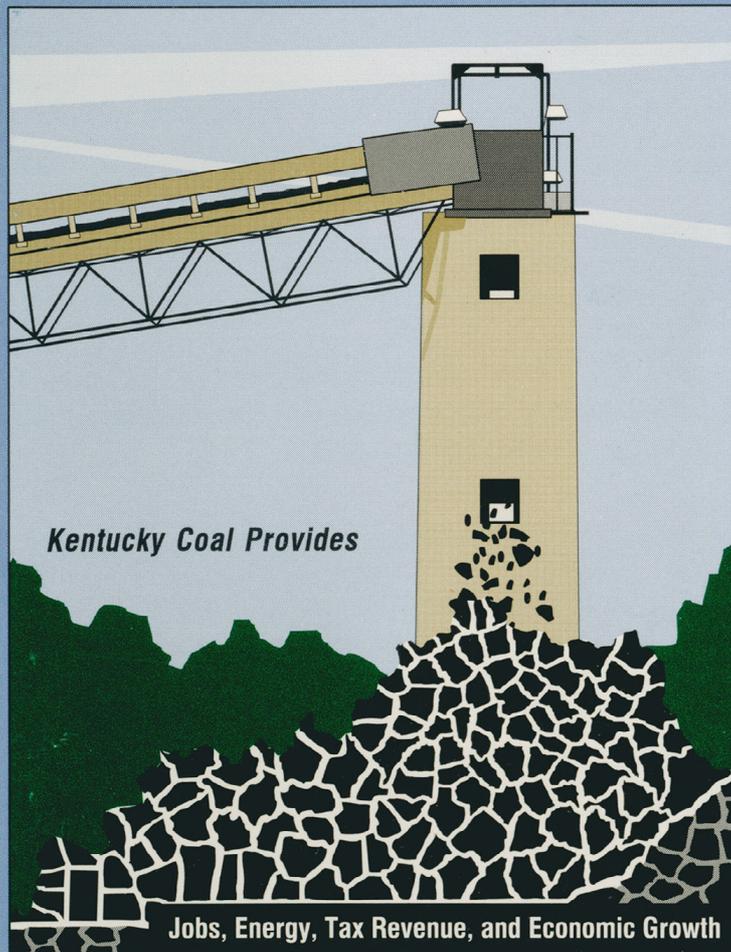


1999-2000 POCKET GUIDE

KENTUCKY COAL FACTS



Prepared by the
Kentucky Coal Council
and the
Kentucky Coal Association

<http://www.coaleducation.org>

Edition

6

Highlights

Electricity

Average electricity costs in Kentucky were 4.2 cents/kilowatt-hour in 1998, the third lowest in the United States behind two Northwestern hydro states.

Production

Kentucky produced 156.9 million tons of coal in 1998, 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 \$830.6 million in direct wages in 1998, directly employing 18,950 persons and indirectly providing 3 additional jobs for every miner employed. The average weekly wage for coal miners in Kentucky was \$843 during 1998.

Economy

The Kentucky coal industry brought over \$2.7 billion into Kentucky from out-of-state during Fiscal Year 1998-1999 through coal sales to customers in 24 other states and several foreign countries. Kentucky coal companies paid \$153.6 million in coal severance taxes in Fiscal Year 1999.

Coal Markets

A total of 64 electric utility companies purchased 120.5 million tons of Kentucky coal for 138 electric power plants located in 24 states during 1998, accounting for almost 77% of the Kentucky coal sold.

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 (95.7%) 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 received 5 national reclamation awards in 1997 and 1998 for surface mining and received a total of 22 awards in the past 13 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 \$726.6 million into the Federal Abandoned Mine Land Fund since 1978 to reclaim abandoned coal mines. Nationwide, operators have paid over \$5.09 billion into this fund. However, \$1.35 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 89 billion tons of coal resources remaining represent 85% 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 1999. 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 56% of the electricity in this country, and in Kentucky 95.7% of our electricity comes from coal.

Average electricity costs in Kentucky were 4.2 cents per kilowatt-hour during 1998, the third lowest in the United States.

What Changes are Occurring?

Kentucky's share of the steam coal market to U.S. electric utilities has declined, down from 23.5% of the market in 1975 to 13.0% in 1998. (see page 28)

As Kentucky coal companies consolidated into a globally competitive industry, the number of mines currently in Kentucky are down to almost a 1/4 of the 2,063 mines in 1984. (see page 6)

The amount of sulfur dioxide emitted from burning coal in Kentucky has been reduced by more than 1/2 since 1976. (see page 38)

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 2.8 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 22)

Natural gas costs to U.S. electric utilities in 1993 and again in 1998 increased higher than petroleum while coal costs continued to steadily decrease. (see page 33)

Underground mining in Kentucky continues to show steady safety improvements. (see page 10)

Over \$2.7 billion continues to be brought into Kentucky each year from coal sales to 29 other states and 13 foreign countries. (see page 15)

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

On the Horizon?

A "New Age" of electrical use according to a Forbes magazine article, May, 1999, drawing from a study by Mills-McCarthy & Associates is on the horizon. "24-by-7" (24 hours a day / 7 days a week) is how they refer to this new age of electric demand by the PC-Internet industry. The information technology industry has created a stealth revolution in electric demand; 100% up time. And currently, Internet use is doubling every 3 months.



Personal Computers (PCs)

in home	50,000,000
business use	150,000,000
sold each year	36,000,000

Forecasters predict that the Internet will be responsible for one-half to two-thirds of all growth in the U.S. electricity demand. Analysis shows that for every 2,000 kilobytes of data moving on the Internet, the energy from one pound of coal is needed to create the necessary kilowatt-hours (kWh^{Coal}). (see page 45)

Source: See individual reference pages as listed.

References

Governor's Office

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

Phone: 502/564-2611

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Department of Local Government

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

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or 502/573-2512

Department of Mines and Minerals

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Phone: 502/573-0140

Fax: 502/573-0152

Kentucky Geological Survey

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

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Legislative Research Commission

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Natural Resources and Environmental Protection Cabinet

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

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Department for Surface Mining Reclamation & Enforcement

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Commissioner's Office

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Division of Field Services

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Division of Permits

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2 Hudson Hollow - Frankfort, KY 40601

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Division of Abandoned Lands

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2521 Lawrenceburg Road - Frankfort, KY 40601

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Department for Environmental Protection

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Division of Waste Management

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Revenue Cabinet

Department of Tax Administration

Phone: 502/564-4581

Division of Compliance and Tax Payer Assistance

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Miscellaneous Tax Section, Severance Tax Unit

Fax: 502/564-2906

200 Fair Oaks Lane - Frankfort, KY 40620

Department of Property Valuation

Phone: 502/564-8334

Division of Technical Support, Mineral Valuation Section

Fax: 502/564-5977

200 Fair Oaks Lane, 4th Floor - Frankfort, KY 40620

Transportation Cabinet

Division of Planning, Coal Haul Section

Phone: 502/564-7183

125 Holmes Street - Frankfort, KY 40622

Fax: 502/564-2865

UK - Center for Applied Energy Research

Research Park Drive - Lexington, KY 40511-8433

Phone: 606/257-0305

Fax: 606/257-0220

United States Department of Energy

National Energy Information Ctr., E1-30, Forrestal Bldg., IE-248

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1000 Independence Ave. - Washington, DC 20585

Fax: 202/586-0727

Workforce Development Cabinet

Dept. for Employment Services, Research and Statistics Branch

Phone: 502/564-7976

Employment and Wages Section

Fax: 502/564-2937

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

Web site addresses: most reference sources have a web site address listed at the bottom of each page, and 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

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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 150.3* million tons of 1998 coal production, 92.8 million tons were produced by underground mining methods and 57.5 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 6 for details.

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

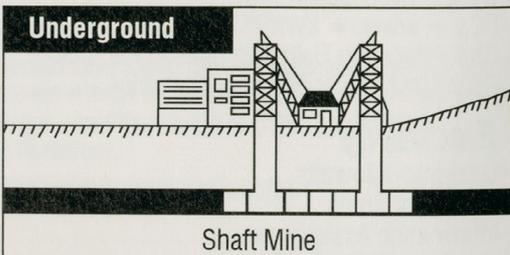
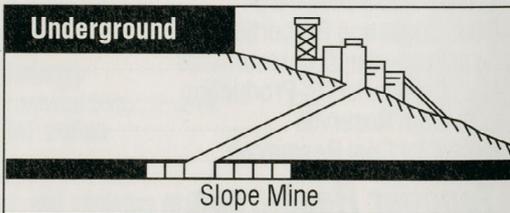
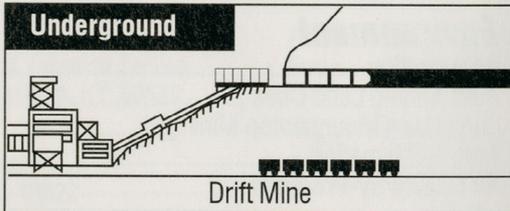
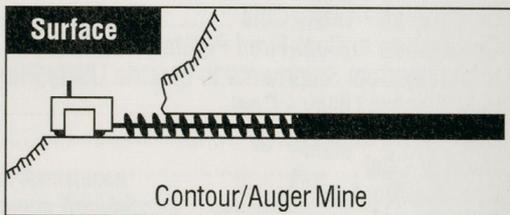
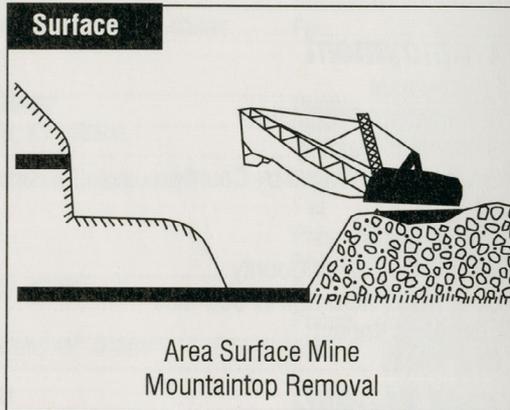
1998 Mining Type Estimates

Mine Type	No. of Mines	Production (million tons)
Surface	205	57.5
Surface Only*	-	15.2
Surface & Auger*	-	41.2
Auger Mining*	-	1.1
Underground	277	92.8
Continuous**	-	74.0
Conventional**	-	2.8
Longwall**	-	9.8
Other**	-	6.2
State Totals	482	150.3

***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*, 1998. U.S. DOE - EIA, *Coal Industry Annual*, 1998.



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

U.S. Coal Production

Kentucky and U.S. Coal Production,* 1970-98 (millions of tons)

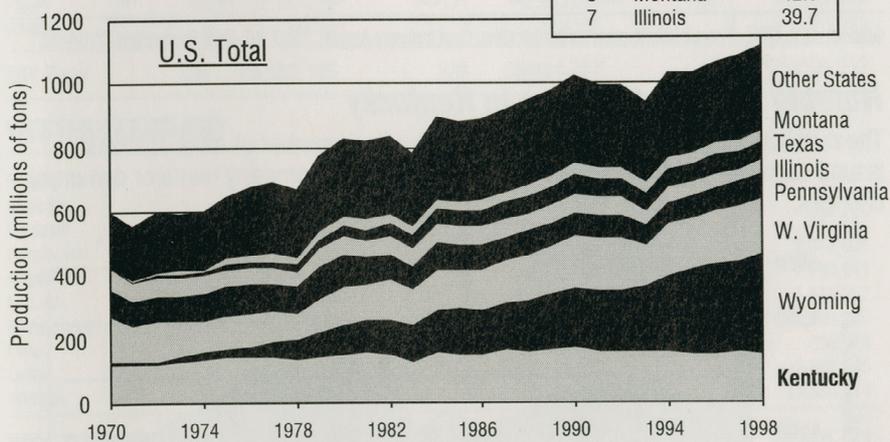
Year	Kentucky			United States	Kentucky as % of U.S.
	Eastern	Western	Total		
1970	72.5	52.8	125.3	602.9	20.8
1971	71.6	47.8	119.4	552.2	21.6
1972	68.9	52.3	121.2	595.4	20.4
1973	74.0	53.7	127.6	591.7	21.6
1974	85.4	51.8	137.2	603.4	22.7
1975	87.3	56.4	143.6	648.4	22.1
1976	91.1	52.8	144.0	678.7	21.2
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

*NOTE: This is the official U.S. DOE number for Kentucky. State and Federal numbers will differ; please see page 6 for details.

U.S. Leading Coal Producers**

Kentucky ranked third in the United States in coal production during 1998.

1998*** Rank	State	Millions of Tons
1	Wyoming	314.4
2	West Virginia	171.2
3	Kentucky	150.3
4	Pennsylvania	81.0
5	Texas	52.6
6	Montana	42.8
7	Illinois	39.7



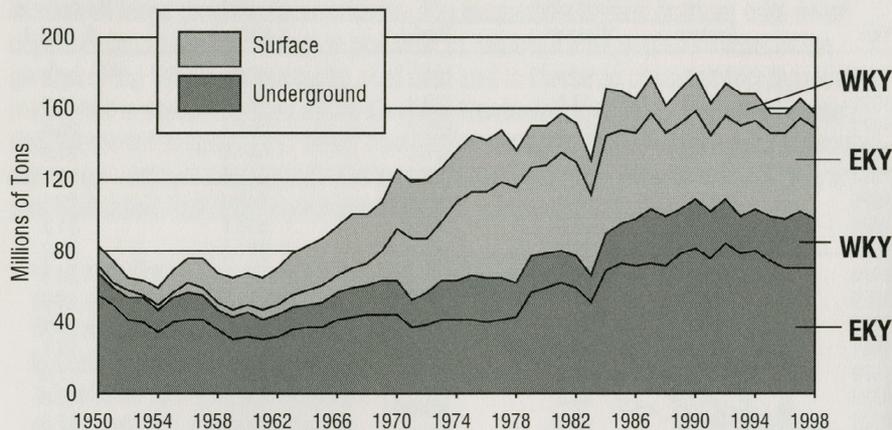
**NOTE: Wyoming, Texas, and Montana were not among the top seven original coal producers in 1970 but are included to show their rise to be included among the leading coal-production states.

***NOTE: See page 40, U.S. Comparisons - Production.

Sources: U.S. DOE - Energy Information Administration; *Coal Industry Annual*, 1993-1998, *Coal Production*, 1977-1992. U.S. Bureau of Mines, *Minerals Yearbook*, 1970-1976.

Kentucky Production

Kentucky produced 156.9* million tons of bituminous coal in 1998, 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 in this publication.

Source: Kentucky Department of Mines and Minerals, *Annual Reports*, 1950-1998.

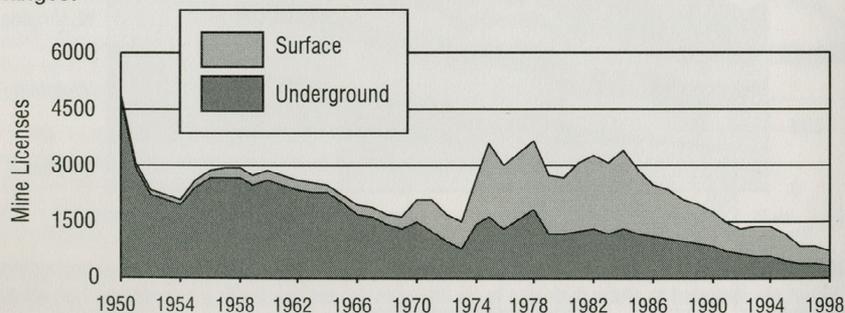
Number of Mines, 1984-1998

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

Source: U.S. DOE - Energy Information Administration, *Coal Industry Annual*, 1993-98, *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*, 1950-1998.

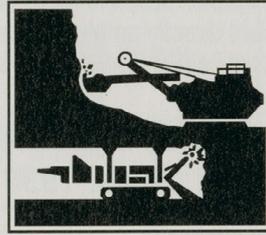
County Production

There were 482 mines in Kentucky during 1998. These 482 mines were issued 721 Kentucky mine licenses and produced 156.9 million tons.

277 underground mines (356 licenses) accounted for 62% of Kentucky's production and 205 surface mines (365 licenses) accounted for 38% of Kentucky's production.

78% of Western Kentucky and 58% of Eastern Kentucky's coal production was from underground mines during 1998.

29 Kentucky counties produced coal in 1998; 10 Western Kentucky counties and 19 Eastern Kentucky counties.



1998 Production by County and Type of Mine License*

County	Underground		Surface		Total	
	Licenses	Tonnage	Licenses	Tonnage	Licenses	Tonnage
EASTERN KENTUCKY						
Bell	18	3,446,024	13	2,089,313	31	5,535,337
Breathitt	-	-	15	5,114,284	15	5,114,284
Carter	-	-	1	10,068	1	10,068
Clay	1	24,780	11	358,950	12	383,730
Floyd	40	3,371,872	8	3,549,131	48	6,921,003
Harlan	42	7,030,822	19	1,863,585	61	8,894,407
Jackson	-	-	1	1,000	1	1,000
Johnson	3	1,122,515	6	161,327	9	1,283,842
Knott	34	5,323,122	23	5,708,165	57	11,031,287
Knox	16	456,128	9	192,765	25	648,893
Lawrence	2	238,340	4	162,482	6	400,822
Leslie	9	7,543,274	5	1,797,234	14	9,340,508
Letcher	23	7,272,864	32	3,654,936	55	10,927,800
Magoffin	-	-	2	819,070	2	819,070
Martin	27	5,932,925	17	6,328,104	44	12,261,029
Owsley	-	-	3	50,429	3	50,429
Perry	18	5,652,935	21	6,035,671	39	11,688,606
Pike	100	22,567,221	131	12,929,025	231	35,496,246
Whitley	2	83,373	7	159,168	9	242,541
EKY Total	335	70,066,195	328	50,984,707	663	121,050,902
WESTERN KENTUCKY						
Butler	-	-	1	9,123	1	9,123
Christian	-	-	1	555,059	1	555,059
Daviess	-	-	4	881,587	4	881,587
Henderson	1	530,637	3	1,482,264	4	2,012,901
Hopkins	7	4,610,713	14	3,178,328	21	7,789,041
McLean	1	1,279,421	2	536,936	3	1,816,357
Muhlenberg	4	2,636,442	5	654,907	9	3,291,349
Ohio	-	-	3	336,548	3	336,548
Union	3	7,592,726	1	4,819	4	7,597,545
Webster	5	11,221,131	3	317,483	8	11,538,614
WKY Total	21	27,871,070	37	7,957,054	58	35,828,124
KY Totals	356	97,937,265	365	58,941,761	721	156,879,026

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

Source: Kentucky Department of Mines and Minerals, *Annual Report*, 1998.

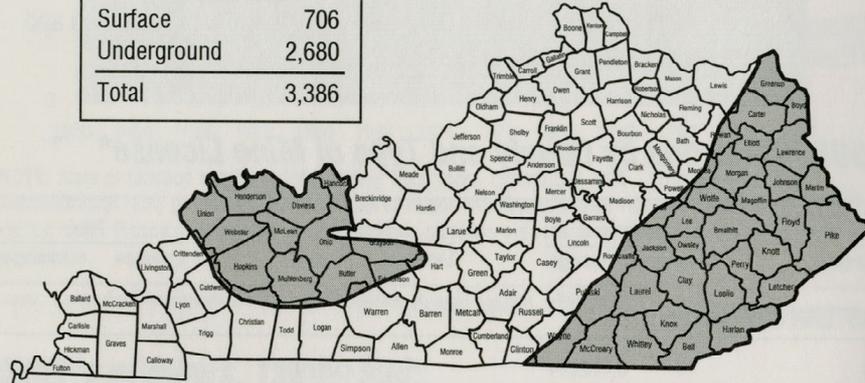
Employment

The Kentucky coal mining industry has a current work force of approximately 17,794* people directly employed in coal mining jobs. The Western Kentucky coal field directly employs approximately 3,386 persons, while the Eastern Kentucky coal field provides 14,408 direct mining jobs.

Kentucky's Coal Mining Work Force, 1998

Western Kentucky Coal Field	
Surface	706
Underground	2,680
Total	3,386

Eastern Kentucky Coal Field	
Surface	5,105
Underground	9,303
Total	14,408



Eastern Kentucky averaged 81% of Kentucky's coal mining work force and accounted for about 78% of Kentucky's total coal production in 1998.

Western Kentucky averaged 19% of Kentucky's coal mining work force and accounted for about 22% of Kentucky's total coal production in 1998.

Kentucky produced 150.3 million tons during 1998 while direct mining employment continued to decline.

Kentucky Coal Mining Employment, 1979-1998

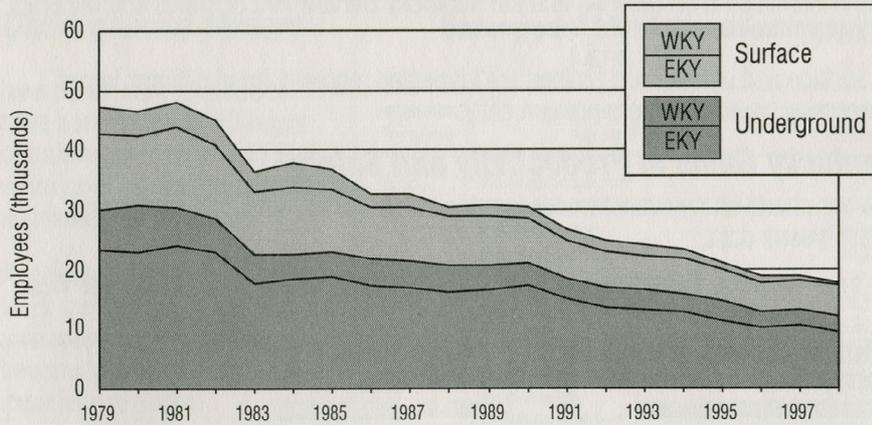
Year	Western Kentucky			Eastern Kentucky			Kentucky Totals
	Surface	Underground	Total	Surface	Underground	Total	
1979	4,343	6,945	11,288	12,838	23,064	35,902	47,190
1980	3,995	7,879	11,874	11,819	22,702	34,521	46,395
1981	4,056	6,489	10,545	13,473	24,032	37,505	48,050
1982	4,120	5,639	9,759	12,319	22,782	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	706	2,680	3,386	5,105	9,303	14,408	17,794

*NOTE: State employment numbers (page 12) differ from federal EIA numbers.

Source: U.S. DOE - EIA; Coal Industry Annual, 1993-1998, Coal Production, 1979-1992.

Employment/Productivity

Kentucky Coal Mine Employment, 1979-1998*

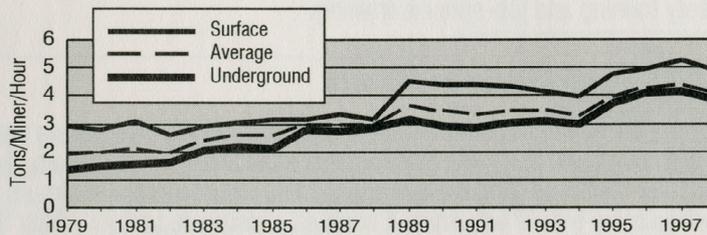


*State employment numbers (page 12) differ from federal EIA numbers.

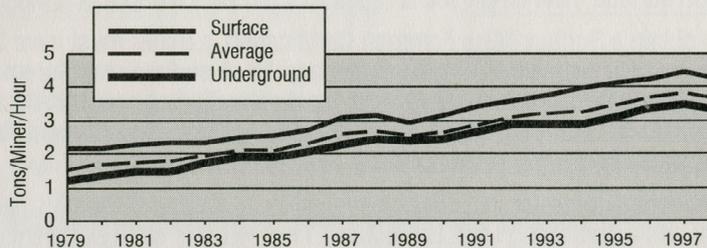
Mine Productivity, 1977-1998 (tons/miner/hour)

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	3.64	4.06	3.73	3.72	5.47	19.37	6.22

Western Kentucky Coal Mine Productivity 1979-1998



Eastern Kentucky Coal Mine Productivity 1979-1998



Source: U.S. Department of Energy - EIA; Coal Industry Annual, 1993-1998, Coal Production, 1977-1992.

Safety and Training

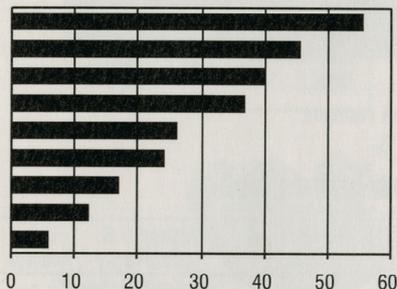
Safety and health standards are highly regulated by the federal Mine Safety and Health Administration (MSHA) and the Kentucky Department of Mines and Minerals (KDMM).

All surface and underground mines are inspected regularly for violations; larger mines may have inspectors present daily.

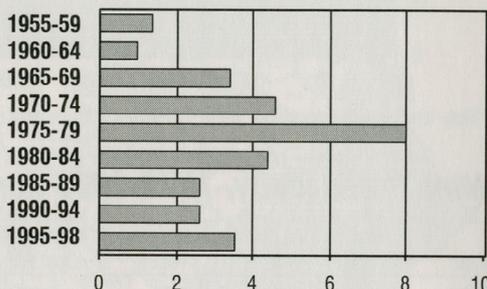
Kentucky Gains in Productivity and Safety

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

5 - Year Average Fatalities per Year
(Underground)

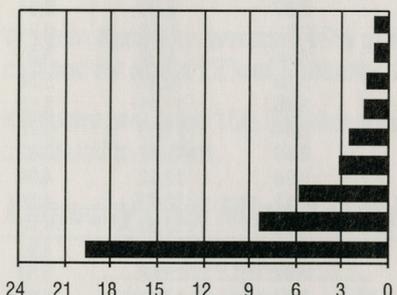


5 - Year Average Fatalities per Year
(Surface)

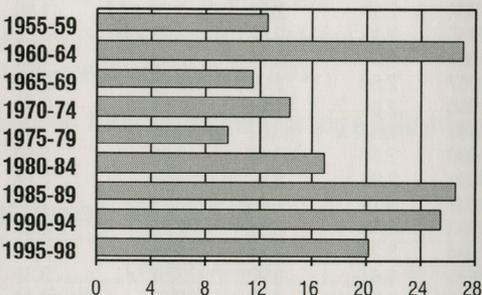


The underground bar chart (below) indicates steady safety improvements in underground mines in Kentucky.

5 - Year Average Tons Per Fatality
(Underground)



5 - Year Average Tons Per Fatality
(Surface)



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

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

Training for Surface Miners

New miners are required to have 24 hours of training plus pass a written exam before employment at a surface mine; this includes workers at prep plants, rail sidings, and river terminals. 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 8 hours of annual retraining.

To obtain a Surface Mine Foreman Certification, a miner must have 3 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 activities). The applicant must have at least 1 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 plus 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 8 hours of mine site-specific training.

To receive an Underground Mine Foreman Certification, a miner must have 5 years practical underground coal mining experience gained after age 18, with at least 1 year on an active working section of a coal mine. An Assistant Mine Foreman Certification requires 3 years 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.

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, with an additional MET or EMT employed for every additional 50 employees, or any portion thereof.

METs are certified thru training and examination as administered by KDMM under regulations as established by the KDMM. The MET certification requires 40 hours of initial training, plus a current CPR certification and 8 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 passed.

Underground Miner Classifications (June, 1999)

Experience Required	Underground Mining Position	Miners Certified
5 Yrs.	Electrical Inspector*	21
	Mine Inspector/Mine Safety Analyst*	809
	Mine Foreman*	10,441
	Electrical Instructor*	100
3 Yrs.	Asst. Mine Foreman*	3,082
	Instructor	694
1 Yr.	Electrical Worker*	8,081
	Belt Examiner	2,851
	Hoisting Engineer*	1,234
45 days	Mine Rescue	293
	Shot Firer*	13,691
	Certified Miners	32,441

SPECIAL TRAINING

MET - Mine Emergency Technician or	
EMT - Emergency Medical Technician	2,251
First Aid	2,145

*NOTE: Tests are required in addition to years of experience.

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



Employment / Wages by County

Coal County Employment and Wages, 1998⁴

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	853	8.6%	9.1%	\$35,168,183	17.2%	\$792.86
Boyd	572	2.5%	2.7%	\$19,568,341	2.5%	\$657.89
Breathitt	123	2.9%	3.2%	\$5,016,646	7.6%	\$784.34
Clay	50	0.7%	0.8%	\$1,567,384	1.9%	\$602.84
Floyd	994	7.0%	7.5%	\$31,918,360	11.4%	\$617.52
Harlan	1,233	13.2%	15.0%	\$50,870,148	26.3%	\$793.41
Johnson	163	1.7%	1.8%	\$6,044,172	4.6%	\$713.09
Knott	1,165	19.8%	21.2%	\$49,032,035	49.6%	\$809.38
Knox	148	1.3%	1.4%	\$3,363,750	2.3%	\$437.08
Laurel	53	0.2%	0.3%	\$1,772,239	0.4%	\$643.05
Leslie	1,510	33.6%	35.6%	\$75,507,507	63.2%	\$961.63
Letcher	929	12.4%	13.4%	\$38,173,431	27.9%	\$790.21
Magoffin	161	3.2%	3.6%	\$6,593,103	13.2%	\$787.52
Martin	885	29.7%	33.4%	\$46,975,183	56.7%	\$1,020.76
Perry	1,102	9.3%	10.0%	\$44,258,734	16.1%	\$772.35
Pike	4,770	17.4%	18.7%	\$197,194,374	32.1%	\$795.01
Whitley	135	1.0%	1.0%	\$4,097,203	1.8%	\$583.65
Subtotal	14,846	-	-	\$617,120,793	-	\$799.39
EKY Total ²	14,910	-	-	\$619,072,841	-	\$798.47

Fayette **Note:** The direct mining employment classification does not include most of the administrative/professional employees of the coal companies located in (2) \$1,238.85
 Jefferson Kentucky metropolitan areas and does not include any private services or indirect employment. \$ --

WESTERN KENTUCKY

Daviess	141	0.3%	0.3%	\$9,897,820	1.0%	\$1,349.95
Henderson	173	0.7%	0.8%	\$8,652,880	1.6%	\$961.86
Hopkins	988	5.0%	5.2%	\$42,752,686	9.7%	\$823.81
Muhlenberg	308	2.5%	2.7%	\$18,968,061	9.9%	\$1,184.32
Ohio	121	1.2%	1.3%	\$5,086,514	4.3%	\$808.41
Union	967	16.9%	18.1%	\$56,978,607	37.8%	\$1,133.14
Webster	871	15.6%	16.5%	\$45,598,258	38.8%	\$1,006.76
Subtotal	3,579	-	-	\$187,934,826	-	\$1,009.82
WKY Total ²	3,758	-	-	\$195,253,341	-	\$999.17

State Total² 18,950 - - \$830,587,339 - \$842.89

1 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. The counties are as follows: Butler, Carter, Christian, Lawrence, Logan, McCreary, McLean, Nelson, Owsley, Pulaski. It is suspected that multi-county mining employment attributes to some counties being "under reported" and others being over reported.

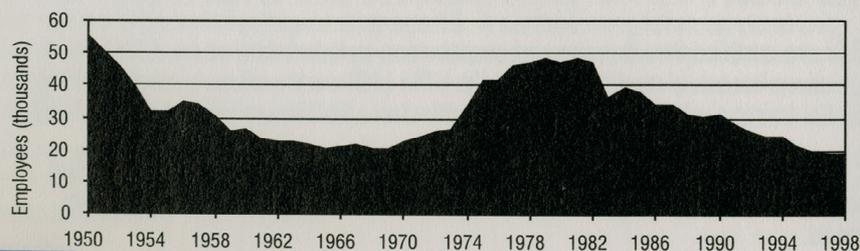
2 Columns do not add to the totals due to withheld data.

3 Variation in average weekly mining income affected greatly by hours worked per week as well as hourly wage rate.

4. Values and methodologies used in this table may not be consistent with LGEDF regulations (see page 14). 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, 1950-1998



Severance Tax by County

Coal Severance Tax Revenue by County, FY 1998-99

County	Gross Value of Severed Coal	Tax on Severed Coal	Gross Value of Processing	Total Tax Receipts
EASTERN KENTUCKY				
Bell	\$114,661,062	\$5,279,675	\$14,041,577	\$5,881,427
Boyd	2,706,655	121,770	12,406,855	683,345
Breathitt	64,736,226	2,928,036	1,057,449	2,975,621
Clay	2,597,716	118,002	890,184	157,031
Floyd	107,836,940	4,865,329	13,254,786	5,462,116
Harlan	189,173,731	8,549,789	12,493,757	9,088,611
Johnson	14,743,705	660,246	2,241,393	760,435
Knott	233,884,918	10,525,119	24,887,198	11,639,429
Knox	20,015,066	885,110	4,882,285	1,082,077
Lawrence	9,759,417	439,165	858,941	477,817
Leslie	224,856,498	10,136,169	22,073,540	11,108,767
Letcher	214,283,852	9,895,818	27,864,335	11,122,373
McCreary	202,702	9,122	55,960	11,640
Martin	214,155,428	9,015,546	25,994,892	10,183,318
Perry	215,539,899	9,471,574	44,820,526	11,467,962
Pike	828,006,532	37,152,128	109,031,969	42,015,592
Pulaski	---	---	69,541	3,130
Whitley	5,605,622	253,784	6,071,159	501,892
EASTERN KY Total*	\$2,475,844,101	\$110,895,006	\$325,878,392	\$125,363,770
WESTERN KENTUCKY				
Butler	\$ ---	\$ 2,246	\$ 77,420	\$ 7,642
Daviess	17,362,097	781,295	560,342	812,525
Henderson	55,344,450	2,496,176	6,108,511	2,772,077
Hopkins	110,944,749	5,048,171	14,858,762	5,629,613
McLean	23,560,849	1,061,652	184,679	1,070,216
Muhlenberg	55,686,120	2,505,876	859,839	2,544,569
Webster	179,900,154	8,036,828	22,139,163	9,033,091
WESTERN KY Total*	\$569,997,914	\$25,689,931	\$59,152,380	\$28,274,308
STATE TOTALS*	\$3,045,842,015	\$136,584,937	\$385,030,772	\$153,638,078

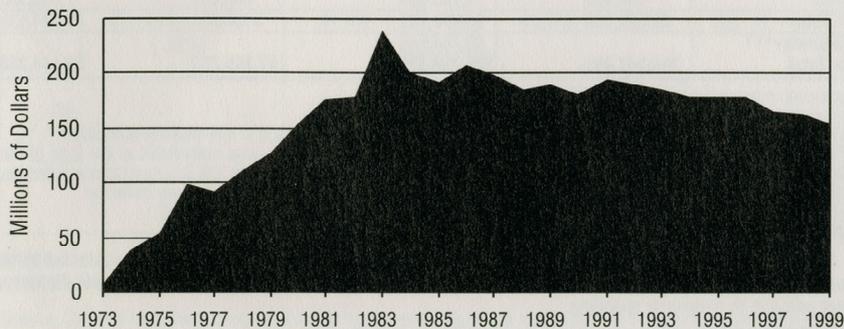
* Columns do not add to State Totals because of Carter, Christian, Estill, Greenup, Jackson, Jefferson, Laurel, Magoffin, Menifee, Ohio, Owsley, Rockcastle, Union, and Wolfe Counties' information being withheld to avoid disclosure of individual company data.

Source: Kentucky Revenue Cabinet

Severance Tax Revenues (millions of dollars)

The gross value of coal mined and processed in Kentucky during Fiscal Year 1998-99 was \$3.4 billion.

The Kentucky coal industry paid \$153.6 million in coal severance taxes in Fiscal Year 1998-99.



Coal Taxes Returned

Coal Severance Taxes Returned to Counties, FY 1992-2000

Fiscal Year	Local Government Assistance Fund (LGEAF)*	Economic	Local Government Development Fund (LGEDF)**	Economic	Total Percent Returned
1991-92	\$22,120,783	12%	\$0	—	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	—	14%	—	24%	38%

*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 99)	LGEDF** Single County (FY 99)	Unmined Minerals Tax (FY98)	
			County Estimate**** Average (84.7%)	Total Tax Billed
EASTERN KY				
Bell	\$603,887	\$728,309	\$176,180	\$208,005
Boyd	175,259	110,573	2,285	2,698
Breathitt	413,267	633,111	105,554	124,621
Carter	—	114,978	354	418
Clay	166,897	197,046	25,237	29,796
Elliott	—	—	305	360
Floyd	732,171	705,742	564,442	666,401
Greenup	—	73,974	—	—
Harlan	980,251	1,461,709	793,210	936,494
Jackson	—	65,708	498	588
Johnson	253,056	240,214	19,498	23,020
Knott	1,102,066	1,438,237	667,770	788,394
Knox	242,478	214,342	39,701	46,872
Laurel	—	89,944	1,131	1,335
Lawrence	406,063	200,075	19,467	22,983
Lee	—	—	258	305
Leslie	1,021,196	1,461,364	456,495	538,955
Letcher	978,721	1,023,839	417,340	492,727
McCreary	—	103,698	697	823
Magoffin	217,579	264,662	73,655	86,960
Martin	977,242	1,836,195	559,961	661,111
Menifee	—	73,393	—	—
Morgan	—	127,429	21	25
Owsley	106,277	188,348	42	49
Perry	1,045,727	1,027,021	627,937	741,366
Pike	3,441,656	2,894,650	2,322,279	2,741,770
Pulaski	—	—	9	11
Whitley	181,014	234,615	3,127	3,692
Wolfe	—	61,136	16	19
EKY Total	\$13,044,807	\$15,570,312	\$6,877,469	\$8,119,798
WESTERN KY				
Butler	—	\$57,317	88	\$104
Christian	129,736	76,178	753	889
Daviess	353,720	89,386	12,764	15,070
Hancock	—	63,493	—	—
Henderson	362,278	225,537	98,279	116,032
Hopkins	604,920	614,952	179,156	211,518
McLean	186,350	130,304	26,258	31,001
Muhlenberg	434,868	349,440	133,254	157,325
Ohio	—	304,824	59,830	70,637
Union	534,389	902,292	74,511	87,970
Webster	896,328	1,185,058	282,891	333,992
WKY Total	\$3,502,589	\$3,998,781	\$867,784	\$1,024,538
Multi-County***		\$9,784,546		
State Total	\$16,547,395	\$29,353,638	\$7,745,253	\$9,144,336

*County and municipal totals for FY 1998-99.

**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 that the counties receive 84.7%, with the remainder being the state share; not all billable taxes are collected.

Impacted Counties

The table above does not include non-producing counties impacted by coal transportation, referred to as "Impacted Counties." These 47 counties received **\$2.07 million** in coal severance taxes during FY99. Columns do not add due to individual rounding.

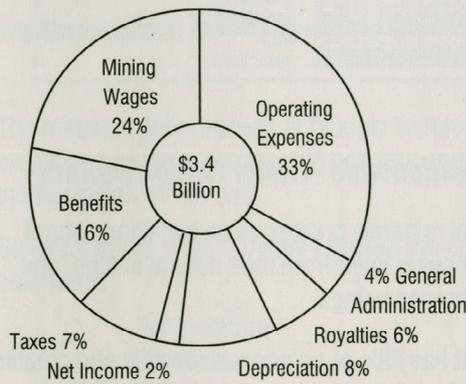
Economic Impact

The Kentucky coal industry in 1998:

- employed 18,950 miners earning over \$830.6 million in wages.
- created a total of 68,937 jobs statewide.
- paid over \$153.6 million in severance taxes and generated total state tax revenues of about \$438 million.
- was a \$3.4 billion industry which brought into Kentucky receipts totaling about \$2.7 billion from 29 states and 13 countries. The five leading states were: North Carolina (\$392 million), Georgia (\$377 million), Florida (\$369 million), Tennessee (\$351 million), and South Carolina (\$292 million).*
- created economic activity throughout Kentucky totaling \$7.413 billion.

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

1998 Estimated Distribution of \$3.4 Billion



Of the \$3.4 billion in receipts from coal produced and processed, the largest part, 40 percent, went to miners' wages and benefits. Another 33 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%).

1998 Estimated Impact of \$3.4 Billion

The \$3.4 billion in receipts from coal produced and processed in Kentucky in 1998 generated additional economic activity totaling \$3.98 billion and 49,987 jobs. This additional economic activity plus coal production and processing yielded total economic activity in Kentucky of \$7.413 billion and 68,937 jobs.

	Coal Industry		Indirect		Coal Industry and Indirect	
	Output (billion \$)	Jobs	Output (billion \$)	Jobs	Output (billion \$)	Jobs
Mining Wages and Benefits (40%)	\$1.372	18,950	\$1.341	18,378	\$2.713	37,328
Operating Costs (33%)	\$1.132	N/A*	\$1.579	16,717	\$2.711	16,717
Other** (27%)	\$0.926	N/A*	\$1.062	14,892	\$1.989	14,892
Total	\$3.431	18,950	\$3.982	49,987	\$7.413	68,937

*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 1998 by Haywood and Baldwin.

Economic Impact

Benefits Throughout the Kentucky Economy

Due to the economic impact of the coal industry throughout Kentucky in 1998, in addition to 18,950 persons working at the mines, 6,522 persons worked in factories making everything from mining equipment to home appliances; 2,833 persons drove coal trucks and cargo trucks, worked at rail yards, etc.;

13,763 persons worked in warehouses, sold clothing, appliances, furniture, in retail stores, etc.; 13,512 persons worked in banks, law offices, engineering firms, accounting firms, and other service businesses; 4,729 persons built homes, offices, factories, and highways; and 8,628 others were teachers, government officials, and a wide variety of other professions and occupations.

Industry	Employment	Product Value
Coal mining, processing	18,950 jobs	\$3.431 billion
Manufacturing	6,522 jobs	1.057 billion
Transportation	2,833 jobs	.253 billion
Wholesale/retail trade	13,763 jobs	.597 billion
Services	13,512 jobs	.615 billion
Construction	4,729 jobs	.341 billion
Other	8,628 jobs	1.119 billion
Total	68,937 jobs	\$7.413 billion

Source: Updated from the University of Kentucky Center for Business and Economic Research, Economic Impact Analysis of Coal in Kentucky, (1995) to 1998 by Haywood and Baldwin.

Economic Impacts of All Mining Nationwide - Half a Trillion Dollars

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.

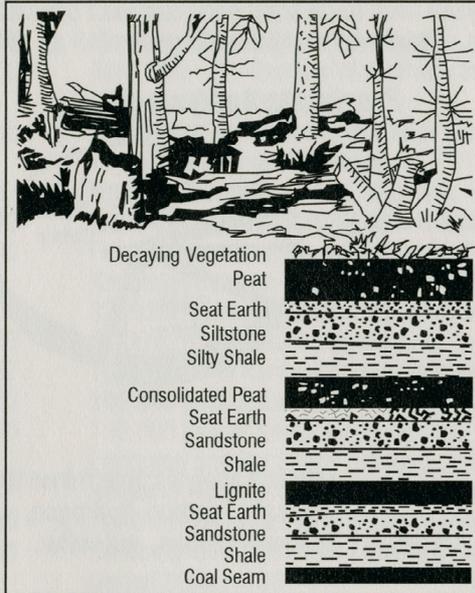
A study for the National Mining Association found that in 1995, the American mining industries (coal mining, metal mining, and industrial minerals mining) had a combined direct and indirect impact on the economy of the United States of \$523.6 billion. That sum included combined direct and indirect contributions of \$143.7 billion in personal income, \$295.7 billion in business income, \$56.9 billion in federal government revenues and \$27.2 billion in 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 an obvious mining state or work directly in the mining industry to benefit from mining. All 50 states benefit from mining. In 1995, mining employed 320,400 people who produced coal and minerals with a total value of over \$60 billion.

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

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

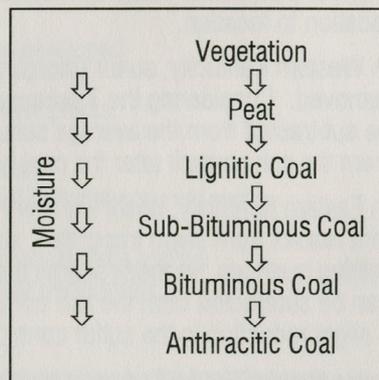
Coal usually is divided into two main classes - anthracite (hard coal) and bituminous (soft coal). When anthracite was formed, it was squeezed under greater heat and pressure than was bituminous. As a result, anthracite contains the highest percentage of carbon and the lowest percentage of moisture. 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).

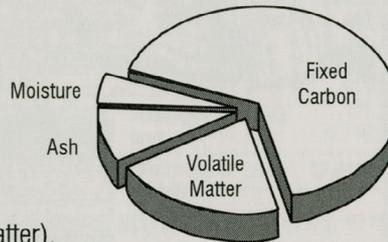


Coal Properties/Improvements

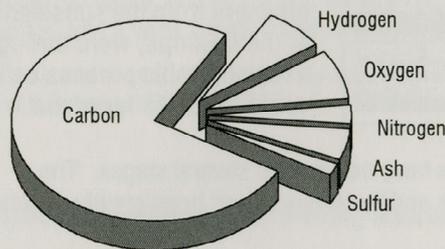
There are two different types of analyses used to determine the nature of bituminous coal: proximate and ultimate analysis. Proximate analysis determines (on an as-received basis):

- **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.

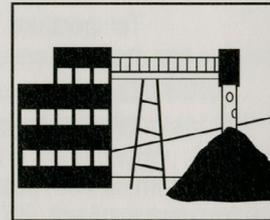
Western Kentucky had 15,195 tons per hour of coal preparation design capacity at approximately 25 coal preparation plants during 1999. Eastern Kentucky had 45,340 tons per hour of coal preparation design capacity at approximately 76 sites during 1999.

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 7 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's Kentucky Coal Marketing Information System.



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 Earlington, 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.**

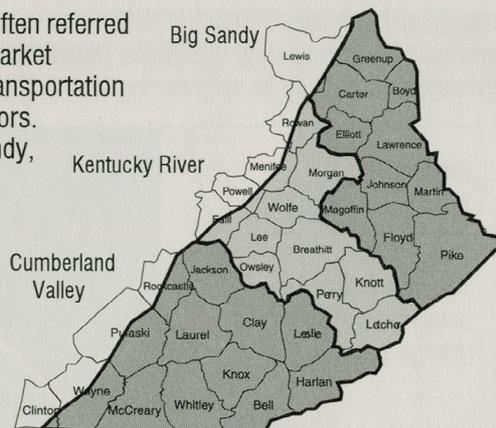
History of Coal

- 1940 Auger surface mining introduced.
- 1942 Republic Steel Company's first production - 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 - 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, which invested \$550 million for the study of "acid rain." Industries spend over \$1 billion on Air Pollution Control Equipment during 1980.
- 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 \$2.5 billion in Federal matching funds committed to assist the private sector to develop and demonstrate improved clean coal technologies.
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 (1990).
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 Co.
- 1994 Western Kentucky CEDAR, Inc. was 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 are passed in Kentucky.
- 1997 The Kentucky Fish and Wildlife Commission re-introduced free ranging Elk into East Kentucky on post-mined lands, citing mountaintop areas and old mine benches as good elk habitat.
- 1997 Kentucky Coal Association celebrates 50 years of service.**
- 1998 Mountaintop mining comes under attack.
- 1998 Federal tax credit begins for use of coal fines in a nonconventional solid synthetic fuel.

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

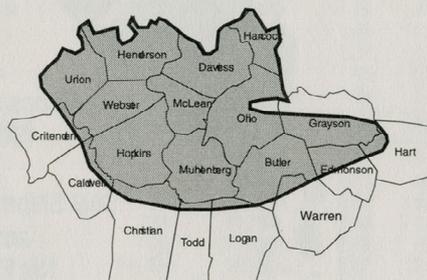
Top Utility Consumers

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 90.4 million tons of coal to 59 electric utility companies for use at 128 electric power plants located in 23 states during 1998.

The Western Kentucky coal field sold approximately 30.1 million tons of coal to 19 electric utility companies for use at 33 power plants in 10 states during 1998. Utility companies purchased almost all of Western Kentucky's coal, including the Tennessee Valley Authority which purchased almost half of the coal mined in Western Kentucky during 1998.



Source: Analysis from U.S. DOE - Energy Information Administration, Form 423 Data, 1998, with computer assistance from Kenneth McCleavy, EIA.

A total of 64 electric utility companies purchased 120.5 million tons of Kentucky coal for 138 electric plants located in 24 states during 1998.

Top 30 Electric Utility Consumers of Kentucky Coal during 1998

Rank	Electric Utility*	Total Coal	KY Coal	KY Coal	EKY Coal	WKY Coal
		tons (000)	tons (000)	%	tons (000)	tons (000)
1	Tennessee Valley Authority (TVA)	42,422	23,278	54.9	6,288	16,990
2	Georgia Power Company	30,903	15,614	50.5	15,577	37
3	Duke Power Company	16,299	11,164	68.5	11,164	0
4	South Carolina Public Service Auth.	6,131	6,131	100.0	6,131	0
5	Carolina Power & Light Co.	12,369	5,146	41.6	5,146	0
6	South Carolina Electric & Gas Co.	5,965	4,564	76.5	4,564	0
7	Louisville Gas & Electric Co.	6,948	4,424	63.7	431	3,993
8	Dayton Power & Light Co.	8,366	3,707	44.3	3,707	0
9	Florida Power Corporation	5,593	3,578	64.0	3,578	0
10	Kentucky Utilities Company	7,338	3,503	47.7	2,699	804
11	Big Rivers Electric Corporation	3,022	2,942	97.4	624	2,319
12	Kentucky Power Company	2,936	2,936	100.0	2,936	0
13	Cincinnati Gas & Electric Co.	11,563	2,804	24.2	2,775	29
14	Virginia Electric & Power Co.	14,082	2,790	19.8	2,789	0
15	East Kentucky Power Coop., Inc.	3,752	2,744	73.1	2,744	0
16	Tampa Electric Company	8,153	2,488	30.5	758	1,730
17	Orlando Utilities Commission	2,396	2,396	100.0	2,396	0
18	Consumers Power Co.	8,395	2,024	24.1	2,024	0
19	Jacksonville Electric Authority	3,287	1,689	51.4	1,689	0
20	Detroit Edison Company	22,811	1,639	7.2	1,639	0
21	Alabama Power Co.	23,958	1,325	5.5	203	1,122
22	Indiana Michigan Power Co.	11,890	1,236	10.4	1,071	165
23	Seminole Electric Coop., Inc.	3,591	1,167	32.5	261	906
24	South Mississippi Electric Power	952	952	100.0	952	0
25	Gulf Power Co.	3,616	901	24.9	214	687
26	Owensboro City of	1,321	796	60.3	0	796
27	Ohio Edison Company	6,892	786	11.4	786	0
28	Gainsville Regional Utilities	639	639	100.0	639	0
29	Orange & Rockland Utilities, Inc.	684	622	90.9	622	0
30	Lansing City of	1,116	620	55.6	620	0
Total	64 Utilities*	n/a	120,492	n/a	90,446	30,045

*NOTE: Receiving Kentucky Coal (columns do not add to totals due to utilities not being listed).

Distribution - Utility Coal

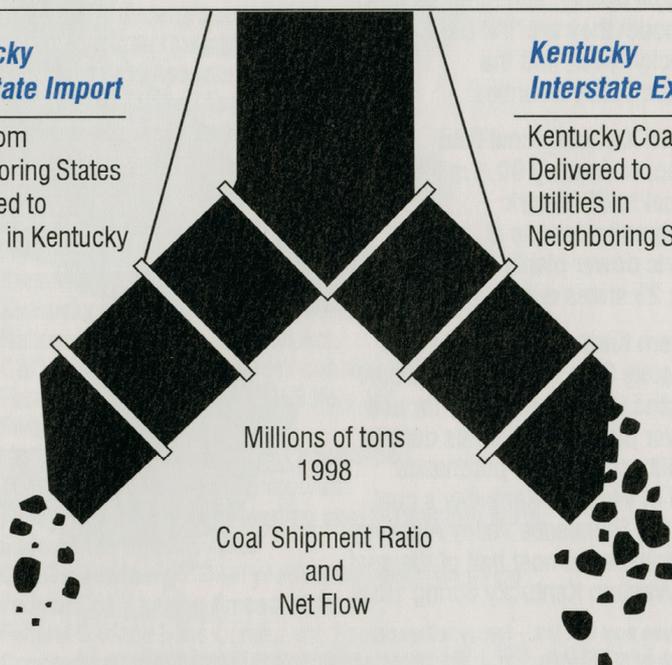
Kentucky exports over 2.8 tons of utility coal to neighboring states for every ton imported. The chart below shows the *Interstate Imports and Exports* of utility coal between Kentucky and its neighboring states.*

Kentucky Interstate Import

Coal from Neighboring States Delivered to Utilities in Kentucky

Kentucky Interstate Export

Kentucky Coal Delivered to Utilities in Neighboring States



Kentucky receives from Illinois 0.25	←	KY : IL 1 : 2.5	Illinois receives from Kentucky 0.10
Kentucky receives from Indiana 2.02	←	KY : IN 1 : 1.4	Indiana receives from Kentucky 1.41
Kentucky receives from Missouri 0.0		KY : MO N/A	→ Missouri receives from Kentucky 0.04
Kentucky receives from Ohio 0.66		KY : OH 12.9 : 1	→ Ohio receives from Kentucky 8.49
Kentucky receives from Tennessee 0.0		KY : TN N/A	→ Tennessee receives from Kentucky 13.82
Kentucky receives from Virginia 0.0		KY : VA N/A	→ Virginia receives from Kentucky 2.96
Kentucky receives from West Virginia 6.52	←	KY : WV 1 : 217.3	West Virginia receives from Kentucky 0.03

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

2.8 : 1
→

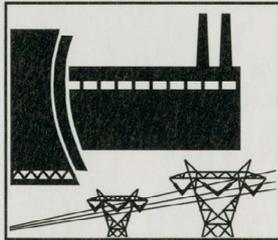
Kentucky Exports to Utilities in Neighboring States
26.9 Million Tons of Coal

*Does not include metallurgical or industrial coal shipments, or Kentucky's imports of coal from Colorado (2.8 million tons), Pennsylvania (0.08 million tons), Utah (0.02 million tons), and Wyoming (0.25 million tons).

Source: U.S. DOE - Energy Information Administration, *Cost and Quality of Fuels for Electric Utility Plants*, 1998.

Distribution/KY Coal-Fired Plants

Kentucky coal was shipped to electric utility plants in 24 states in 1998.



Sources: U.S. DOE, Energy Information Administration, Form 423 Data, 1998, with computer assistance from Kenneth McCleevy, EIA.

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
	Alabama	1,101	12,233	.93	11.0
	Connecticut	456	13,115	.50	7.0
	Delaware	92	12,837	.68	6.5
	Florida	10,120	12,765	1.07	8.6
	Georgia	16,043	12,510	1.02	9.9
	Illinois	9	13,322	.76	5.6
	Indiana	1,130	12,749	1.17	8.2
EASTERN KENTUCKY	Kentucky	9,969	12,115	1.10	11.2
	Maryland	485	13,112	.76	6.5
	Massachusetts	558	12,814	.64	7.1
	Michigan	4,440	12,795	.87	8.5
	Minnesota	1	12,650	1.35	7.9
	Mississippi	961	12,344	.89	8.8
	Missouri	28	13,193	1.19	7.5
	New Jersey	110	12,933	.75	7.5
	New York	999	12,925	.65	8.2
	North Carolina	15,721	12,338	.96	10.4
	Ohio	8,466	11,875	.88	12.4
	South Carolina	11,287	12,793	1.19	8.7
	Tennessee	5,424	12,543	1.43	9.7
	Virginia	2,959	12,804	1.22	7.7
West Virginia	32	12,229	.83	10.7	
Wisconsin	55	13,102	.79	6.7	
Eastern Ky. Subtotal		90,446	12,479	1.04	9.8
WESTERN KENTUCKY	Alabama	3,353	11,924	2.37	11.7
	Florida	3,322	11,870	2.75	8.2
	Illinois	89	11,465	2.89	9.2
	Indiana	276	11,757	2.60	9.4
	Iowa	195	11,916	2.46	9.1
	Kentucky	14,365	10,980	3.67	15.3
	Mississippi	6	12,034	2.67	8.7
	Missouri	15	11,500	3.25	13.0
	Ohio	26	11,399	2.70	14.3
	Tennessee	8,398	11,761	2.72	9.5
Western Ky. Subtotal		30,045	11,417	3.14	12.4
Total		120,492	12,214	1.56	10.5

1998 Fuel Origin

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

COMPANY/Plant (County)	Coal Tons (000)					State	Unit (Capacity) (Megawatts Each)
	Total Coal	Eastern Kentucky	Western Kentucky	Out-of-State (35% Total)			
WKE/DB Wilson (Ohio)***	865	-	865	-	-	-	1*(510)
WKE/HMP&L Stat. 2 (Henderson)***	See Reid Plant	-	-	-	-	-	1*(180) 2*(185)
WKE/KC Coleman (Hancock)***	662	496	87	79	12%	IN, WV	1 & 2 (174) 3(173)
WKE/RA Reid (Webster)***	591	-	591	-	-	-	1(82)
WKE/RD Green (Webster)***	904	128	776	-	-	-	1* & 2*(264)
Cinergy/East Bend (Boone)	1,696	454	11	1,231	73%	IN, OH, PA, WV	2*(648)
EKP/Cooper (Pulaski)	783	783	-	-	-	-	1(100) 2(221)
EKP/Dale (Clark)	466	466	-	-	-	-	1 & 2(22) 3 & 4(66)
EKP/HL Spurlock (Mason)	2,503	1,495	-	1,008	40%	WV	1(305) 2*(508)
HMPL Station One (Henderson)	31	-	31	-	-	-	5(11) 6(32)
KP/Big Sandy (Lawrence)	2,936	2,936	-	-	-	-	1(281) 2(816)
KU/EW Brown (Mercer)	1,515	1,507	-	8	0.5%	PA	1(114) 2(180) 3(446)
KU/Ghent (Carroll)	5,149	1,089	233	3,827	74%	IN, WV	1*(557) 2(556) 3(557) 4(556)
KU/Green River (Muhlenberg)	571	-	571	-	-	-	1* & 2 (38) 3(75) 4(114)
KU/Pineville (Bell)	52	52	-	-	-	-	3(38)
KU/Tyrone (Woodford)	103	103	-	-	-	-	3(75)
LG&E/Cane Run (Jefferson)	1,423	6	521	896	63%	IN, OH	4*(163) 5*(209) 6*(272)
LG&E/Mill Creek (Jefferson)	3,941	212	3,146	583	15%	IN, OH, WV	1* & 2*(356) 3*(463) 4*(544)
LG&E/Trimble Co. (Trimble)	1,584	219	320	1,045	66%	WV, OH	1*(566)
OMU/Elmer Smith (Davies)	1,321	-	796	525	40%	IN	1*(151) 2*(265)
TVA/Paradise (Muhlenberg)	7,015	-	6,347	668	10%	WY, CO	1* & 2*(704) 3(1,150)
TVA/Shawnee (McCracken)	3,599	91	85	3,423	95%	CO, IL, UT, WV, WY	1-10*(175)

*Flue Gas Desulfurization (FGD) Capacity. **Unit 10 is (AFBC) Atmospheric Fluidized Bed Combustion.

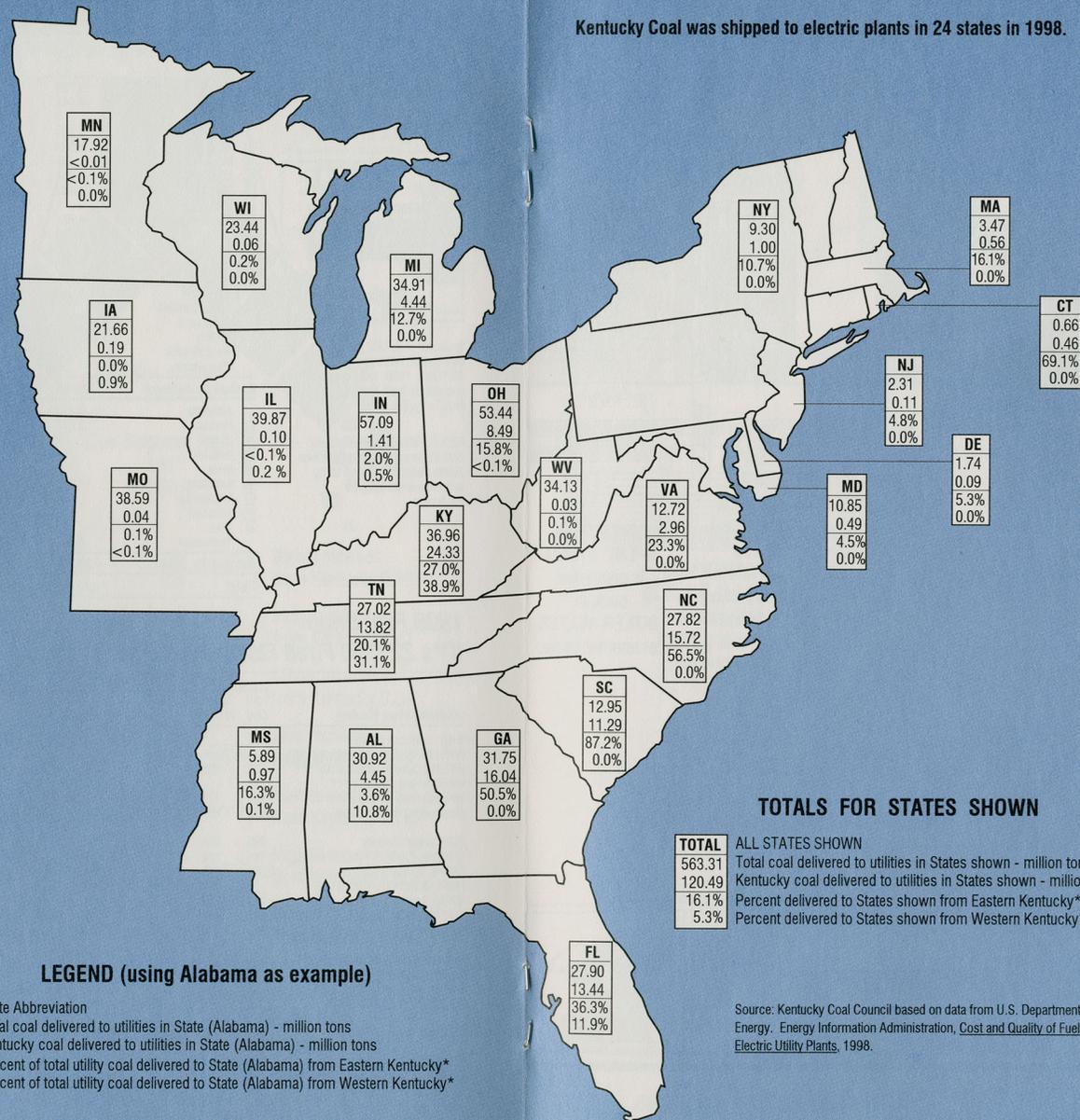
***Reported through July, 1998 only - reclassified as Non-Utility Plants.

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

Source: Cost & Quality of Fuels for Electric Utility Plants, 1998; Inventory of Electric Utility Plants, 1998.

Kentucky Coal Shipments to Electric Utility Plants by State in 1998

Kentucky Coal was shipped to electric plants in 24 states in 1998.



TOTALS FOR STATES SHOWN

TOTAL	ALL STATES SHOWN
563.31	Total coal delivered to utilities in States shown - million tons
120.49	Kentucky coal delivered to utilities in States shown - million tons
16.1%	Percent delivered to States shown from Eastern Kentucky*
5.3%	Percent delivered to States shown from Western Kentucky*

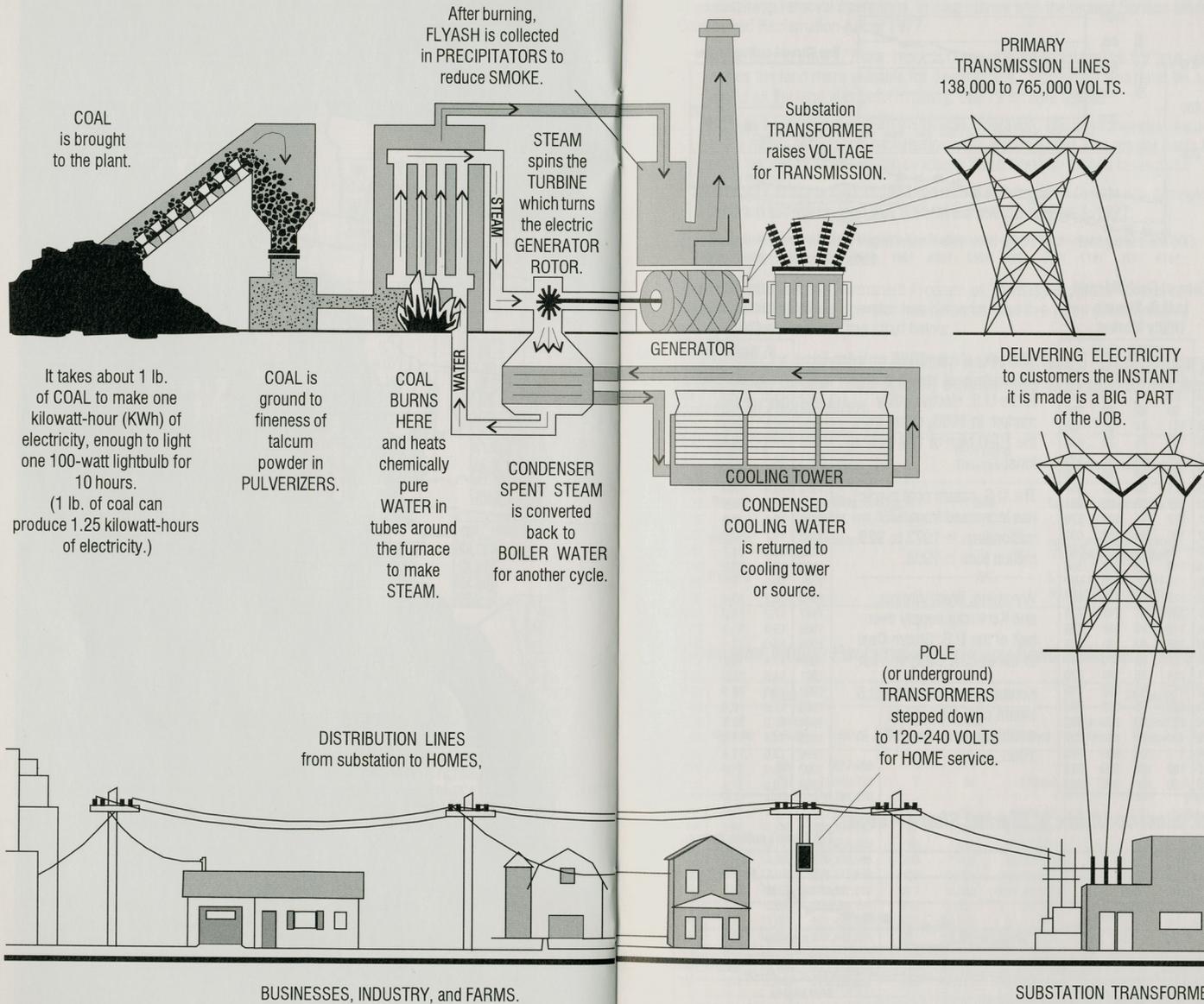
LEGEND (using Alabama as example)

AL	State Abbreviation
30.92	Total coal delivered to utilities in State (Alabama) - million tons
4.45	Kentucky coal delivered to utilities in State (Alabama) - million tons
3.6%	Percent of total utility coal delivered to State (Alabama) from Eastern Kentucky*
10.8%	Percent of total utility coal delivered to State (Alabama) from Western Kentucky*

*Percentages are rounded to the nearest tenth

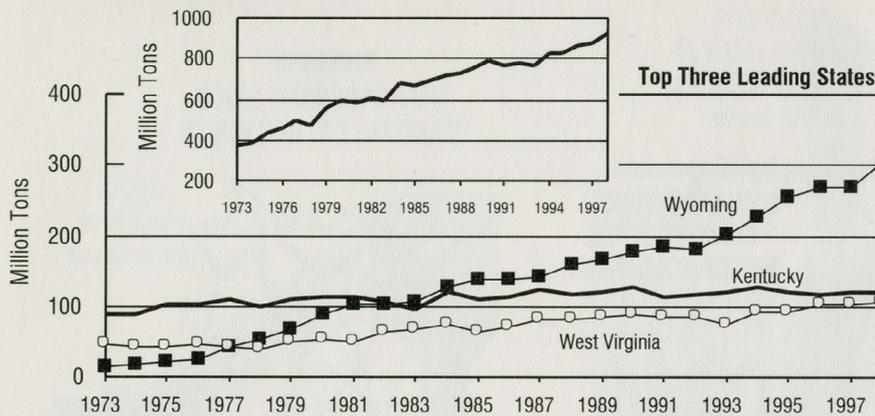
Source: Kentucky Coal Council based on data from U.S. Department of Energy, Energy Information Administration, Cost and Quality of Fuels for Electric Utility Plants, 1998.

Coal-into-Kilowatts



U.S. Electric Utility-Coal

U.S. Electric Utility Market Coal Shipments



Tons of Coal Shipped to U.S. Electric Utility Market

Year	Million Tons			
	KY	WV	WY	U.S.
1973	87	47	13	375
1974	90	42	18	385
1975	101	44	22	432
1976	102	45	26	455
1977	110	44	42	490
1978	99	38	53	476
1979	111	50	69	557
1980	112	53	90	594
1981	112	51	101	579
1982	106	64	102	601
1983	95	66	107	593
1984	119	74	127	684
1985	111	65	138	667
1986	115	73	138	687
1987	124	81	142	721
1988	116	80	158	728
1989	120	83	166	753
1990	129	89	176	787
1991	114	85	184	770
1992	117	85	182	776
1993	120	75	202	769
1994	127	93	226	832
1995	121	91	254	827
1996	117	102	269	863
1997	122	104	269	881
1998	120	106	305	929

Kentucky shipped 120 million tons of steam coal to the U.S. electric utility market in 1998, down from the 1990 high of 129 million tons.

The U.S. steam coal market has increased from 375 million tons in 1973 to 929 million tons in 1998.

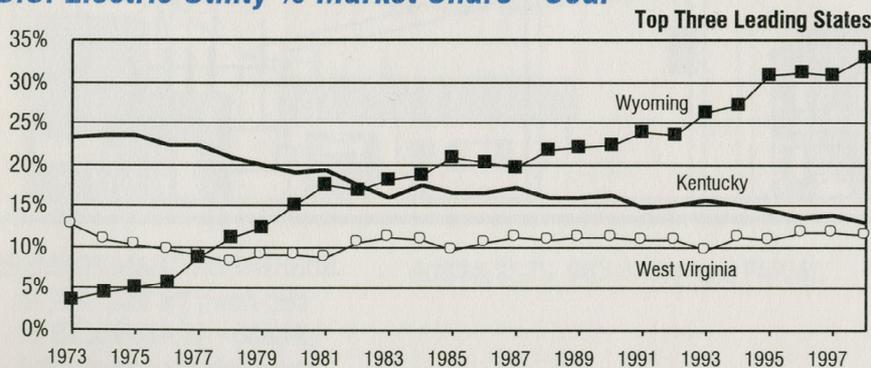
Wyoming, West Virginia, and Kentucky supply over half of the U.S. Steam Coal to the electric utility market.

Kentucky's share of the U.S. steam coal market has declined, down to 13.0% in 1998.

% Market Share U.S. Electric Utility - Coal

Year	% Market Share		
	KY	WV	WY
1973	23.2	12.6	3.5
1974	23.4	10.8	4.7
1975	23.5	10.2	5.0
1976	22.5	9.8	5.7
1977	22.4	9.0	8.6
1978	20.7	8.0	11.2
1979	19.9	8.9	12.4
1980	18.9	8.9	15.1
1981	19.4	8.8	17.5
1982	17.7	10.6	17.0
1983	16.1	11.1	18.1
1984	17.4	10.8	18.6
1985	16.6	9.7	20.7
1986	16.7	10.6	20.1
1987	17.2	11.2	19.8
1988	15.9	11.0	21.7
1989	16.0	11.1	22.0
1990	16.4	11.3	22.4
1991	14.8	11.0	24.0
1992	15.1	10.9	23.4
1993	15.6	9.8	26.3
1994	15.2	11.1	27.2
1995	14.6	11.0	30.7
1996	13.6	11.8	31.2
1997	13.9	11.8	30.7
1998	13.0	11.4	32.8

U.S. Electric Utility % Market Share - Coal



Source: U.S. DOE/EIA - Cost and Quality of Fuels for Electric Utility Plants, 1973-1998

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 it 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 with random oversight inspections by federal inspectors.

Kentucky coal operators have paid over \$726.6 million to date into a federal program to reclaim land that was 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.)

The Kentucky coal mining industry currently has \$795.6 million of reclamation bonds (866 bonds) outstanding 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 2 Years of Successful Reclamation
Phase III	Final	15%	5 Years of Consecutive Successful Reclamation

Successful Mining Reclamation/Primacy Bond Releases, 1984-98

Year	Phase I			Phase II			Phase III		
	# of Releases	Acres* Released	Bond	# of Releases	Acres* Released	Bond	# of Releases	Acres* Released	Bond
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
Total	6,298	192,562	\$385,869,246	3,504	109,416	\$106,133,421	4,153	140,630	\$120,449,563

*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

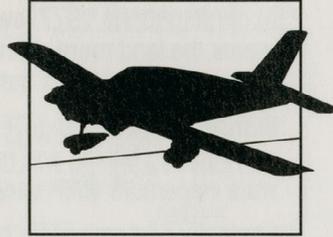
Post-mining land use changes go hand-in-hand with economic development in Kentucky, especially in many parts of Eastern Kentucky where much needed level to gently rolling land for development is still at a premium.

Post-Mining Land Use and County

Regional Airports

Big Sandy Regional Airport
Hatcher Field Airport
Carroll Field Airport
Ford Airport
Ohio County Airport

Martin
Pike
Breathitt
Perry
Ohio



Correctional Facilities

Federal Correctional Institute
East Kentucky Correctional Complex
Medium Security Prison
Otter Creek Correctional Center
Juvenile Boot Camp

Clay, Martin
Morgan
Muhlenberg, Knott (in development)
Floyd
Breathitt

Government Facilities

Earle C. Clements Job Corps Ctr.
Army National Guard Training Ctr.
U.S. Postal Service
County Park
Madisonville South By-Pass
Solid Waste Landfills
Hazard Armory

Muhlenberg
Muhlenberg
Laurel
Ohio
Hopkins
Davies, Greenup, Ohio, Hopkins, Perry
Perry

Fish & Wildlife

Duck Refuge Areas
Catfish Farming
Wildlife Management Area
Wetland Development

Ohio, Perry, Breathitt, Knott, Martin, Muhlenberg
McLean
Muhlenberg, Ohio, Perry
Muhlenberg

Elk in the Mountains of East Kentucky Again

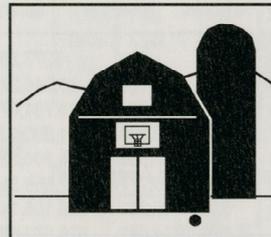
Free-ranging elk returned to the mountains of East Kentucky, with reclaimed mountaintop removal areas, old reclaimed mine benches, and hardwood forests serving as their home once again. Of the 14 East Kentucky counties selected for the elk reintroduction, the combined 475,000 acres of the Cyprus-Amax Wildlife Management Area on an active mountaintop coal mine, and the adjacent Robinson Forest Wildlife Management Area was the initial home of the first 200 free-ranging elk introduced.



Farms

Starfire Project
MAPCO/Morehead Agriculture Ctr.
Martin County Coal Corp. Farm
D&R Brangus Farm
Hog Farm
Livestock Feed
Chicken/Broiler Houses
Avian Farms

Perry
Martin
Martin
Perry
Hopkins, Knox
Lee
Hopkins, Muhlenberg
Wayne



Industrial/Commercial

Electrical Construction Office/Shop
Electric Utility Operations Center
Industrial Scrubber Sludge Disposal
Explosive Manufacturing
Wood Fabrication Plant
Apparel Manufacturing
Mine Shops/Welding/Machine/Equip.
Truck/Equipment Sales
Trucking Company
Explosive Company
Farm Equipment
Sawmill/Logs/Lumber
Recycling Facility
Blacktop/Concrete Facilities
Oil/Gas Facilities

Hopkins
Hopkins
Ohio, Daviess, Webster
Muhlenberg
Breathitt, Perry
Perry
Johnson, Hopkins, Knox, Muhlenberg, Ohio, Union, Whitley
Butler
Muhlenberg
Perry, Hopkins
Hopkins
Bell, Butler, Clay, Jackson, Laurel, Pike, Whitley, Wolfe
Letcher
Laurel, Perry
Clay, Lee, Elliott

(continued on page 31)

Land Uses/Mountaintop Mining

Post-Mining Land Use and County (continued)

Industrial/Commercial (continued)

Regional Industrial Park	Greenup-Boyd-Carter, Letcher-Perry-Knott (in design), Perry-Leslie-Harlan
Industrial Park	McCreary, Martin, Letcher, Bell, Whitley (proposed), Breathitt (in development)
Paul Coffey Industrial Park	Boyd
Industrial Park Expansion (Proposed)	Leslie-Clay
Plastic Injection Molding Company	Perry
Mine/Electronics Supply	Martin
South McCreary Industrial Site	McCreary
Industrial Parkway	Greenup
United Parcel Services	Perry
Unified Power Distribution	Martin

R&R/Sport

Red Fox Resort	Knott (in development)
Recreation Areas	Greenup
Golf Courses	Clay, Laurel, Letcher, Floyd (in development), McLean
Golf (drive & putt)	Webster
Recreational Area & Fishing Lake	Pike
Athletic Facilities	Letcher
Fairgrounds	Morgan
Riding Stables & Trails	Muhlenberg
Campground (proposed)	Hopkins

Structural Building Sites

High Schools	Bell, Harlan, Pike
Middle School	Bell
Athletic Complexes	Bell, Letcher, Perry, Pike
Appalachian Regional Hospital	Perry
Housing Project - Happy Top	Lee
Housing Developments	Clay, Letcher, Perry, Pike, Knox, Laurel, Bell, Harlan, Martin, Floyd (proposed)
Church, Daycare	Laurel
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
Storage Rental Facility	Hopkins

Numerous small businesses in EKy

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

Mountaintop Mining

Mining is only a temporary land use, and mined land must be returned to its approximate original shape, with the exception of mountaintop mining. Where mountaintop mining occurs the slopes of the reclaimed land are less steep than before mining (i.e., now they are gently rolling to almost level land).

By law, reclaimed land must be as useful as the land was before mining, if not more useful. Five years of successful reclamation must be achieved before a reclamation bond can be released.

Mountaintop mining has created numerous sites, such as several of the sites listed above, for new schools, hospitals, shopping centers, parks, golf courses, housing, airports, industry, agriculture and timber in Eastern Kentucky.

Landowners must give their permission for mountaintop mining. Mountaintop mining gives the landowners more land use options after mining.

Many mountaintop mines today re-mine and reclaim old mined areas using much improved (i.e., flatter slopes, ponds, emission controls) mountaintop mining reclamation techniques which result in more beneficial land-use options such as those listed above.

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 \$726.6 million to the Abandoned Mine Land (AML) Reclamation Fund since 1978, and nationally over \$5.09 billion has been paid by coal operators across the United States.

50% of the total KY AML fees go directly to the state share account. However, \$97.4 million (September, 1998) is unallocated due to the federal appropriation process (see Kentucky State Share Balance column in table below).

\$1,351,564,993 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	\$29.97	\$14.98	\$ 0	\$15.0
1979	33.70	16.85	0.6	31.8
1980	35.03	17.51	0	49.3
1981	35.82	17.91	1.4	67.2
1982	36.58	18.29	16.4	69.6
1983	31.13	15.56	28.9	56.7
1984	37.75	18.87	36.8	44.8
1985	34.60	17.30	32.3	31.4
1986	34.50	17.25	19.7	31.6
1987	35.22	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	38.44	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	35.22	17.61	15.5	77.1
1996	33.79	16.90	16.0	83.6
1997	34.48	17.24	16.1	90.1
1998	34.90	17.45	15.7	97.4
Totals	\$726.60	\$364.16	\$334.5	

*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 1998)

Kentucky AML Projects

523 Multi-site State AML Projects
 \$334.5 million in expenditures
 14,300 acres reclaimed
 (plus various projects currently under construction)

Federal AML Projects

822 Multi-site AML Projects
 \$96.3 million in expenditures
 5,400 acres reclaimed
 Rural Abandoned Mine Program,
 Emergency and Non-Emergency

1,345 multi-site AML projects have been undertaken in Kentucky by both the state and federal programs from 1978-1998 reclaiming over 19,700 acres and expending \$430.8 million in AML reclamation funds.

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

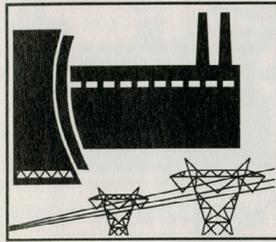
38 water line projects - \$42 million.	1,374 mine portal closures.
Over 25,000 feet of highwall eliminated.	103 vertical shafts sealed.
Over 175 hazardous structures removed.	37 miles of stream restoration.
Over 1,800 acres of landslide projects stabilized.	297 acres of mine fires controlled.

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 lands mined prior 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-Low Cost Energy

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



95.7% of Kentucky's electricity was generated from coal in 1998 (56.3% of the total U.S. electricity). (Hydro provided 3.6%; oil and gas together provided 0.7%.)

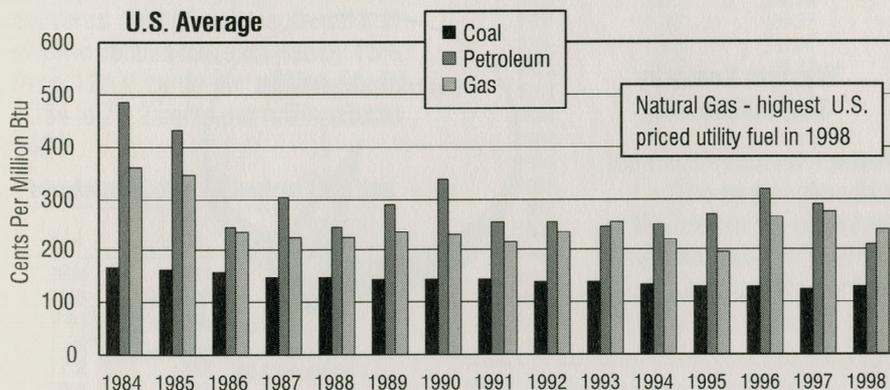
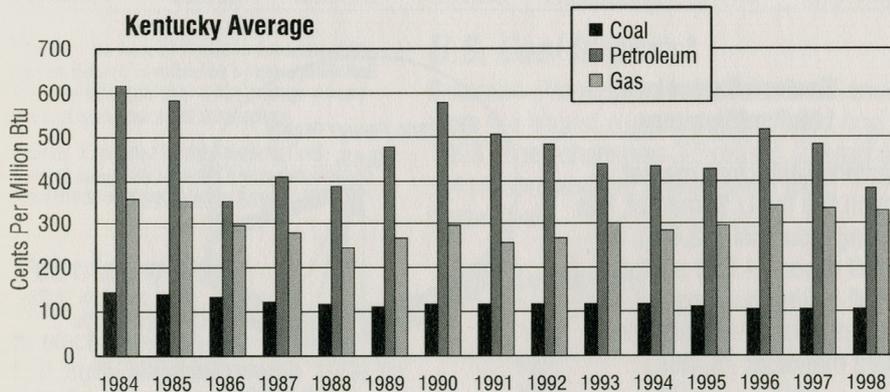
Utilities in Kentucky generated about 86.2 billion kilowatt-hours of electricity in 1998. After accounting for line losses and net state-line flows of electricity, 73.9 billion kilowatt-hours of electricity were sold within Kentucky during 1998 compared to 86.2 kilowatt-hours of net generation.

Source: U.S. DOE-EIA, *Electric Power Annual*, 1998, Volume I.

Electric Generating Capability- Net Generation in Kentucky during 1998 by Fuel Type

Fuel Type	No. Units	Net Winter Capability Megawatts %		Net Generation %
Coal	58	14,311	90.1%	95.7%
Petroleum	15	200	1.35%	<0.2%
Gas	10	610	3.8%	0.6%
Hydro	30	768	4.8%	3.6%
Total	113	15,910		

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



*NOTE: In 1993 and again in 1998 gas cost rose above petroleum while coal costs remained steady.
Source: U.S. DOE - EIA, *Cost and Quality of Fuels for Electric Utility Plants*, 1998.

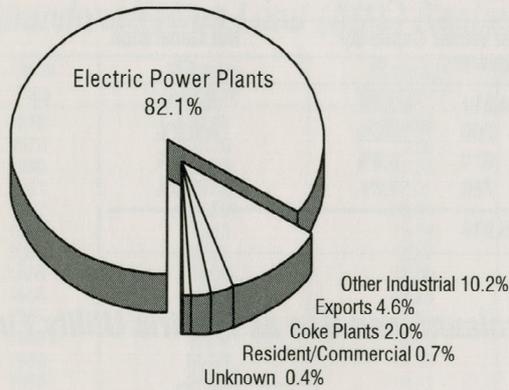
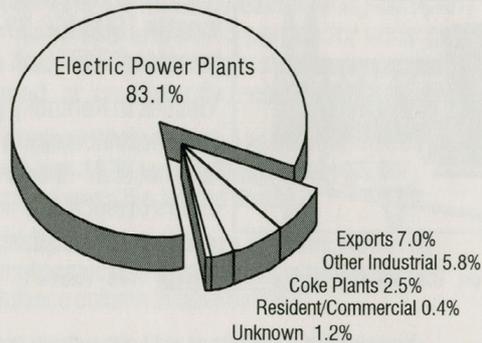
Uses of Coal

Distribution of Coal by Consuming Sector, 1998

U.S. TOTAL 1,118.7 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.



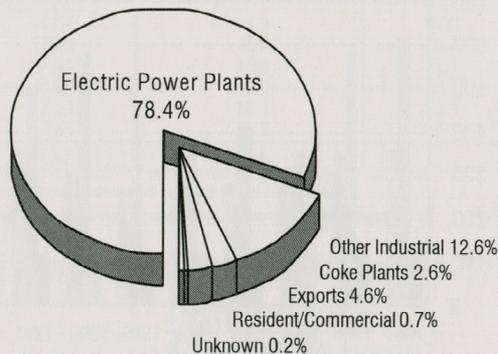
KENTUCKY TOTAL 150.3 million tons*

Combining market sectors shows that 95.4% of Kentucky's coal goes to the domestic market in approximately 29 states.

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

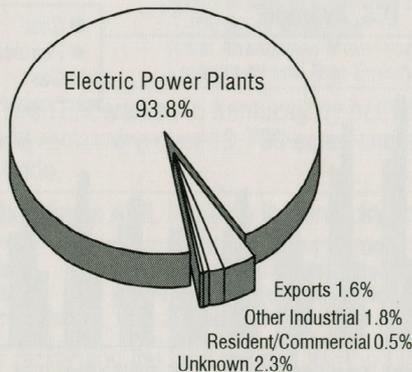
Eastern Kentucky 116.7 million tons

Eastern Kentucky's market, much like the U.S. market, has strong industrial (12.6%), a small export (4.6%) sector, small coking coal market, and a predominate electric power plant market at 78.4%.



Western Kentucky 33.6 million tons

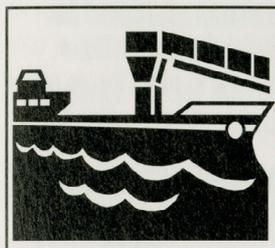
Western Kentucky is almost totally dependent on the electric power market with 93.8% of its coal going to electric power plants.



Source: U.S. DOE - Energy Information Administration, *Quarterly Coal Report*, October-December, 1998. *Cost and Quality of Fuels for Electric Utility Plants, 1998*, *Coal Industry Annual*, 1998.

*Includes stockpiled coal.

Coal Exports/Imports



In 1998 the U.S. exported 78.0 million tons of coal (31.0 million steam coal and 47.1 million metallurgical coal). Metallurgical coal remained the majority of U.S. exports, with its share at 60.3% in 1998. The U.S. coal exports in 1998 were down by 14 million tons from 1996. U.S. coal imports totaled 8.7 million tons in 1998.

Kentucky's 1998 exports of 6.9 million tons were 8.9% of total U.S. exports. Kentucky exported coal to 13 foreign countries during 1998 at an estimated value of \$283 million.

Kentucky ranked fourth in the U.S. in 1998 for coal exports behind West Virginia (37.5 million tons), Virginia (12.9 million tons), and Pennsylvania (7.9 million tons).

Kentucky Coal Exports, 1998

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 (\$)
Belgium&Luxembourg	-	-	44,000	2,082,960	44,000	2,082,960
Canada	-	-	1,459,000	50,160,420	1,459,000	50,160,420
China (Taiwan)	1,780,000	61,338,800	87,000	3,700,980	1,867,000	65,039,780
France	-	-	422,000	19,559,700	422,000	19,559,700
Germany, FR	-	-	71,000	3,295,110	71,000	3,295,110
Iceland	-	-	62,000	3,464,560	62,000	3,464,560
Italy	-	-	291,000	13,973,820	291,000	13,973,820
Japan	109,000	3,692,920	518,000	21,906,220	627,000	25,599,140
Netherlands	-	-	1,096,000	51,380,480	1,096,000	51,380,480
Norway	-	-	138,000	7,686,600	138,000	7,686,600
Saudi Arabia	-	-	42,000	1,928,640	42,000	1,928,640
Sweden	-	-	33,000	1,556,280	33,000	1,556,280
United Kingdom	-	-	781,000	37,284,940	781,000	37,284,940
KENTUCKY	1,889,000	65,031,720	5,042,000	217,980,710	6,931,000	283,012,430

*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*, 1998.

U.S. Coal Imports*

Columbia, Venezuela, Indonesia, and Canada were the largest suppliers of imported coal in 1998. Their share was 3.5 million, 2.5 million, 1.4 million, and 1.2 million short tons, respectively.

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

*NOTE: Includes Puerto Rico and Virginia Islands

Source: U.S. DOE Energy Information Administration, *Quarterly Coal Report*, October-December, 1998.

Petroleum Coke

Since 1984 petroleum coke received by electric utilities have increased 10 fold from 335,200 tons in 1984 to 3,217,000 tons in 1998. The average delivered cost of petroleum coke at electric utilities has declined by 45% from 128.6 cents per million Btu in 1984 to 71.2 cents per million Btu in 1998.

Petroleum Coke - Electric Utilities

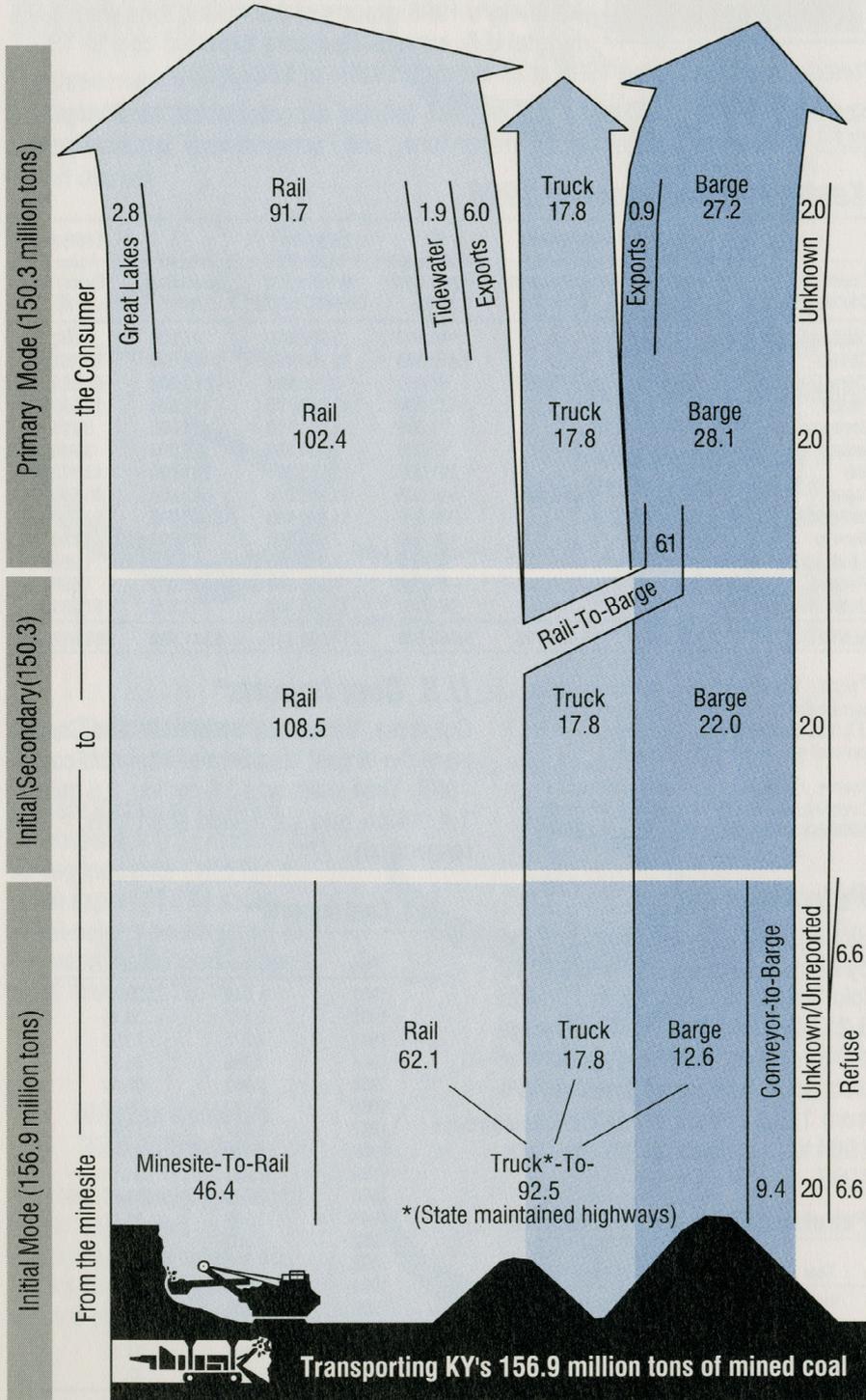
Year	Tons (000)	Cents per Million Btu
1984	335	128.6
1986	359	105.5
1988	355	97.2
1990	554	80.3
1992	687	75.0
1994	1,263	68.9
1996	1,410	78.2
1998	3,217	71.2

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

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 is often 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, 1998; Coal Industry Annual, 1998; Kentucky Department of Mines and Minerals, Annual Report, 1998.

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

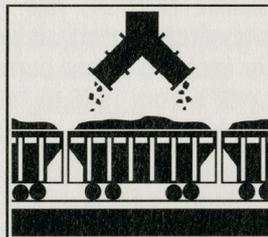
Kentucky has over 2,500 miles of railroad lines, over which 108.5 million tons of Kentucky coal were transported in 1998.

There are 2 Class I railroads, 1 Regional railroad, and 2 short line railroads that operate totally in Kentucky or originate coal in Kentucky.

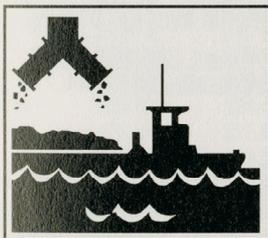
These railroads have in excess of 67,000 hopper cars dedicated to the transport of coal.

Kentucky has approximately 138 coal rail loading facilities.

97% of 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 28 million tons of Kentucky coal were shipped in 1998.

Statewide, 48 coal river terminals on the Ohio River and its tributaries serve Kentucky coal shippers (29 within Kentucky). In total, 19 coal river terminals are located near Eastern Kentucky, 5 in Central Kentucky, and 24 near Western Kentucky.

Of these, 19 of the coal river terminals have rail access, 38 have truck access, 9 have barge off-loading access, and 5 have conveyor access. Automated blending is found in 33 of the coal river terminals with 30 having automatic sampling, 22 having some coal crushing equipment, and 9 having stoker preparation equipment.

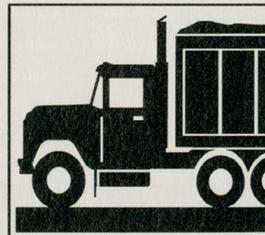
Source: Kentucky Coal Council, Kentucky Coal Marketing Updates - Coal River Terminals, 1998.

Coal Transportation by Truck in Kentucky

Approximately 4,200 miles of state-maintained highways are used for transporting coal.

Truck shipments are a very important mode of coal transportation in Kentucky. In 1998, approximately 2.2 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 3,061 coal trucks were registered during 1998 in Kentucky, indicating that over 3,061 coal truck drivers were employed in Kentucky. The sale of extended weight coal decals generated \$825,616 in 1998.



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

Air Quality/By-Products

Coal Use and Sulfur Dioxide Emissions from Electric Utility Plants

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

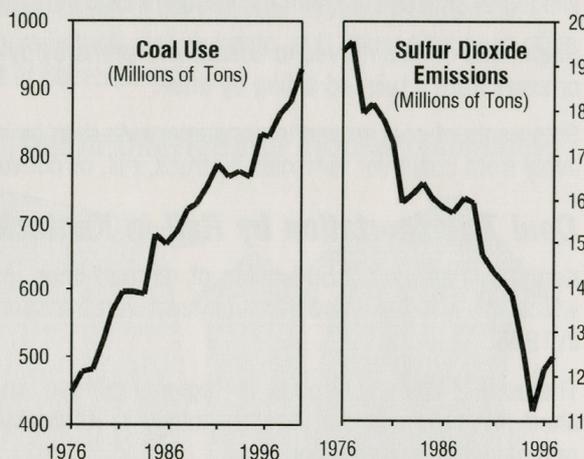
Coal-fired power plants in the U.S. have reduced their sulfur dioxide emission rate (the amount of pollution produced for each ton of coal burned) by 67% from 1976 to 1997.

U.S. sulfur dioxide emissions have decreased by 36% from 1976 to 1997, even though power plants increased their 1976 to 1997 coal use level by 97%.

Kentucky's 1997 sulfur dioxide emissions of 790,000 tons - EIA (599,049 tons EQC) have been reduced by 47% - EIA (60% EQC) from the 1976 sulfur dioxide emissions level of 1,495,622 tons.

These achievements are the result of using lower-sulfur coal and using 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 1997 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: 1998-99 Air Quality*; U.S. DOE - EIA; *Electric Power Annual, 1989-97*; *Cost and Quality of Fuels for Electric Utility Plants, 1998*.



Coal Combustion By-Products

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, estimated to be 8.5 million tons of ash, generated from the combustion of Kentucky coal outside Kentucky in 22 other states during 1996 (13.6% of total U.S. utility coal).

1997 U.S. Coal Combustion By-Product Production & Consumption (million tons)

	Production	Consumption	% Used
Fly Ash	60.3	19.3	32.0
Bottom Ash	16.9	5.1	30.2
Boiler Slag	2.7	2.6	95.5
Subtotal	79.9	27.0	33.8
FGD Material	25.2	2.2	8.7
Total	105.1	29.2	27.8

Source: American Coal Ash Association, Inc.

Coal combustion materials that are not reused are being disposed of in Kentucky as high volume - low hazard special waste. Electric utility plants use existing ash ponds (lagoons) and stabilized landfills for onsite disposal. For off-site disposal, special waste landfills such as monofills or co-disposal (minesite haulback) are used.

Existing Consumption

Cement and concrete products
Road base/subbase
Snow and ice control
Grouting/wallboard
Coal mining applications/other

Structural fill/flowable fill
Mineral filler in asphalt
Blasting grit/roofing granules
Waste stabilization

Source: American Coal Ash Association, Inc.,
UK - Center for Applied Energy Research.

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 Kentucky Coal FOB Mine (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	(Not Available as of 1-31-2000)						

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*, 1993-1998.

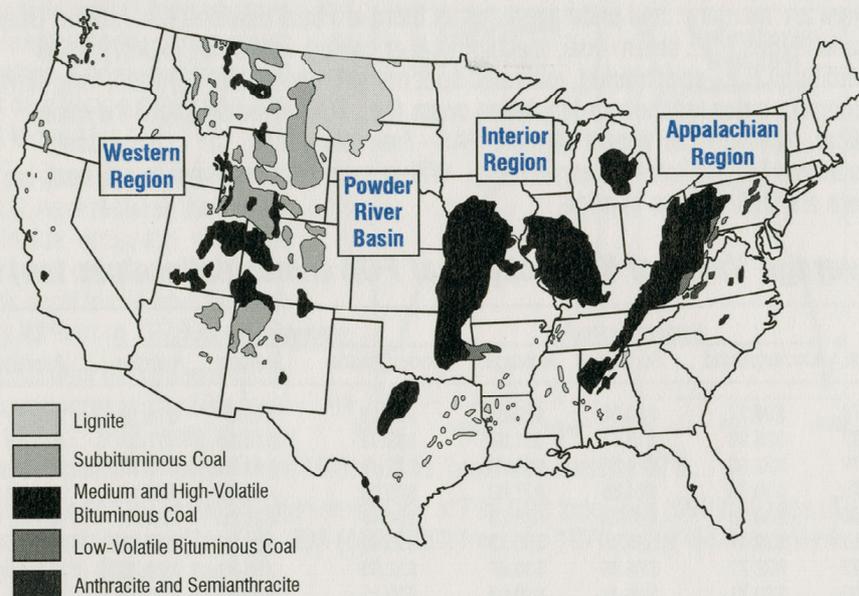
Electric Utility Deregulation - Impact on Coal

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 the Federal Energy Regulatory Commission (FERC) issued Order 888 addressing the issues of open access to encourage wholesale competition to the electric utility industry and FERC Order 889 requiring utilities to share information about available transmission capacity.

A competitive market will greatly intensify pressures to keep generating costs 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 or so, 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. Comparisons-Production

U.S. Coal Fields and Coal Producing Areas



Source: Developed from the U.S. Geological Survey

Coal Production by State, 1998 (thousand tons)

State and Region	Total	Anthracite	Bituminous	Sub-Bituminous	Lignite
Alabama	23,013	--	23,013	--	--
Alaska	1,344	--	--	1,344	--
Arizona	11,315	--	11,230	85	--
Arkansas	24	--	24	--	--
Colorado	29,631	--	20,027	9,604	--
Illinois	39,732	--	39,732	--	--
Indiana	36,803	--	36,803	--	--
Kansas	341	--	341	--	--
Kentucky, Total	150,295	--	150,295	--	--
Eastern	116,654	--	116,654	--	--
Western	33,641	--	33,641	--	--
Louisiana	3,216	--	--	--	3,216
Maryland	4,060	--	4,060	--	--
Missouri	372	--	372	--	--
Montana	42,840	--	--	42,511	329
New Mexico	28,597	--	5,205	29,392	--
North Dakota	29,912	--	--	--	29,912
Ohio	28,048	--	28,013	35	--
Oklahoma	1,661	--	1,661	--	--
Pennsylvania	81,036	5,231	75,575	230	--
Tennessee	2,696	--	2,695	--	--
Texas	52,583	--	274	--	52,309
Utah	26,075	--	26,075	--	--
Virginia	33,747	--	33,747	--	--
Washington	4,638	--	16	4,622	--
West Virginia	171,145	--	171,145	--	--
Wyoming	314,409	--	1,389	313,019	--
Appalachian Total	460,399	5,231	454,903	265	--
Interior Total	168,374	--	112,848	--	55,526
Western Total	488,762	--	63,902	394,578	30,241
East of Miss. River	570,575	5,231	565,079	265	--
West of Miss. River	546,960	--	66,614	394,578	85,767
U.S. Total	1,117,535	5,231	631,693	394,844	85,767

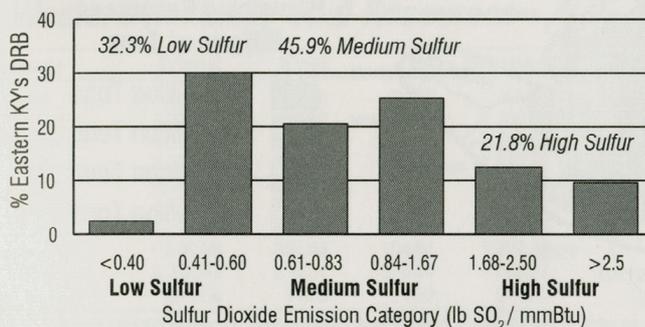
Source: U.S. DOE - Energy Information Administration, *Coal Industry Annual*, 1998.

U.S. Coal Reserves

Eastern Kentucky Low-Sulfur Coal

The U.S. DOE estimates that 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 that 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	6.8%	92.2%		1.0%	108,088.8
Alabama		76.2%		23.8%	4,546.6
Georgia		100.0%			3.6
Kentucky, Eastern		100.0%			12,086.2
Maryland		100.0%			717.0
North Carolina		100.0%			10.7
Ohio		100.0%			23,663.9
Pennsylvania	25.2%	74.8%			28,646.1
Tennessee		100.0%			815.7
Virginia	5.7%	94.3%			2,202.0
West Virginia		100.0%			35,397.1
Interior Total	<0.1%	91.5%		8.4%	159,611.4
Arkansas	25.0%	68.9%		6.1%	416.9
Illinois		100.0%			105,068.9
Indiana		100.0%			9,916.5
Iowa		100.0%			2,189.5
Kansas		100.0%			975.0
Kentucky, Western		100.0%			19,954.4
Louisiana				100.0%	462.7
Michigan		100.0%			127.7
Missouri		100.0%			5,994.1
Oklahoma		100.0%			1,575.0
Texas				100.0%	12,931.0
Western Total	<0.1%	10.5%	77.1%	12.4%	240,039.5
Alaska		11.4%	88.4%	0.2%	6,125.9
Arizona		100.0%			160.8
Colorado	0.1%	52.0%	22.9%	25.0%	16,755.9
Idaho		100.0%			4.4
Montana		1.2%	85.7%	13.1%	119,676.5
New Mexico	<0.1%	29.7%	70.3%		12,482.7
North Dakota				100.0%	9,395.0
Oregon			100.0%		17.5
South Dakota				100.0%	366.1
Utah		>99.9%	<0.1%		5,850.4
Washington		21.8%	77.6%	0.6%	1,389.7
Wyoming		6.4%	93.6%		67,814.5
U.S. Total	1.5%	53.4%	36.4%	8.7%	507,739.7

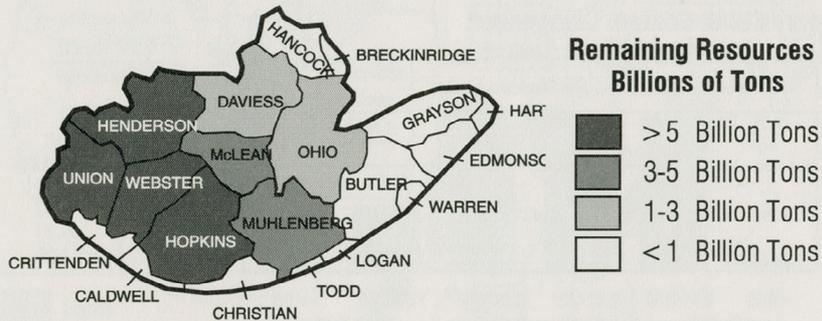
**Kentucky coal resource values are considered by some to be too high of a value, while the Eastern Kentucky "Demonstrated Coal Reserve Base" value being increased by 4 billion tons is still openly rejected by many others as being too low.

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 35.9 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 7 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 12.2% of total Western Kentucky coal resources.

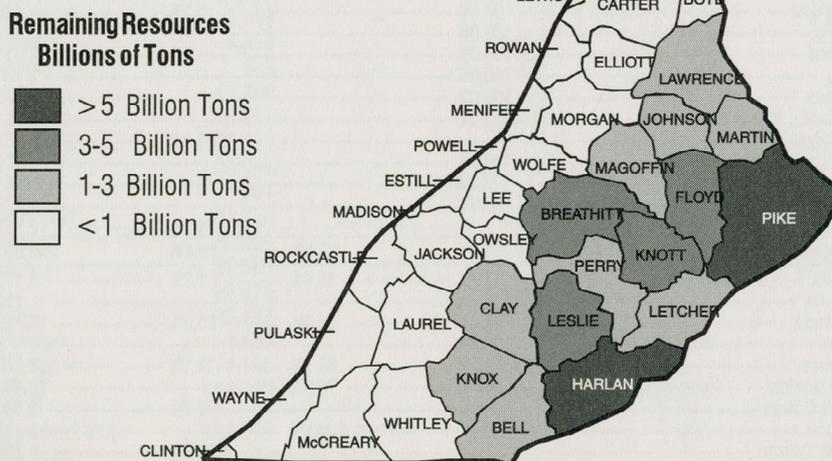


How To Calculate Tons of Coal

Total Tons = _____ Acres x _____ Inches x 135 tons per acre - inch
 (acres of coal) x (height of coal) x (density of coal)

Eastern Kentucky Coal Field

The Eastern Kentucky coal field covers 10,500 square miles and contains approximately 53.1 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 more than 80 named coal beds in the Eastern Kentucky coal field which covers parts of 37 counties.

Approximately 10.9 billion tons of coal have been mined or lost due to mining, amounting to only about 17% 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 35.9 billion tons in Western Kentucky and 53.1 billion tons in Eastern Kentucky. As shown in the Demonstrated Reserve Base (DRB) tables on page 41, assumptions on the percentage available for development reduce those values even further.

Western Kentucky Coal Resources

County	Original	Mined	Lost	Remaining
Butler	413.69	30.18	30.18	353.33
Daviess	1,330.32	60.22	60.22	1,209.88
Henderson	6,852.78	61.09	61.09	6,730.60
Hopkins	8,814.80	737.79	737.79	7,339.22
McLean	3,576.41	18.54	18.54	3,539.33
Muhlenberg	4,723.84	724.26	724.26	3,275.32
Ohio	1,824.55	263.25	263.25	1,298.05
Union	6,506.98	304.84	304.84	5,897.30
Webster	6,322.95	276.34	276.34	5,770.27
Other*	623.08	24.39	24.39	574.30
WKY Total	40,989.40	2,500.90	2,500.90	35,987.60

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

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".

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

Eastern Kentucky Coal Resources

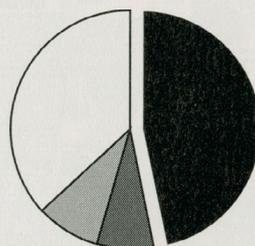
County	Original	Mined	Lost	Remaining
Bell	3,194.70	283.15	283.15	2,628.40
Boyd	630.68	19.93	19.93	590.82
Breathitt	4,112.20	198.45	198.45	3,715.30
Carter	501.96	18.61	18.61	464.74
Clay	1,536.11	60.94	60.94	1,414.23
Elliott	316.32	9.83	9.83	296.66
Floyd	4,168.08	441.46	441.46	3,285.16
Greenup	204.87	10.41	10.41	184.05
Harlan	7,881.12	853.09	853.09	6,174.94
Jackson	375.87	11.20	11.20	353.47
Johnson	1,419.44	91.63	91.63	1,236.18
Knott	4,385.10	257.21	257.21	3,870.68
Knox	1,381.93	72.44	72.44	1,237.05
Laurel	408.04	35.64	35.64	336.76
Lawrence	2,024.68	20.59	20.59	1,983.50
Lee	363.98	8.40	8.40	347.18
Leslie	3,554.65	222.34	222.34	3,109.97
Letcher	3,692.80	501.66	501.66	2,689.48
McCreary	444.97	55.34	55.34	334.29
Magoffin	1,969.10	54.82	54.82	1,859.46
Martin	3,319.97	337.35	337.35	2,645.27
Morgan	849.40	15.08	15.08	819.24
Owsley	574.14	9.62	9.62	554.90
Perry	3,596.70	517.34	517.34	2,562.02
Pike	11,391.70	1,226.87	1,226.87	8,937.96
Whitley	987.44	90.38	90.38	806.68
Wolfe	443.92	7.16	7.16	429.60
Other***	334.89	33.11	33.11	268.67
EKY Total	64,064.76	5,464.05	5,464.05	53,136.66

**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 12.5 billion tons but is still rejected by some as being too low (see page 41).

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

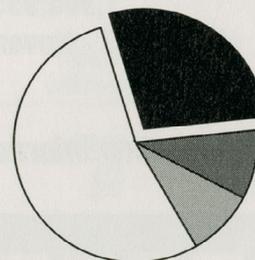
Sources: Smith and Brant (1980), Mined and Lost and Remaining Resources updated by the Kentucky Coal Council from Kentucky Department of Mines and Minerals Annual reports.

Original Coal Resources Estimate (41 Billion Tons)



- 19.95 Billion Tons in DRB**
- 2.5 Billion Tons Lost Due to Mining 1790-1998
- 2.5 Billion Tons Mined 1790-1998
- 16 Billion Tons Remaining but not in DRB**

Original Coal Resources Estimate (64.1 Billion Tons)



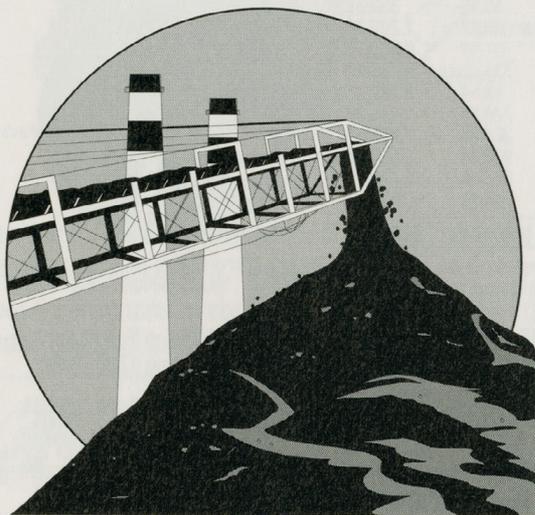
- 12.1 Billion Tons in DRB **
- 5.5 Billion Tons Lost Due to Mining 1790-1998
- 5.5 Billion Tons Mined 1790-1998
- 41 Billion Tons Remaining, but not in DRB **

Source for DRB: U.S. DOE-EIA, U.S. Coal Reserves, August, 1998.

Visit Our Coal Education Web Site at <http://www.coaleducation.org>

Welcome to the
Kentucky Coal Council

Coal Education

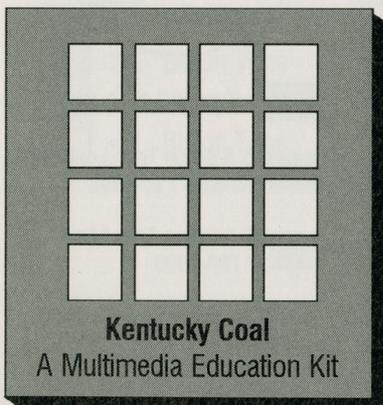


Web Site

1,908,995 Hits
July, 1997 - November 15, 1999

- [Classroom Lesson Plans](#)
- [Coal Education Resources](#)
- [Coal Education Scholarship Competition](#)
- [Coal Mining History \(updated\)](#)
- [Coal Related Issues Info](#)
- [Modern Mining Technology](#)
- [Glossary of Terms](#)
- [Kentucky Coal and the Regulatory Authority Agencies of the Coal Industry](#)
- [Kentucky Coal Council](#)
- [Kentucky Coal Facts Book](#)
- [Question and Answer Forum](#)
- [Technical Abstracts of Coal Related Periodicals](#)
- [Where We've Been and Where We're Going](#)

Coal Education Interactive Multimedia Library Kit



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

Coal is a fossil fuel used to make electricity to power our schools, homes, and industries. Kentucky coal is a natural resource used around the world. But, how do we use coal to make electricity? Explore the world of Kentucky coal and see how we get coal out of the ground and use it to make electricity.

The interactive multimedia CD-ROM and three coal education classroom videos are a production of Western Kentucky University in cooperation with the Kentucky Authority for Educational Television with partial funding from the Kentucky Coal Council.

PCs + www. = kWh^{Coal}

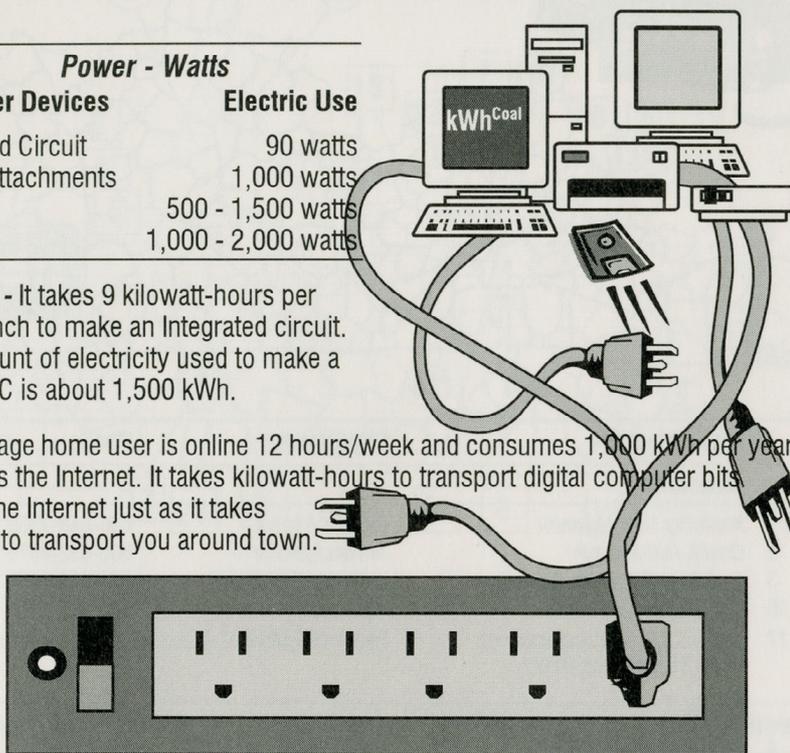
Your typical PC and its peripherals (printers, scanners, modems, etc.) accessing the Internet require about 1,000 watts of power; a lump of coal is burned every time a book is ordered on-line.

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.



Electric Demand from PCs on the Internet

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

Type	Estimated # Million/Yr.*	Estimated Use Billion kWh/Yr.	Fuel Use - Coal	
			100% Coal (million tons)	56% Coal** (million tons)
Manufacturing				
PCs	17	25	10.600	5.936
Routers	1	2	.850	0.476
Servers	2	2	.850	0.476
Operating				
PCs - Home	41	31	13.175	7.378
PCs - Office	41	44	18.700	10.472
Host & .com				
Company Devices	4	120	51.000	28.560
Netbit movers	3	65	27.825	15.470
Estimated Total	100	290	123.259	69.020

* Individual table numbers do not add to estimated total.

** U.S. averages 56% of its electricity from coal.

NOTE: PCs for other use, and other computer types are not included in this table; it is estimated that 200 million computers are installed for use in the U.S. today, up from 2 million in 1978.

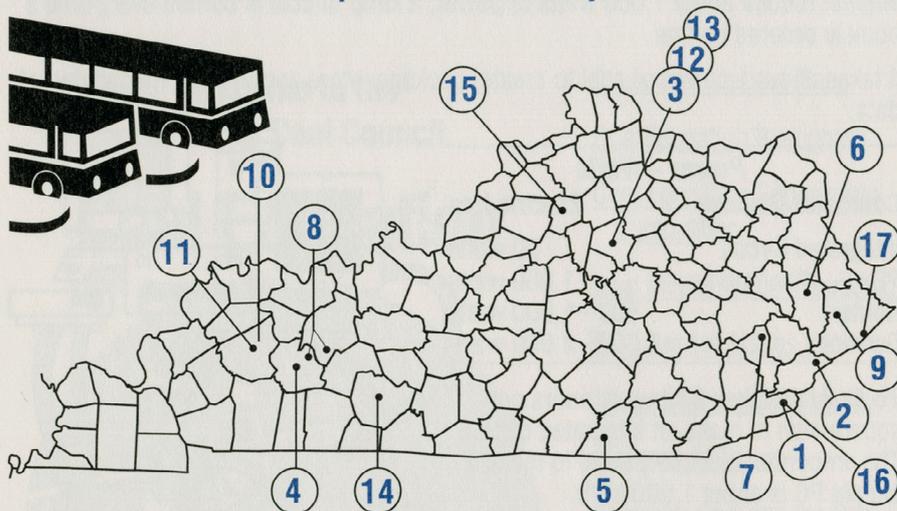
Growth of the Internet

Intel projects a billion people on-line worldwide in the future. One billion PCs on the web represents an electric demand equal to the total capacity of the U.S. today. As technology continues to develop broad bandwidth (i.e., video) use will increase and as one new means of transport, data may be transported along the outside of your existing electric wires (i.e., in the electromagnetic field) to deliver expanded Internet services to your home.

Source: Dig More Coal, Forbes, May 31, 1999; The Internet Begins with Coal, May, 1999, Mill-McCarthy & Associates, Inc.

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	606-258-3253	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: Jonathan Young, KDFWR	Muhlenberg & Ohio	270-273-3569	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	West Kentucky Coal Field	270-333-9807	all ages
Underground Mine Tour*			
16 <i>Portal 31 UG Mine</i> *Planned opening date: 2001	Lynch/Harlan	606-848-1530	all ages
Simulated Underground Mine			
11 <i>Madisonville Technical College</i> Contact: Jenny Saint	Madisonville/Hopkins	270-824-7009	3rd grade & up
Coal Research Labs**			
12 <i>Center for Applied Energy Research</i>	Lexington/Fayette	606-257-0224	all ages
13 <i>Kentucky Geological Survey</i>	Lexington/Fayette	606-257-5500	all ages
14 <i>Western Kentucky University</i>	Bowling Green/Warren	270-745-6020	all ages

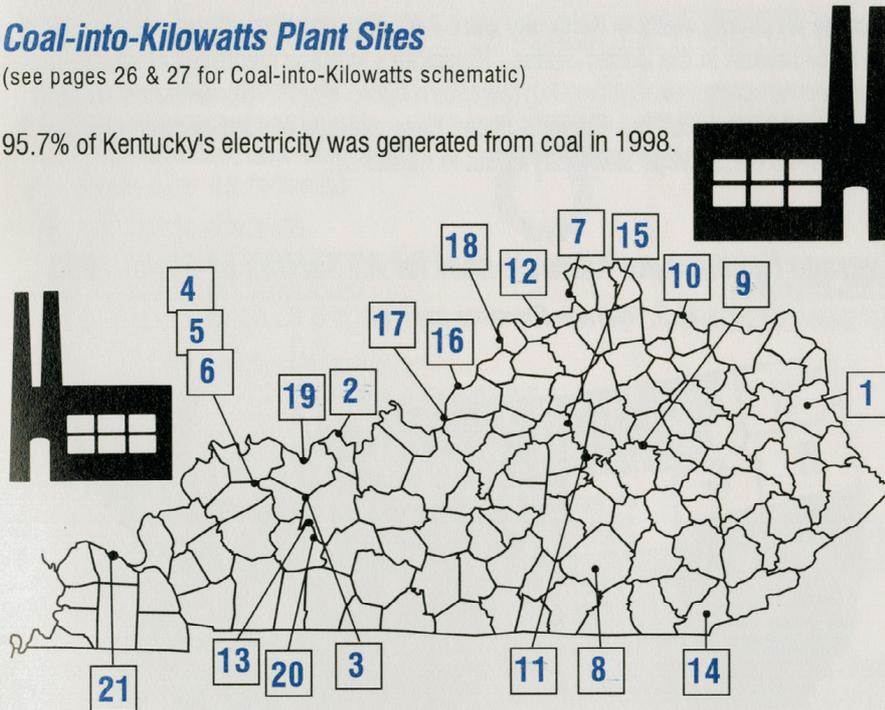
**All labs are limited to tours for special projects only.

Coal-Fired Power Plants

Coal-into-Kilowatts Plant Sites

(see pages 26 & 27 for Coal-into-Kilowatts schematic)

95.7% of Kentucky's electricity was generated from coal in 1998.



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

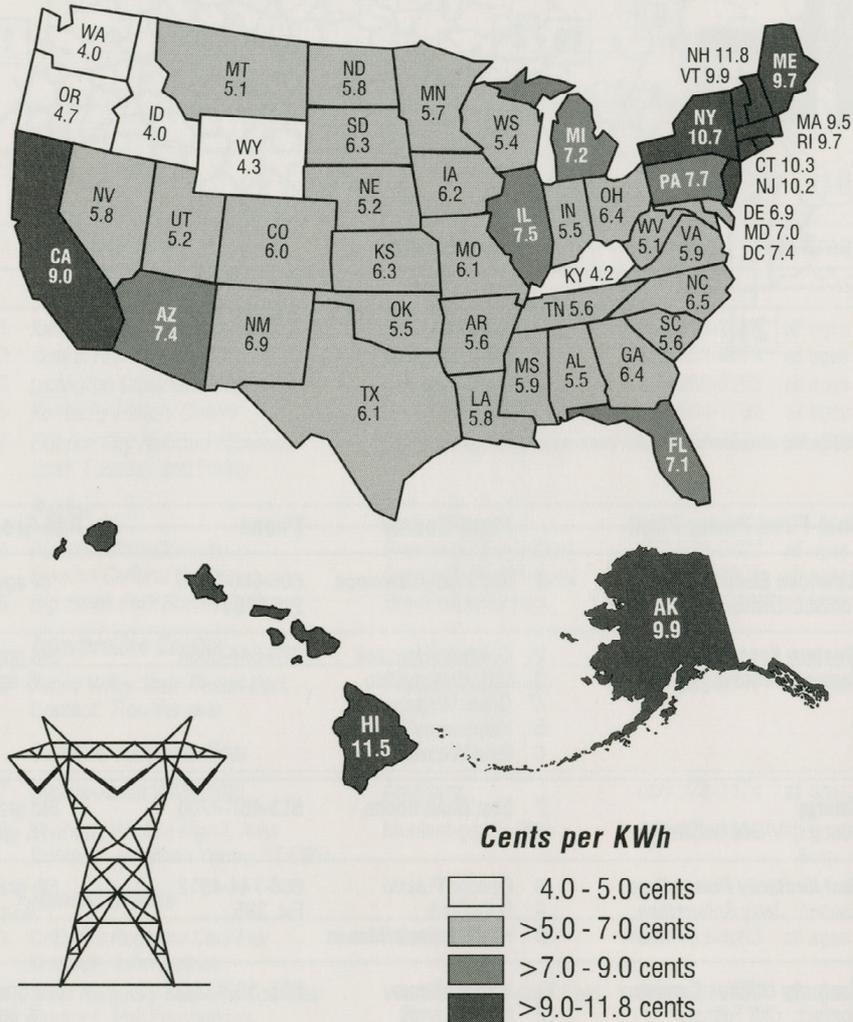
Coal-Fired Power Plant	Plant/County	Phone	Age Group
American Electric Power Contact: Diana Frasher	1 Big Sandy/Lawrence	606-686-2415, Ext. 1133	all ages
Western Kentucky Energy Contact: Jennifer Headdy	2 Coleman/Hancock	270-844-6004	3rd grade & up
	3 D.B. Wilson/Ohio		
	4 Green/Webster		
	5 Henderson/Webster		
	6 Reid/Webster		
	7 East Bend/Boone		
East Kentucky Power Corp. Contact: Jerry Schureman	8 Cooper/Pulaski	606-744-4812, Ext. 385	5th grade & up
	9 Dale/Clark		
	10 H.L. Spurlock /Mason		
Kentucky Utilities Company Contact: Cliff Feltham	11 Brown/Mercer	606-367-1105	6th grade & up
	12 Ghent/Carroll		
	13 Green River/Muhlenberg		
	14 Pineville/Bell		
	15 Tyrone/Woodford		
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: Jody Wassmer	19 Elmer Smith/Daviess	270-926-3200, Ext. 336	5th grade & up
Tennessee Valley Authority Contact: Beverly Morehead Beverly Davis	20 Paradise/Muhlenberg	270-476-3301	4th grade & up
	21 Shawnee/McCracken	270-575-8001	

Electricity Costs

Average electricity costs in Kentucky were 4.2 cents per kilowatt-hour during 1998, **the third lowest** in the United States. Kentucky's average electricity costs are lower than all other states except two Northwestern *hydro* states. Some states such as California and several New England states have average electricity costs that are 2 to 2.5 times the average electricity costs in Kentucky.

Average Revenue per Kilowatt-hour for All Sectors by State, 1998

U.S. Average Revenue per KWh is 6.75 Cents



Only two Northwestern hydro states have lower average electricity costs than Kentucky.

KWh = Kilowatt-hour

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

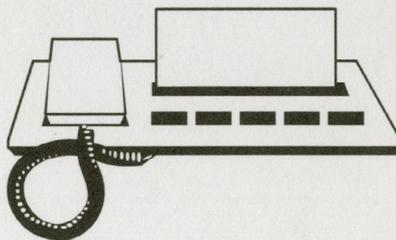
*Includes energy charges, demand charges, consumer service charges, environmental surcharges, fuel adjustments, and other miscellaneous charges. Taxes assessed on the consumer, "pass through" taxes, are not recorded in the operating revenues of the utility and are not included; however, taxes assessed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

Source: U.S. DOE - Energy Information Administration, *Electric Power Annual, 1998*, Volume I, April, 1999.

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

606/246-2500
FAX 606/246-2497

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

606/233-4743
FAX 606/233-4745

Mike Musulin II, President
Bill K. Caylor, Vice-President

E-mail: bcaylor@miningusa.com

1999-2000 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]

606/257-3896

Teacher Workshops

KyNEED

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

606/578-0312
FAX 606/578-0316

Coal Teaching Materials

Kentucky Coal Council

[www.coaleducation.org]

Kentucky Geological Survey (KGS)

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

American Coal Foundation

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

KET, The Kentucky Network

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

Center for Energy and Economic Development

[www.ceednet.org]

University of Kentucky

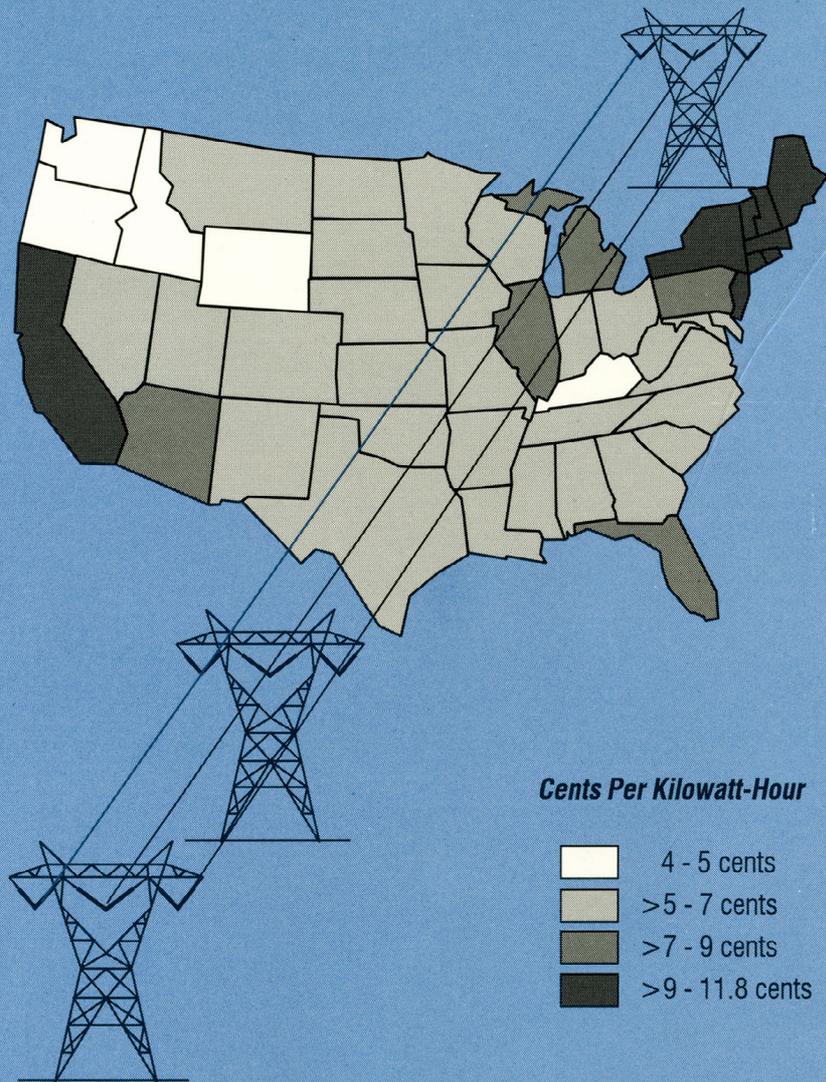
Center for Applied Energy Research (CAER)
[www.caer.uky.edu]

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, 1998



Average electricity costs in Kentucky were 4.2 cents per kilowatt-hour during 1998, the third lowest in the United States. Only two Northwestern hydro states have lower average electricity costs than Kentucky.

Source: U.S. Department of Energy - Energy Information Administration, *Electric Power Annual, 1998*, Volume I, April, 1999.

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