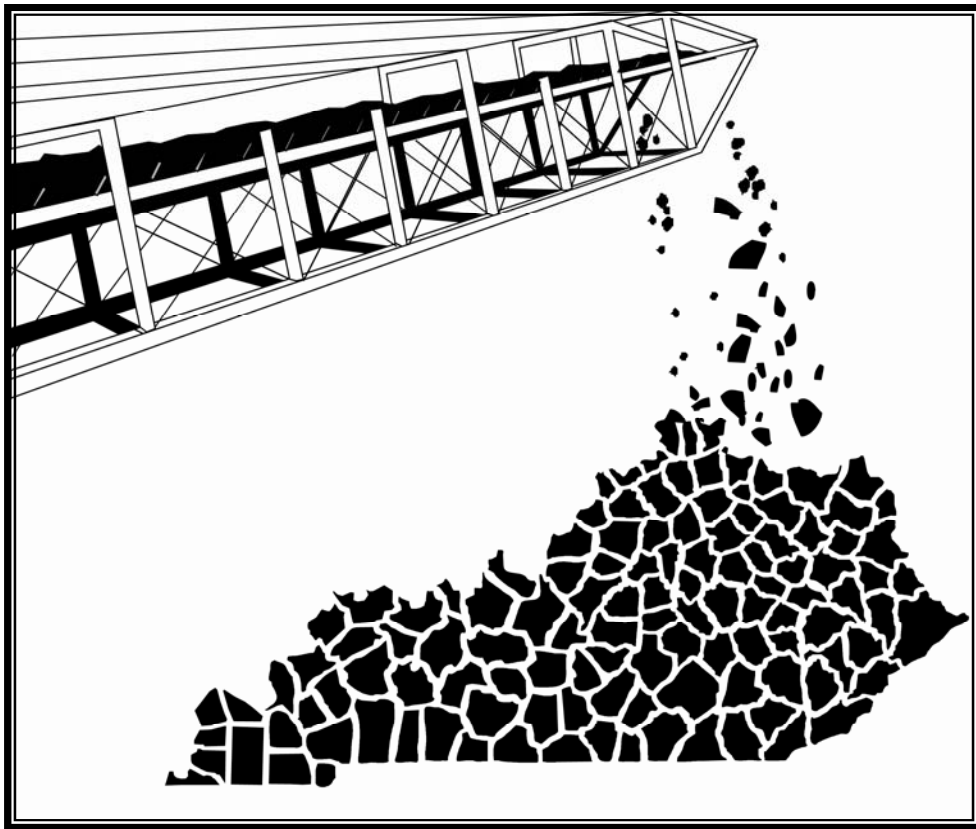


# Kentucky Coal Facts



Prepared by the  
Kentucky Office of Energy Policy  
Division of Fossil Fuels & Utility Services  
and the  
Kentucky Coal Association

## *Highlights*

### ***Electricity***

Average electricity costs in Kentucky were 4.63 cents/kilowatt-hour in 2004, the lowest in the United States.

### ***Production***

Kentucky produced 119.0 million tons of coal in 2004, 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 \$759 million in direct wages in 2004, directly employing 15,012 persons and indirectly providing 3 additional jobs for every miner employed. The average weekly wage for coal miners in Kentucky was \$972 during 2004.

### ***Economy***

The Kentucky coal industry brought \$3.25 billion into Kentucky from out-of-state during Fiscal Year 2004-05 through coal sales to customers in 23 other states and 4 foreign countries. Kentucky coal companies paid \$183.94 million in coal severance taxes in Fiscal Year 2004-05.

### ***Coal Markets***

Electric power plants, located in 23 states, accounted for almost 68% of the Kentucky coal sold during 2004.

Approximately 73% 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 (91%) of Kentucky's electricity is generated from coal.

### ***Environment***

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

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

Kentucky operators have paid over \$898.6 million into the Federal Abandoned Mine Land Fund since 1978 to reclaim abandoned coal mines. Nationwide, operators have paid over \$7.45 billion into this fund. However, \$1.8 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 87.6 billion tons of coal resources remaining represent 84% of the original resource.

### ***Teacher Resources***

Coal education resources materials are now available to teachers and students on the Internet at the web site [www.coaleducation.org](http://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.

March 2006. 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 Division of Fossil Fuels & Utility Services or the Kentucky Coal Association.

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## 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, coal, 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 52% of the electricity in this country, and in Kentucky 91% of our electricity comes from coal.

Average electricity costs in Kentucky were 4.63 cents per kilowatt-hour during 2004, the lowest in the United States, 23% below the national average in 2000. **These low rates are due to our reliance on coal-fired generation**, sold at cost-based rates, as well as sound utility management and excellent public policy.

### What Changes are Occurring?

Kentucky's share of the steam coal market to U.S. electric utilities declined from 23.2% of the market in 1973 to 8.5% in 2004. (see page 35)

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

Post-mining land use changes are providing long term economic, social, and environmental benefits to Kentucky, and the benefits are increasing. (see pages 25 and 26)

### Is there a Trend?

Kentucky ships over three 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 21)

In comparison to other fuels, coal continues to be the lowest-cost fuel for electric generation.

Underground and surface mining in Kentucky continue to show steady safety improvements.

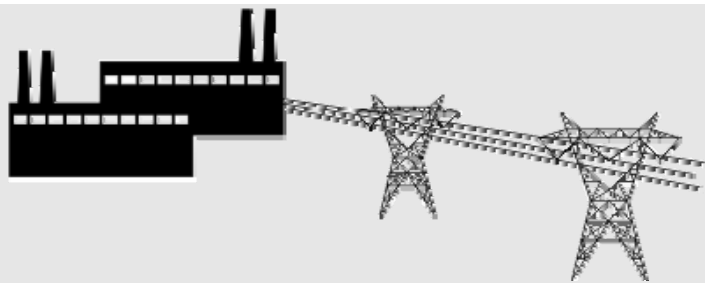
Over \$3.25 billion continues to be brought into Kentucky each year from coal sales to 23 other states and 4 foreign countries. (see page 16)

The number of successful mining reclamation bond releases in Kentucky continues to grow each year. (see page 24)

Source: See individual reference pages as listed.

### On the Horizon?

A new coal-fired electric utility company power plant went online in 2005, the first in over 15 years. In 2005, the Kentucky PSC approved another coal-fired power plant, and in 2006 applications were pending before the PSC for two additional coal-fired power plants.



## *Contacts*

<b>Governor's Office</b> 700 Capitol Ave., Capitol Building, Frankfort, KY 40601	Phone: 502-564-2611 FAX: 502-564-2517
<b>Governor's Office for Local Development (GOLD)</b> 1024 Capital Center Drive, Suite 340, Frankfort, KY 40601	Phone: 502-573-2382 FAX: 502-573-2939
<b>Kentucky Environmental and Public Protection Cabinet</b> Capital Plaza Tower, 500 Mero Street, 5th Floor, Frankfort, KY 40601	Phone: 502-564-3350 FAX: 502-564-3354
<u>Department for Environmental Protection</u> 14 Reilly Road, Frankfort, KY 40601	Phone: 502-564-2225 FAX: 502-564-4245
Division of Waste Management 14 Reilly Road, Frankfort, KY 40601	Phone: 502-564-6716 FAX: 502-564-4049
Division of Water 14 Reilly Road, Frankfort, KY 40601	Phone: 502-564-3410 FAX: 502-564-0111
Division of Air Quality Control 803 Schenkel Lane, Frankfort, KY 40601	Phone: 502-573-3382 FAX: 502-573-3787
<u>Department for Natural Resources</u> #2 Hudson Hollow, Frankfort, KY 40601	Phone: 502-564-6940 FAX: 502-564-5698
Division of Abandoned Mine Lands 2521 Lawrenceburg Road, Frankfort, KY 40601	Phone: 502-564-2141 FAX: 502-564-6544
Division of Mine Permits #2 Hudson Hollow Road, Frankfort, KY 40601	Phone: 502-564-2320 FAX: 502-564-6764
Division Mine Reclamation and Enforcement #2 Hudson Hollow Road, Frankfort, KY 40601	Phone: 502-564-2340 FAX: 502-564-5848
Office of Administrative Hearings 35-36 Fountain Place, Frankfort KY 40601	Phone: 502-564-7312 FAX: 502-564-4973
Office of Mine Safety & Licensing 1025 Capital Center Dr., Suite 201, Frankfort, KY 40602	Phone: 502-573-0140 FAX: 502-573-0152
<u>Independent Commissions</u> Mine Safety Review Commission 132 Brighton Park Boulevard, Frankfort, KY 40601	Phone: 502-573-0316 FAX: 502-573-0344
<b>Revenue, Department of</b> Department of Tax Administration, Division of Minerals Taxation and GIS Services, Severance Tax Unit, 200 Fair Oaks Lane, 4th Floor, Frankfort, KY 40620	Phone: 502-564-8334 FAX: 502-564-5977
Office of Property Valuation, Division of Minerals Taxation and GIS Services, 200 Fair Oaks Lane, 4th Fl., Frankfort, KY 40620	Phone: 502-564-8334 FAX: 502-564-5977
<b>Transportation Cabinet</b> Division of Planning, Coal Haul Section 200 Mero Street, 5th Floor, Frankfort, KY 40622	Phone: 502-564-7183 FAX: 502-564-2865
<b>UK Center for Applied Energy Research</b> 2540 Research Park Drive, Lexington, KY 40511	Phone: 859-257-0305 FAX: 859-257-0220
<b>United States Department of Energy</b> National Energy Information Ctr., EI-30, Forrestal Bldg., IE-238 1000 Independence Avenue, SW, Washington, D.C. 20585	Phone: 202-586-8800 FAX: 202-586-0727

## 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, Kentucky.
- 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 produced 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 rose to 72.4 million tons for the war effort.**  
Auger surface mining introduced.
- 1942 Republic Steel Company's first production - Road Creek, Kentucky.  
**Post-War Marshall Plan - production rose to 88.7 million tons in Kentucky.**
- 1942 Continuous underground mining systems developed.  
Kentucky Water Contamination Legislation.
- 1947 Kentucky Coal Association founded.**

## History of Coal

- 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 producing 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 ruled the unmined minerals tax on coal is subject to the same state and local property tax rates as other real estate.  
TVA 160-MW Atmospheric Fluidized Bed Combustion Unit on line.  
**Wyoming displaces Kentucky as the leading coal producing state.**
- 1990 Federal Clean Air Act Amendments of 1990.  
**Kentucky record production - 179.4 million tons.**  
U.S. coal production exceeds 1 billion tons.
- 1992 U.S. Energy Policy Act of 1992.
- 1993 CEDAR, Inc. (Coal Education Development and Resource) formed in Pike County.
- 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.  
Kentucky Coal Education ([www.coaleducation.org](http://www.coaleducation.org)) was introduced on the Internet.  
Workers' Comp Reform Laws are passed in Kentucky.
- 1997 The Kentucky Fish and Wildlife Commission voted to re-introduce elk into 14 East Kentucky counties on post-mined lands, citing mountain-top removal areas and old mine benches as good elk habitat. This is to be the only large free-ranging elk herd in the Eastern United States.
- 1997 **Kentucky Coal Association celebrates 50 years of service to the mining industry.**
- 1998 Mountaintop mining comes under attack.  
Federal synthetic fuel tax credit for use of coal fines begins.
- 2001 Natural gas prices increase over 50% in one year.  
Electricity shortages result in rolling blackouts in California.
- 2004 Governor Fletcher unveils Kentucky's first comprehensive energy strategy, "*Kentucky's Energy: Opportunities for Our Future.*"
- 2005 East Kentucky Power Cooperative's Gilbert coal-fueled fluidized-bed power plant begins operation, the first coal-fired plant in over 15 years.  
Energy Policy Act of 2005 signed by President Bush; includes major Clean Coal Technology programs.
- 2006 Kentucky Energy Security National Leadership Act (HB 299) enacted; Act calls for strategy for producing liquid and gaseous fuels from Kentucky coal.  
Kentucky Coal Academy founded to provide training for coal miners that reflect the technological advancements in the mining industry.

Sources: Energy Information Administration, ([www.eia.doe.gov](http://www.eia.doe.gov)), Kentucky Department of Mines and Minerals, [Annual Reports](#), and Willard Rouse Jillson, [Coal Industry in Kentucky](#), 1922.

## Types of Mining

**Kentucky has two distinct coal fields**, each containing numerous deposits of bituminous coal of various characteristics and mines of every type and size. In surface mining the use of large mining equipment maximizes the recovery through the excavation of one or more coal seam deposits in the large area surface mines of the gently rolling **Western Kentucky** coal field and in the large mountain top 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 114.2\* million tons of 2004 coal production, 71.7 million tons were produced by underground mining methods and 42.5 million tons were produced by surface mining methods.

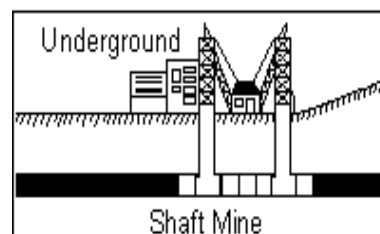
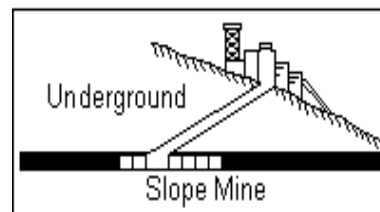
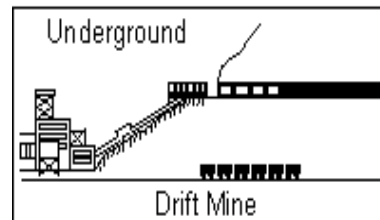
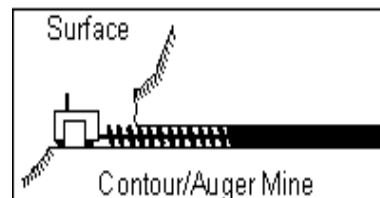
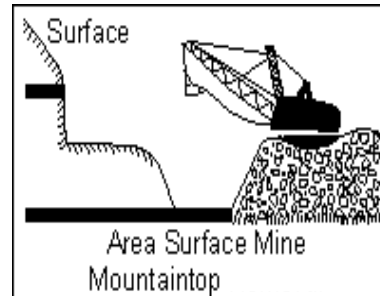
The EKY and WKY breakdown for the number of mines and production for both surface and underground mining methods used in Kentucky is as follows:

### 2004 Production by Mine Type

Mine Type	No. of Mines	Production (million tons)
<b>Surface</b>	<b>196</b>	<b>42.5</b>
E KY	185	38.4
W KY	11	4.1
<b>Underground</b>	<b>223</b>	<b>71.7</b>
E KY	212	52.4
W KY	11	19.3
<b>State Totals</b>	<b>419</b>	<b>114.2</b>

\*NOTE: This is the official U.S. DOE number for Kentucky. State and Federal production numbers will differ.

Source: U.S. DOE - EIA [Coal Data Report](#), 2004.



Source: U.S. DOE - EIA [Coal Data: A Reference](#), 1989.



## U.S. Coal Production

KY and U.S. Coal Production\* 1970—2004 (millions of tons)

Year	Kentucky			United States	Kentucky as % of U.S.
	Eastern	Western	Total		
1970	72.5	52.8	125.3	602.9	20.8
1971	71.6	47.8	119.4	552.2	21.6
1972	68.9	52.3	121.2	595.4	20.4
1973	74.0	53.7	127.6	591.7	21.6
1974	85.4	51.8	137.2	603.4	22.7
1975	87.3	56.4	143.6	648.4	22.1
1976	91.1	52.8	144.0	678.7	21.2
1977	94.0	52.3	146.3	691.3	21.2
1978	96.2	39.5	135.7	665.1	20.4
1979	104.1	42.5	146.5	777.9	18.8
1980	109.2	41.0	150.1	829.7	18.1
1981	117.9	39.7	157.6	823.8	19.1
1982	111.2	39.0	150.2	838.1	17.9
1983	95.6	35.6	131.2	782.1	16.8
1984	117.3	42.3	159.5	895.9	17.8
1985	113.3	39.0	152.3	883.6	17.2
1986	112.7	41.2	153.9	890.3	17.3
1987	119.9	45.3	165.2	918.8	18.0
1988	117.5	40.3	157.9	950.3	16.6
1989	125.7	41.6	167.4	980.7	17.1
1990	128.4	44.9	173.3	1,029.1	16.8
1991	117.2	41.8	159.0	996.0	16.0
1992	119.4	41.7	161.1	997.5	16.2
1993	120.2	36.1	156.3	945.4	16.5
1994	124.4	37.2	161.6	1,033.5	15.6
1995	118.5	35.2	153.7	1,033.0	14.9
1996	117.0	35.5	152.4	1,063.9	14.3
1997	120.9	34.9	155.9	1,089.9	14.3
1998	116.7	33.6	150.3	1,118.1	13.4
1999	110.0	29.6	139.6	1,100.4	12.7
2000	105.0	25.8	130.7	1,073.6	12.2
2001	109.1	24.7	133.8	1,125.9	11.9
2002	99.4	24.7	124.1	1,094.3	11.3
2003	91.3	21.5	112.8	1,071.8	10.5
2004	90.9	23.4	114.2	1,112.1**	10.3

\* NOTE: These are the official U.S. DOE production numbers for Kentucky. (Federal and state (page 8) production numbers will differ.

### U. S. Leading Coal Producers

Kentucky ranked third in the United States in coal production during 2004.

Sources: U.S. DOE - Energy Information Administration; Coal Industry Annual, 1993-2004, Coal Production, 1977-1992. U. S. Bureau of Mines, Mineral Yearbook, 1970-1976.

2004 Rank	State	Millions of Tons
1	Wyoming	396.5
2	West Virginia	148.0
<b>3</b>	<b>Kentucky</b>	<b>114.2</b>
4	Pennsylvania	66.0
5	Texas	45.9
6	Montana	40.0
7	Colorado	39.9
8	Indiana	35.1
9	Illinois	31.9
10	Virginia	31.4

## *Kentucky Production*

Kentucky produced 119.0 million tons of bituminous coal in 2004, down over 60 million tons from the record 179.4 million tons set in 1990.

Year	<u>UNDERGROUND</u>		<u>SURFACE</u>		<u>STATE TOTALS</u>
	Eastern Kentucky	Western Kentucky	Eastern Kentucky	Western Kentucky	
1960	32,041,487	12,851,108	4,622,417	18,552,641	67,067,653
1965	37,740,473	13,341,646	9,587,626	26,537,294	87,207,039
1970	44,068,538	19,430,489	28,527,422	33,281,946	125,308,395
1975	41,280,096	24,757,456	46,957,448	31,209,511	144,204,511
1980	59,603,430	19,558,157	49,582,095	21,400,291	150,143,973
1985	75,530,607	21,188,598	52,294,115	22,602,743	169,616,063
1990	81,577,417	27,375,465	49,393,390	21,026,997	179,373,269
1995	73,922,358	24,763,534	47,288,817	11,812,973	157,787,682
2000	59,956,626	21,543,143	44,335,363	6,010,856	131,845,988
2002	59,562,704	21,244,764	44,615,777	5,979,552	131,402,797
2003	52,952,957	19,055,260	40,751,963	4,360,719	117,120,899
2004	54,250,895	19,228,512	41,544,662	3,930,444	118,954,473

Source: Kentucky Division of Mines & Minerals, Annual Reports, 1960—2002; Office of Mine Safety & Licensing, Annual Reports, 2003-2004.

### **Number of Mines, 1984-2004**

Year	Kentucky			Eastern Kentucky			Western Kentucky		
	Surface	Underground	Total	Surface	Underground	Total	Surface	Underground	Total
1984	1,137	926	2,063	1,026	900	1,926	111	26	137
1985	937	921	1,858	836	897	1,733	101	24	125
1986	723	830	1,553	633	802	1,435	90	28	118
1987	612	816	1,428	532	791	1,323	80	25	105
1988	492	738	1,230	426	714	1,140	66	24	90
1989	429	670	1,099	358	644	1,002	71	26	97
1990	360	627	987	301	601	902	59	26	85
1991	296	542	838	243	513	756	53	29	82
1992	270	482	752	225	459	684	45	23	68
1993	250	446	696	197	425	622	53	21	74
1994	248	425	673	206	401	607	42	24	66
1995	237	361	598	201	339	540	36	22	58
1996	237	307	544	197	287	484	40	20	60
1997	221	308	529	193	289	482	28	19	47
1998	205	277	482	186	259	445	19	18	37
1999	198	260	458	178	243	421	20	17	37
2000	162	246	408	148	234	382	14	12	26
2001	203	264	467	187	253	440	16	11	27
2002	194	233	427	180	219	399	14	14	28
2003	213	187	400	174	201	375	13	12	25
2004	196	223	419	185	212	397	11	11	22

Source: U. S. DOE—Energy Information Administration, Coal Industry Annual, 1993-2004, Coal Production, 1984--2004.

### **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.

Year	<u>UNDERGROUND</u>		<u>SURFACE</u>		<u>STATE TOTALS</u>
	Eastern Kentucky	Western Kentucky	Eastern Kentucky	Western Kentucky	
1960	2,563	74	179	70	2,886
1965	1,959	49	176	45	2,229
1970	1,449	34	502	73	2,058
1975	1,614	31	1,743	182	3,570
1980	1,131	32	1,349	136	2,648
1985	1,153	31	1,548	139	2,871
1990	799	27	860	83	1,769
1995	456	28	665	48	1,197
2000	309	14	256	26	605
2002	300	18	310	20	648
2003	268	17	240	16	541
2004	282	14	298	14	608

Source: Kentucky Division of Mines & Minerals, Annual Reports, 1960—2002; Office of Mine Safety & Licensing, Annual Reports, 2003-2004

## County Production

There were 419 mines in Kentucky during 2004. These 419 mines were issued 608 mine licenses and produced 119.0 million tons.

223 underground mines (296 licenses) accounted for 61.8% of Kentucky's production and 196 surface mines (312 licenses) accounted for 38.2% of Kentucky's production.

83% of Western Kentucky and 57% of Eastern Kentucky's coal production was from underground mines during 2004.

In 2004, 28 Kentucky counties produced coal; six Western Kentucky counties and 22 Eastern Kentucky counties.



### 2004 Production by County and Type of Mine License\*

County	Underground		Surface		Total	
	Licenses	Tonnage	Licenses	Tonnage	Licenses	Tonnage
<b><u>EASTERN KENTUCKY</u></b>						
Bell	7	477,858	13	978,002	20	1,455,860
Breathitt	-	-	7	911,528	7	911,528
Clay	2	11,385	11	94,930	13	106,315
Elliott	-	-	2	20,000	2	20,000
Floyd	33	1,137,158	20	2,112,568	53	3,249,726
Harlan	43	9,246,972	24	2,725,886	67	11,972,858
Jackson	-	-	5	53,081	5	53,081
Johnson	2	585,129	12	263,408	14	848,537
Knott	35	9,031,684	21	4,591,552	56	13,623,236
Knox	6	279,078	8	356,716	14	635,794
Laurel	-	-	2	84,645	2	84,645
Lawrence	4	1,019,740	7	214,462	11	1,234,202
Lee	-	-	1	22,900	1	22,900
Leslie	7	2,703,110	9	1,806,399	16	4,509,509
Letcher	27	4,826,172	41	3,794,227	68	8,620,399
Magoffin	-	-	5	851,299	5	851,299
Martin	9	3,000,969	15	3,372,221	24	6,373,190
Morgan	1	-	1	22,202	2	22,202
Owsley	-	-	6	80,678	6	80,678
Perry	14	4,539,355	24	7,500,739	38	12,040,094
Pike	90	17,375,051	62	11,491,708	152	28,866,759
Whitley	2	17,234	2	195,471	4	212,705
<b>EKY Total</b>	<b>282</b>	<b>54,250,895</b>	<b>298</b>	<b>41,544,622</b>	<b>580</b>	<b>95,795,517</b>
<b><u>WESTERN KENTUCKY</u></b>						
Henderson	1	1,527,207	1	1,288,553	2	2,815,760
Hopkins	5	8,358,964	6	852,152	11	9,211,116
Muhlenberg	2	2,563,895	6	1,747,957	8	4,311,852
Ohio	1	1,305,491	-	-	1	1,305,491
Union	2	4,359,576	1	41,782	3	4,401,358
Webster	3	1,113,379	-	-	3	1,113,379
<b>WKY Total</b>	<b>14</b>	<b>19,228,512</b>	<b>14</b>	<b>3,930,444</b>	<b>28</b>	<b>23,158,956</b>
<b>KY Totals</b>	<b>296</b>	<b>73,479,407</b>	<b>312</b>	<b>45,475,066</b>	<b>608</b>	<b>118,954,473</b>

\*NOTE: The number of licenses is greater than the number of mines because a mine may be relicensed if the company changes name or ownership.  
Source: Kentucky Office of Mine Safety and Licensing, [Annual Report](#), 2004

## Employment

The Kentucky coal mining industry has a current work force of approximately 15,522\* people directly employed in coal mining jobs. The Western Kentucky coal field directly employs approximately 2,250 persons, while the Eastern Kentucky coal field provides 13,272 direct mining jobs.

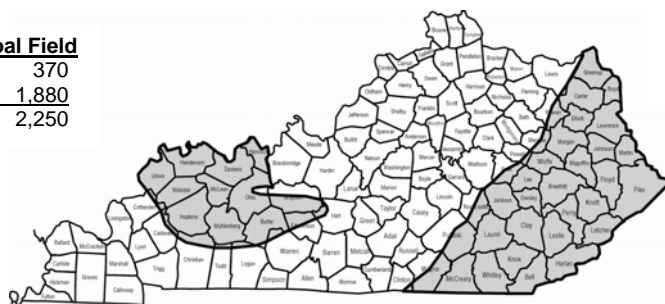
### Kentucky's Coal Mining Work Force, 2004

#### Western Kentucky Coal Field

Surface	370
Underground	1,880
<b>Total</b>	<b>2,250</b>

#### Eastern Kentucky Coal Field

Surface	4,901
Underground	8,371
<b>Total</b>	<b>13,272</b>



Eastern Kentucky averaged just over 85% of Kentucky's coal mining work force and accounted for about 80% of Kentucky's total coal production in 2004. Western Kentucky averaged approximately 15% of Kentucky's coal mining work force and accounted for about 20% of Kentucky's total coal production in 2004.

Kentucky produced 114.2 million tons during 2004 while direct mining employment continued to decline.

### Kentucky Coal Mining Employment, 1979—2004

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	30,599
1989	1,870	4,166	6,036	8,034	16,586	24,620	30,656
1990	2,095	3,491	5,586	7,505	17,407	24,912	30,498
1991	1,910	3,603	5,513	6,251	14,878	21,129	26,642
1992	1,722	3,483	5,205	6,014	13,405	19,419	24,624
1993	1,887	3,465	5,352	5,683	13,028	18,711	24,063
1994	1,803	2,988	4,791	5,728	12,849	18,577	23,368
1995	1,109	3,176	4,285	5,474	11,366	16,840	21,125
1996	1,095	2,601	3,696	4,855	10,275	15,130	18,826
1997	937	2,578	3,515	5,053	10,369	15,422	18,937
1998	747	2,763	3,510	5,493	9,924	15,417	18,927
1999	615	2,309	2,924	4,973	9,314	14,287	17,211
2000	450	2,060	2,510	4,162	8,828	12,990	15,500
2001	558	1,864	2,422	5,197	9,915	15,112	17,534
2002	495	2,029	2,524	5,237	9,281	14,518	17,042
2003	443	1,773	2,216	4,896	8,143	13,039	15,255
2004	370	1,880	2,250	4,901	8,371	13,272	15,522

\*Note: State employment numbers differ from federal EIA numbers.

Source: U.S. DOE—EIA: Coal Industry Annual, 1993-2004, Coal Production 1979-1992.

## *Productivity*

### ***Kentucky Coal Mine Productivity***

The average Kentucky and U.S. coal mine productivity peaked in 2000, and has decreased slightly through 2004.

#### ***Mine Productivity, 1977-2004 (tons/miner/hour)***

Year	Eastern Kentucky	Western Kentucky	Kentucky Average	Appalachian Coal Field	Interior Coal Field	Western U.S. Coal Field	U.S. Average
1977	1.71	2.22	1.86	1.36	2.42	5.85	1.82
1978	1.62	1.97	1.71	-	-	-	1.79
1979	1.54	1.94	1.64	1.33	2.21	5.47	1.81
1980	1.67	1.96	1.74	1.39	2.30	5.64	1.93
1981	1.76	2.12	1.84	1.51	2.35	6.15	2.10
1982	1.79	2.01	1.84	1.51	2.38	6.26	2.11
1983	1.98	2.43	2.08	1.75	2.69	7.60	2.50
1984	2.13	2.61	2.24	1.86	2.80	8.30	2.64
1985	2.13	2.57	2.23	1.90	2.81	8.55	2.74
1986	2.31	2.94	2.45	2.09	3.14	9.27	3.01
1987	2.59	2.98	2.69	2.30	3.33	10.42	3.30
1988	2.68	2.95	2.74	2.44	3.45	11.01	3.55
1989	2.58	3.62	2.78	2.49	3.84	11.63	3.70
1990	2.66	3.46	2.83	2.60	3.88	11.82	3.83
1991	2.90	3.37	3.01	2.74	3.98	12.42	4.09
1992	3.10	3.49	3.20	2.95	4.18	12.73	4.36
1993	3.18	3.49	3.25	3.00	4.43	13.53	4.70
1994	3.24	3.28	3.25	3.20	4.43	14.58	4.98
1995	3.47	3.97	3.57	3.32	4.97	15.68	5.38
1996	3.68	4.29	3.80	3.48	5.39	17.41	5.69
1997	3.83	4.38	3.94	3.76	5.54	17.75	6.04
1998	3.70	4.16	3.79	3.78	5.39	18.03	6.20
1999	3.74	4.57	3.89	3.84	5.64	19.05	6.61
2000	3.86	4.46	3.96	4.10	5.81	19.63	7.02
2001	3.52	4.43	3.66	3.85	5.56	20.64	6.82
2002	3.32	4.22	3.47	3.71	5.54	20.07	6.81
2003	3.32	4.23	3.46	3.71	5.56	20.82	6.95
2004	3.13	4.38	3.32	3.56	5.47	21.28	6.80

#### ***Western Kentucky Coal Mine Productivity, 1977-2004***

Western Kentucky coal mine productivity peaked in 1999 at 4.57 tons per miner per hour..

#### ***Eastern Kentucky Coal Mine Productivity, 1977-2004***

Eastern Kentucky coal mine productivity peaked at 3.86 tons per miner per hour record in 2000.

Source: U.S. Department of Energy—EIA: [Coal Industry Annual, 1993-2004](#), [Coal Production: 1977-1992](#).

## *Employment / Wages by County*

### **Coal County Employment and Wages, 2004**

County <sup>1</sup>	Direct Mining Employment	% of Labor Force	Miners as % of Total Employed	Mining Wages	% of Total County Wages	Average Weekly Mining Earnings <sup>3</sup>
<b>Eastern Kentucky</b>						
Bell	941	9.9	10.6	\$35,363,577	15.2	\$722.71
Clay	44	0.6	0.6	\$1,741,637	1.8	\$761.20
Floyd	574	3.9	4.2	\$23,244,536	6.9	\$778.76
Harlan	1,220	12.0	12.9	\$63,073,583	27.0	\$994.22
Johnson	135	1.4	1.5	\$5,838,122	3.7	\$831.64
Knott	1,481	22.8	24.3	\$80,568,209	57.9	\$1,046.18
Knox	66	0.6	0.6	\$2,300,617	1.2	\$670.34
Laurel	129	0.5	0.5	\$5,645,461	0.9	\$841.60
Lawrence	58	1.0	1.1	\$2,585,094	3.2	\$857.13
Leslie	494	13.7	14.9	\$27,617,455	39.8	\$1,075.11
Letcher	944	10.6	11.5	\$36,718,975	21.5	\$748.02
Magoffin	55	1.2	1.4	\$1,647,941	0.3	\$576.20
Martin	633	17.2	18.6	\$33,190,021	40.5	\$1,008.32
Perry	1,528	14.0	15.2	\$81,527,395	21.4	\$1,026.07
Pike	3,942	16.5	17.7	\$198,932,925	28.3	\$970.48
Whitley	10	0.1	0.1	\$250,430	0.1	\$481.60
<b>Subtotal</b>	<b>12,254</b>			<b>\$600,245,978</b>		<b>\$941.99</b>
<b>EKY Total<sup>2</sup></b>	<b>12,486</b>			<b>\$613,920,104</b>		<b>\$945.55</b>
<b>Fayette &amp; Jefferson Counties</b>						
						Note: The direct mining employment classification does not include most of the administrative/professional employees of coal companies located in these Kentucky metropolitan areas and does not include any private services or indirect employment.
<b>Western Kentucky</b>						
Henderson	318	1.4	1.5	\$21,285,498	3.2	\$1,287.22
Hopkins	893	4.0	4.2	\$54,479,551	10.5	\$1,173.22
Muhlenberg	250	1.9	2.1	\$16,919,140	7.5	\$1,301.47
Union	565	7.7	8.0	\$30,582,220	20.1	\$1,040.92
Webster	162	2.5	2.6	\$8,796,184	10.7	\$1,044.18
<b>Subtotal</b>	<b>2,188</b>			<b>\$132,062,593</b>		<b>\$1,160.72</b>
<b>WKY Total<sup>2</sup></b>	<b>2,293</b>			<b>\$136,264,425</b>		<b>\$1,142.81</b>
<b>State Total<sup>2</sup></b>	<b>15,012</b>			<b>\$758,961,573</b>		<b>\$972.25</b>

- Counties with less than three employers or one employer with 80% of the total county miner workforce were withheld to avoid disclosure of individual company data. These counties are as follows: Boyd, Breathitt, Daviess, Fayette, Greenup, Jefferson, Lee, McCreary, McLean, Mason, Menifee and Ohio. It is suspected that multi-county mining employment attributes to some counties being under reported and others being over reported.
- Columns do not add to the EKY & WKY totals due to withheld data and do not equal state totals due to county of employment being reported outside of coal field.
- Variation in average weekly mining income affected greatly by hours worked per week as well as hourly wage rate.

Values and methodologies used in this table may not be consistent with LGEDF regulations (page 15). Do not use these values for LGEDF estimates.

## Safety and Training

Safety and health standards are highly regulated by the federal Mine Safety and Health Administration (MSHA) and the Kentucky Office of Mine Safety and Licensing (KOMSL).

All surface and underground mines are inspected regularly. Larger mines may have inspectors at the mine site every day.

### Training for Surface Miners

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

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

To become a blaster in a surface coal mine, the applicant must attend 30 hours of training and pass both a licensing and certification test. Two years of additional work experience under a licensed blaster is required.

### Training for Underground Miners

New miners are required to have a minimum of 40 hours of training 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) also must receive up to eight hours of mine site-specific training.

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

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

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

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

Underground Miner Classifications	
Experience Required	Underground Mining Position
5 yrs	Electrical Inspector* Mine Inspector/Mine Safety Analyst* Mine Foreman* Electrical Instructor*
3 yrs	Asst. Mine Foreman* Instructor
1 yr.	Electrical Worker* Hoisting Engineer*
45 days	Shot Firer* Certified Miners
SPECIAL TRAINING	
MET EMT	Mine Emergency Technician or Emergency Medical Technician First Aid
<p>*Tests are required in addition to years of experience.</p> <p>NOTE: Over 20,000 persons are trained or retrained annually for one or more surface and/or underground miner classification by the KOMSL to maintain the current Kentucky miner workforce of over 15,000 miners.</p> <p>Source: Kentucky Office of Mine Safety and Licensing (KOMSL).</p>	

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 50 or fewer employees. An additional MET or EMT must be employed for each additional 50 employees, or any portion thereof.

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

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



## Severance Tax by County

### Coal Severance Tax Revenue by County, FY 2004-2005

County	Gross Value of Severed Coal	Tax on Severed Coal	Gross Value of Processing	Total Tax Receipts
<b>Eastern Kentucky</b> (Carter, Elliott, Lee, and Menifee County data withheld)*				
Bell	\$ 38,107,957	\$ 1,547,031	\$ 6,257,998	\$ 1,822,860
Boyd	-	-	9,846,847	446,202
Breathitt	45,983,778	2,069,438	627,775	2,097,688
Clay	3,791,930	166,789	1,528,942	235,592
Floyd	86,815,418	3,898,381	11,775,602	4,428,229
Harlan	435,094,635	19,013,945	42,408,804	20,899,255
Jackson	1,341,395	60,366	-	60,366
Johnson	27,520,219	1,183,203	2,417,135	1,291,974
Knott	362,886,771	16,261,404	24,997,969	17,384,248
Knox	18,584,318	700,448	4,033,904	842,074
Laurel	7,599,475	342,316	416,718	361,068
Lawrence	45,100,448	2,022,416	6,374,522	2,307,352
Leslie	157,440,972	7,078,016	23,365,449	8,127,256
Letcher	372,630,486	16,173,531	24,875,446	17,206,642
Magoffin	32,088,004	1,438,798	164,131	1,446,068
Martin	128,106,627	5,764,279	23,447,907	6,815,699
Morgan	1,177,014	47,512	-	47,512
Owsley	1,028,985	46,320	23,288	47,375
Perry	365,246,881	16,326,413	36,095,378	17,949,046
Pike	1,050,380,390	47,147,662	116,075,233	52,407,157
Whitley	10,688,571	507,265	759,282	530,237
<b>Eastern KY Total *</b>	<b>\$ 3,193,270,251</b>	<b>\$ 141,861,675</b>	<b>\$ 335,468,706</b>	<b>\$ 156,820,150</b>
<b>Western Kentucky</b> (Crittenden, Hancock, Henderson, and Ohio County data withheld)*				
Hopkins	\$ 221,219,194	\$ 9,934,130	\$ 25,135,345	\$ 11,064,554
Muhlenberg	91,216,691	4,101,425	14,075,662	4,734,998
Union	91,470,740	4,116,517	12,248,889	4,667,718
Webster	39,136,510	1,761,143	23,520,090	2,819,547
<b>Western KY Total *</b>	<b>\$ 522,166,483</b>	<b>\$ 23,473,767</b>	<b>\$ 81,007,404</b>	<b>\$ 27,118,558</b>
<b>State Totals *</b>	<b>\$ 3,715,436,734</b>	<b>\$ 165,335,442</b>	<b>\$ 416,476,110</b>	<b>\$ 183,938,708</b>

\* Columns do not add to State Totals because of Carter, Crittenden, Elliott, Hancock, Henderson, Lee, Menifee, and Ohio Counties' information being withheld to avoid disclosure of individual company data.

Severance Tax Revenue (millions of dollars)

The gross value of coal mined and processed in Kentucky during Fiscal Year 2004-2005 was \$4.1 billion.

Source: Kentucky Department of Revenue



# Coal Taxes Returned

## Coal Severance Taxes Returned to Counties, FY 1992 - 2005

Fiscal Year	Local Govt. Economic Assistance Fund (LGEAF)*	Economic	Local Govt. Economic Development Fund (LGEDF)**	Economic	Total % 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	17,373,579	14%	27,081,883	24%	38%
2000-01	15,279,384	13%	29,105,903	27%	40%
2001-02	19,387,021	14%	37,017,575	30%	44%
2002-03	17,348,797	14.5%	35,041,129	32.5%	47%
2003-04	17,610,654	15.0%	38,215,684	35.0%	50%
2004-05	22,874,326	15.0%	38,183,105	35.0%	50%

\* Established by the General Assembly; however, this column only includes fiscal years 1992 thru 2005 and includes coal severance taxes only.

\*\* Does not include interest.

## Coal Taxes Returned to Coal Producing Counties

Producing Counties	LGEAF* (FY05)	LGEDF** (FY05)	Unmined Minerals Tax - FY 04	
			County Estimate**** Average 84.50%	Total Tax Billed
<b>Eastern KY</b>				
Bell	\$ 392,729	\$ 751,499	\$ 140,582	\$ 166,983
Boyd	0	138,440	2,586	2,980
Breathitt	323,517	563,193	179,823	214,166
Carter	41,958	103,373	338	412
Clay	240,069	224,501	14,845	17,820
Elliott	30,951	136,741	281	331
Floyd	721,284	854,813	636,631	725,754
Greenup	0	98,961	0	0
Harlan	1,898,338	2,058,439	1,324,933	1,539,377
Jackson	150,751	51,920	189	221
Johnson	374,876	305,648	9,960	11,946
Knott	1,576,961	2,451,154	814,379	985,557
Knox	263,760	271,748	19,225	22,913
Laurel	306,172	106,154	1,604	1,984
Lawrence	657,733	364,376	47,672	56,366
Lee	58,506	285,718	0	0
Leslie	771,507	1,818,825	640,334	742,484
Letcher	1,591,956	1,919,066	945,169	1,100,892
McCreary	0	121,913	16,105	18,753
Magoffin	265,592	450,441	62,233	70,664
Martin	744,102	1,917,497	457,015	535,133
Menifee	58,267	71,023	0	0
Morgan	189,308	169,957	0	0
Owsley	84,161	243,953	0	0
Perry	1,622,109	1,708,007	1,072,225	1,280,149
Pike	4,707,846	4,503,497	1,925,380	2,250,524
Pulaski	0	0	9	11
Rockcastle	0	0	132	162
Whitley	234,913	145,565	414	501
<b>EKY Total</b>	<b>\$ 17,307,366</b>	<b>\$ 21,836,422</b>	<b>\$ 8,312,064</b>	<b>\$ 9,746,083</b>
<b>Western KY</b>				
Butler	0	57,696	0	0
Christian	0	70,147	0	0
Crittenden	26,086	53,229	0	0
Daviess	0	64,740	461	531
Hancock	97,867	74,394	1,638	1,939
Henderson	428,650	293,995	129,601	155,882
Hopkins	1,042,044	937,482	170,017	199,102
McLean	0	158,073	3,053	3,693
Muhlenberg	657,317	632,850	139,374	165,316
Ohio	242,808	171,352	38,275	46,759
Union	457,518	932,109	115,188	137,749
Webster	316,817	1,076,900	118,516	136,430
<b>WKY Total</b>	<b>\$ 3,269,107</b>	<b>\$ 4,522,967</b>	<b>\$ 716,123</b>	<b>\$ 847,401</b>
<b>Multi - County***</b>		<b>\$ 13,179,694</b>		
<b>State Total</b>	<b>\$ 20,576,473</b>	<b>\$ 39,539,083</b>	<b>\$ 9,028,187</b>	<b>\$ 10,593,484</b>

\* County and municipal totals for FY2004-2005. Thirty-two (32) coal producing counties and ninety-five (95) cities.

\*\* Includes interest and taxes collected.

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

\*\*\*\* Revenue generated from the Unmined Minerals Tax for some coal counties was unavailable at the time of this publication. The ad valorem tax rates on real property vary greatly from county to county. The Department of Revenue estimates the counties receive 84.5%, with the remainder being the state share. Not all billable taxes are collected. Columns do not add due to individual rounding.

### FY 2004 - 2005 Impacted Counties

The table at left does not include non-producing counties impacted by coal transportation, referred to as "Impacted Counties." These 43 counties and the cities within them received \$2,297,853 in coal severance taxes during FY05.

## *Economic Impact*

The Kentucky coal industry:

- employed 15,012 miners earning over \$759 million in wages during 2004.
- created a total of 61,158 jobs statewide.
- paid over \$183.94 million in severance taxes during FY 2004-05 and generated total state tax revenues of about \$528.3 million.
- was a \$4.13 billion industry which brought into Kentucky receipts totaling about \$3.25 billion from approximately 23 states and 4 countries in FY 2004-05.
- created economic activity throughout Kentucky totaling \$8.97 billion.

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

### **2004 Estimated Distribution of \$4.13 Billion**

Of the \$4.13 billion in receipts from coal produced and processed, the largest part, 36%, went to miners' wages and benefits. Another 33% went to operating costs, including fuel, materials, maintenance, etc. The remaining 31% is broken down as follows: depreciation (7%), taxes (7%), royalties (6%), net income (6%), and general administration (5%).

### **2004 Estimated Impact of \$4.13 Billion**

The \$4.13 billion in receipts from coal produced and processed in Kentucky in 2004 generated additional economic activity totaling \$4.84 billion and 46,146 jobs. This additional economic activity plus coal production and processing yielded total economic activity in Kentucky of \$8.97 billion and 61,158 jobs.

### **Benefits Throughout the Kentucky Economy**

Due to the economic impact of the coal industry throughout Kentucky in 2004, in addition to 15,012 persons working at the mines, 6,021 persons worked in factories making everything from mining equipment to home appliances; 2,617 persons drove coal trucks and cargo trucks, worked at rail yards, etc.; 12,704 persons worked in warehouses, sold clothing, appliances, furniture, in retail stores, etc.; 12,470 persons worked in banks, law offices, engineering firms, accounting firms, and other service businesses; 4,366 persons built homes, offices, factories, and highways; and 7,968 others were teachers, government officials, and a wide variety of other professions and occupations.

Source: Updated from the University of Kentucky Center for Business and Economic Research. [Economic Impact Analysis of Coal in Kentucky](#), (1995) for 2004 by Haywood and Baldwin.

### **Economic Impacts of All Mining Nationwide**

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

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

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

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

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

Source: National Mining Association, [Mining and the American Economy - Economy - Everything Begins with Mining](#), July 1997.

## Coal Prices

### Coal Prices

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

### **Average Value of KY Coal FOB Mine, 2004 (dollars per ton)**

Year	Eastern Kentucky			Western Kentucky			KY Average
	Underground	Surface	Average	Underground	Surface	Average	
1976	\$26.37	\$20.36	\$23.03	\$15.12	\$13.41	\$14.18	\$19.79
1977	25.98	18.71	21.67	19.88	14.80	17.07	20.02
1978	28.86	22.58	25.30	22.78	18.35	20.36	23.86
1979	30.18	24.85	27.62	26.26	18.79	22.17	26.04
1980	30.98	26.23	28.73	27.40	22.28	24.72	27.62
1981	32.47	28.86	30.72	30.92	25.03	27.66	29.95
1982	32.71	28.85	30.87	32.50	26.53	29.25	30.44
1983	30.71	28.43	29.63	30.72	25.97	28.09	29.20
1984	29.29	27.84	28.61	28.68	25.50	26.81	28.13
1985	29.83	27.41	28.77	26.79	26.68	26.73	28.24
1986	26.89	25.67	26.38	24.25	26.56	25.31	26.09
1987	27.48	25.74	26.71	25.06	24.16	24.68	26.15
1988	27.72	25.92	26.97	24.89	22.32	23.96	26.20
1989	25.69	25.96	25.80	23.03	21.79	22.48	24.97
1990	25.49	26.44	25.84	24.42	22.01	23.32	25.19
1991	26.29	26.51	26.37	24.83	20.26	22.88	25.45
1992	25.32	24.49	25.00	24.75	20.94	23.10	24.50
1993	25.42	25.63	25.50	23.84	20.45	22.36	24.77
1994	26.19	23.92	25.25	25.95	20.07	23.63	24.88
1995	26.52	25.24	26.00	21.33	19.46	20.75	24.79
1996	25.98	23.53	24.98	21.04	18.79	20.38	23.91
1997	26.26	22.45	24.65	20.67	19.92	20.49	23.72
1998	25.36	23.57	24.59	21.23	20.24	21.01	23.82
1999	24.59	23.51	24.14	21.71	19.25	21.15	23.50
2000	25.32	23.59	24.58	21.42	17.91	20.69	23.80
2001	28.11	27.76	27.96	21.72	21.10	21.58	26.77
2002	29.77	28.11	29.04	22.37	21.81	22.23	27.77
2003	29.83	29.03	29.49	22.23	21.44	22.05	28.15
2004	35.56	34.60	35.15	23.77	22.87	23.60	32.74

### **Electric Utility Consumption of Coal, 2004**

The U.S. electric power plant sector reported a record level of 1,016.3 billion tons of coal consumed during 2004. The average delivered price of coal to electric utilities was \$27.30 per ton.

Almost 92% of all coal consumed in the U.S. was in the electric power sector, the driving force for all coal consumption. Coal consumption in the U.S. electric power sector increased by 11.2 million tons over 2003. Ninety-one percent of Kentucky's electric power generation came from coal in 2005, while 3.6% came from petroleum coke, 3.1% from hydro, 1.8% from natural gas, 0.4% from renewables and 0.1% from petroleum.

Sources: U.S. Bureau of Mines, Minerals Yearbook, 1976, U.S. DOE, Bituminous Coal & Lignite Production and Mine Operations, 1977-1978, and Coal Production, 1979-1992, DOE-EIA, Coal Data: A Reference, May 1989, and Coal Industry Annual, 1993-2004.

## *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 2,640 miles of railroad lines. 72 million tons of Kentucky coal were transported over these lines in 2004.

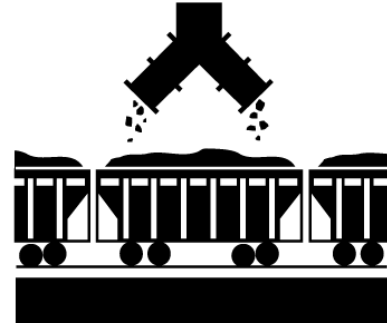
There are two Class I railroads, one regional railroad, and two short line railroads that operate totally in Kentucky or originate coal in Kentucky.

These railroads, along with privately owned cars of electric power companies, have over 71,380 hopper cars dedicated to the transport of coal.

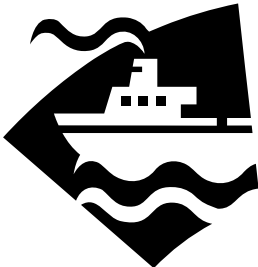
Kentucky has approximately 108 coal rail loading facilities.

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

Source: Association of American Railroad, 2004.



### **Coal Transportation by Barge in Kentucky**



Kentucky has more than 1,000 miles of navigable rivers over which approximately 15.9 million tons of Kentucky coal were shipped in 2004.

Statewide, 47 coal river terminals on the Ohio River and its tributaries serve Kentucky coal shippers (35 within Kentucky). In total, 17 coal river terminals are located near Eastern Kentucky, 6 in Central Kentucky, and 24 near Western Kentucky.

Of these, 19 of the coal river terminals have rail access, 39 have truck access, 12 have barge off-loading access, and 6 have conveyor access.

Automated blending is found in 31 of the coal river terminals with 28 having automatic sampling, 18 having some coal crushing equipment, and 8 having stoker preparation equipment.

Source: Kentucky Coal Council, Kentucky Coal Marketing Updates-Coal River Terminals, 2005.

### **Coal Transportation by Truck in Kentucky**

Approximately 3,693 miles of state-maintained highways are used for transporting coal.

Truck shipments are a very important mode of coal transportation in Kentucky. In 2004, approximately 1.52 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 3,218 coal trucks were registered during 2004 in Kentucky, indicating that over 3,218 coal truck drivers were employed in Kentucky. The sale of extended weight coal decals generated \$971,155 in 2004.



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

## *Uses of Coal*

### ***Distribution of Coal By Consuming Sector, 2004***

#### **U.S. TOTAL 1,109,803,000 Tons**

Electric power plants represent the largest market for U.S. and Kentucky coal. The three major markets for coal are electric power, industrial and the export markets.

Electric Power Plants	78.0%	863,802,000 Tons
Other Industrial	13.5%	150,309,000 Tons
Exports	4.1%	45,455,000 Tons
Coke Plants	1.5%	17,095,000 Tons
Resident/Commercial	0.5%	5,122,000 Tons
Unknown	2.4%	28,020,000 Tons

#### **KENTUCKY TOTAL 112,417,000 Tons \***

Combining market sectors shows 97.4% of Kentucky's coal goes to the domestic market in 23 states. Kentucky's other coal is sold to Canada and to 3 other foreign countries.

Electric Power Plants	67.8%	76,227,000 Tons
Other Industrial	28.4%	31,886,000 Tons
Resident/Commercial	1.0%	1,117,000 Tons
Exports	2.6%	3,004,000 Tons
Coke Plants	0.2%	183,000 Tons

#### **Eastern Kentucky 90,218,000 Tons**

Eastern Kentucky's market has remained steady in the industrial market (30.5%), the export and coking markets have increased while the electric power plant market remains predominate at 65.0%.

Electric Power Plants	65.0%	58,663,000 Tons
Other Industrial	30.5%	27,526,000 Tons
Exports	3.1%	2,816,000 Tons
Resident/Commercial	1.2%	1,030,000 Tons
Coke Plants	0.2%	183,000 Tons

#### **Western Kentucky 22,199,000 Tons**

Western Kentucky's market has seen a decrease in the industrial market (19.6%), while remaining almost totally dependent on the electric power market with 79.1% of its coal going to electric power plants.

Electric Power Plants	79.1%	17,564,000 Tons
Other Industrial	19.6%	4,360,000 Tons
Resident/Commercial	0.4%	87,000 Tons
Exports	0.9%	188,000 Tons

\* Distribution figures may differ from production figures due to the stockpiling of coal.  
Source: U.S. DOE—Energy Information Administration, Coal Industry Annual, 2004.

## *Electric Utility Shipments*

Kentucky coal was shipped to electric power plants in 23 states in 2004. The Eastern Kentucky coal field shipped approximately 58.7 million tons of coal to electric power plants located in 23 states during 2004. The Western Kentucky coal field sold approximately 17.6 million tons of coal to electric power plants in 10 states during 2004. These electric power plants purchased 76.2 million tons of Kentucky coal during 2004.

### ***Kentucky Coal Shipments To Electric Utility Plants, 2004***

#### **Eastern Kentucky Coal Field**

<u>Destination (State)</u>	<u>Receipts in Tons</u>
Alabama	1,959,000
Delaware	239,000
Florida	7,609,000
Georgia	8,724,000
Illinois	42,000
Indiana	98,000
Kentucky	3,002,000
Maryland	157,000
Michigan	1,306,000
Minnesota	8,000
Mississippi	604,000
New Hampshire	12,000
New Jersey	38,000
New York	561,000
North Carolina	9,403,000
Ohio	4,387,000
Pennsylvania	375,000
South Carolina	5,113,000
Tennessee	2,488,000
Texas	57,000
Virginia	4,416,000
West Virginia	160,000
Wisconsin	172,000
Unknown**	7,733,000
<b>EKY Utility Shipments</b>	<b>58,663,000</b>

#### **Western Kentucky Coal Field**

Alabama	624,000
Florida	2,345,000
Illinois	9,000
Indiana	268,000
Kentucky	10,792,000
Michigan	68,000
Mississippi	7,000
Ohio	33,000
Tennessee	3,147,000
Wisconsin	77,000
Unknown**	194,000
<b>WKY Utility Shipments</b>	<b>17,564,000</b>

### ***Kentucky Coal Shipments to All Sectors, 2004***

(Includes electricity generation, coke plants, industrial plants, residential & commercial).

#### **Kentucky distributed a total of 112.4 million tons of coal in 2004.**

East KY Total Distribution	*90.2 million tons	West KY Total Distribution	22.2 million tons
East KY Delivered to Kentucky	15.2 million tons (17%)	West KY Delivered to KY	15.2 million tons (68%)
East KY Delivered Out of State	*75.0 million tons (83%)	West KY Delivered Out of State	7.0 million tons (32%)

**Seventy three** percent of Kentucky coal is shipped out of state.

**Twenty seven** percent of Kentucky coal remains in state.

\* Includes coal that is exported.

\*\* Includes coal distributed to synthetic fuel plants and brokers to unknown consumers.

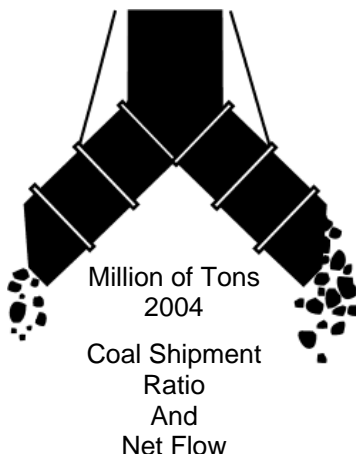
Source: U.S. DOE—Energy Information Administration, *Coal Industry Annual*, 2004.

## *Distribution — State to State*

Kentucky exports over 3.0 tons of electric power plant coal to neighboring states for every ton imported. The chart below shows the ***Interstate Imports and Exports*** of electric power plant coal between Kentucky and its neighboring states.\*

### **Kentucky Interstate Import**

Coal from  
Neighboring States  
Delivered to Electric  
Power Plants  
In Kentucky.



### **Kentucky Interstate Export**

Kentucky Coal  
Delivered to Electric  
Power Plants in  
Neighboring States

Kentucky receives from Illinois 0.57	KY : IL 1 : 11	Illinois receives from Kentucky 0.05
Kentucky receives from Indiana 1.80	KY : IN 1 : 5	Indiana receives from Kentucky 0.37
Kentucky receives from Missouri 0.00	KY : MO N/A	Missouri receives from Kentucky 0.00
Kentucky receives from Ohio 0.52	KY : OH 9 : 1	Ohio receives from Kentucky 4.42
Kentucky receives from Tennessee 0.02	KY : TN 282 : 1	Tennessee receives from Kentucky 5.64
Kentucky receives from Virginia 0.00	KY : VA 442 : 1	Virginia receives from Kentucky 4.42
Kentucky receives from West Virginia 2.06	KY : WV 1 : 13	West Virginia receives from Kentucky 0.16
<b>Kentucky's Utilities Import from Neighboring States 4.97 Million Tons of Coal</b>	<b>3.0 : 1</b>	<b>Kentucky Exports to Utilities in Neighboring States 15.06 Million Tons of Coal</b>

**Kentucky's imports from Colorado (5.8 million tons) and Wyoming (1.3 million tons) totaled 7.1 million tons, up only 400,000 tons in the last 2 years.**

**Kentucky's imports from Pennsylvania (3.5 million tons) doubled from 1.8 to 3.5 million tons in the last 2 years.**

\* Does not include metallurgical or industrial coal shipments.

Source: U.S. DOE—Energy Information Administration, *Coal Industry Annual, 2004*.

## Coal Exports / Imports

In 2004, the U.S. exported 45.5 million tons of coal. U.S. coal exports in 2004 were down by 67 million tons from the record high of 112.5 million tons in 1981. U.S. coal imports totaled 27.3 million tons in 2004. U.S. imports have steadily increased from the 1.04 million tons in 1981.



Kentucky's 2004 exports of 3.0 million tons were 6.6% of total U.S. exports. Kentucky exported coal to 4 foreign countries during 2004 at an estimated value of \$162.3 million. The four foreign countries were Canada, Italy, The Netherlands and the United Kingdom.

### U.S. Coal Imports\*

Columbia (16.7 million tons), Venezuela (4.4 million tons), Canada (2.9 million tons), Indonesia (2.2 million tons), and Australia (0.3 million tons) were the largest suppliers of imported coal in 2004.

#### U.S. Coal Imports\*

Year	Quantity (millions)	Average Price/Ton
1981	1.043	\$28.47
1982	0.742	\$30.40
1983	1.271	\$33.59
1984	1.286	\$35.37
1985	1.952	\$36.04
1986	2.212	\$36.02
1987	1.747	\$32.04
1988	2.134	\$29.96
1989	2.851	\$34.14
1990	2.699	\$34.45
1991	3.390	\$33.12
1992	3.803	\$34.46
1993	7.309	\$29.89
1994	7.584	\$30.21
1995	7.201	\$34.13
1996	7.127	\$33.45
1997	7.487	\$34.32
1998	8.724	\$32.18
1999	9.089	\$30.77
2000	12.513	\$30.10
2001	19.787	\$34.00
2002	16.875	\$35.51
2003	25.044	\$31.45
2004	27.280	\$37.52

\* NOTE: Includes China, Puerto Rico and Virgin Islands.  
Source: U.S. DOE Energy Information Administration, Coal Industry Annual, 2004.

### Petroleum Coke

Since 1984, petroleum coke received by electric power plants increased 22 fold, from 335,200 tons to 7,358,000 tons in 2004.

#### Petroleum Coke—Electric Utilities

Year	Tons (000)	Cents per Million Btu
1984	335	128.6
1986	359	105.5
1988	355	97.2
1990	554	80.3
1992	687	75.0
1994	1,263	68.9
1996	1,410	78.2
1998	6,216 *	71.2
1999	4,690 *	65.4
2000	4,153 *	58.5
2001	2,019 (Utility Plant only)	78.4
2001	N/A (Non-Utility Plant)	N/A
2002	2,677 (Utility Plant only)	62.5
2002	1,770 (Non-Utility Plant)	100.8
2003	5,720	N/A
2004	7,358	N/A

\* NOTE: Includes utility and non-utility plants. N/A: Not Available

Source: U.S. DOE Energy Information Administration, Petroleum Coke Tables, Electric Power Monthly, Cost & Quality, 2004.



## *Air Quality / By-Products*

### **Coal Use and Sulfur Dioxide Emissions from Electric Power 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 produced per ton of coal burned by 80 percent from 1976 to 2004.

U.S. sulfur dioxide emissions have decreased by 52 percent from 1976 to 2004, even though power plants increased their coal use by 120 percent in that time period.

Kentucky's 2004 sulfur dioxide emissions of 460,000 tons have been reduced by 69 percent from the 1976 sulfur dioxide emissions level of 1,496,000 tons.

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

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

### **Coal Combustion By-Products**

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

#### **2004 U.S. Coal Combustion By-Product Production & Consumption (million tons)**

	Production	Consumption	% Used
Fly Ash	70.8	28.1	40.0
Bottom Ash	17.2	8.2	47.7
Boiler Slag	2.2	2.0	90.9
FDG Material (combined)	31.4	10.4	33.1

Source: American Coal Ash Association, Inc. 2004 CCP Survey

#### **Existing Consumption**

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

## *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. Land is frequently more valuable and useful after mining reclamation.

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

Kentucky coal operators through FY 2004 have paid \$898.6 million into the Federal Abandoned Mine Land program to reclaim land mined prior to August 3, 1977.

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

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

**As of December 2005, the Kentucky mining industry had a total of 8,502 outstanding bonds, valued at \$779.9 million. The bonds assure timely and successful reclamation.**

**Mining reclamation bonds are released in the following phases:**

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

### **Successful Mining Reclamation/Primacy Bond Releases, 1984—2005**

Year	Phase I			Phase II			Phase III		
	# of Releases	Acres* Released	Bond Amount	# of Releases	Acres* Released	Bond Amount	# of Releases	Acres* Released	Bond Amount
1984	4	123	\$277,886	-	-	-	-	-	-
1985	40	767	\$1,946,323	2	84	\$79,841	1	8	\$11,600
1986	248	6,361	\$16,781,470	-	-	-	1	14	\$16,800
1987	332	8,379	\$21,390,109	11	253	\$289,767	4	155	\$284,300
1988	561	15,583	\$38,194,394	57	1,303	\$1,261,810	-	-	-
1989	446	16,777	\$32,058,350	60	1,632	\$1,967,811	3	21	\$38,500
1990	533	15,383	\$28,108,146	260	7,298	\$6,221,870	51	1,697	\$1,569,147
1991	626	14,642	\$28,373,662	428	12,667	\$11,200,897	130	2,958	\$6,890,877
1992	670	18,278	\$33,822,612	477	13,338	\$11,489,035	255	8,101	\$6,811,872
1993	498	13,893	\$25,386,134	416	12,661	\$11,242,965	448	15,986	\$8,629,089
1994	452	15,933	\$27,423,038	319	10,828	\$9,768,647	406	14,098	\$8,709,946
1995	525	16,650	\$32,343,224	427	13,141	\$12,399,017	517	18,419	\$16,338,524
1996	619	23,968	\$47,602,996	419	14,784	\$17,378,599	784	27,018	\$22,365,232
1997	393	13,179	\$23,571,000	373	13,323	\$13,463,098	806	30,768	\$29,923,783
1998	351	12,646	\$28,589,902	255	8,104	\$9,370,064	747	21,387	\$18,859,893
1999	357	11,259	\$20,644,178	192	5,971	\$6,719,383	602	19,774	\$23,043,414
2000	285	10,237	\$18,529,971	206	6,380	\$9,449,942	587	20,678	\$17,215,050
2001	268	9,837	\$13,321,034	175	7,963	\$12,064,790	439	13,274	\$14,176,508
2002	398	14,380	\$19,236,198	142	5,929	\$6,130,207	449	15,384	\$16,013,176
2003	396	12,296	\$16,879,563	143	5,855	\$5,424,044	367	10,462	\$11,291,162
2004	328	11,974	\$18,229,856	136	3,941	\$3,581,106	412	10,772	\$13,163,416
2005	241	9,216	\$15,148,893	131	4,922	\$3,980,049	314	12,732	\$12,419,565
<b>Total</b>	<b>8,571</b>	<b>271,761</b>	<b>\$507,858,939</b>	<b>4,629</b>	<b>150,377</b>	<b>\$153,482,942</b>	<b>7,323</b>	<b>243,706</b>	<b>\$227,771,854</b>

\* NOTE: Includes surface acreage over underground mines.

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

## *Post-Mining Land Uses*

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

### **Post-Mining Land Use and County**

#### **Regional Airports**

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



#### **Correctional Facilities**

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

#### **Government Facilities**

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

#### **Fish & Wildlife**

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

### ***Elk in the Mountains of East Kentucky Again***

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

#### **Farms**

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



#### **Industrial / Commercial**

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

*(Continued on page 26)*

## *Post-Mining Land Uses cont.*

### **Industrial / Commercial continued**

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

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

### **R&R / Sport**

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

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

### **Structural Building Sites**

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

Numerous small businesses in Eastern Kentucky

Sources: Environmental and Public Protection Cabinet, Area Development Districts.

## AML Reclamation

### Abandoned Mine Land (AML) Reclamation

The federal Surface Mining Control and Reclamation Act of 1977 established authority for the AML Fund. Production fees of \$0.35 per ton for surface-mined coal and \$0.15 per ton for underground-mined coal are collected from coal producers at all active coal mining operations. These funds reclaim pre-law (1977) and certain interim program (1977-1982) sites left abandoned, un-reclaimed, or insufficiently reclaimed.

**The Kentucky coal industry (through FY 2004) has contributed \$898.6 million to the Abandoned Mine Land (AML) Reclamation Fund since 1978. Nationally, over \$7.45 billion (through FY 2005) has been paid by active coal operators across the United States.**

**Fifty percent of the total Kentucky AML fees go directly to the state share account.** However, \$124.4 million (September, 2004) is unallocated due to the federal appropriation process (see Kentucky State Share Balance column in table below).

<b>Abandoned Mine Land (AML) Reclamation Fund (millions)</b>				
Fiscal Year	Kentucky Collection	Kentucky State Share*	KY AML Grant Disbursement	KY State Share Balance**
1978	\$20.38	\$14.98	\$ 0	\$15.0
1979	31.18	16.85	0.6	31.8
1980	34.64	17.51	0	49.3
1981	36.52	17.91	1.4	67.2
1982	38.60	18.29	16.4	69.6
1983	31.46	15.56	28.9	56.7
1984	38.12	18.87	36.8	44.8
1985	36.91	17.30	32.3	31.4
1986	35.29	17.25	19.7	31.6
1987	35.02	17.61	16.4	36.7
1988	26.34	13.17	15.3	37.5
1989	35.39	17.69	27.6	38.5
1990	38.40	19.41	6.4	43.3
1991	37.04	18.45	11.0	47.8
1992	35.60	17.82	28.2	54.9
1993	36.18	18.04	11.5	62.8
1994	36.82	18.24	18.7	70.7
1995	35.49	17.61	15.5	77.1
1996	33.98	16.90	16.0	83.6
1997	34.66	17.24	16.1	90.1
1998	35.04	17.45	15.7	97.4
1999	32.38	16.15	16.5	103.4
2000	30.49	15.19	17.0	108.0
2001	29.42	14.71	18.8	111.9
2002	30.16	15.03	16.7	116.9
2003	26.71	13.35	16.4	120.5
2004	26.38	13.19	16.0	124.4
<b>Totals</b>	<b>898.60</b>	<b>451.77</b>	<b>435.9</b>	

\* 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 2004)

Kentucky AML Projects	Federal AML Projects
745 Multi-site State AML Projects	1,255 Multi-site AML Projects
\$419 million in expenditures	\$130 million in expenditures
15,400 acres reclaimed	Rural Abandoned Mine Program
(plus various projects currently under construction)	Emergency and Non-Emergency

From 1978-2003, 2,000 multi-site AML projects have been undertaken in Kentucky by both the federal and state programs reclaiming thousands of acres and spending \$499 million in AML funds.

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

77 water line projects—\$64 million.	1,909 mine portal closures.
over 27,200 feet of high wall eliminated.	145 vertical shafts sealed.
over 200 hazardous structures removed.	45 miles of stream restoration.
over 2,000 acres of landslide projects stabilized.	282 acres of mine fires controlled.

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

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

# Coal Origin and Properties



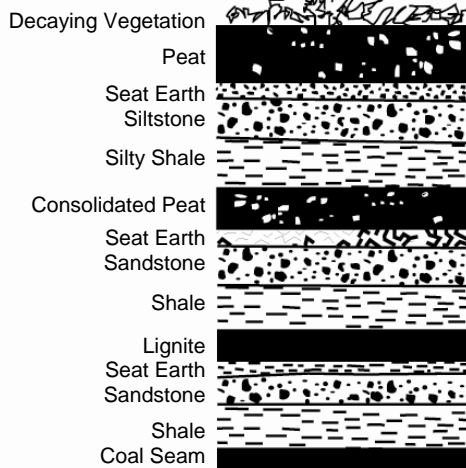
It is generally accepted that coal originated from plant debris including ferns, trees, bark, leaves, roots and seeds some of which accumulated and settled in swamps.

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

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

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

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



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

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

## Coal Rank

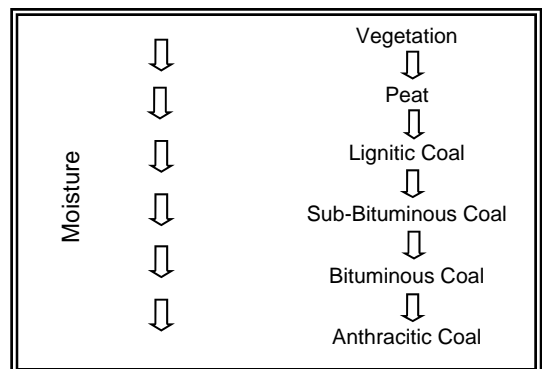
Coal usually is divided into two main classes - anthracite (hard coal) and bituminous (soft coal). When anthracite was formed, it was squeezed under greater heat and pressure than was bituminous. As a result, anthracite contains the highest percentage of carbon and the lowest percentage of moisture.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

Moisture decreases, rank increases.

Rank increases, fixed carbon increases.

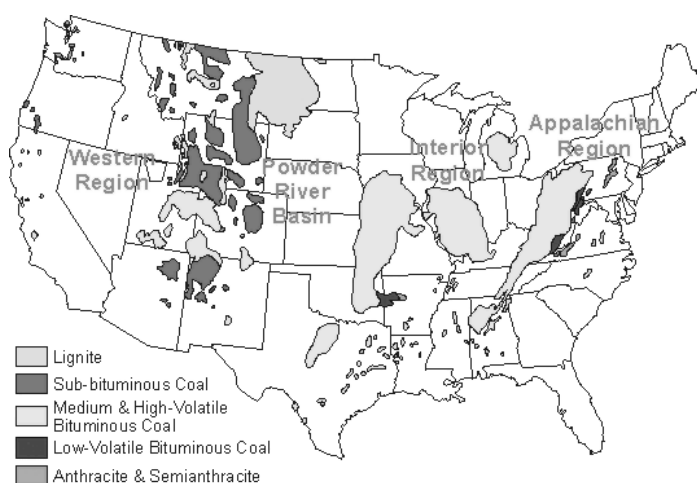
Rank increases, volatile matter decreases.

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



## U.S. Comparisons — Production

### U.S. Coal Fields and Coal Producing Areas



### Coal Production by State, 2004 (thousand tons)

State and Region	Total	Anthracite	Bituminous	Sub-Bituminous	Lignite
Alabama	22,271	—	22,271	—	—
Alaska	1,512	—	—	1,512	—
Arizona	12,731	—	12,731	—	—
Arkansas	7	—	7	—	—
Colorado	39,870	—	31,515	8,335	—
Illinois	31,853	—	31,853	—	—
Indiana	35,110	—	35,110	—	—
Kansas	71	—	71	—	—
<b>Kentucky, Total</b>	<b>114,244</b>	—	<b>114,244</b>	—	—
<b>Eastern</b>	<b>90,871</b>	—	<b>90,871</b>	—	—
<b>Western</b>	<b>23,373</b>	—	<b>23,373</b>	—	—
Louisiana	3,805	—	—	—	3,805
Maryland	5,225	—	5,225	—	—
Mississippi	3,586	—	—	—	3,586
Missouri	578	—	578	—	—
Montana	39,989	—	—	39,607	382
New Mexico	27,250	—	13,484	13,766	—
North Dakota	29,943	—	—	—	29,943
Ohio	23,222	—	23,222	—	—
Oklahoma	1,792	—	1,792	—	—
Pennsylvania	65,996	1,679	64,317	—	—
Tennessee	2,887	—	2,887	—	—
Texas	45,863	—	40	—	45,823
Utah	21,746	—	21,746	—	—
Virginia	31,420	—	31,420	—	—
Washington	5,653	—	—	5,653	—
<b>West Virginia, Total</b>	<b>147,993</b>	—	<b>147,993</b>	—	—
Northern	40,646	—	40,646	—	—
Southern	107,347	—	107,347	—	—
Wyoming	396,493	—	20	396,473	—
<b>Appalachian Total</b>	<b>389,884</b>	<b>1,679</b>	<b>388,206</b>	—	—
<b>Interior Total</b>	<b>146,038</b>	—	<b>92,824</b>	—	<b>53,215</b>
<b>Western Total</b>	<b>575,186</b>	—	<b>79,496</b>	<b>465,365</b>	<b>30,325</b>
East of Miss. River	483,806	1,679	478,541	—	3,586
West of Miss. River	627,303	—	81,984	465,365	79,953
<b>U.S. Total</b>	<b>1,112,099*</b>	<b>1,706*</b>	<b>561,488*</b>	<b>465,365</b>	<b>83,540</b>

Source: U.S. DOE - Energy Information Administration, *Coal Industry Annual*, 2004  
 (\* Note: U.S. Totals include 963,000 tons of Bituminous and 27,000 tons of Anthracite Refuse Recovery).

## U.S. Coal Reserves

### 2005 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)
<b>Appalachian Region</b>					
Alabama		3,158.77		1,083.00	4,241.77
Georgia		3.60			3.60
Kentucky, Eastern		10,671.35			10,671.35
Maryland		651.51			651.51
North Carolina		10.70			10.70
Ohio		23,342.49			23,342.49
Pennsylvania	7,200.47	20,396.73			27,597.20
Tennessee		779.26			779.26
Virginia	125.49	1,614.23			1,739.72
West Virginia		33,220.10			33,220.10
<b>Appalachian Total</b>	<b>7,325.96</b>	<b>93,848.74</b>		<b>1,083.00</b>	<b>102,257.70</b>
<b>Interior Region</b>					
Arkansas	104.00	287.40		25.37	416.77
Illinois		104,528.89			104,528.89
Indiana		9,534.47			9,534.47
Iowa		2,189.45			2,189.45
Kansas		972.56			972.56
Kentucky, Western		19,553.67			19,553.67
Louisiana				426.71	426.71
Michigan		127.70			127.70
Missouri		5,989.93			5,989.93
Oklahoma		1,556.83			1,556.83
Texas				12,442.36	12,442.36
<b>Interior Total</b>	<b>104.00</b>	<b>144,740.90</b>		<b>12,894.44</b>	<b>157,739.34</b>
<b>Western Region</b>					
Alaska		697.51	5,400.36	14.00	6,111.87
Arizona		6.67			6.67
Colorado	25.50	8,330.08	3,747.27	4,189.86	16,292.71
Idaho		4.42			4.42
Montana		1,385.38	102,138.45	15,756.52	119,280.35
New Mexico	2.30	3,598.65	8,571.28		12,172.22
North Dakota				9,090.13	9,090.13
Oregon			17.45		17.45
South Dakota				366.10	366.10
Utah		5,443.76	1.10		5,444.86
Washington		303.71	1,028.94	8.07	1,340.72
Wyoming		4,318.15	60,006.97		64,325.12
<b>Western Total</b>	<b>27.80</b>	<b>24,088.33</b>	<b>180,911.82</b>	<b>29,424.68</b>	<b>234,452.64</b>
<b>U.S. Total</b>	<b>7,457.76</b>	<b>262,677.97</b>	<b>180,911.82</b>	<b>43,402.12</b>	<b>494,449.67</b>
					<b>East of the Mississippi</b>
					<b>236,002.42</b>
					<b>West of the Mississippi</b>
					<b>258,447.25</b>

\*\* Kentucky coal resource values are considered by some to be too high, while the Eastern Kentucky "Demonstrated Coal Reserve Base" value is still openly rejected by many others as being too low.  
Source: U.S. DOE—EIA, *U.S. Coal Reserves: 2005 Update* (January 2005).



# Kentucky Coal Resources

## Western Kentucky Coal Field — 2004

The Western Kentucky coal field covers 6,400 square miles and contains over 35.67 billion tons of remaining resources. (Part of this cannot be mined economically using today's technology). The remaining resources and their locations are illustrated below.

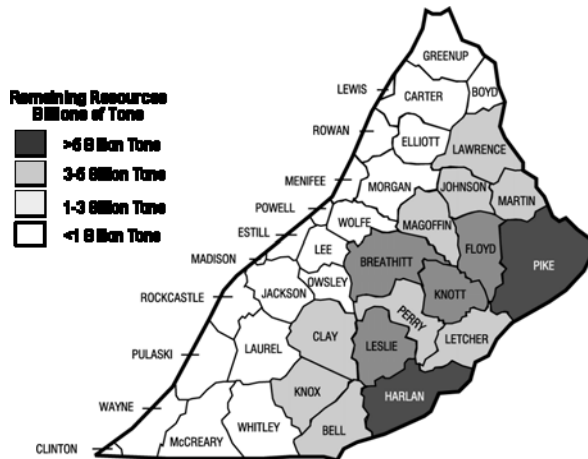


There are 35 named coal beds, of which seven principal coal beds contain about 94% of the resources in Western Kentucky.

Over 5.32 billion tons of coal have been mined or lost due to mining, amounting to only about 13% of total Western Kentucky coal resources.

## Eastern Kentucky Coal Field — 2004

The Eastern Kentucky coal field covers 10,500 square miles and contains approximately 51.90 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 12.17 billion tons of coal have been mined or lost due to mining, amounting to only about 19% of total Eastern Kentucky coal resources.



### How To Calculate Tons of Coal

$$\text{Total Tons} = \text{Acres} \times \text{Inches} \times 145 \text{ tons per acre-inch}$$

$$(\text{acres of coal}) \times (\text{height of coal}) \times (\text{density of coal})$$

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 35.7 billion tons in Western Kentucky and 51.9 billion tons in Eastern Kentucky. As shown in the Demonstrated Reserve Base (DRB) tables on page 30, assumptions on the percentage available for development reduce those values even further.

### **Western Kentucky Coal Resources, 2004**

<b>County</b>	<b>Original</b>	<b>Mined</b>	<b>Lost</b>	<b>Remaining</b>
Butler	413.69	30.20	30.20	353.29
Daviess	1,330.32	62.33	62.33	1,205.66
Henderson	6,852.78	76.12	76.12	6,700.54
Hopkins	8,814.80	781.80	781.80	7,251.20
McLean	3,576.41	19.73	19.73	3,536.95
Muhlenberg	4,723.84	749.83	749.83	3,224.18
Ohio	1,824.55	266.72	266.72	1,291.11
Union	6,506.98	332.21	332.21	5,842.56
Webster	6,322.95	317.11	317.11	5,688.73
Other*	623.08	25.44	25.44	572.20
<b>WKY Total</b>	<b>40,989.40</b>	<b>2,661.49</b>	<b>2,661.49</b>	<b>35,666.42</b>

<b>Original Coal Resources Estimate (40.99 Billion Tons)</b>
<b>2.66 billion tons mined 1790-2004</b>
<b>2.66 billion tons lost due to mining 1790-2004</b>
<b>19.55 billion tons in DRB**</b>
<b>16.12 billion tons remaining, but not in DRB**</b>

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

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

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

### **Eastern Kentucky Coal Resources, 2004**

<b>County</b>	<b>Original</b>	<b>Mined</b>	<b>Lost</b>	<b>Remaining</b>
Bell	3,194.70	302.69	302.69	2,589.32
Boyd	630.68	19.93	19.93	590.82
Breathitt	4,112.20	208.47	208.47	3,695.26
Carter	501.96	18.61	18.61	464.74
Clay	1,536.11	61.87	61.87	1,412.37
Elliot	316.32	9.87	9.87	296.58
Floyd	4,168.08	459.68	459.68	3,248.72
Greenup	204.87	10.42	10.42	184.03
Harlan	7,881.12	917.66	917.66	6,045.80
Jackson	375.87	11.31	11.31	353.25
Johnson	1,419.44	97.56	97.56	1,224.32
Knott	4,385.10	329.90	329.90	3,725.30
Knox	1,381.93	75.51	75.51	1,230.91
Laurel	408.04	35.95	35.95	336.14
Lawrence	2,024.68	26.81	26.81	1,971.06
Lee	363.98	8.49	8.49	347.00
Leslie	3,554.65	259.17	259.17	3,036.31
Letcher	3,692.80	558.17	558.17	2,576.46
McCreary	444.97	55.34	55.34	334.29
Magoffin	1,969.10	55.77	55.77	1,857.56
Martin	3,319.97	391.28	391.28	2,537.41
Morgan	849.40	15.22	15.22	818.96
Owsley	574.14	10.02	10.02	554.10
Perry	3,596.70	593.36	593.36	2,409.98
Pike	11,391.70	1,420.07	1,420.07	8,551.56
Whitley	987.44	91.40	91.40	804.64
Wolfe	443.92	7.16	7.16	429.60
Other***	334.89	33.18	33.18	268.53
<b>EKY Total</b>	<b>64,064.76</b>	<b>6,084.87</b>	<b>6,084.87</b>	<b>51,895.02</b>

<b>Original Coal Resources Estimate (64.06 billion tons)</b>
<b>6.08 billion tons mined 1790-2004</b>
<b>6.08 billion tons lost due to mining 1790-2004</b>
<b>10.67 billion tons in DRB**</b>
<b>41.21 billion tons remaining, but not in DRB**</b>

Source for DRB: U.S. DOE-EIA, [U.S. Coal Reserves](#), 2004

\*\* NOTE: Kentucky coal resource values are considered by some to be too high of a value while the Eastern Kentucky "DRB" value was increased but is still rejected by some as being too low.

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

Sources: Smith and Brant (1980), [Mined and Lost](#) and [Remaining Resources](#) updated by the Division of Fossil Fuels from the Office of Mine Safety and Licensing Annual Reports.

## Coal Properties / Improvements

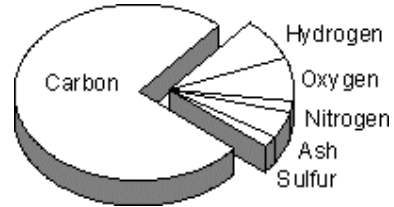
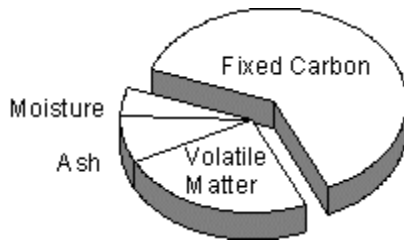
There are two different types of analyses used to determine the nature of bituminous coal:

### 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).



#### Ultimate Analysis

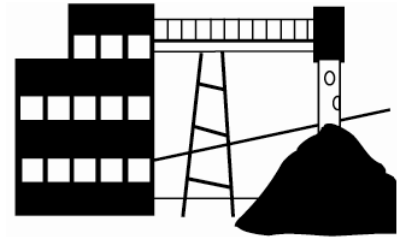
Determines the amount of carbon, hydrogen, oxygen, nitrogen, and sulfur.

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

### **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 13,090 tons per hour of coal preparation design capacity at approximately 20 coal preparation plants during 2005. **Eastern Kentucky** had 46,495 tons per hour of coal preparation design capacity at approximately 67 coal preparation plants during 2005.

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

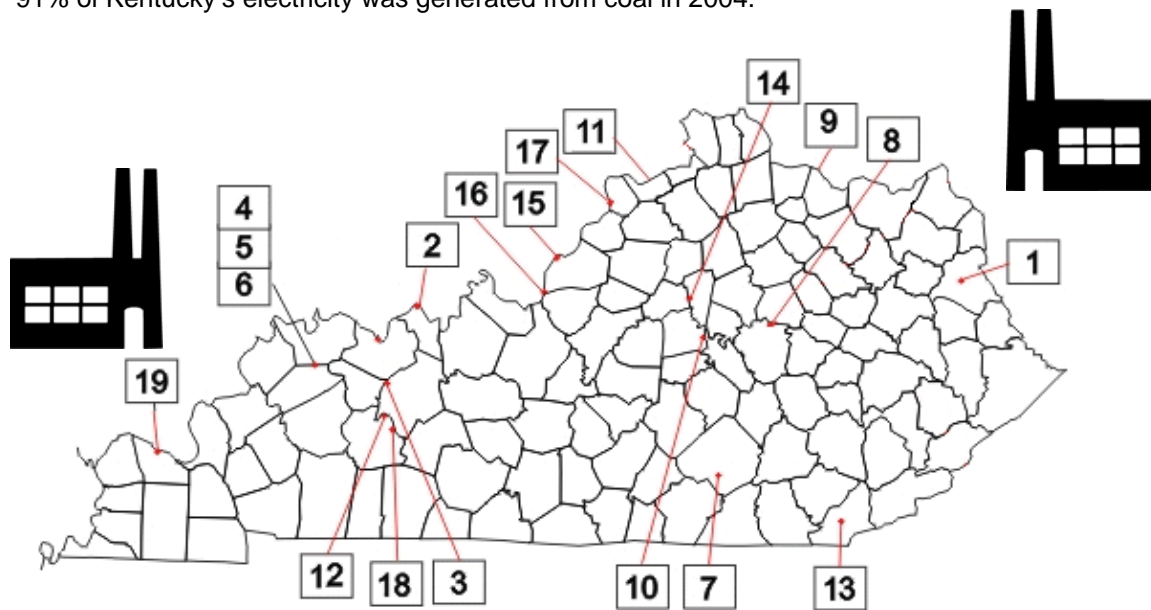
In Western Kentucky, sulfur (inorganic sulfur) and ash are the two main impurities removed. Considering the seven principal mined seams in this area, 0.5% to 2.5% can be subtracted from the average sulfur content and 9% to 13% can be subtracted from the ash content after the coal washing process.

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

Source: Kentucky Office of Energy Policy's Kentucky prep/rail directory.

## Coal-Fired Power Plants Offering Tours

91% of Kentucky's electricity was generated from coal in 2004.



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

Coal-Fired Power Plant	Plant/County	Phone	Age Group
<b>American Electric Power</b> Contact: Diana Frasher	1 Big Sandy/Lawrence	606-686-2415, Ext. 1133	all ages
<b>East Kentucky Power Cooperative</b> Contact: Belinda Stafford	7 Cooper/Pulaski	859-744-4812	5th grade
	8 Dale/Clark	Ext. 385	& up
	9 H.L. Spurlock/Mason		
<b>Kentucky Utilities Company</b> Contact: Cliff Feltham	10 Brown/Mercer	800-981-0600	6th grade
	11 Ghent/Carroll		& up
	12 Green River/Muhlenberg		
	13 Pineville/Bell		
	14 Tyrone/Woodford		
<b>Louisville Gas &amp; Electric Co.</b> Contact: Sandy Gentry	15 Cane Run/Jefferson	502-627-2713	5th grade & up
	16 Mill Creek/Jefferson		(others considered
	17 Trimble County/Trimble		upon request)
<b>Tennessee Valley Authority</b> Contact: Beverly Morehead Debby Abell	18 Paradise/Muhlenberg	270-476-3301	4th grade
	19 Shawnee/McCracken	270-575-8001	& up
<b>Western Kentucky Energy</b> Contact: Jennifer Headdy email: jennifer.headdy@eon-us.com	2 Coleman/Hancock	270-844-6004	3rd grade
	3 D.B. Wilson/Ohio		& up
	4 Green/Webster		
	5 Henderson/Webster		
	6 Reid/Webster		

## *Electric Utility / Non-Utility*

### **History of Electric Utility Deregulation, 2000—Impact on Coal**

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

While initial efforts to form a more competitive electric market in some states, such as California, have resulted in disaster during periods of both “under-supply” and “over-supply,” other states have greatly intensified pressure to keep generating 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 and beyond, coal’s ability to capture this new market will be aided by its low and stable cost, by expected increases in the cost of natural gas, and by increasingly efficient and environmentally beneficial Clean Coal Technologies.

### **U.S. Electric Power Plant Shipments**

<u>Million Tons</u>					<u>Market Share %</u>					
<u>Year</u>	<u>KY</u>	<u>WV</u>	<u>WY</u>	<u>U.S. TOTAL</u>		<u>Year</u>	<u>KY</u>	<u>WV</u>	<u>WY</u>	
1973	87	47	13	375	Kentucky shipped 76 million tons of steam coal to U.S. electric power plants in 2004.	1973	23.2	12.6	3.5	
1974	90	42	18	385	Kentucky shipped 53 million tons less steam coal to the U.S. electric utilities than in 1990.	1974	23.4	10.8	4.7	
1975	101	44	22	432	Kentucky’s share of the U.S. steam coal market declined to 8.5% in 2004, compared to 23.2% in 1973.	1975	23.5	10.2	5.0	
1976	102	45	26	455		1976	22.5	9.8	5.7	
1977	110	44	42	490		1977	22.4	9.0	8.6	
1978	99	38	53	476		1978	20.7	8.0	11.2	
1979	111	50	69	557		1979	19.9	8.9	12.4	
1980	112	53	90	594		1980	18.9	8.9	15.1	
1981	112	51	101	579		1981	19.4	8.8	17.5	
1982	106	64	102	601	Wyoming increased steam coal shipments by 207 million tons since 1990, increasing its market share to 43.0% of the U.S. electric utility steam coal market, compared to 3.5% in 1973.	1982	17.7	10.6	17.0	
1983	95	66	107	593		1983	16.1	11.1	18.1	
1984	119	74	127	684		1984	17.4	10.8	18.6	
1985	111	65	138	667		1985	16.6	9.7	20.7	
1986	115	73	138	687		1986	16.7	10.6	20.1	
1987	124	81	142	721		1987	17.2	11.2	19.8	
1988	116	80	158	728		1988	15.9	11.0	21.7	
1989	120	83	166	753		1989	16.0	11.1	22.0	
1990	129	89	176	787		1990	16.4	11.3	22.4	
1991	114	85	184	770		1991	14.8	11.0	24.0	
1992	117	85	182	776		1992	15.1	10.9	23.4	
1993	120	75	202	769		1993	15.6	9.8	26.3	
1994	127	93	226	832		1994	15.2	11.1	27.2	
1995	121	91	254	827		1995	14.6	11.0	30.7	
1996	117	102	269	863		1996	13.6	11.8	31.2	
1997	122	104	269	881		1997	13.9	11.8	30.7	
1998 *	120	106	305	929		1998 *	13.0	11.4	32.8	
*Deregulation began in 1998						*Deregulation began in 1998				
1999	115	105	328	942		1999	12.2	11.2	34.8	
2000	106	105	324	905		2000	11.7	11.6	35.9	
2001	98	111	351	935		2001	10.5	11.9	37.5	
2002	84	101	360	884		2002	9.5	11.4	40.7	
2003	67	87	365	849		2003	7.9	10.2	43.0	
2004	76	84	383	892		2004	8.5	9.4	43.0	

**BLACKOUT**  
August 14, 2003

Utility experts say the national system of electric transmission lines, known as the grid, is being asked to do more than it was designed to do.

Trends that could lead to power failures:

1. More electric power transactions over longer distances as a result of deregulation.
2. Increased competition producing less coordination among utilities.
3. Independent “merchant power plants” being added to the grid.
4. The creation of Regional Transmission Organizations.
5. Staff reductions by investor-owned utilities.

Source: Kentucky Living Magazine, November 2003.

Source: U.S. DOE/EIA—Cost and Quality for Fuels for Electric Utility Plants, 1973-1998, Coal Industry Annual, 1999-2004.

## *Electricity Costs*

Average electricity costs in Kentucky were 4.63 cents per kilowatt-hour during 2004, **the lowest** in the United States for the **third consecutive year**. Kentucky's average electricity costs are lower than all other states. Some states such as California and several New England states have average electricity costs that are two to two-and-one-half times the average electricity costs in Kentucky. All Kentuckians enjoy the many advantages of low-cost power due to Kentucky coal.

### **Average Revenue per KWh for All Sectors of Consumers by State, 2004**

U.S. Average Revenue per KWh is 7.62 cents

STATE	CENTS PER KWh
KENTUCKY	4.63
IDAHO	4.97
WYOMING	4.98
WEST VIRGINIA	5.13
INDIANA	5.58
ARKANSAS	5.67
UTAH	5.69
NORTH DAKOTA	5.69
NEBRASKA	5.70
WASHINGTON	5.80
MISSOURI	6.07
ALABAMA	6.08
TENNESSEE	6.14
OREGON	6.21
SOUTH CAROLINA	6.22
MINNESOTA	6.24
KANSAS	6.37
IOWA	6.40
MONTANA	6.40
VIRGINIA	6.43
SOUTH DAKOTA	6.44
OKLAHOMA	6.50
GEORGIA	6.58
ILLINOIS	6.80
WISCONSIN	6.88
OHIO	6.89
MICHIGAN	6.94
COLORADO	6.95
NORTH CAROLINA	6.97
MISSISSIPPI	7.00
NEW MEXICO	7.10
LOUISIANA	7.13
MARYLAND	7.15
ARIZONA	7.45
DISTRICT OF COLUMBIA	7.47
DELAWARE	7.53
TEXAS	7.95
PENNSYLVANIA	8.00
FLORIDA	8.16
NEVADA	8.56
MAINE	9.69
CONNECTICUT	10.26
NEW JERSEY	10.29
MASSACHUSETTS	10.77
RHODE ISLAND	10.96
ALASKA	10.99
VERMONT	11.02
NEW HAMPSHIRE	11.37
CALIFORNIA	11.45
NEW YORK	12.55
HAWAII	15.70

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 Sales and Revenue, 2004

# Information Assistance

Visit our educational web site at [www.coaleducation.org](http://www.coaleducation.org)

## Welcome to the Kentucky Coal Education Web Site

- Classroom Lesson Plans
- Coal Education Resources
- Coal Mining History
- Coal Related Issues Info
- Modern Mining Technology
- Glossary of Terms
- Kentucky Coal and the Regulatory Authority Agencies of the Coal Industry
- Kentucky Coal Facts Book
- Kentucky Coal Tree
- Question and Answer Forum
- Technical Abstracts of Coal Related Periodicals
- Mining T.V.

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

**Kentucky Commerce Cabinet** **502-564-4270**  
Capital Plaza Tower, 500 Mero Street, 24th Floor, Frankfort, Kentucky 40601  
**George Ward**, Secretary

**Ky Office of Energy Policy, Division of Fossil Fuels & Utility Services** **502-564-7192**  
500 Mero Street, Capital Plaza Tower, Room 1209, Frankfort, Kentucky 40601  
Fax 502-564-7484  
**William H. Bowker**, Director  
William.Bowker@ky.gov

**Dennis McCully**, Division of Fossil Fuels & Utility Services **270-824-7543**  
625 Hospital Drive, Room 228  
Madisonville, Kentucky 42431  
Fax 270-824-8315  
DennisG.McCully@ky.gov

**Kentucky Coal Association** **859-233-4743**  
340 South Broadway, Suite # 100  
Lexington, Kentucky 40508-2553  
Fax 859-233-4745  
**Bill K. Caylor**, President  
bcaylor@kentuckycoal.com  
**Roberta A. James**, Office Manager  
rjames@kentuckycoal.com  
(www.kentuckycoal.org)

**Kentucky Geological Survey** **859-257-3896**  
228 Mining and Mineral Resources Bldg., University of Kentucky  
Lexington, Kentucky 40506-0107  
(www.uky.edu/kgs)

### Coal Education Programs

**CEDAR, Inc.** Office: **276-679-2505**  
P. O. Box 2152, Pikeville, Kentucky 41502  
Voice: 606-433-4053  
**John F. Justice**, President  
jjustice@naxs.net

**CEDAR West, Inc.** **270-824-7543**  
625 Hospital Drive, Room 228, Madisonville, Kentucky 42431  
DennisG.McCully@ky.gov  
**Dennis McCully**, Advisor

**Kentucky Coal Academy** Office: **859-256-3187**  
300 North Main Street, Versailles, Kentucky 40383  
bill.higginbotham@kctcs.edu  
**Bill Higginbotham**, Executive Director  
(www.kctcs.edu)

**Kentucky NEED** **866-736-8941**  
P. O. Box 176055, Covington, Kentucky 41017  
kregor@need.org  
**Karen Reagor**, Executive Director  
(www.need.org/states/kentucky)

### Coal Teaching Materials

**American Coal Foundation**  
101 Constitution Avenue, NW, Suite 525 E  
Washington, D.C. 20001-2133  
202/463-9785—Fax 202/463-9786  
(www.teachcoal.org)

**KET, The Kentucky Network**  
(www.ket.org/trips/coal/)

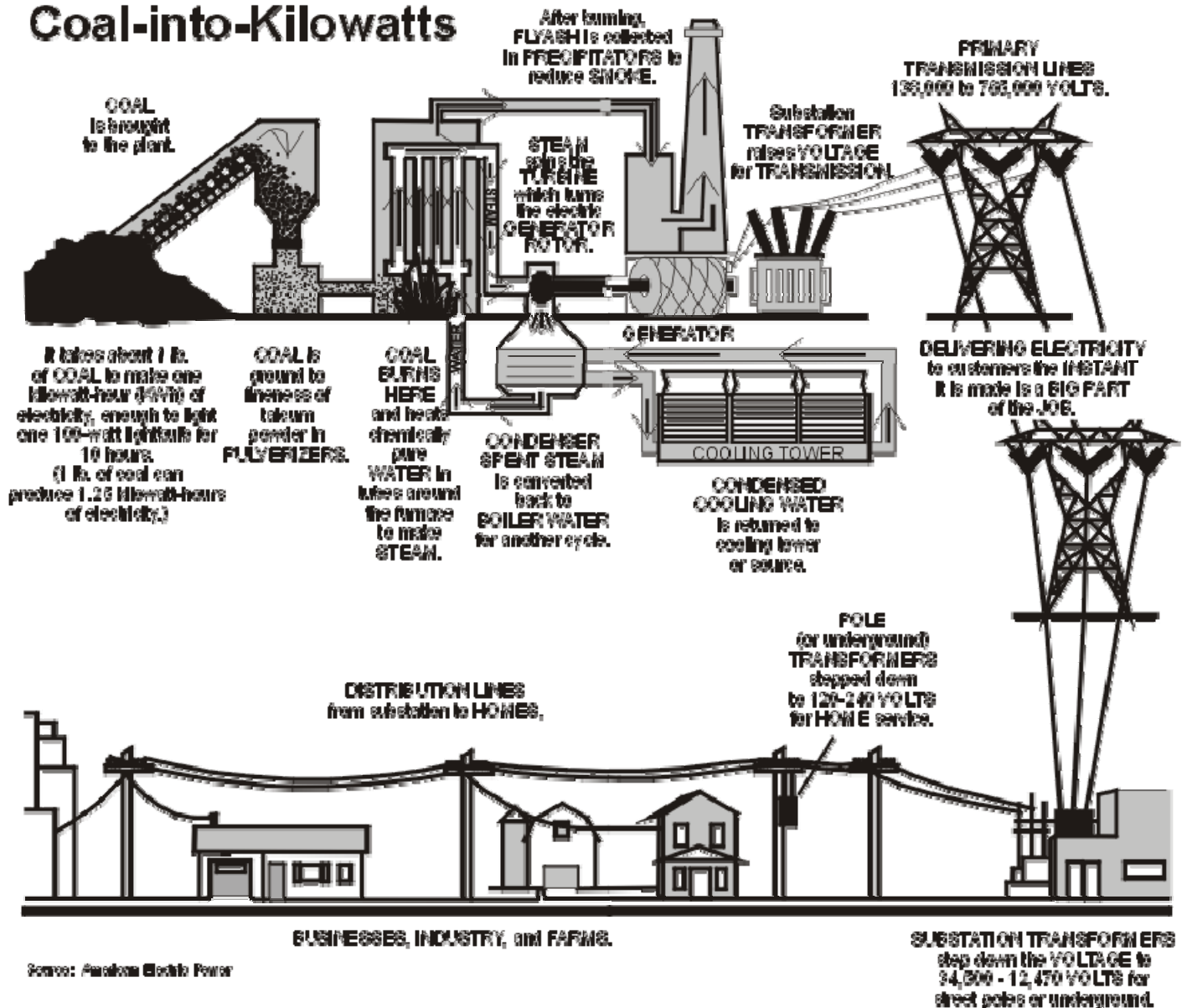
**Kentucky Geological Survey**  
(www.uky.edu/kgs)

**University of Kentucky**, Center for Applied Energy Research  
(www.caer.uky.edu)

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

**Center for Energy and Economic Development** **Office of Surface Mining**  
(www.ceednet.org/ceed) (www.osmre.gov/learn.htm)

# Coal-into-Kilowatts



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

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

**Affordable** — Coal is a bargain compared with other fuels.

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

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

**Clean** — Coal can be burned cleanly using clean coal technology.