technical College</i> Contact: Rick Caskey	Madisonville/Hopkins	270-824-1671	3rd grade & up
Coal Research Labs**			
12 <i>Center for Applied Energy Research</i>	Lexington/Fayette	859-257-0224	all ages
13 <i>Kentucky Geological Survey</i>	Lexington/Fayette	859-257-5500	all ages
14 <i>Western Kentucky University</i>	Bowling Green/Warren	270-780-2533	all ages

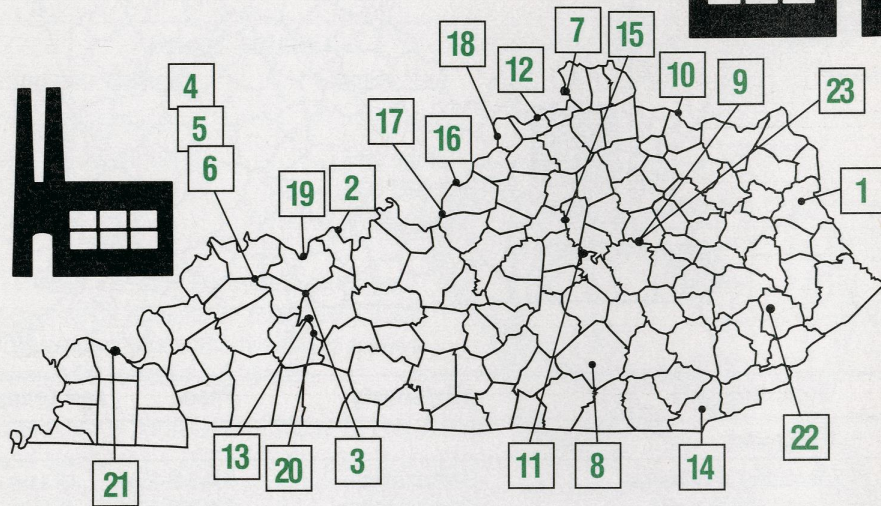
**All labs are limited to tours for special projects only.

Coal-Fired Power Plants

Coal-into-Kilowatts Plant Sites

(see pages 44 & 45 for Coal-into-Kilowatts schematic)

97% of Kentucky's electricity was generated from coal in 2000.



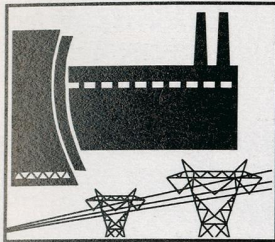
NOTE: Not all power plants offer tours on a regular basis.

Coal-Fired Power Plant	Plant/County	Phone	Age Group
American Electric Power Contact: Diana Frasher	1 Big Sandy/Lawrence	606-686-2415, Ext. 1133	all ages
Cinergy Contact: Ron Flake	7 East Bend/Boone	513-467-4838	4th grade & up
East Kentucky Power Corp. Contact: Jerry Schureman	8 Cooper/Pulaski	859-744-4812,	5th grade & up
	9 Dale/Clark	Ext. 385	
	10 H.L. Spurlock/Mason		
Kentucky Utilities Company Contact: Cliff Feltham	11 Brown/Mercer	859-367-1105	6th grade & up
	12 Ghent/Carroll		
	13 Green River/Muhlenberg		
	14 Pineville/Bell		
	15 Tyrone/Woodford		
Kentucky Mountain Power Contact: John Tate	22 Ky. Mtn. Power*/Knott	606-251-3304	all ages
Kentucky Pioneer Energy Contact: Mike Musulin	23 Pioneer IGCC*/Clark	859-254-4074	all ages
Louisville Gas & Electric Co. Contact: Sandy Gentry	16 Cane Run/Jefferson	502-627-2713	5th grade & up (others considered upon request)
	17 Mill Creek/Jefferson		
	18 Trimble County/Trimble		
Owensboro Municipal Utilities Contact: Sonya Dixon	19 Elmer Smith/Daviess	270-926-3200, Ext. 336	5th grade & up
Tennessee Valley Authority Contact: Beverly Morehead Debby Abell	20 Paradise/Muhlenberg	270-476-3301	4th grade & up
	21 Shawnee/McCracken	270-575-8001	
Western Kentucky Energy Contact: Jennifer Headdy	2 Coleman/Hancock	270-844-6004	3rd grade & up
	3 D.B. Wilson/Ohio		
	4 Green/Webster		
	5 Henderson/Webster		
	6 Reid/Webster		

* New proposed power plant permitted in 2001.

Coal — Low Cost Energy

Coal is the lowest cost fossil fuel and its price is the most stable.



97% of Kentucky's electricity was generated from coal in 2000 (51.8% of the total U.S. electricity). Hydro provided 2.5%; oil and gas together provided 0.4%.

Utilities in Kentucky generated about 92.6 billion kilowatt-hours of electricity in 2000. After accounting for line losses and net state-line flows of electricity, 78.4 billion kilowatt-hours of electricity were sold within Kentucky during 2000 compared to the 92.6 billion kilowatt-hours of net generation.

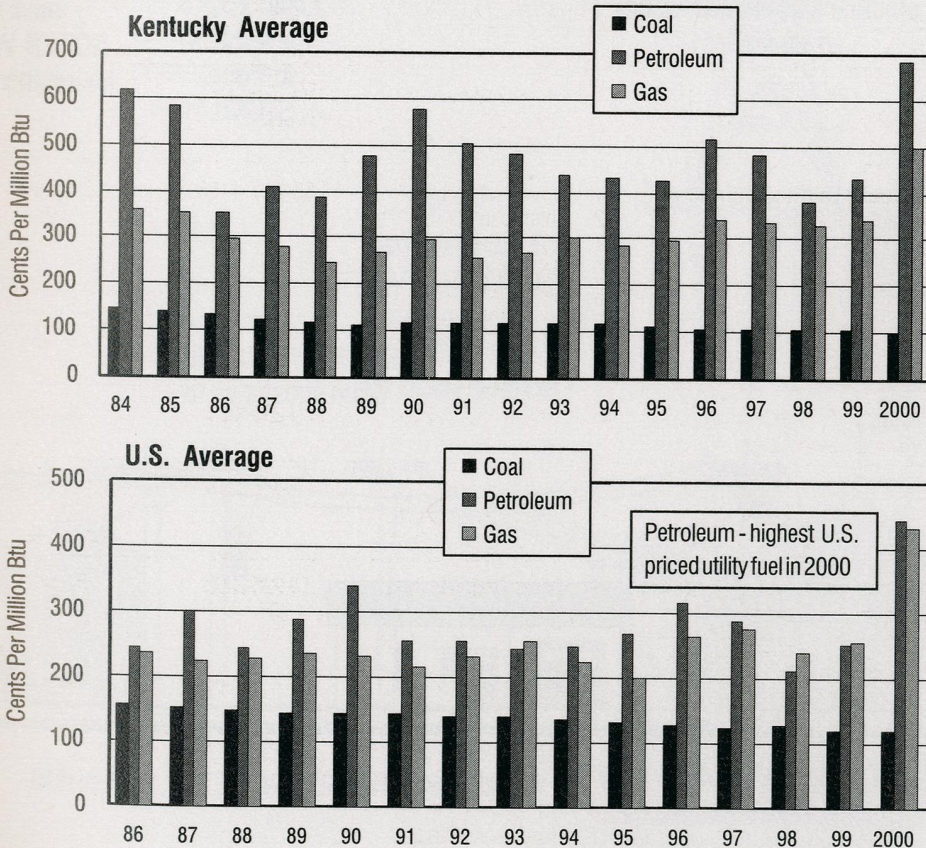
Source: U.S. DOE-EIA, *Electric Power Annual*, 2000, Volume I.

Electric Generating Capability- Net Generation in Kentucky during 2000 by Fuel Type*

Fuel Type	No. Units	Net Winter Capability		Net Generation %
		Megawatts	%	
Coal	58	16,100	92.0%	97.0%
Petroleum/Gas	30	544	3.1%	0.4%
Hydro	30	844	4.8%	2.5%
Other	1	12	>0.0%	--
Total	119	17,500		

*Does not include over 5,000 MW's of newly permitted power plants, some of which are currently under construction.

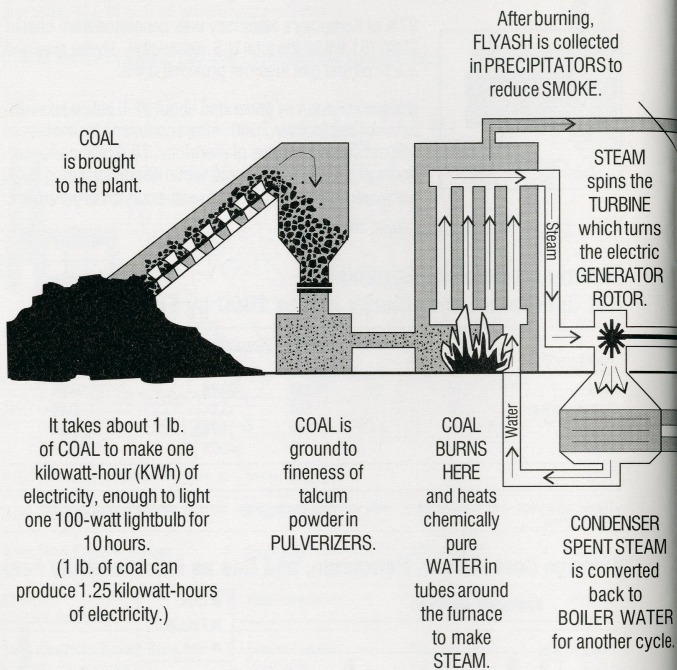
Average Cost of Coal, Petroleum, and Gas as Electric Utility Fuel



*NOTE: In 1993 and again in 98-1999 gas cost rose above petroleum while coal costs remained steady.

Source: U.S. DOE - EIA, *Cost and Quality of Fuels for Electric Utility Plants*, 2000.

Coal-into-Kilowatts

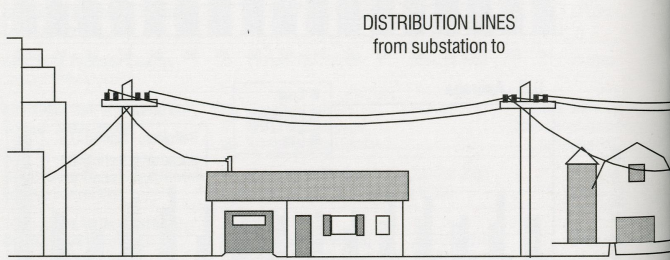


It takes about 1 lb. of COAL to make one kilowatt-hour (KWh) of electricity, enough to light one 100-watt lightbulb for 10 hours. (1 lb. of coal can produce 1.25 kilowatt-hours of electricity.)

COAL is ground to fineness of talcum powder in PULVERIZERS.

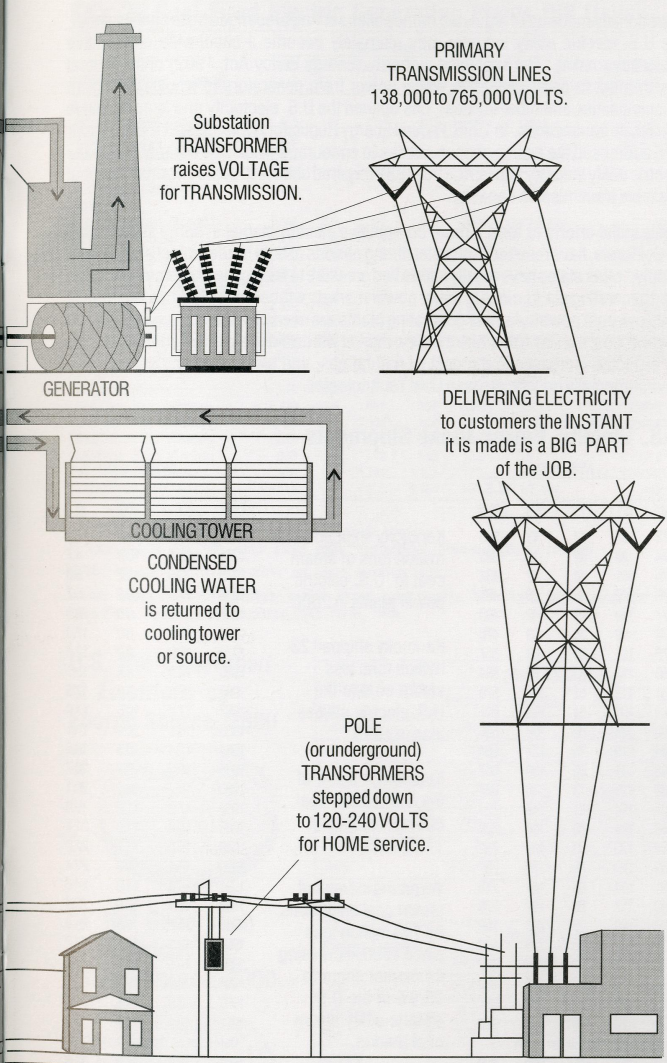
COAL BURNS HERE and heats chemically pure WATER in tubes around the furnace to make STEAM.

CONDENSER SPENT STEAM is converted back to BOILER WATER for another cycle.



HOMES, BUSINESSES, INDUSTRY, and FARMS.

Coal-into-Kilowatts



Source: American Electric Power

Electric Utility / Non-Utility

History of Electric Utility Deregulation, 2000 - Impact on Coal

Traditionally made up of regulated monopolies serving prescribed state service areas, the U.S. electric utility industry may ultimately become a nationwide competitive electricity market. The expanded authority (Energy Policy Act, 1992) of the federal government to order utilities to wheel power from generators to wholesale buyers (municipalities and other utilities), has opened the U.S. electricity grid to competitive wholesale transactions. In 1996, Federal Energy Regulatory Commission (FERC) Order 888 addressed the issues of open access to encourage wholesale competition to the electric utility industry and FERC Order 889 required utilities to share information about available transmission capacity.

While initial efforts to form a more competitive electric market in some states, such as California, have resulted in disaster during periods of both "under-supply" and "over-supply," other states have greatly intensified pressure to keep generating cost low. Coal-fired generating plants close to major power markets will be well positioned to compete with low-cost power. As new generating plants are needed in the coming decade and beyond, coal's ability to capture this new market will be aided by its low and stable cost, by expected increases in the cost of natural gas, and by increasingly efficient and environmentally beneficial Clean Coal Technologies.

U.S. Electric Power Plant Shipments

Year	Million Tons			U.S. Total		Market Share %			
	KY	WV	WY			Year	KY	WV	WY
1973	87	47	13	375	Kentucky shipped 106 million tons of steam coal to U.S. electric power plants in 2000.	1973	23.2	12.6	3.5
1974	90	42	18	385		1974	23.4	10.8	4.7
1975	101	44	22	432		1975	23.5	10.2	5.0
1976	102	45	26	455	Kentucky shipped 23 million tons less steam coal to the U.S. electric utilities than in 1990.	1976	22.5	9.8	5.7
1977	110	44	42	490		1977	22.4	9.0	8.6
1978	99	38	53	476		1978	20.7	8.0	11.2
1979	111	50	69	557	Kentucky's share of the U.S. steam coal market declined to 11.7% in 2000.	1979	19.9	8.9	12.4
1980	112	53	90	594		1980	18.9	8.9	15.1
1981	112	51	101	579		1981	19.4	8.8	17.5
1982	106	64	102	601	Wyoming increased steam coal shipments by 148 million tons since 1990, increasing its market share to 35.9% of the U.S. electric utility steam coal market.	1982	17.7	10.6	17.0
1983	95	66	107	593		1983	16.1	11.1	18.1
1984	119	74	127	684		1984	17.4	10.8	18.6
1985	111	65	138	667	*Deregulation began in 1998	1985	16.6	9.7	20.7
1986	115	73	138	687		1986	16.7	10.6	20.1
1987	124	81	142	721		1987	17.2	11.2	19.8
1988	116	80	158	728	*Deregulation began in 1998	1988	15.9	11.0	21.7
1989	120	83	166	753		1989	16.0	11.1	22.0
1990	129	89	176	787		1990	16.4	11.3	22.4
1991	114	85	184	770	*Deregulation began in 1998	1991	14.8	11.0	24.0
1992	117	85	182	776		1992	15.1	10.9	23.4
1993	120	75	202	769		1993	15.6	9.8	26.3
1994	127	93	226	832	*Deregulation began in 1998	1994	15.2	11.1	27.2
1995	121	91	254	827		1995	14.6	11.0	30.7
1996	117	102	269	863		1996	13.6	11.8	31.2
1997	122	104	269	881	*Deregulation began in 1998	1997	13.9	11.8	30.7
1998*	120	106	305	929		1998*	13.0	11.4	32.8
1999	115	105	328	942		1999	12.2	11.2	34.8
2000	106	105	324	905	2000	11.7	11.6	35.9	

Source: U.S. DOE/EIA - Cost and Quality for Fuels for Electric Utility Plants, 1973-1998, Coal Industry Annual, 1999-2000

Source: U.S. DOE/EIA - Cost and Quality for Fuels for Electric Utility Plants, 1973-1998, Coal Industry Annual, 1999-2000

KY Coal-Fired Power Plants

2000 Fuel Origin

KY's 22 Coal-Fired Electric Generating Plants (58 Units)

COMPANY/Plant (County)	Coal Tons (000)					State	Unit (Capacity) (Megawatts Ea.)
	Total Coal	Eastern Ky	Western Ky	Out-of-State	Total %		
Non-Utility							
WKE/KC Coleman (Hancock)***	1,401	***	***	***	***	***	1 & 2(174) 3(173)
WKE/HMP&L Stat. 2 (Henderson)***	609	***	***	***	***	***	1*(153) 2*(205)
WKE Green (Webster)***	1,607	***	***	***	***	***	1* & 2*(293)
WKE Reid (Webster)***	117	***	***	***	***	***	1(65)
WKE Wilson (Ohio)***	1,406	***	***	***	***	***	1*(420)
Utility							
Cinery/East Bend (Boone)	1,746	226	22	1,498	86%	IL, OH, PA, WV	2*(648)
EKP/Cooper (Pulaski)	756	756	-	-	-	-	1(100) 2(221)
EKP/Dale (Clark)	520	520	-	-	-	-	1 & 2(22) 3 & 4(66)
EKP/HL Spurlock (Mason)	2,271	1,137	-	1,134	50%	WV	1(305) 2*(508)
HMPL Station One (Henderson)	23	-	23	-	-	-	5(11) 6(32)
KP/Big Sandy (Lawrence)	2,589	2,497	-	92	4%	WV	1(281) 2(816)
KU/EW Brown (Mercer)	1,729	1,669	-	60	3%	PA	1(114) 2(180) 3(446)
KU/Ghent (Carroll)	4,756	483	44	4,229	89%	WV, WY	1*(557) 2, 3, & 4(556)
KU/Green River (Muhlenberg)	534	-	534	-	-	-	1* & 2(38) 3(75) 4(114)
KU/Pineville (Bell)	-	-	-	-	-	-	3(38)
KU/Tyrone (Woodford)	140	140	-	-	-	-	3(75)
LG&E/Cane Run (Jefferson)	1,430	-	444	986	69%	IN	4*(163) 5*(209) 6*(272)
LG&E/Mill Creek (Jefferson)	4,006	202	3,096	708	18%	IL, WV	1* & 2*(356) 3*(463) 4*(544)
LG&E/Trimble Co. (Trimble)	1,337	107	346	884	66%	WV	1*(566)
OMU/Elmer Smith (Davies)	838	13	712	113	13%	IN	1*(163) 2*(282)
TVA/Paradise (Muhlenberg)	6,830	-	5,701	1,129	17%	WV	1* & 2*(704) 3(1,150)
TVA/Shawnee (McCracken)	3,615	-	131	3,484	96%	CO, UT, WY	1-10*(175)

*Flue Gas Desulfurization (FGD) Capacity.

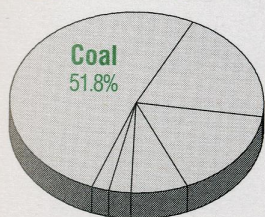
**Unit 10 is (AFBC) Atmospheric Fluidized Bed Combustion.

***Classified as Non-Utility power plants under "deregulation". State-of-origin not reported.

NOTE: Net summer capability (88%); net winter capability (90%).

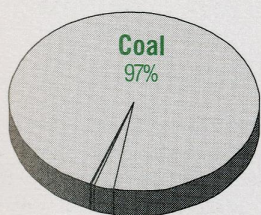
Source: Electric Power Annual, Volume II, 1999; Electric Power Monthly, 2000; Cost & Quality of Fuels for Electric Utility Plants, 2000; Inventory of Electric Utility Plants, 1999.

U.S. Net Generation of Electricity by Energy Source, 2000



Energy Source	Billion Kilowatthours			
	Utility	Nonutility	Total	% Total
Coal	1,697	271	1,968	51.8%
Petroleum	72	37	109	2.9%
Gas	291	321	612	16.1%
Nuclear	705	48	754	19.8%
Hydro	248	25	273	7.2%
Renewable/other*	2	82	84	2.2%
Total	3,015	785	3,800	

KY Net Generation of Electricity by Energy Source, 2000



Energy Source	Billion Kilowatthours			
	Utility	Nonutility	Total	% Total
Coal	78.6	11.3	89.9	97%
Petroleum	0.1	>0.0	0.1	0.1%
Gas	0.3	----	0.3	0.3%
Nuclear	----	----	----	----
Hydro	2.3	----	2.3	2.5%
Renewable/other*	----	>0.0	>0.0	>0.0%
Total	81.4	11.3	92.6	

*Renewable/other includes: geothermal, biomass, wind, photovoltaic, chemical, etc.

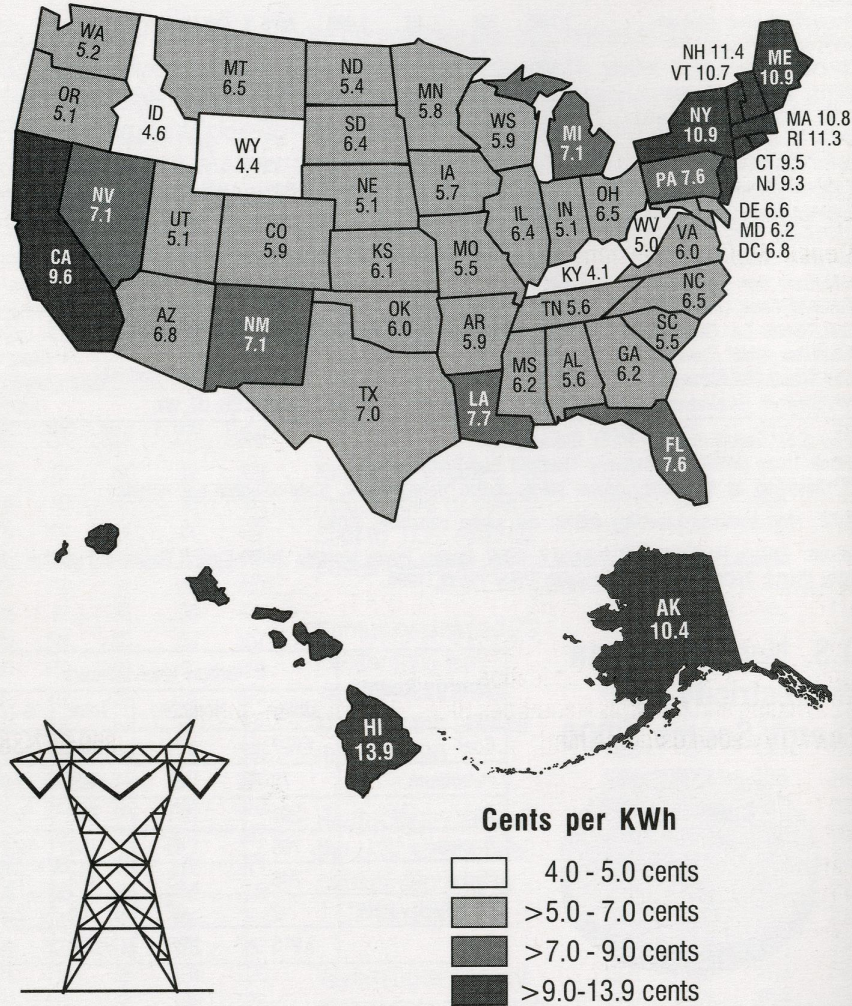
Source: Energy Information Administration, Electric Power Annual, Volume I, 2000.

Electricity Costs

Average electricity costs in Kentucky were 4.1 cents per kilowatt-hour during 2001, **the lowest** in the United States. Kentucky's average electricity costs are lower than all other states. Some states such as California and several New England states have average electricity costs that are two to two-and-one-half times the average electricity costs in Kentucky.

Average Revenue per KWh for All Sectors of Consumers by State, 2001

U.S. Average Revenue per KWh is 6.93 Cents



Kentucky's 4.1 cents per KWh is the lowest average electricity costs in the nation.

KWh = Kilowatt-hour

Note: The average revenue per kilowatt-hour of electricity sold is calculated by dividing revenue* by sales.

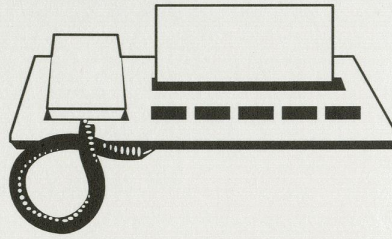
*Includes energy charges, demand charges, consumer service charges, environmental surcharges, fuel adjustments, and other miscellaneous charges. Taxes assessed on the consumer, "pass through" taxes, are not recorded in the operating revenues of the utility and are not included; however, taxes assessed on the utility are included in the electric utility's operating revenue.

Source: U.S. DOE - Energy Information Administration, Electric Power Monthly Annual, August, 2001.

Information Assistance

Kentucky Coal Information

Kentucky coal data, information, and referral assistance to government, private organizations, and individuals are available from the following:



KENTUCKY COAL COUNCIL

709 Millpond Road, Lexington, KY 40514
[www.coaleducation.org/kcmec]
E-mail: kcmec@mis.net

859/246-2500
Fax 859/246-2497

William J. Grable, Executive Director
J. Dan Guffey, P.E., P.L.S., Principal Assistant II
Tears Francis, Executive Secretary

Karen L. Smith, Eastern Kentucky Coal Representative
P.O. Box 2974, 282 S. Mayo Trail #2, Pikeville, KY 41502
E-mail: ekcmec@eastky.net

606/433-7510
Fax 606/433-7075

Dennis McCully, Western Kentucky Coal Representative
State Office Building, Room 205
625 Hospital Drive, Madisonville, KY 42431
E-mail: wkkcmec@vci.net

270/824-7543
Fax 270/824-7037

KENTUCKY COAL ASSOCIATION

340 South Broadway, Suite 100, Lexington, KY 40508
[www.kentuckycoal.org]

859/233-4743
Fax 859/233-4745

Bill K. Caylor, President E-mail: bcaylor@miningusa.com
William I. (Bill) Marcum, Vice-President E-mail: wmarcum@miningusa.com

2001-2002 KENTUCKY COAL FACTS Ordering Information

Kentucky Geological Survey (KGS)

University of Kentucky - Publication Section
228 Mining and Minerals Resources Bldg., Lexington, KY 40506
[www.uky.edu/kgs/home.htm]

859/257-3896

Teacher Workshops

KyNEED

Karen Reagor, Coordinator
P.O. Box 176055, Covington, KY 41017-6055
[www.need.org/states/kentucky]
E-mail: kpreagor@aol.com

859/578-0312
Fax 859/578-0316

Coal Teaching Materials

Kentucky Coal Council

[www.coaleducation.org]

American Coal Foundation

1130 Seventeenth St., N.W., Suite 220
Washington, DC 20036-4604
202/466-8630
[www.acf-coal.org]

University of Kentucky

Center for Applied Energy Research (CAER)
[www.caer.uky.edu]

Kentucky Geological Survey (KGS)

[www.uky.edu/kgs/home.htm]

KET, The Kentucky Network

[www.ket.org/Education/videos/fieldtrips/coalmine.html]

Center for Energy and Economic Development

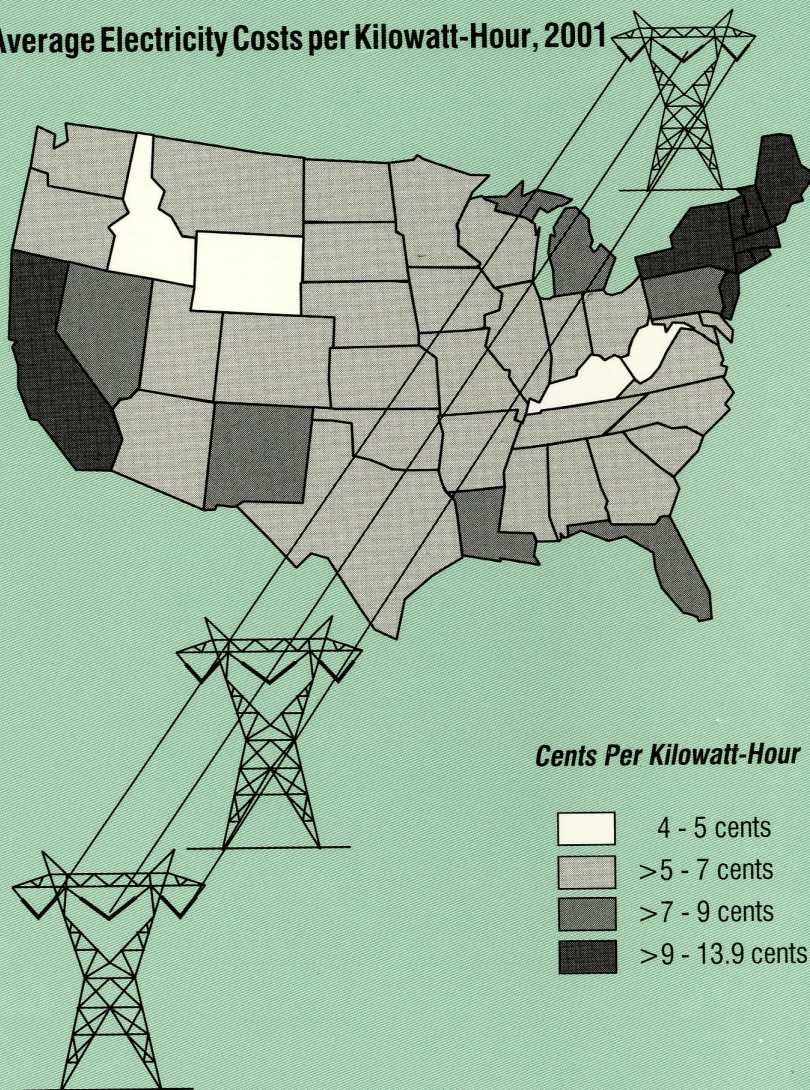
[www.ceednet.org]

U.S. Department of Energy

[www.eia.doe.gov/kids]

Help the teachers at your school
obtain coal education classroom materials.

Average Electricity Costs per Kilowatt-Hour, 2001



Average electricity costs in Kentucky were 4.1 cents per kilowatt-hour during 2001, the lowest in the United States. The U.S. average was 6.93 cents per KWh.

Source: U.S. Department of Energy - Energy Information Administration, *Electric Power Monthly*, August 2001.

We should build new coal-fired power plants because coal is ...

Abundant - At current production rates, we have a 250 year supply of coal in the United States.

Affordable - Coal is a bargain compared with other fuels

Reliable - Coal is mined in America. It is not subject to dependence on foreign suppliers and the price volatility inherent with other fuel sources.

A Job Provider - Coal employs many more Kentuckians than any other energy source.

Clean - Coal can be burned cleanly using clean coal technology.

A Joint Industry/Government Project
Paid Through Coal Education Grant Funds
by the Kentucky Foundation, Inc.

Paul E. Patton, Governor