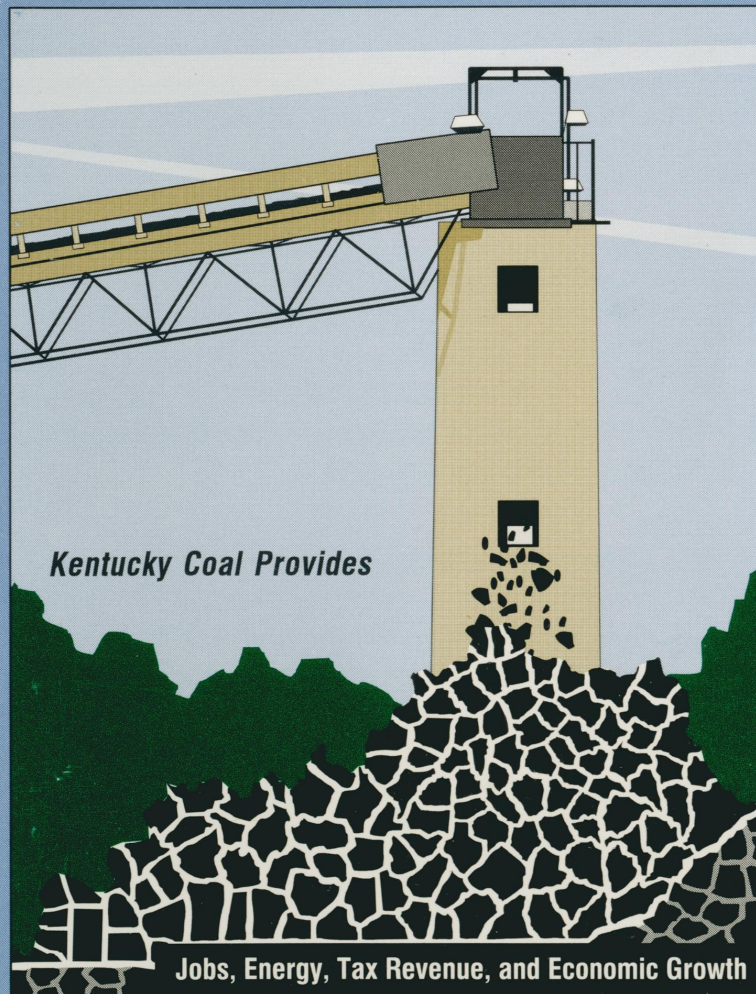


1999-2000 POCKET GUIDE

KENTUCKY COAL FACTS



Prepared by the
Kentucky Coal Council
and the
Kentucky Coal Association

Highlights

Electricity

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

Production

Kentucky produced 156.9 million tons of coal in 1998, compared to the record production of 179.4 million tons set in 1990. Kentucky has been one of the top three coal producers in the United States for the last 50 years.

Employment

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

Economy

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

Coal Markets

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

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

There are 22 major coal-burning electric generating plants in Kentucky, and almost all (95.7%) of Kentucky's electricity is generated from coal.

Environment

All surface-mined land today is reclaimed equal to or better than it was prior to mining. Kentucky received 5 national reclamation awards in 1997 and 1998 for surface mining and received a total of 22 awards in the past 13 years.

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

Kentucky operators have paid over \$726.6 million into the Federal Abandoned Mine Land Fund since 1978 to reclaim abandoned coal mines. Nationwide, operators have paid over \$5.09 billion into this fund. However, \$1.35 billion remains unallocated for AML reclamation.

Coal Resources

Kentucky has two distinct coal fields, one in Western Kentucky and one in Eastern Kentucky. Kentucky's 89 billion tons of coal resources remaining represent 85% of the original resource.

Teacher Resources

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

December 1999. This publication is for informational use only. It includes some extrapolative second and third party data as well as some broad estimates, and should not necessarily be construed as official source data or be construed as advocating or reflecting any policy position of the Kentucky Coal Council or the Kentucky Coal Association.

Changes and Trends

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

Coal provides 56% of the electricity in this country, and in Kentucky 95.7% of our electricity comes from coal.

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

What Changes are Occurring?

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

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

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

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

Is there a Trend?

Kentucky ships over 2.8 times as much coal to its neighboring states as it receives from them, but Kentucky's positive coal flow ratio has been cut in half since 1990. (see page 22)

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

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

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

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

On the Horizon?

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



Personal Computers (PCs)

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

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

References

Governor's Office

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

Phone: 502/564-2611
Fax: 502/564-2517

Department of Local Government

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

Phone: 502/573-2382
Fax: 502/573-2939
or 502/573-2512

Department of Mines and Minerals

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

Phone: 502/573-0140
Fax: 502/573-0152

Kentucky Geological Survey

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

Phone: 606/257-5500
Fax: 606/257-1147

Legislative Research Commission

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

Phone: 502/564-8100
Fax: 502/564-6543

Natural Resources and Environmental Protection Cabinet

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

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Department for Surface Mining Reclamation & Enforcement

Commissioner's Office

Division of Field Services

Division of Permits

2 Hudson Hollow - Frankfort, KY 40601

Division of Abandoned Lands

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Department for Environmental Protection

Division of Waste Management

Division of Water

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Division of Air Quality Control

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Revenue Cabinet

Department of Tax Administration

Division of Compliance and Tax Payer Assistance

Miscellaneous Tax Section, Severance Tax Unit

200 Fair Oaks Lane - Frankfort, KY 40620

Phone: 502/564-4581
Phone: 502/564-5523
Fax: 502/564-2906

Department of Property Valuation

Division of Technical Support, Mineral Valuation Section

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

Phone: 502/564-8334
Fax: 502/564-5977

Transportation Cabinet

Division of Planning, Coal Haul Section

125 Holmes Street - Frankfort, KY 40622

Phone: 502/564-7183
Fax: 502/564-2865

UK - Center for Applied Energy Research

Research Park Drive - Lexington, KY 40511-8433

Phone: 606/257-0305
Fax: 606/257-0220

United States Department of Energy

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

1000 Independence Ave. - Washington, DC 20585

Phone: 202/586-8800
Fax: 202/586-0727

Workforce Development Cabinet

Dept. for Employment Services, Research and Statistics Branch

Employment and Wages Section

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

Phone: 502/564-7976
Fax: 502/564-2937

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

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

Acknowledgment

Tears Francis, Desktop Publishing

Krina Fry, Graphic Designer

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Types of Mining

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

Of Kentucky's 150.3* million tons of 1998 coal production, 92.8 million tons were produced by underground mining methods and 57.5 million tons were produced by surface mining methods.

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

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

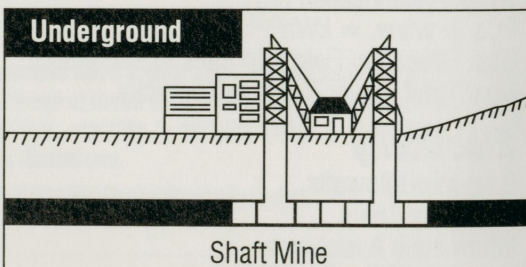
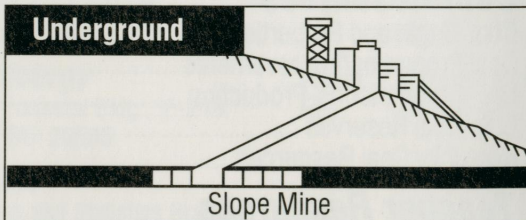
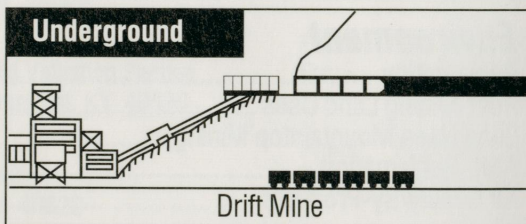
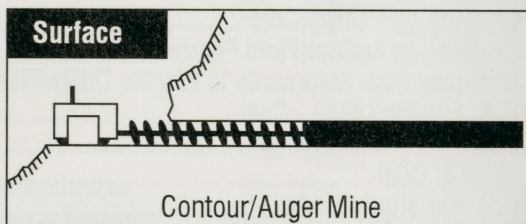
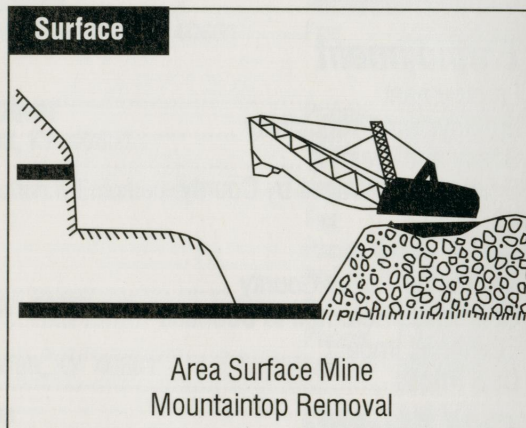
1998 Mining Type Estimates

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

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

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

Sources: Kentucky Department of Mines and Minerals, *Annual Report*, 1998. U.S. DOE - EIA, *Coal Industry Annual*, 1998.



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

U.S. Coal Production

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

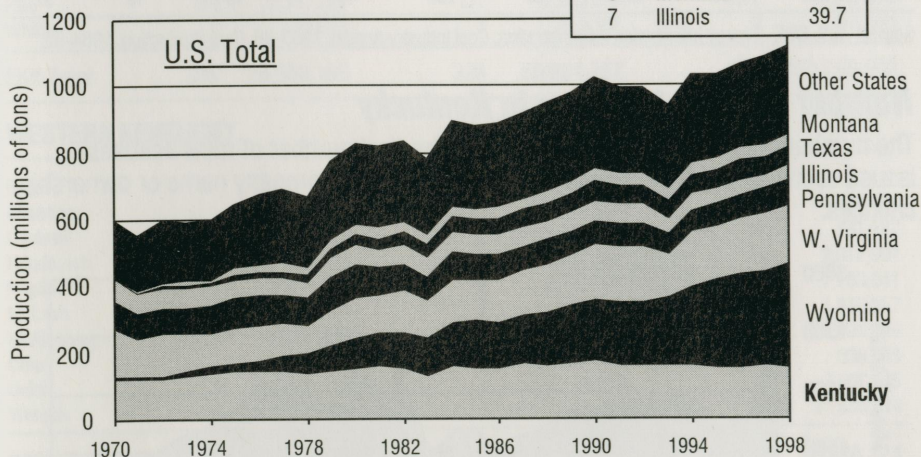
| Year | Kentucky | | | United States | Kentucky as % of U.S. |
|------|----------|---------|-------|---------------|-----------------------|
| | Eastern | Western | Total | | |
| 1970 | 72.5 | 52.8 | 125.3 | 602.9 | 20.8 |
| 1971 | 71.6 | 47.8 | 119.4 | 552.2 | 21.6 |
| 1972 | 68.9 | 52.3 | 121.2 |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

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

U.S. Leading Coal Producers**

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

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



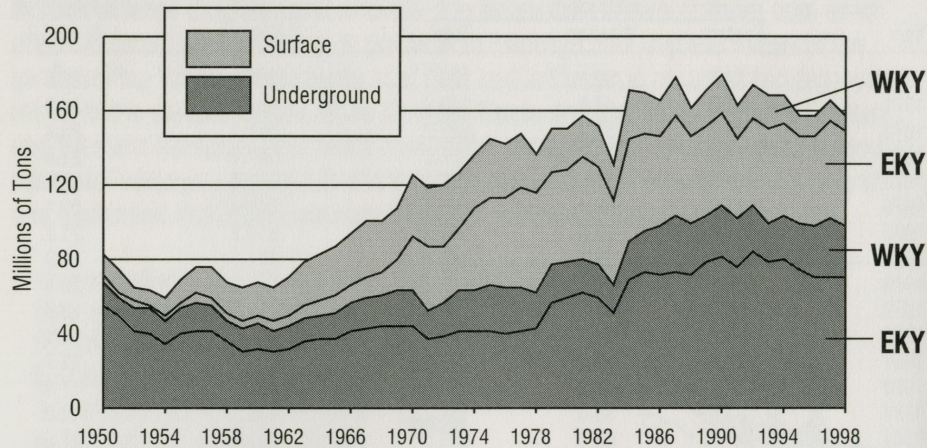
**NOTE: Wyoming, Texas, and Montana were not among the top seven original coal producers in 1970 but are included to show their rise to be included among the leading coal-production states.

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

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

Kentucky Production

Kentucky produced 156.9* million tons of bituminous coal in 1998, down from the record of 179.4 million tons set in 1990.



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

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

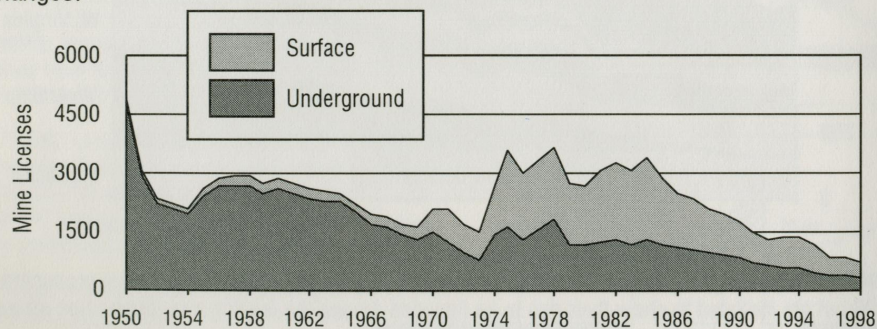
Number of Mines, 1984-1998

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

Source: U.S. DOE - Energy Information Administration, Coal Industry Annual, 1993-98, Coal Production, 1984-92.

Number of Mine Licenses in Kentucky

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



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

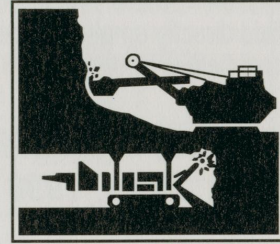
County Production

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

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

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

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



1998 Production by County and Type of Mine License*

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

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

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

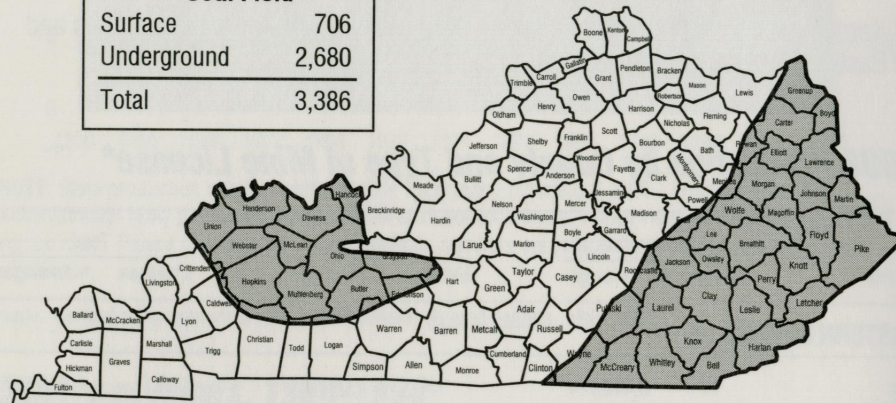
Employment

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

Kentucky's Coal Mining Work Force, 1998

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

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



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

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

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

Kentucky Coal Mining Employment, 1979-1998

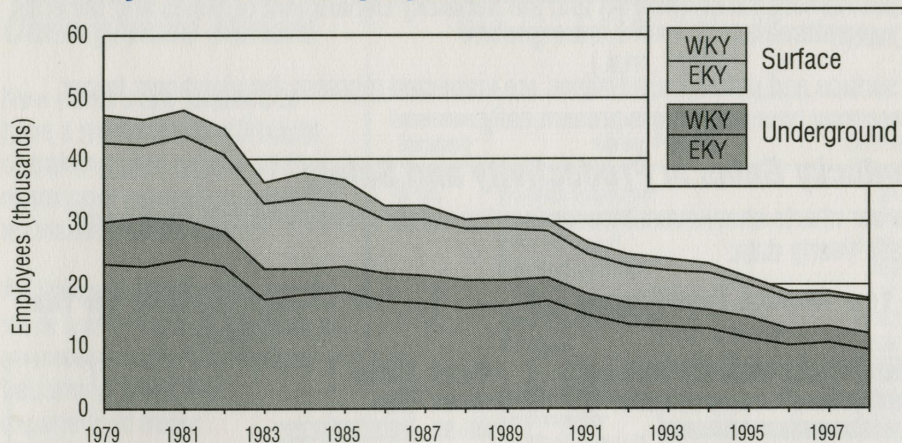
| Year | Western Kentucky | | | Eastern Kentucky | | | Kentucky Totals |
|------|------------------|-------------|--------|------------------|-------------|--------|-----------------|
| | Surface | Underground | Total | Surface | Underground | Total | |
| 1979 | 4,343 | 6,945 | 11,288 | 12,838 | 23,064 | 35,902 | 47,190 |
| 1980 | 3,995 | 7,879 | 11,874 | 11,819 | 22,702 | 34,521 | 46,395 |
| 1981 | 4,056 | 6,489 | 10,545 | 13,473 | 24,032 | 37,505 | 48,050 |
| 1982 | 4,120 | 5,639 | 9,759 | 12,319 | 22,782 | 35,101 | 44,860 |
| 1983 | 3,415 | 4,918 | 8,333 | 10,485 | 17,615 | 28,100 | 36,433 |
| 1984 | 4,022 | 4,053 | 8,075 | 11,327 | 18,474 | 29,801 | 37,876 |
| 1985 | 3,421 | 4,294 | 7,715 | 10,516 | 18,583 | 29,099 | 36,814 |
| 1986 | 2,327 | 4,297 | 6,624 | 8,718 | 17,312 | 26,030 | 32,654 |
| 1987 | 2,345 | 4,605 | 6,950 | 8,740 | 16,900 | 25,640 | 32,590 |
| 1988 | 1,825 | 4,388 | 6,213 | 8,261 | 16,085 | 24,346 | 30,559 |
| 1989 | 1,870 | 4,166 | 6,036 | 8,034 | 16,586 | 24,620 | 30,656 |
| 1990 | 2,095 | 3,491 | 5,586 | 7,505 | 17,407 | 24,912 | 30,498 |
| 1991 | 1,910 | 3,603 | 5,513 | 6,251 | 14,878 | 21,129 | 26,642 |
| 1992 | 1,722 | 3,483 | 5,205 | 6,014 | 13,405 | 19,419 | 24,624 |
| 1993 | 1,887 | 3,465 | 5,352 | 5,683 | 13,028 | 18,711 | 24,063 |
| 1994 | 1,803 | 2,988 | 4,791 | 5,728 | 12,849 | 18,577 | 23,368 |
| 1995 | 1,109 | 3,176 | 4,285 | 5,474 | 11,366 | 16,840 | 21,125 |
| 1996 | 1,095 | 2,601 | 3,696 | 4,855 | 10,275 | 15,130 | 18,826 |
| 1997 | 937 | 2,578 | 3,515 | 5,053 | 10,369 | 15,422 | 18,937 |
| 1998 | 706 | 2,680 | 3,386 | 5,105 | 9,303 | 14,408 | 17,794 |

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

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

Employment/Productivity

Kentucky Coal Mine Employment, 1979-1998*

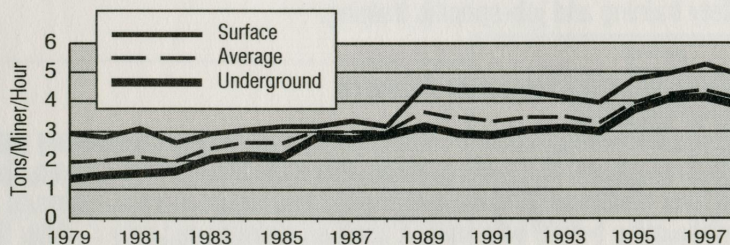


*State employment numbers (page 12) differ from federal EIA numbers.

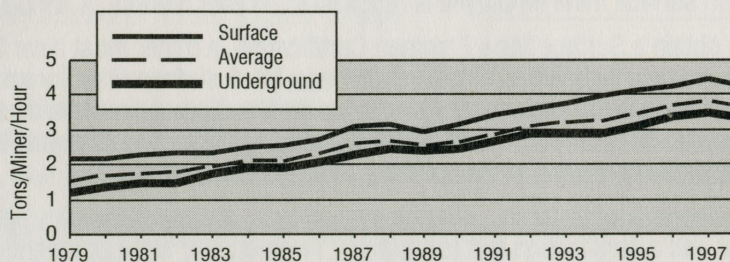
Mine Productivity, 1977-1998 (tons/miner/hour)

| Year | Eastern Kentucky | Western Kentucky | Kentucky Average | Appalachian Coal Field | Interior Coal Field | Western U.S. Coal Field | U.S. Average |
|------|------------------|------------------|------------------|------------------------|---------------------|-------------------------|--------------|
| 1977 | 1.71 | 2.22 | 1.86 | 1.36 | 2.42 | 5.85 | 1.82 |
| 1978 | 1.62 | 1.97 | 1.71 | - | - | - | 1.79 |
| 1979 | 1.54 | 1.94 | 1.64 | 1.33 | 2.21 | 5.47 | 1.81 |
| 1980 | 1.67 | 1.96 | 1.74 | 1.39 | 2.30 | 5.64 | 1.93 |
| 1981 | 1.76 | 2.12 | 1.84 | 1.51 | 2.35 | 6.15 | 2.10 |
| 1982 | 1.79 | 2.01 | 1.84 | 1.51 | 2.38 | 6.26 | 2.11 |
| 1983 | 1.98 | 2.43 | 2.08 | 1.75 | 2.69 | 7.60 | 2.50 |
| 1984 | 2.13 | 2.61 | 2.24 | 1.86 | 2.80 | 8.30 | 2.64 |
| 1985 | 2.13 | 2.57 | 2.23 | 1.90 | 2.81 | 8.55 | 2.74 |
| 1986 | 2.31 | 2.94 | 2.45 | 2.09 | 3.14 | 9.27 | 3.01 |
| 1987 | 2.59 | 2.98 | 2.69 | 2.30 | 3.33 | 10.42 | 3.30 |
| 1988 | 2.68 | 2.95 | 2.74 | 2.44 | 3.45 | 11.01 | 3.55 |
| 1989 | 2.58 | 3.62 | 2.78 | 2.49 | 3.84 | 11.63 | 3.70 |
| 1990 | 2.66 | 3.46 | 2.83 | 2.60 | 3.88 | 11.82 | 3.83 |
| 1991 | 2.90 | 3.37 | 3.01 | 2.74 | 3.98 | 12.42 | 4.09 |
| 1992 | 3.10 | 3.49 | 3.20 | 2.95 | 4.18 | 12.73 | 4.36 |
| 1993 | 3.18 | 3.49 | 3.25 | 3.00 | 4.43 | 13.53 | 4.70 |
| 1994 | 3.24 | 3.28 | 3.25 | 3.20 | 4.43 | 14.58 | 4.98 |
| 1995 | 3.47 | 3.97 | 3.57 | 3.32 | 4.97 | 15.68 | 5.38 |
| 1996 | 3.68 | 4.29 | 3.80 | 3.48 | 5.39 | 17.41 | 5.69 |
| 1997 | 3.83 | 4.38 | 3.94 | 3.76 | 5.54 | 17.75 | 6.04 |
| 1998 | 3.64 | 4.06 | 3.73 | 3.72 | 5.47 | 19.37 | 6.22 |

Western Kentucky Coal Mine Productivity 1979-1998



Eastern Kentucky Coal Mine Productivity 1979-1998



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

Safety and Training

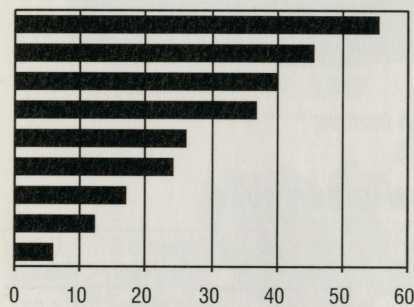
Safety and health standards are highly regulated by the federal Mine Safety and Health Administration (MSHA) and the Kentucky Department of Mines and Minerals (KDMM).

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

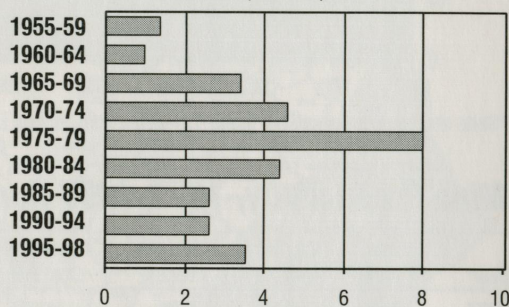
Kentucky Gains in Productivity and Safety

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

5 - Year Average Fatalities per Year
(Underground)

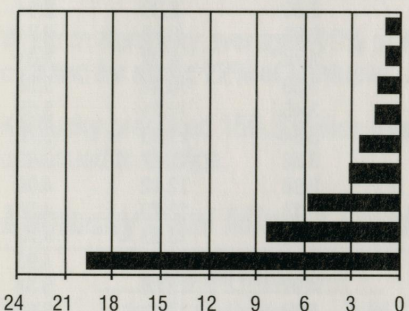


5 - Year Average Fatalities per Year
(Surface)

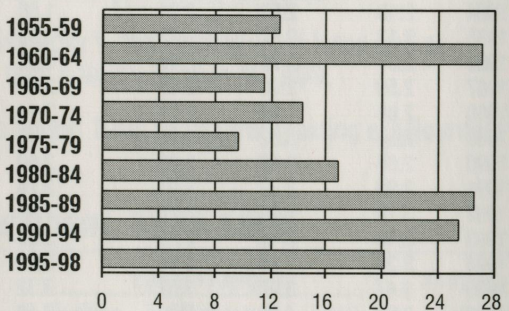


The underground bar chart (below) indicates steady safety improvements in underground mines in Kentucky.

5 - Year Average Tons Per Fatality
(Underground)



5 - Year Average Tons Per Fatality
(Surface)



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

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

Training for Surface Miners

New miners are required to have 24 hours of training plus pass a written exam before employment at a surface mine; this includes workers at prep plants, rail sidings, and river terminals. The inexperienced miner must work a minimum of 45 days at a surface mine before becoming a certified experienced miner. After the initial training, each surface mine employee is required to receive 8 hours of annual retraining.

To obtain a Surface Mine Foreman Certification, a miner must have 3 years of surface mining experience achieved after age 18. A surface mine foreman obtaining certification must specialize in either coal extraction or post mining activities (coal preparation or coal handling activities). The applicant must have at least 1 year of practical experience in the specialty class he designates.

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

Safety and Training

Training for Underground Miners

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

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

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

A newly hired miner (experienced or inexperienced) must receive 8 hours of mine site-specific training.

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

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

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

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

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

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

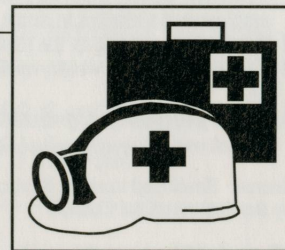
All certifications and mining specialties, as established by the Kentucky Mining Board, must be signed by the Commissioner (KDMM) verifying the holder has passed.

Underground Miner Classifications (June, 1999)

| Experience Required | Underground Mining Position | Miners Certified |
|---------------------|--|------------------|
| 5 Yrs. | Electrical Inspector* | 21 |
| | Mine Inspector/Mine Safety Analyst* | 809 |
| | Mine Foreman* | 10,441 |
| | Electrical Instructor* | 100 |
| 3 Yrs. | Asst. Mine Foreman* | 3,082 |
| | Instructor | 694 |
| 1 Yr. | Electrical Worker* | 8,081 |
| | Belt Examiner | 2,851 |
| | Hoisting Engineer* | 1,234 |
| 45 days | Mine Rescue | 293 |
| | Shot Firer* | 13,691 |
| | Certified Miners | 32,441 |
| SPECIAL TRAINING | | |
| | MET - Mine Emergency Technician or EMT - Emergency Medical Technician | 2,251 |
| | First Aid | 2,145 |

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

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



Employment / Wages by County

Coal County Employment and Wages, 1998⁴

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

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

WESTERN KENTUCKY

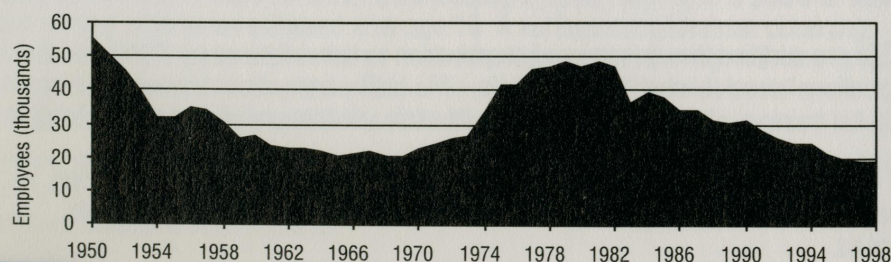
| | | | | | | |
|------------------------|-------|-------|-------|---------------|-------|------------|
| Daviess | 141 | 0.3% | 0.3% | \$9,897,820 | 1.0% | \$1,349.95 |
| Henderson | 173 | 0.7% | 0.8% | \$8,652,880 | 1.6% | \$961.86 |
| Hopkins | 988 | 5.0% | 5.2% | \$42,752,686 | 9.7% | \$823.81 |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

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

- Counties with less than three employers or one employer with 80% of the total county miner workforce were withheld to avoid disclosure of individual company data. The counties are as follows: Butler, Carter, Christian, Lawrence, Logan, McCreary, McLean, Nelson, Owsley, Pulaski. It is suspected that multi-county mining employment attributes to some counties being "under reported" and others being over reported.
- Columns do not add to the totals due to withheld data.
- Variation in average weekly mining income affected greatly by hours worked per week as well as hourly wage rate.
- Values and methodologies used in this table may not be consistent with LGEDF regulations (see page 14). Do not use these values for LGEDF estimates.

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

Coal Mining Employees in Kentucky, 1950-1998



Severance Tax by County

Coal Severance Tax Revenue by County, FY 1998-99

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

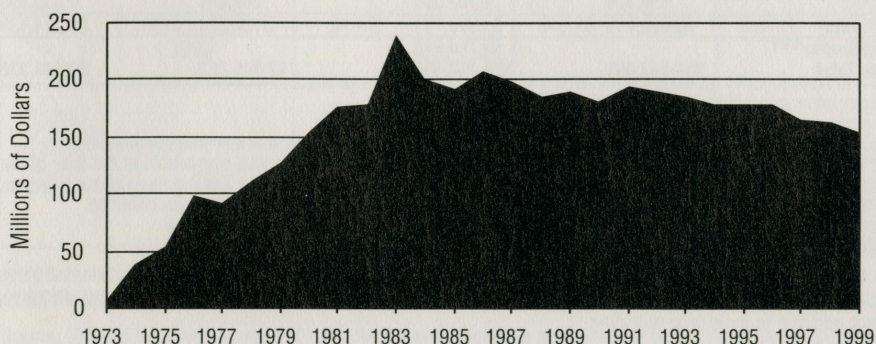
* Columns do not add to State Totals because of Carter, Christian, Estill, Greenup, Jackson, Jefferson, Laurel, Magoffin, Menifee, Ohio, Owsley, Rockcastle, Union, and Wolfe Counties' information being withheld to avoid disclosure of individual company data.

Source: Kentucky Revenue Cabinet

Severance Tax Revenues (millions of dollars)

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

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



Coal Taxes Returned

Coal Severance Taxes Returned to Counties, FY 1992-2000

| Fiscal Year | Local Government Assistance Fund (LGEAF)* | Economic 12% | Local Government Development Fund (LGEDF)** | Economic 3% | Total Percent Returned |
|-------------|---|--------------|---|-------------|------------------------|
| 1991-92 | \$22,120,783 | 12% | \$0 | — | 12% |
| 1992-93 | \$21,559,445 | 12% | \$5,389,862 | 3% | 15% |
| 1993-94 | \$21,537,099 | 12% | \$10,768,550 | 6% | 18% |
| 1994-95 | \$21,359,598 | 12% | \$15,218,716 | 9% | 21% |
| 1995-96 | \$19,805,628 | 12% | \$20,383,293 | 13% | 25% |
| 1996-97 | \$19,574,470 | 12% | \$24,806,340 | 16% | 28% |
| 1997-98 | \$18,674,360 | 13% | \$24,260,750 | 18% | 31% |
| 1998-99 | \$18,615,839 | 14% | \$25,627,772 | 21% | 35% |
| 1999-00 | — | 14% | — | 24% | 38% |

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

**Does not include interest.

Coal Taxes Returned to Coal Producing Counties

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

*County and municipal totals for FY 1998-99.

**Includes interest and taxes collected.

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

****Revenue generated from the Unmined Minerals Tax for some coal counties was unavailable at the time of this publication. The *ad valorem* tax rates on real property vary greatly from county to county. The Revenue Cabinet estimates that the counties receive 84.7%, with the remainder being the state share; not all billable taxes are collected.

Impacted Counties

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

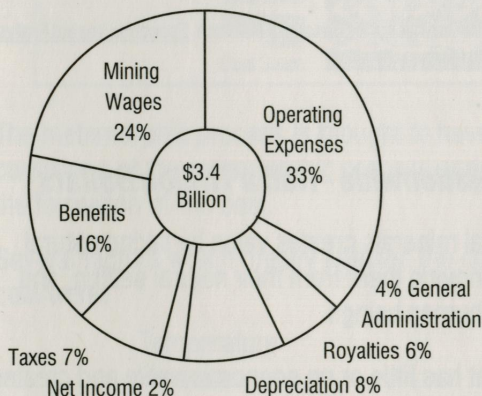
Economic Impact

The Kentucky coal industry in 1998:

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

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

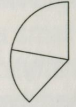

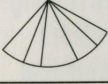
1998 Estimated Distribution of \$3.4 Billion



Of the \$3.4 billion in receipts from coal produced and processed, the largest part, 40 percent, went to miners' wages and benefits. Another 33 percent went to operating costs, including fuel, materials, maintenance, etc., and the remaining 27 percent went to depreciation (8%), taxes (7%), royalties (6%), net income (2%), and general administration (4%).

1998 Estimated Impact of \$3.4 Billion

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

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

*NOTE: Not Applicable.

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

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

Economic Impact

Benefits Throughout the Kentucky Economy

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

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

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

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

Economic Impacts of All Mining Nationwide - Half a Trillion Dollars

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

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

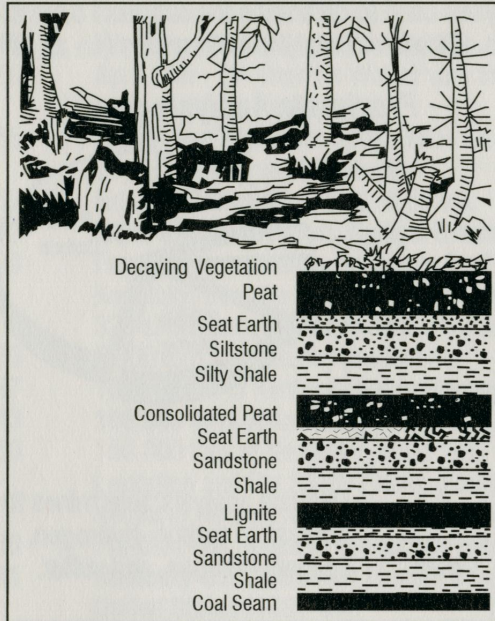
A study for the National Mining Association found that in 1995, the American mining industries (coal mining, metal mining, and industrial minerals mining) had a combined direct and indirect impact on the economy of the United States of \$523.6 billion. That sum included combined direct and indirect contributions of \$143.7 billion in personal income, \$295.7 billion in business income, \$56.9 billion in federal government revenues and \$27.2 billion in state and local government revenues.

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

A major finding of the study was that people don't have to live in an obvious mining state or work directly in the mining industry to benefit from mining. All 50 states benefit from mining. In 1995, mining employed 320,400 people who produced coal and minerals with a total value of over \$60 billion.

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

Coal Origin and Properties



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

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

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

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

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

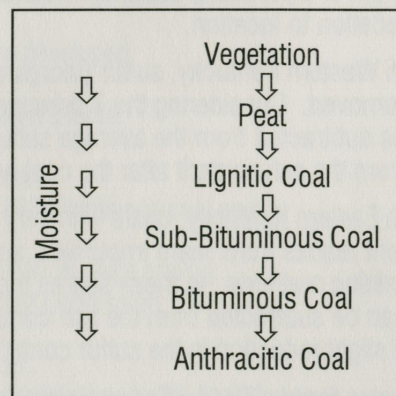
- | | |
|------------------|-------------------------|
| Temperature | Fresh water/sea water |
| Pressure | Swamp acidity |
| Time | Types of plant debris |
| Layering process | Types of sediment cover |

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

Coal Rank

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

- Moisture decreases, rank increases.
- Rank increases, fixed carbon increases.
- Rank increases, volatile matter decreases.
- Rank increases, heating value increases (optimum Btu at low-volatile bituminous).

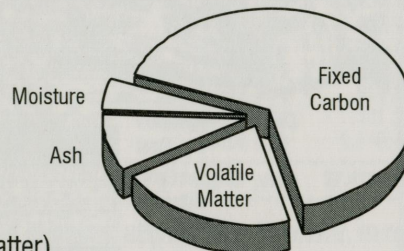


Coal Properties/Improvements

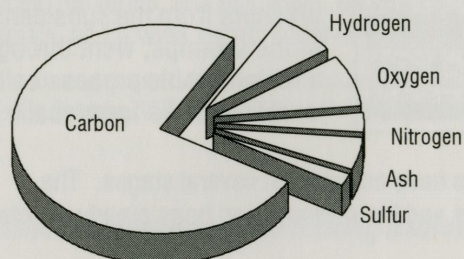
There are two different types of analyses used to determine the nature of bituminous coal: proximate and ultimate analysis. Proximate analysis determines (on an as-received basis):

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

Proximate Analysis



Ultimate Analysis



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

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

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

Improving the Properties of Mined Coal

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

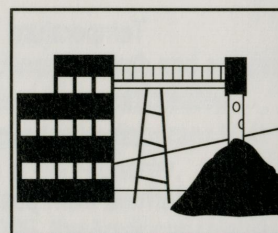
In general, coal cleaning is accomplished by separating and removing inorganic impurities from organic coal particles. The inorganic ash impurities are predominantly more dense than the coal particles. This property is generally the basis for separating the coal particles from the ash impurities.

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

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

In Western Kentucky, sulfur (inorganic sulfur) and ash are the two main impurities removed. Considering the 7 principal mined seams in this area, 0.5% to 2.5% can be subtracted from the average sulfur content and 9% to 13% can be subtracted from the ash content after the coal washing process.

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



Source: Kentucky Coal Council's Kentucky Coal Marketing Information System.

History of Coal

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

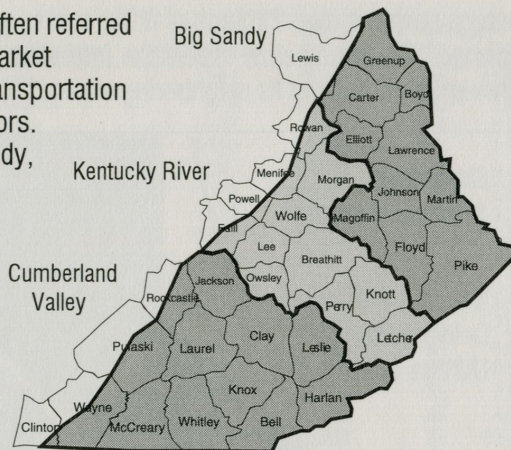
History of Coal

- 1940 Auger surface mining introduced.
- 1942 Republic Steel Company's first production - Road Creek, Kentucky.
Post-War Marshall Plan - production rises to 88.7 million tons in Kentucky.
Continuous underground mining systems developed.
Kentucky Water Contamination Legislation.
- 1947 Kentucky Coal Association founded.**
- 1950 82.2 million tons of Kentucky production.**
- 1956 Fish and Wildlife Coordination Act.
Railroads converting from coal to diesel fuel.
Roof bolting introduced in underground mines.
- 1960 Railroads began using unit coal trains.
First longwall mining with powered roof supports.
Kentucky Surface Mining Legislation.
- 1963 Kentucky coal production exceeded 100 million tons.**
- 1966 National Historic Preservation Act.
C&O Railroad to John's Creek constructed - Pike County.
- 1969 Federal Coal Mine Health and Safety Act.
- 1970 Federal Clean Air Act.
- 1972 Kentucky Coal Severance Tax established.
Federal Water Pollution Control Act.
Kentucky becomes the leading coal production state.
- 1973 Endangered Species Act.
OPEC oil embargo: Coal production and prices rise.
- 1976 Federal Coal Leasing Amendments Act.
- 1977 Federal Surface Mine Control and Reclamation Act.
- 1980 Congress enacts the National Acid Precipitation Assessment Program (NAPAP) Study, a 10 year research program, which invested \$550 million for the study of "acid rain." Industries spend over \$1 billion on Air Pollution Control Equipment during 1980.
- 1983 OPEC cuts oil prices for first time.**
Martha Layne Collins becomes Kentucky's first woman Governor (1983-87).
U.S. Clean Coal Technology Demonstration Program established \$2.5 billion in Federal matching funds committed to assist the private sector to develop and demonstrate improved clean coal technologies.
1988 Kentucky Supreme Court rules that the unmined minerals tax on coal is subject to the same state and local property tax rates as other real estate.
TVA 160-MW Atmospheric Fluidized Bed Combustion Unit on line.
Wyoming displaces Kentucky as the leading coal producing state.
- 1990 Federal Clean Air Act Amendments of 1990.
Kentucky record production - 179.4 million tons (1990).
U.S. coal production exceeds 1 billion tons.
- 1992 U.S. Energy Policy Act of 1992.
- 1993 CEDAR, Inc. (Coal Education Development & Resources) formed in Pike Co.
- 1994 Western Kentucky CEDAR, Inc. was formed in Webster and Union Counties.
- 1996 Federal Energy Regulatory Commission (FERC) issues Order 888 addressing the issues of open access to encourage wholesale competition in the electric utility industry and FERC Order 889 requiring utilities to share information about available transmission capacity.
- 1996 Workers' Comp Reform Laws are passed in Kentucky.
- 1997 The Kentucky Fish and Wildlife Commission re-introduced free ranging Elk into East Kentucky on post-mined lands, citing mountaintop areas and old mine benches as good elk habitat.
- 1997 Kentucky Coal Association celebrates 50 years of service.**
- 1998 Mountaintop mining comes under attack.
- 1998 Federal tax credit begins for use of coal fines in a nonconventional solid synthetic fuel.

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

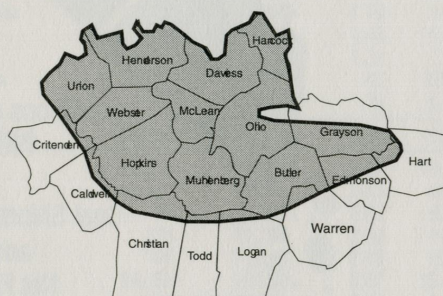
Top Utility Consumers

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



The Eastern Kentucky coal field shipped approximately 90.4 million tons of coal to 59 electric utility companies for use at 128 electric power plants located in 23 states during 1998.

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



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

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

Top 30 Electric Utility Consumers of Kentucky Coal during 1998

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

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

Distribution - Utility Coal

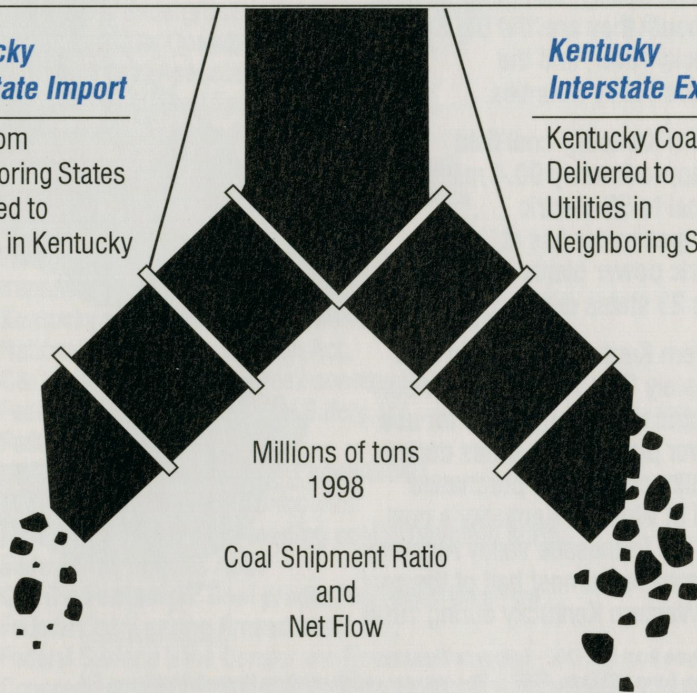
Kentucky exports over 2.8 tons of utility coal to neighboring states for every ton imported. The chart below shows the *Interstate Imports and Exports* of utility coal between Kentucky and its neighboring states.*

Kentucky Interstate Import

Coal from Neighboring States Delivered to Utilities in Kentucky

Kentucky Interstate Export

Kentucky Coal Delivered to Utilities in Neighboring States



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

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

2.8 : 1
→

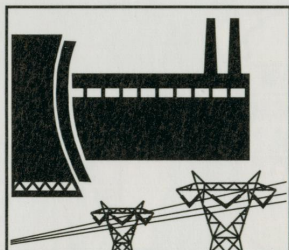
Kentucky Exports to Utilities in Neighboring States
26.9 Million Tons of Coal

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

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

Distribution/KY Coal-Fired Plants

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



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

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

| Coal Field | Receipts | | Average | |
|-----------------------------|---------------------|----------------|---------------|------------------|
| | Destination (State) | (1,000) Tons | Btu/lb | % Sulfur Ash |
| Alabama | | 1,101 | 12,233 | .93 11.0 |
| Connecticut | | 456 | 13,115 | .50 7.0 |
| Delaware | | 92 | 12,837 | .68 6.5 |
| Florida | | 10,120 | 12,765 | 1.07 8.6 |
| Georgia | | 16,043 | 12,510 | 1.02 9.9 |
| Illinois | | 9 | 13,322 | .76 5.6 |
| Indiana | | 1,130 | 12,749 | 1.17 8.2 |
| EASTERN KENTUCKY | | | | |
| Kentucky | | 9,969 | 12,115 | 1.10 11.2 |
| Maryland | | 485 | 13,112 | .76 6.5 |
| Massachusetts | | 558 | 12,814 | .64 7.1 |
| Michigan | | 4,440 | 12,795 | .87 8.5 |
| Minnesota | | 1 | 12,650 | 1.35 7.9 |
| Mississippi | | 961 | 12,344 | .89 8.8 |
| Missouri | | 28 | 13,193 | 1.19 7.5 |
| New Jersey | | 110 | 12,933 | .75 7.5 |
| New York | | 999 | 12,925 | .65 8.2 |
| North Carolina | | 15,721 | 12,338 | .96 10.4 |
| Ohio | | 8,466 | 11,875 | .88 12.4 |
| South Carolina | | 11,287 | 12,793 | 1.19 8.7 |
| Tennessee | | 5,424 | 12,543 | 1.43 9.7 |
| Virginia | | 2,959 | 12,804 | 1.22 7.7 |
| West Virginia | | 32 | 12,229 | .83 10.7 |
| Wisconsin | | 55 | 13,102 | .79 6.7 |
| Eastern Ky. Subtotal | | 90,446 | 12,479 | 1.04 9.8 |
| WESTERN KENTUCKY | | | | |
| Alabama | | 3,353 | 11,924 | 2.37 11.7 |
| Florida | | 3,322 | 11,870 | 2.75 8.2 |
| Illinois | | 89 | 11,465 | 2.89 9.2 |
| Indiana | | 276 | 11,757 | 2.60 9.4 |
| Iowa | | 195 | 11,916 | 2.46 9.1 |
| Kentucky | | 14,365 | 10,980 | 3.67 15.3 |
| Mississippi | | 6 | 12,034 | 2.67 8.7 |
| Missouri | | 15 | 11,500 | 3.25 13.0 |
| Ohio | | 26 | 11,399 | 2.70 14.3 |
| Tennessee | | 8,398 | 11,761 | 2.72 9.5 |
| Western Ky. Subtotal | | 30,045 | 11,417 | 3.14 12.4 |
| Total | | 120,492 | 12,214 | 1.56 10.5 |

1998 Fuel Origin KY's 22 Coal Fired Electric Generating Plants (58 Units)

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

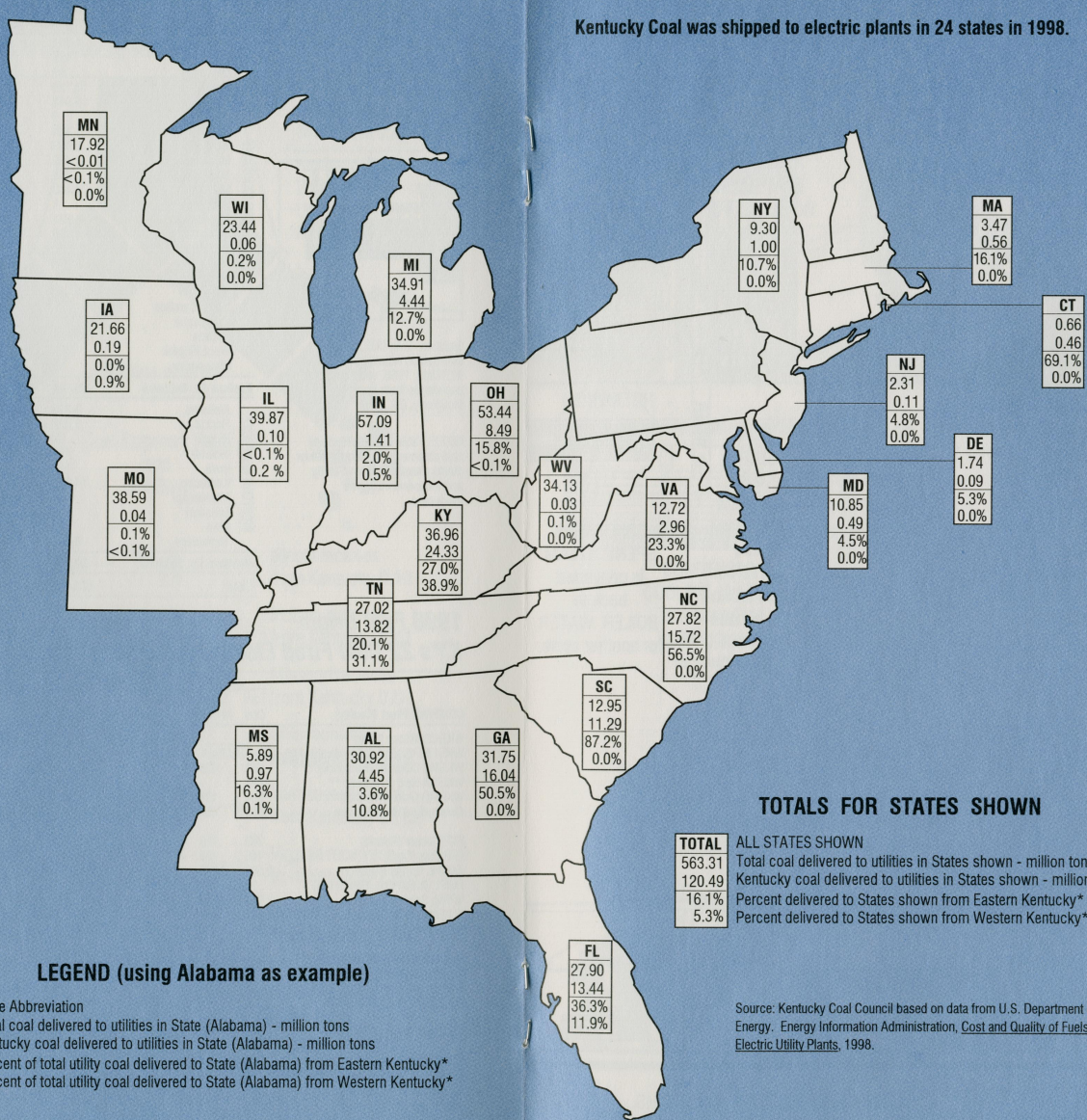
*Flue Gas Desulfurization (FGD) Capacity. **Unit 10 is (AFBC) Atmospheric Fluidized Bed Combustion. ***Reported through July, 1998 only - reclassified as Non-Utility Plants.

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

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

Kentucky Coal Shipments to Electric Utility Plants by State in 1998

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



TOTALS FOR STATES SHOWN

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

LEGEND (using Alabama as example)

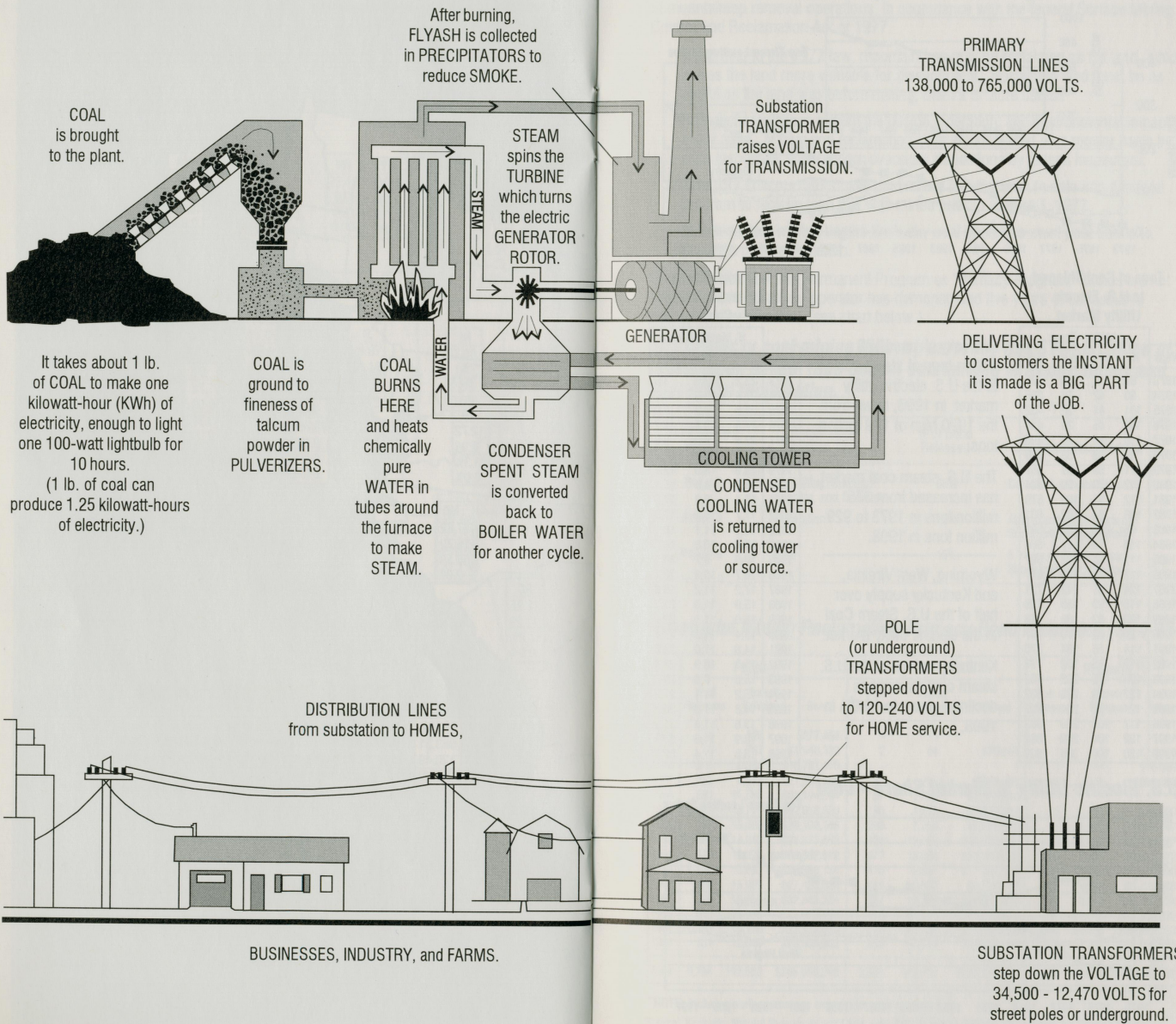
| | |
|-------|---|
| AL | State Abbreviation |
| 30.92 | Total coal delivered to utilities in State (Alabama) - million tons |
| 4.45 | Kentucky coal delivered to utilities in State (Alabama) - million tons |
| 3.6% | Percent of total utility coal delivered to State (Alabama) from Eastern Kentucky*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

*Percentages are rounded to the nearest tenth

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

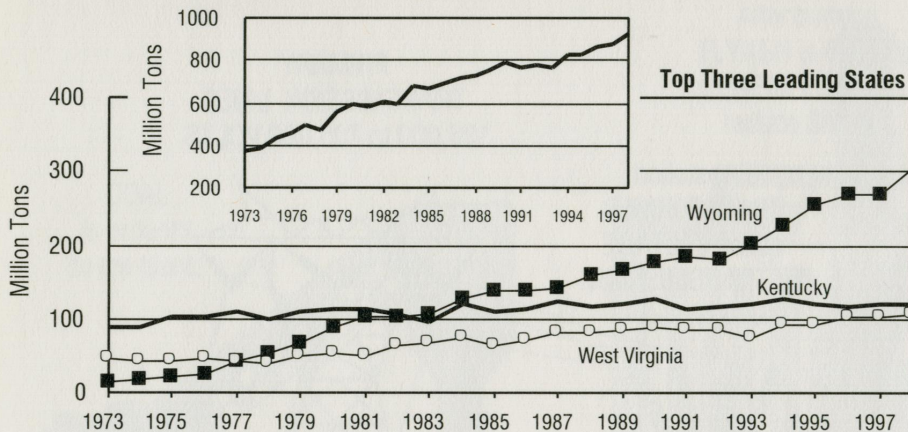
Coal-into-Kilowatts

Coal-into-Kilowatts



U.S. Electric Utility-Coal

U.S. Electric Utility Market Coal Shipments



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

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

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

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

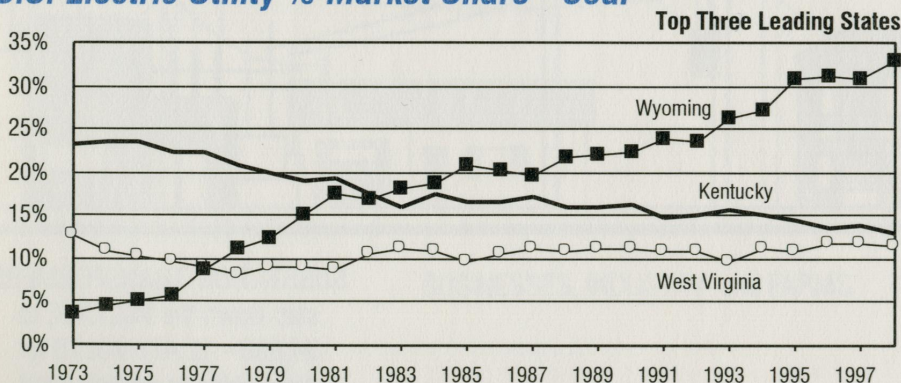
Wyoming, West Virginia, and Kentucky supply over half of the U.S. Steam Coal to the electric utility market.

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

% Market Share U.S. Electric Utility - Coal

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

U.S. Electric Utility % Market Share - Coal



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

Reclamation

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

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

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

Kentucky coal operators have paid over \$726.6 million to date into a federal program to reclaim land that was mined prior to August 3, 1977.

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

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

The Kentucky coal mining industry currently has \$795.6 million of reclamation bonds (866 bonds) outstanding to assure timely and successful reclamation.

| Bond Release Phase | Reclamation Release Type | % of Bond Released | Time/Phase Requirement |
|--------------------|---|--------------------|---|
| Phase I | Backfilling, Grading, Seeding, and Drainage | 60% | Complete Landscaping |
| Phase II | Vegetation | 25% | Approximately 2 Years of Successful Reclamation |
| Phase III | Final | 15% | 5 Years of Consecutive Successful Reclamation |

Successful Mining Reclamation/Primacy Bond Releases, 1984-98

| Year | Phase I | | | Phase II | | | Phase III | | |
|-------|---------------|-----------------|---------------|---------------|-----------------|---------------|---------------|-----------------|---------------|
| | # of Releases | Acres* Released | Bond | # of Releases | Acres* Released | Bond | # of Releases | Acres* Released | Bond |
| 1984 | 4 | 123 | \$277,886 | - | - | - | - | - | - |
| 1985 | 40 | 767 | \$1,946,323 | 2 | 84 | \$79,841 | 1 | 8 | \$11,600 |
| 1986 | 248 | 6,361 | \$16,781,470 | - | - | - | 1 | 14 | \$16,800 |
| 1987 | 332 | 8,379 | \$21,390,109 | 11 | 253 | \$289,767 | 4 | 155 | \$284,300 |
| 1988 | 561 | 15,583 | \$38,194,394 | 57 | 1,303 | \$1,261,810 | - | - | - |
| 1989 | 446 | 16,777 | \$32,058,350 | 60 | 1,632 | \$1,967,811 | 3 | 21 | \$38,500 |
| 1990 | 533 | 15,383 | \$28,108,146 | 260 | 7,298 | \$6,221,870 | 51 | 1,697 | \$1,569,147 |
| 1991 | 626 | 14,642 | \$28,373,662 | 428 | 12,667 | \$11,200,897 | 130 | 2,958 | \$6,890,877 |
| 1992 | 670 | 18,278 | \$33,822,612 | 477 | 13,338 | \$11,489,035 | 255 | 8,101 | \$6,811,872 |
| 1993 | 498 | 13,893 | \$25,386,134 | 416 | 12,661 | \$11,242,965 | 448 | 15,986 | \$8,629,089 |
| 1994 | 452 | 15,933 | \$27,423,038 | 319 | 10,828 | \$9,768,647 | 406 | 14,098 | \$8,709,946 |
| 1995 | 525 | 16,650 | \$32,343,224 | 427 | 13,141 | \$12,399,017 | 517 | 18,419 | \$16,338,524 |
| 1996 | 619 | 23,968 | \$47,602,996 | 419 | 14,784 | \$17,378,599 | 784 | 27,018 | \$22,365,232 |
| 1997 | 393 | 13,179 | \$23,571,000 | 373 | 13,323 | \$13,463,098 | 806 | 30,768 | \$29,923,783 |
| 1998 | 351 | 12,646 | \$28,589,902 | 255 | 8,104 | \$9,370,064 | 747 | 21,387 | \$18,859,893 |
| Total | 6,298 | 192,562 | \$385,869,246 | 3,504 | 109,416 | \$106,133,421 | 4,153 | 140,630 | \$120,449,563 |

*NOTE: Includes surface acreage over underground mines.

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

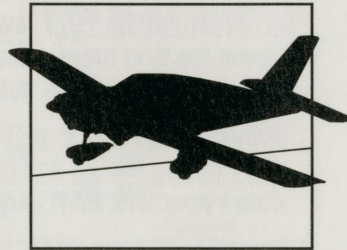
Post-Mining Land Uses

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

Post-Mining Land Use and County

Regional Airports

| | |
|----------------------------|-----------|
| Big Sandy Regional Airport | 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 |
| Hazard Armory | Perry |

Fish & Wildlife

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

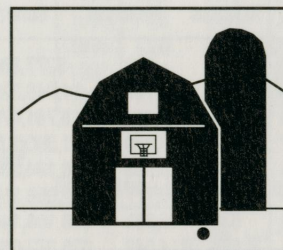
Elk in the Mountains of East Kentucky Again

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. Of the 14 East Kentucky counties selected for the elk reintroduction, the combined 475,000 acres of the Cyprus-Amox Wildlife Management Area on an active mountaintop coal mine, and the adjacent Robinson Forest Wildlife Management Area was the initial home of the first 200 free-ranging elk introduced.



Farms

| | |
|---------------------------------|---------------------|
| Starfire Project | Perry |
| MAPCO/Morehead Agriculture Ctr. | Martin |
| Martin County Coal Corp. Farm | Martin |
| D&R Brangus Farm | Perry |
| Hog Farm | Hopkins, Knox |
| Livestock Feed | Lee |
| Chicken/Broiler Houses | Hopkins, Muhlenberg |
| Avian Farms | Wayne |



Industrial/Commercial

| | |
|-------------------------------------|---|
| Electrical Construction Office/Shop | Hopkins |
| Electric Utility Operations Center | Hopkins |
| Industrial Scrubber Sludge Disposal | Ohio, Daviess, Webster |
| Explosive Manufacturing | Muhlenberg |
| Wood Fabrication Plant | Breathitt, Perry |
| Apparel Manufacturing | Perry |
| Mine Shops/Welding/Machine/Equip. | Johnson, Hopkins, Knox, Muhlenberg, Ohio, Union, Whitley |
| Truck/Equipment Sales | Butler |
| Trucking Company | Muhlenberg |
| 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 31)

Land Uses/Mountaintop Mining

Post-Mining Land Use and County (continued)

Industrial/Commercial (continued)

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

R&R/Sport

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

Structural Building Sites

| | |
|-------------------------------|--|
| High Schools | Bell, Harlan, Pike |
| Middle School | Bell |
| Athletic Complexes | Bell, Letcher, Perry, Pike |
| Appalachian Regional Hospital | Perry |
| Housing Project - Happy Top | Lee |
| Housing Developments | Clay, Letcher, Perry, Pike, Knox, Laurel, Bell, Harlan, Martin, Floyd (proposed) |
| Church, Daycare | Laurel |
| Mobile Home Sales | Laurel |
| Shopping Centers | Breathitt, Clay, Knox, Laurel, Leslie, Letcher, Pike, Perry |
| Car/Truck/Equipment Sales | Perry |
| Motel/Hotel | Laurel, Perry |
| Office Complex | Morgan, Martin |
| Storage Rental Facility | Hopkins |

Numerous small businesses in EKy

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

Mountaintop Mining

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

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

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

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

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

AML Reclamation

Abandoned Mine Land (AML) Reclamation

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

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

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

\$1,351,564,993 of AML taxes remain unallocated for reclaiming abandoned mines across the United States.

Abandoned Mine Land (AML) Reclamation Fund (millions)

| Fiscal Year | Kentucky Collection | Kentucky State Share* | KY AML Grant Disbursement | KY State Share Balance** |
|-------------|---------------------|-----------------------|---------------------------|--------------------------|
| 1978 | \$29.97 | \$14.98 | \$ 0 | \$15.0 |
| 1979 | 33.70 | 16.85 | 0.6 | 31.8 |
| 1980 | 35.03 | 17.51 | 0 | 49.3 |
| 1981 | 35.82 | 17.91 | 1.4 | 67.2 |
| 1982 | 36.58 | 18.29 | 16.4 | 69.6 |
| 1983 | 31.13 | 15.56 | 28.9 | 56.7 |
| 1984 | 37.75 | 18.87 | 36.8 | 44.8 |
| 1985 | 34.60 | 17.30 | 32.3 | 31.4 |
| 1986 | 34.50 | 17.25 | 19.7 | 31.6 |
| 1987 | 35.22 | 17.61 | 16.4 | 36.7 |
| 1988 | 26.34 | 13.17 | 15.3 | 37.5 |
| 1989 | 35.39 | 17.69 | 27.6 | 38.5 |
| 1990 | 38.44 | 19.41 | 6.4 | 43.3 |
| 1991 | 37.04 | 18.45 | 11.0 | 47.8 |
| 1992 | 35.60 | 17.82 | 28.2 | 54.9 |
| 1993 | 36.18 | 18.04 | 11.5 | 62.8 |
| 1994 | 36.82 | 18.24 | 18.7 | 70.7 |
| 1995 | 35.22 | 17.61 | 15.5 | 77.1 |
| 1996 | 33.79 | 16.90 | 16.0 | 83.6 |
| 1997 | 34.48 | 17.24 | 16.1 | 90.1 |
| 1998 | 34.90 | 17.45 | 15.7 | 97.4 |
| Totals | \$726.60 | \$364.16 | \$334.5 | |

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

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

AML Reclamation Accomplishments in Kentucky (through 1998)

Kentucky AML Projects

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

Federal AML Projects

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

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

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

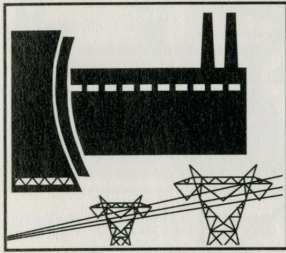
| | |
|--|-------------------------------------|
| 38 water line projects - \$42 million. | 1,374 mine portal closures. |
| Over 25,000 feet of highwall eliminated. | 103 vertical shafts sealed. |
| Over 175 hazardous structures removed. | 37 miles of stream restoration. |
| Over 1,800 acres of landslide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

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

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

Coal-Low Cost Energy

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



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

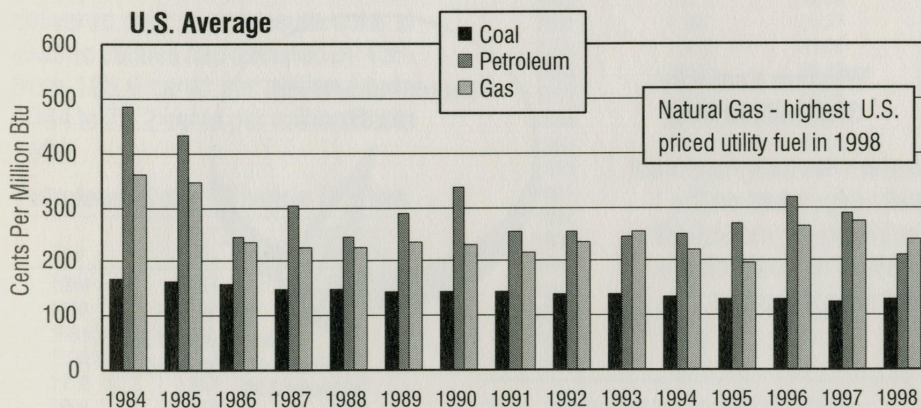
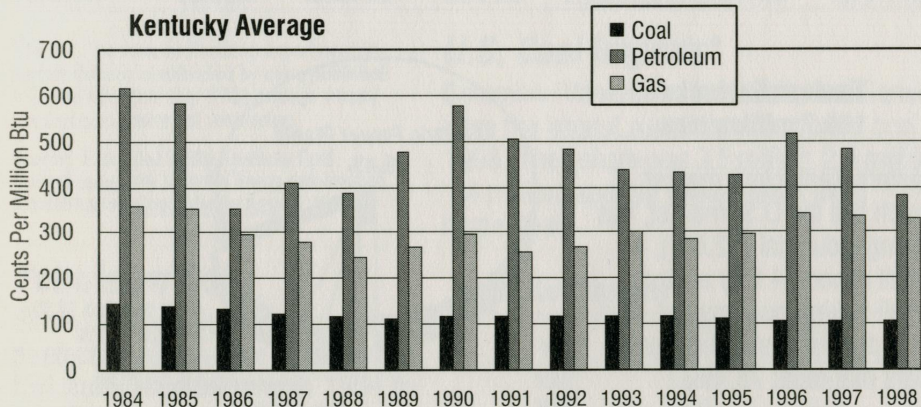
Utilities in Kentucky generated about 86.2 billion kilowatt-hours of electricity in 1998. After accounting for line losses and net state-line flows of electricity, 73.9 billion kilowatt-hours of electricity were sold within Kentucky during 1998 compared to 86.2 kilowatt-hours of net generation.

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

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

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

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



*NOTE: In 1993 and again in 1998 gas cost rose above petroleum while coal costs remained steady.

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

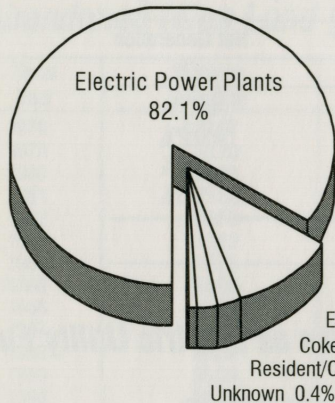
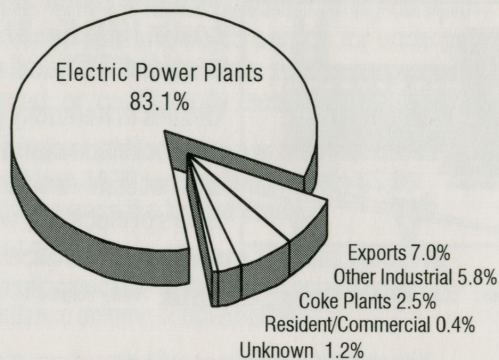
Uses of Coal

Distribution of Coal by Consuming Sector, 1998

U.S. TOTAL 1,118.7 million tons

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

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



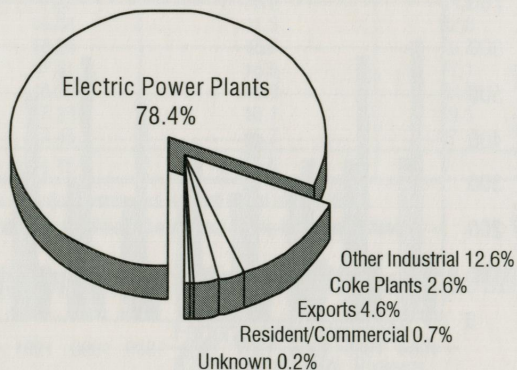
KENTUCKY TOTAL 150.3 million tons*

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

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

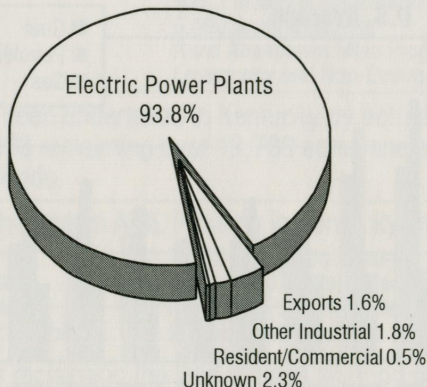
Eastern Kentucky 116.7 million tons

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



Western Kentucky 33.6 million tons

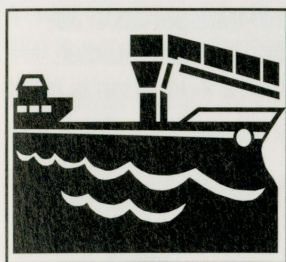
Western Kentucky is almost totally dependent on the electric power market with 93.8% of its coal going to electric power plants.



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

*Includes stockpiled coal.

Coal Exports/Imports



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

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

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

Kentucky Coal Exports, 1998

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

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

Source: Estimated by the Kentucky Coal Council using data from the Energy Information Administration, *Coal Industry Annual*, 1998.

Petroleum Coke

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

Petroleum Coke - Electric Utilities

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

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

U.S. Coal Imports*

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

U.S. Coal Imports*

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

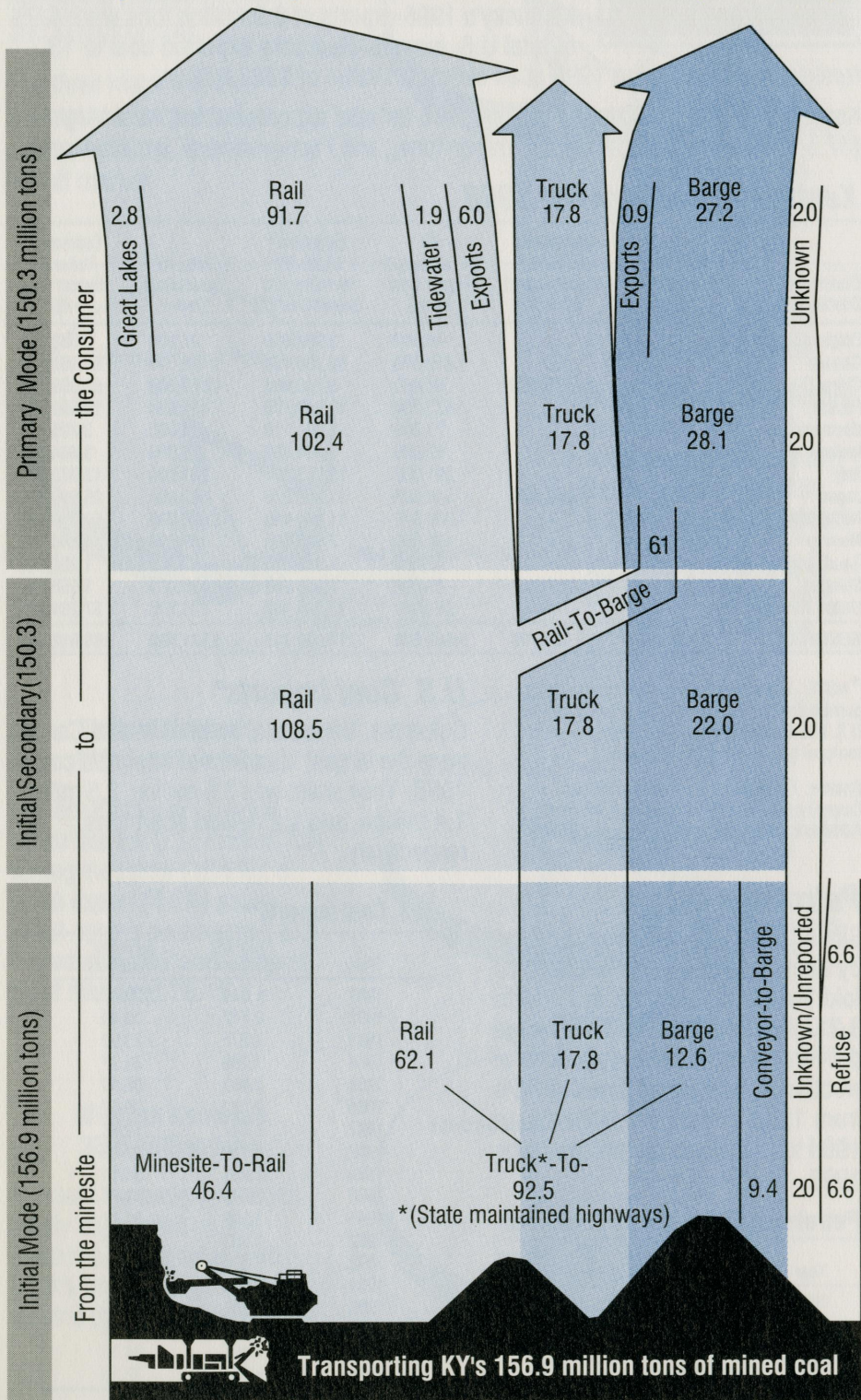
*NOTE: Includes Puerto Rico and Virginia Islands

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

Transportation

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

Kentucky Coal Transportation Distribution Modes (Estimates)



Sources: Kentucky Coal Council estimates based on data from: Kentucky Transportation Cabinet's Coal Haul Highway System; U.S. DOE-EIA, Quarterly Coal Report October-December, 1998; Coal Industry Annual, 1998; Kentucky Department of Mines and Minerals, Annual Report, 1998.

Transportation

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

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

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

Coal Transportation by Rail in Kentucky

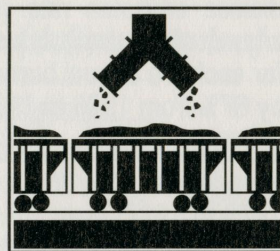
Kentucky has over 2,500 miles of railroad lines, over which 108.5 million tons of Kentucky coal were transported in 1998.

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

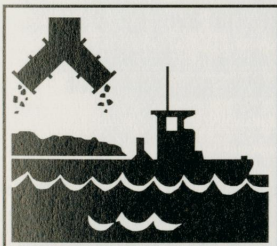
These railroads have in excess of 67,000 hopper cars dedicated to the transport of coal.

Kentucky has approximately 138 coal rail loading facilities.

97% of rail shipments of Kentucky coal move by unit train service.



Coal Transportation by Barge in Kentucky



Kentucky has more than 1,000 miles of navigable rivers over which approximately 28 million tons of Kentucky coal were shipped in 1998.

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

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

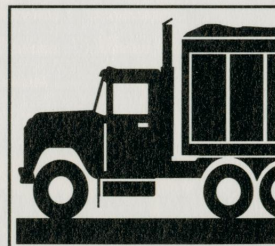
Source: Kentucky Coal Council, [Kentucky Coal Marketing Updates - Coal River Terminals](#), 1998.

Coal Transportation by Truck in Kentucky

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

Truck shipments are a very important mode of coal transportation in Kentucky. In 1998, approximately 2.2 billion ton-miles of coal transportation by truck were reported in at least one leg of the many different types of multimodal coal transportation market routes.

Over 3,061 coal trucks were registered during 1998 in Kentucky, indicating that over 3,061 coal truck drivers were employed in Kentucky. The sale of extended weight coal decals generated \$825,616 in 1998.



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

Air Quality/By-Products

Coal Use and Sulfur Dioxide Emissions from Electric Utility Plants

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

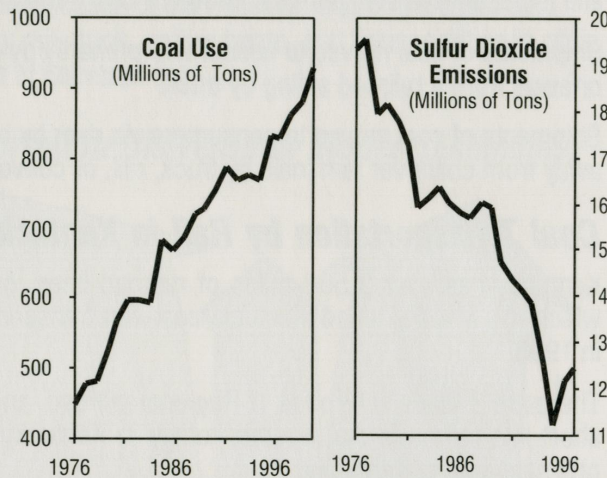
Coal-fired power plants in the U.S. have reduced their sulfur dioxide emission rate (the amount of pollution produced for each ton of coal burned) by 67% from 1976 to 1997.

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

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

These achievements are the result of using lower-sulfur coal and using pollution control equipment such as scrubbers. The use of flue gas desulfurization equipment (FGD or scrubbers) has increased dramatically. Kentucky is second in the nation in installed scrubber capacity. Utilities in Kentucky during 1997 had scrubbers on 48% of their coal-fired generating capacity, compared to the national average of 27%.

Sources: Environmental Quality Commission (EQC), *The State of Kentucky's Environment: 1998-99 Air Quality*; U.S. DOE - EIA; *Electric Power Annual, 1989-97*; *Cost and Quality of Fuels for Electric Utility Plants, 1998*.



Coal Combustion By-Products

Coal combustion in Kentucky produced 3.2 million tons of fly ash, 1.1 million tons of bottom ash, and 3.2 million tons of flue gas desulfurization (FGD) materials during 1996. According to a 1996 University of Kentucky Center for Applied Energy Research survey, 10.3% (0.8 million tons) of the 7.5 million tons coal combustion by-products produced within Kentucky were reused. Combustion materials generated within Kentucky do not include the coal combustion material, estimated to be 8.5 million tons of ash, generated from the combustion of Kentucky coal outside Kentucky in 22 other states during 1996 (13.6% of total U.S. utility coal).

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

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

Source: American Coal Ash Association, Inc.

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

Existing Consumption

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

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

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

Coal Prices

Coal Prices

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

Average Value of Kentucky Coal FOB Mine (dollars per ton)

| Year | Eastern Kentucky | | | Western Kentucky | | | KY Average |
|------|---------------------------------|---------|---------|------------------|---------|---------|------------|
| | Underground | Surface | Average | Underground | Surface | Average | |
| 1976 | \$26.37 | \$20.36 | \$23.03 | \$15.12 | \$13.41 | \$14.18 | \$19.79 |
| 1977 | \$25.98 | \$18.71 | \$21.67 | \$19.88 | \$14.80 | \$17.07 | \$20.02 |
| 1978 | \$28.86 | \$22.58 | \$25.30 | \$22.78 | \$18.35 | \$20.36 | \$23.86 |
| 1979 | \$30.18 | \$24.85 | \$27.62 | \$26.26 | \$18.79 | \$22.17 | \$26.04 |
| 1980 | \$30.98 | \$26.23 | \$28.73 | \$27.40 | \$22.28 | \$24.72 | \$27.62 |
| 1981 | \$32.47 | \$28.86 | \$30.72 | \$30.92 | \$25.03 | \$27.66 | \$29.95 |
| 1982 | \$32.71 | \$28.85 | \$30.87 | \$32.50 | \$26.53 | \$29.25 | \$30.44 |
| 1983 | \$30.71 | \$28.43 | \$29.63 | \$30.72 | \$25.97 | \$28.09 | \$29.20 |
| 1984 | \$29.29 | \$27.84 | \$28.61 | \$28.68 | \$25.50 | \$26.81 | \$28.13 |
| 1985 | \$29.83 | \$27.41 | \$28.77 | \$26.79 | \$26.68 | \$26.73 | \$28.24 |
| 1986 | \$26.89 | \$25.67 | \$26.38 | \$24.25 | \$26.56 | \$25.31 | \$26.09 |
| 1987 | \$27.48 | \$25.74 | \$26.71 | \$25.06 | \$24.16 | \$24.68 | \$26.15 |
| 1988 | \$27.72 | \$25.92 | \$26.97 | \$24.89 | \$22.32 | \$23.96 | \$26.20 |
| 1989 | \$25.69 | \$25.96 | \$25.80 | \$23.03 | \$21.79 | \$22.48 | \$24.97 |
| 1990 | \$25.49 | \$26.44 | \$25.84 | \$24.42 | \$22.01 | \$23.32 | \$25.19 |
| 1991 | \$26.29 | \$26.51 | \$26.37 | \$24.83 | \$20.26 | \$22.88 | \$25.45 |
| 1992 | \$25.32 | \$24.49 | \$25.00 | \$24.75 | \$20.94 | \$23.10 | \$24.50 |
| 1993 | \$25.42 | \$25.63 | \$25.50 | \$23.84 | \$20.45 | \$22.36 | \$24.77 |
| 1994 | \$26.19 | \$23.92 | \$25.25 | \$25.95 | \$20.07 | \$23.63 | \$24.88 |
| 1995 | \$26.52 | \$25.24 | \$26.00 | \$21.33 | \$19.46 | \$20.75 | \$24.79 |
| 1996 | \$25.98 | \$23.53 | \$24.98 | \$21.04 | \$18.79 | \$20.38 | \$23.91 |
| 1997 | \$26.26 | \$22.45 | \$24.65 | \$20.67 | \$19.92 | \$20.49 | \$23.72 |
| 1998 | (Not Available as of 1-31-2000) | | | | | | |

Sources: U.S. Bureau of Mines, *Minerals Yearbook*, 1976, U.S. DOE, *Bituminous Coal and Lignite Production and Mine Operations*, 1977-1978, and *Coal Production*, 1979-1992, DOE-EIA, *Coal Data: A Reference*, May, 1989, and *Coal Industry Annual*, 1993-1998.

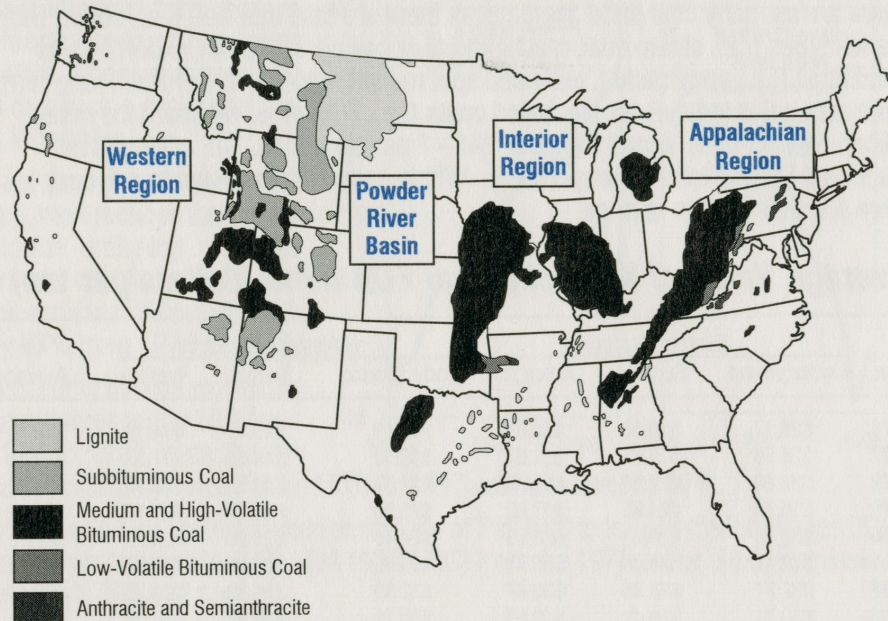
Electric Utility Deregulation - Impact on Coal

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

A competitive market will greatly intensify pressures to keep generating costs low. Coal-fired generating plants close to major power markets will be well positioned to compete with low-cost power. As new generating plants are needed in the coming decade or so, coal's ability to capture this new market will be aided by its low and stable cost, by expected increases in the cost of natural gas, and by increasingly efficient and environmentally beneficial Clean Coal Technologies.

U.S. Comparisons-Production

U.S. Coal Fields and Coal Producing Areas



Source: Developed from the U.S. Geological Survey

Coal Production by State, 1998 (thousand tons)

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

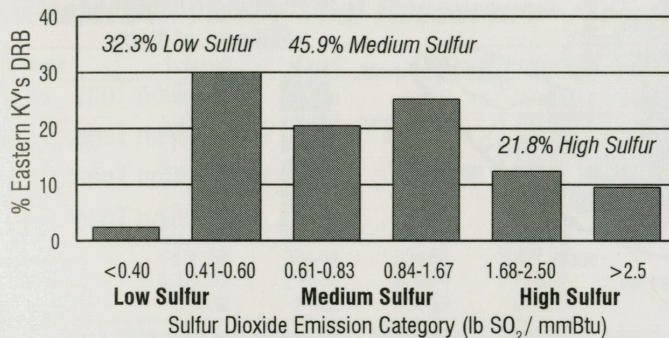
Source: U.S. DOE - Energy Information Administration, *Coal Industry Annual*, 1998.

U.S. Coal Reserves

Eastern Kentucky Low-Sulfur Coal

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

Summary Sulfur Content Categories*



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

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

Examples for 12,500 Btu coal:

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

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

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

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

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

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

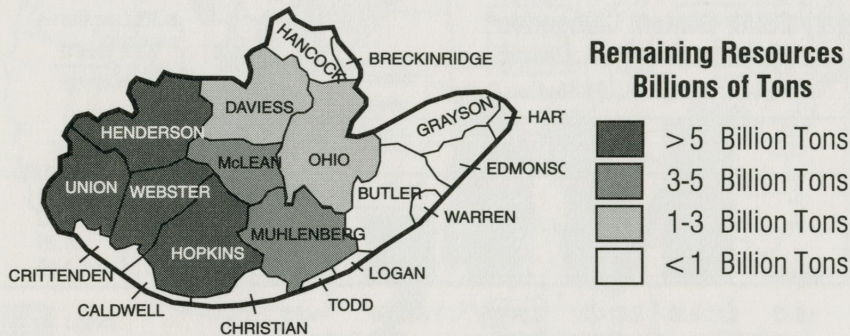
**Kentucky coal resource values are considered by some to be too high of a value, while the Eastern Kentucky "Demonstrated Coal Reserve Base" value being increased by 4 billion tons is still openly rejected by many others as being too low.

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

Kentucky Coal Resources

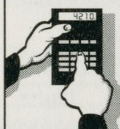
Western Kentucky Coal Field

The Western Kentucky coal field covers 6,400 square miles and contains over 35.9 billion tons of remaining resources. (Part of this cannot be mined economically using today's technology.) The remaining resources and their locations are illustrated below.



There are 35 named coal beds, of which 7 principal coal beds contain about 94% of the resources in Western Kentucky.

Over 5 billion tons of coal have been mined or lost due to mining, amounting to only about 12.2% of total Western Kentucky coal resources.

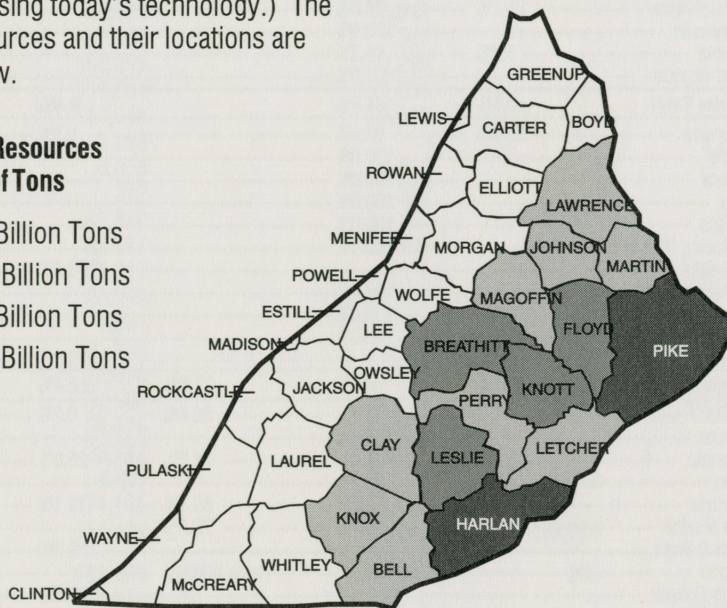
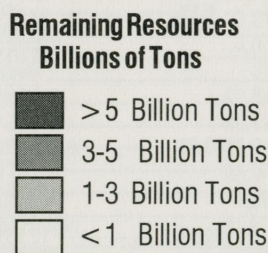


How To Calculate Tons of Coal

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

Eastern Kentucky Coal Field

The Eastern Kentucky coal field covers 10,500 square miles and contains approximately 53.1 billion tons of remaining resources. (Part of this cannot be mined economically using today's technology.) The remaining resources and their locations are illustrated below.



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

Approximately 10.9 billion tons of coal have been mined or lost due to mining, amounting to only about 17% of total Eastern Kentucky coal resources.

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

Kentucky Coal Resources

Original resource estimates for Western and Eastern Kentucky were 41 and 64 billion tons respectively. The resources currently remaining after 200 years of mining are estimated to be 35.9 billion tons in Western Kentucky and 53.1 billion tons in Eastern Kentucky. As shown in the Demonstrated Reserve Base (DRB) tables on page 41, assumptions on the percentage available for development reduce those values even further.

Western Kentucky Coal Resources

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

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

Kentucky coal resource values are considered by some to be too high of a value, while the Eastern Kentucky "DRB" value is rejected by many others as being too low.

Three-fourths of the remaining coal resources in EKY are not considered to be part of the "DRB".

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

Eastern Kentucky Coal Resources

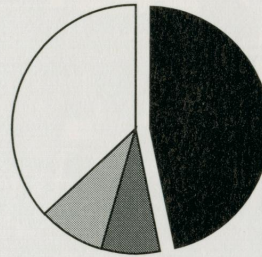
| County | Original | Mined | Lost | Remaining |
|------------------|------------------|-----------------|-----------------|------------------|
| Bell | 3,194.70 | 283.15 | 283.15 | 2,628.40 |
| Boyd | 630.68 | 19.93 | 19.93 | 590.82 |
| Breathitt | 4,112.20 | 198.45 | 198.45 | 3,715.30 |
| Carter |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

**NOTE: Kentucky coal resource values are considered by some to be too high of a value while the Eastern Kentucky "DRB" value was increased from 8.6 to 12.5 billion tons but is still rejected by some as being too low (see page 41).

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

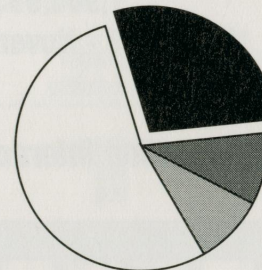
Sources: Smith and Brant (1980), Mined and Lost and Remaining Resources updated by the Kentucky Coal Council from Kentucky Department of Mines and Minerals Annual reports.

Original Coal Resources Estimate (41 Billion Tons)



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

Original Coal Resources Estimate (64.1 Billion Tons)



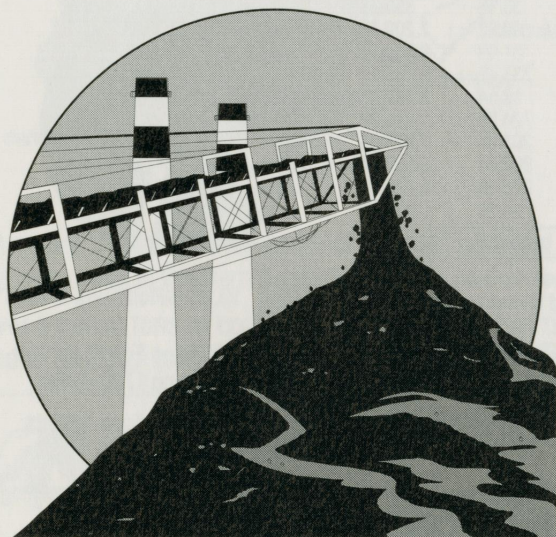
- 12.1 Billion Tons in DRB**
- 5.5 Billion Tons Lost Due to Mining 1790-1998
- 5.5 Billion Tons Mined 1790-1998
- 41 Billion Tons Remaining, but not in DRB**

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

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

Welcome to the
Kentucky Coal Council

Coal Education

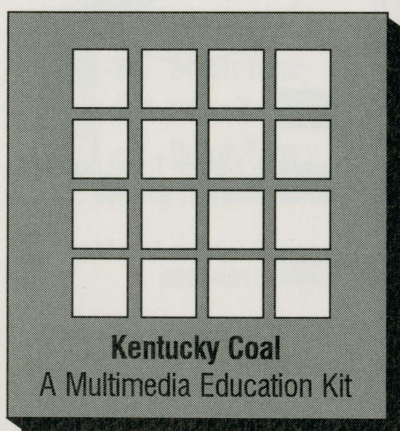


Web Site

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

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

Coal Education Interactive Multimedia Library Kit



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

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

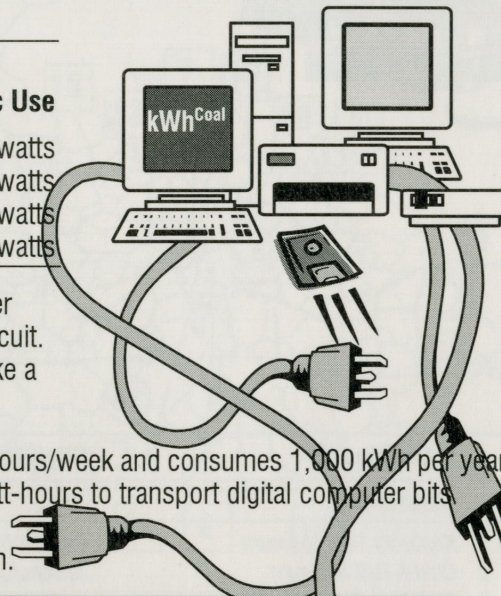
The interactive multimedia CD-ROM and three coal education classroom videos are a production of Western Kentucky University in cooperation with the Kentucky Authority for Educational Television with partial funding from the Kentucky Coal Council.

PCs + www. = kWh^{Coal}

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

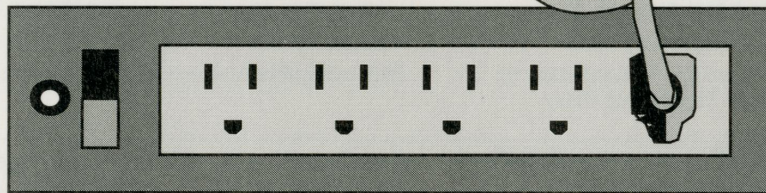
It takes about 1 pound of coal to create, package, store and move 2 megabytes of data.

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



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

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



Electric Demand from PCs on the Internet

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

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

* Individual table numbers do not add to estimated total.

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

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

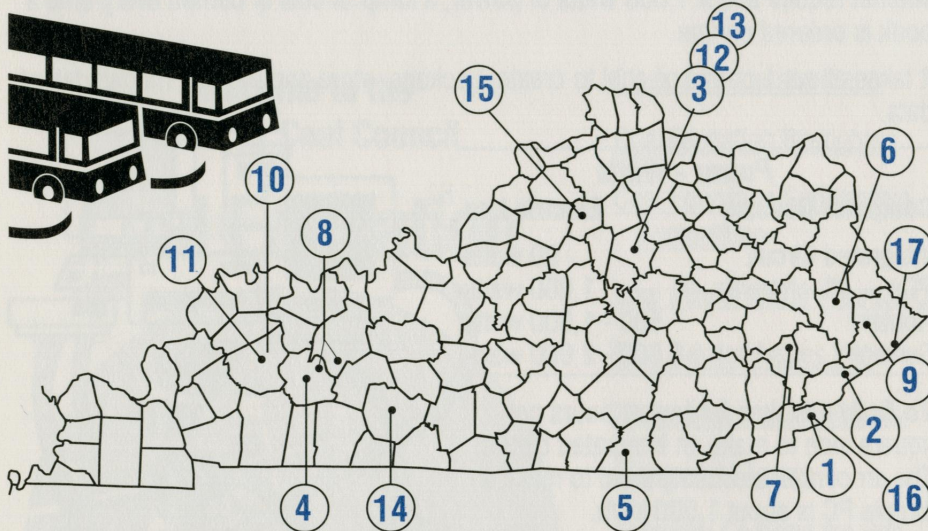
Growth of the Internet

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

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

Coal Education Field Trip Sites

Coal Education Field Trip Sites in Kentucky



| Field Trip Site | City/County | Phone | Age Group |
|---|--------------------------|--------------|-------------------|
| Museums | | | |
| 1 Kentucky Coal Museum | Benham/Harlan | 606-848-1530 | all ages |
| 2 Coal & Rail Museum | Jenkins/Letcher | 606-832-4676 | all ages |
| 3 Lexington Children's Museum | Lexington/Fayette | 606-258-3253 | all ages |
| 15 Kentucky History Center | Frankfort/Franklin | 502-564-1792 | all ages |
| 17 Elkhorn City Railroad Museum Open Tuesday and Friday | Elkhorn City/Pike | 606-754-4554 | all ages |
| Parks | | | |
| 4 Paradise Park Complex Duncan Cultural Center | Greenville/Muhlenberg | 270-338-5422 | all ages |
| 5 Big South Fork Scenic Railway | Stearns/McCreary | 270-338-2605 | all ages |
| 800-GO-ALONG | | | all ages |
| Interpretive Center | | | |
| 6 Jenny Wiley State Resort Park Contact: Ron Vanover | Prestonsburg/Floyd | 606-886-2711 | all ages |
| Wildlife Reclamation | | | |
| 7 Cyprus-Amax WMA (Elk) | Ary/Perry | 606-378-3474 | all ages |
| 8 Peabody Wildlife Mgmt. Area Contact: Jonathan Young, KDFWR | Muhlenberg & Ohio | 270-273-3569 | 4th grade & up |
| Annual Events | | | |
| 9 CEDAR's Regional Coal Fair Contact: John Justice | Pikeville/Pike | 606-433-4053 | all ages |
| 10 West Kentucky CEDAR's Coal Fair Contact: Phil Edmondson | West Kentucky Coal Field | 270-333-9807 | all ages |
| Underground Mine Tour* | | | |
| 16 Portal 31 UG Mine *Planned opening date: 2001 | Lynch/Harlan | 606-848-1530 | all ages |
| Simulated Underground Mine | | | |
| 11 Madisonville Technical College Contact: Jenny Saint | Madisonville/Hopkins | 270-824-7009 | 3rd grade & up |
| Coal Research Labs** | | | |
| 12 Center for Applied Energy Research | Lexington/Fayette | 606-257-0224 | all ages |
| 13 Kentucky Geological Survey | Lexington/Fayette | 606-257-5500 | all ages |
| 14 Western Kentucky University | Bowling Green/Warren | 270-745-6020 | all ages |

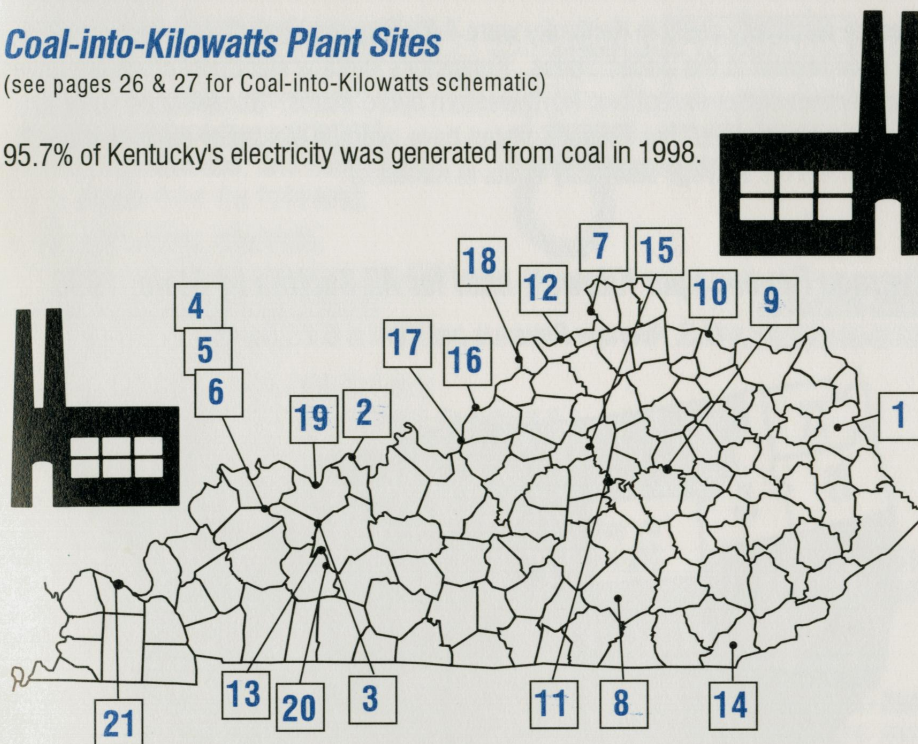
**All labs are limited to tours for special projects only.

Coal-Fired Power Plants

Coal-into-Kilowatts Plant Sites

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

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



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

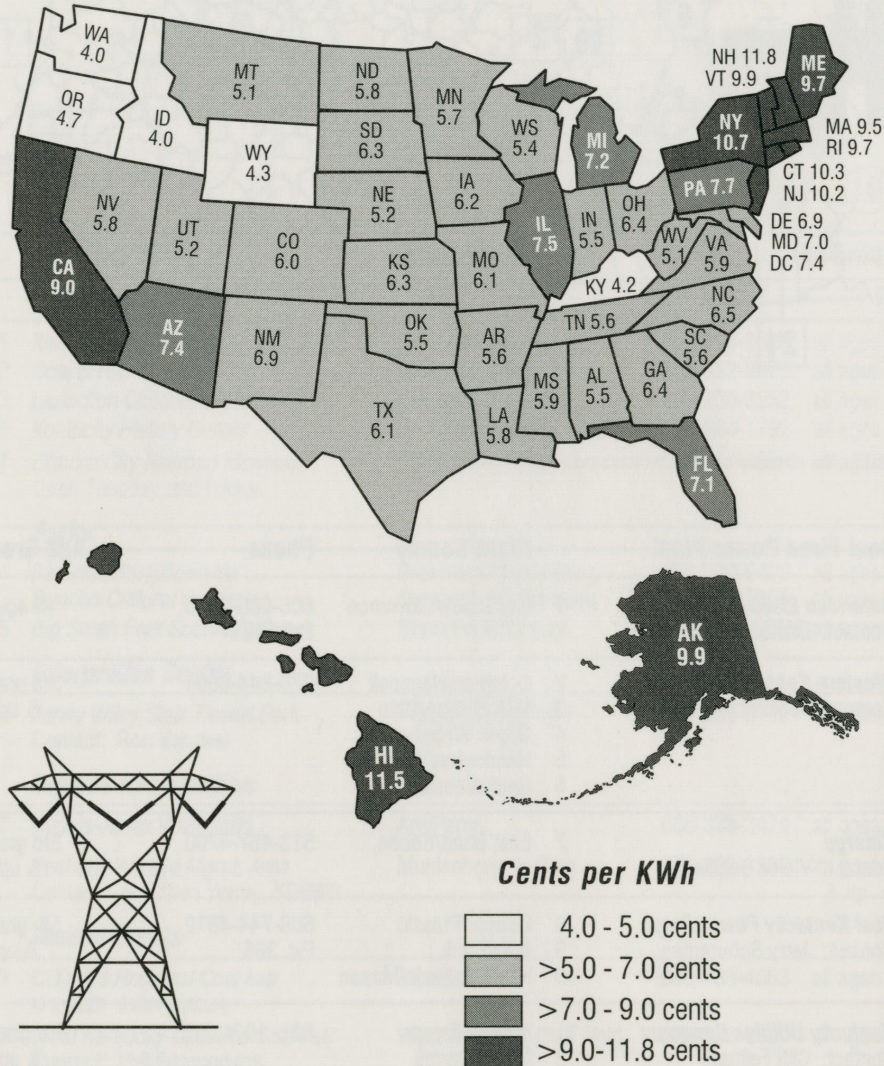
| Coal-Fired Power Plant | Plant/County | Phone | Age Group |
|---|---|------------------------------|---|
| American Electric Power Contact: Diana Frasher | 1 Big Sandy/Lawrence | 606-686-2415, Ext. 1133 | all ages |
| Western Kentucky Energy Contact: Jennifer Headdy | 2 Coleman/Hancock 3 D.B. Wilson/Ohio 4 Green/Webster 5 Henderson/Webster 6 Reid/Webster | 270-844-6004 | 3rd grade & up |
| Cinergy Contact: Vickie Buckler | 7 East Bend/Boone | 513-467-4700 | 3rd grade & up |
| East Kentucky Power Corp. Contact: Jerry Schureman | 8 Cooper/Pulaski 9 Dale/Clark 10 H.L. Spurlock/Mason | 606-744-4812, Ext. 385 | 5th grade & up |
| Kentucky Utilities Company Contact: Cliff Feltham | 11 Brown/Mercer 12 Ghent/Carroll 13 Green River/Muhlenberg 14 Pineville/Bell 15 Tyrone/Woodford | 606-367-1105 | 6th grade & up |
| Louisville Gas & Electric Co. Contact: Sandy Gentry | 16 Cane Run/Jefferson 17 Mill Creek/Jefferson 18 Trimble County/Trimble | 502-627-2713 | 5th grade & up (others considered upon request) |
| Owensboro Municipal Utilities Contact: Jody Wassmer | 19 Elmer Smith/Daviess | 270-926-3200, Ext. 336 | 5th grade & up |
| Tennessee Valley Authority Contact: Beverly Morehead Beverly Davis | 20 Paradise/Muhlenberg 21 Shawnee/McCracken | 270-476-3301 270-575-8001 | 4th grade & up |

Electricity Costs

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

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

U.S. Average Revenue per KWh is 6.75 Cents



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

KWh = Kilowatt-hour

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

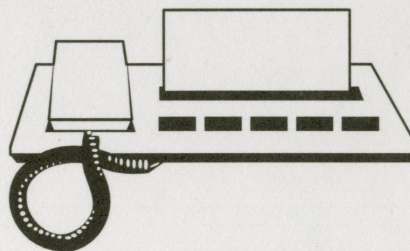
*Includes energy charges, demand charges, consumer service charges, environmental surcharges, fuel adjustments, and other miscellaneous charges. Taxes assessed on the consumer, "pass through" taxes, are not recorded in the operating revenues of the utility and are not included; however, taxes assessed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

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

Information Assistance

Kentucky Coal Information

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



KENTUCKY COAL COUNCIL

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

606/246-2500
FAX 606/246-2497

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

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

606/433-7510
FAX 606/433-7075

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

270/824-7543
FAX 270/824-7037

KENTUCKY COAL ASSOCIATION

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

606/233-4743
FAX 606/233-4745

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

E-mail: bcaylor@miningusa.com

1999-2000 KENTUCKY COAL FACTS Ordering Information

Kentucky Geological Survey (KGS)

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

606/257-3896

Teacher Workshops

KyNEED

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

606/578-0312
FAX 606/578-0316

Coal Teaching Materials

Kentucky Coal Council
[www.coaleducation.org]

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

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

Kentucky Geological Survey (KGS)
[www.uky.edu/kgs/home.htm]

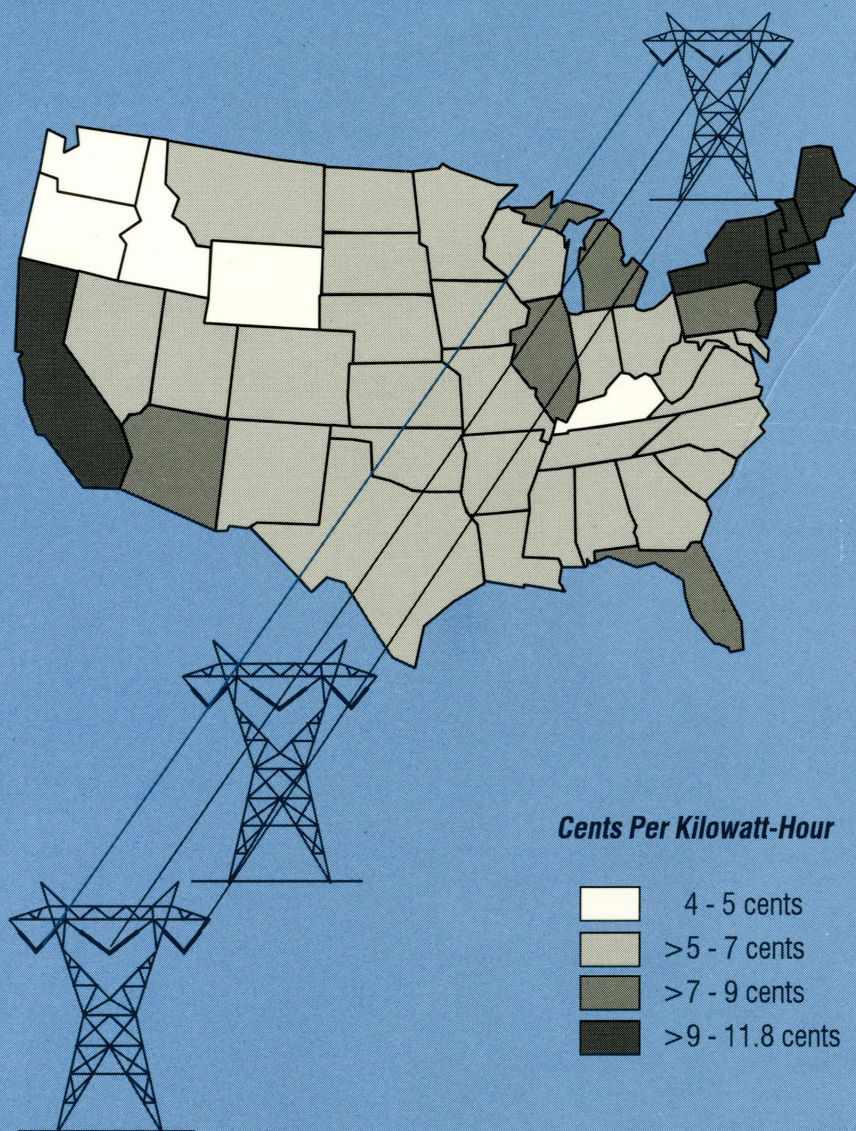
KET, The Kentucky Network
[www.ket.org/Education/videos/fieldtrips/coalmine.html]

Center for Energy and Economic Development
[www.ceednet.org]

U.S. Department of Energy
[www.eia.doe.gov/kids]

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

Average Electricity Costs per Kilowatt-Hour, 1998



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

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

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