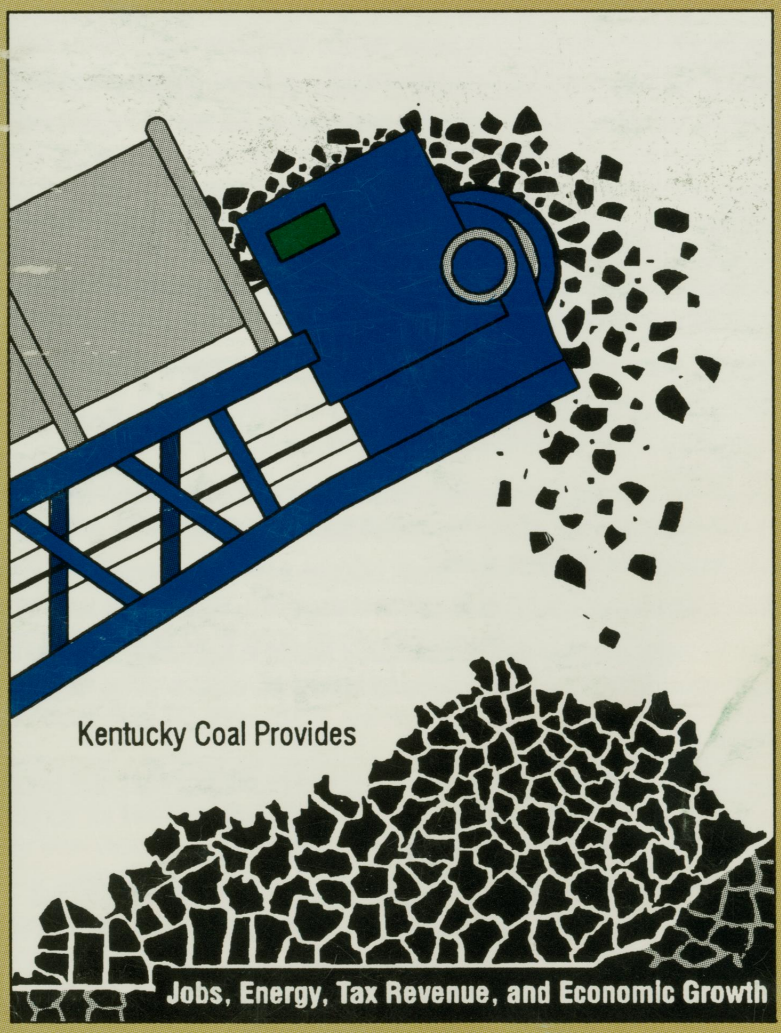
1995-1996 POCKET GUIDE

# KENTUCKY COAL FACTS




Prepared by the

**Kentucky Coal Marketing and Export Council**

and the

**Kentucky Coal Association**

Edition 4

# Highlights

## Electricity

Average electricity costs in Kentucky were 4.3 cents/kilowatt-hour in 1994, the third lowest in the United States behind two Northwestern hydro states.

## Production

Kentucky produced 168.5 million tons of coal in 1994, compared to the record production of 179.4 million tons set in 1990.

Kentucky was the nation's number one coal producer from 1973 to 1987, was number two in 1993, behind Wyoming, but lost the number two spot to West Virginia during 1994. Kentucky has been one of the top three coal producers in the United States for the last 49 years.

## Employment

The Kentucky coal industry paid almost $1 billion in direct wages in 1994, directly employing 24,133 persons and indirectly providing an additional 72,000 jobs in 1994.

## Economy

The Kentucky coal industry brought $3.3 billion into Kentucky from out-of-state during Fiscal Year 1994-1995 through coal sales to customers in 30 other states and 14 foreign countries.

Kentucky coal companies paid $177.9 million in coal severance taxes in Fiscal Year 1994-1995.

## Coal Markets

A total of 69 electric utility companies purchased 126.6 million tons of Kentucky coal for 152 electric power plants located in 25 states during 1994, accounting for almost 81% of the Kentucky coal sold.

Over 83% of Kentucky's coal is sold out-of-state.

There are 20 major coal-burning electric utility plants in Kentucky, and almost all (95%) 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 3 national reclamation awards in 1994 for surface mining, and received a total of 13 awards in the past 9 years.

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

Kentucky operators have paid over $625.5 million into the Federal Abandoned Mine Land Fund since 1978 to reclaim abandoned coal mines, and nationwide operators have paid over $3.9 billion into this fund; however $0.98 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 90.4 billion tons of coal resources remaining represent 86% of the original resource.

December 1995

# Changes and Trends

As we approach the last half-decade of the 20th Century, coal is an important part of our everyday life as it was at the beginning of the Century. The fuel that enabled the United States to become the wealthiest industrialized nation in the world is still providing the means to power the nation.

Coal provides over half of the electricity in this country, and in Kentucky, 95 percent of our electricity comes from coal.

Most experts agree that demand for electricity will continue to grow as our economy grows. Rates of this growth each year have been estimated from a low of 1.3 percent to a high of 2.5 percent. Large coal-fired power plants, built in the 1950's and early 1960's, will need to be replaced.

Utility deregulation is on the horizon. As in other parts of American business, low costs and customer service will be the hallmarks of a successful company. Today, 23 of the 25 lowest operating cost electric-generation units in America are fueled by coal. Renewable energy sources will have less than 10 percent of the market by the year 2010.

In the coal industry, consolidation has been taking place at a rapid pace. Although Kentucky has approximately 300 producing companies, a little over one-third of the utility market share for coal in Kentucky now is purchased from only six companies. Nine companies accounted for another third of the market share in 1994, and over 60 companies shared the remaining one third (*see page 25*). These trends, along with other pertinent issues, are examined in this edition of *Coal Facts*.

**What Changes are Occurring?**

As Kentucky coal companies consolidate into a globally competitive industry, the number of mines in Kentucky declined from 2,249 mines in 1976 to 673 mines in 1994. (*see page 8*)

The number of direct mining employees in Kentucky has been reduced by more than half since 1981 while production has only increased slightly. (*see pages 10 and 14*)

Productivity per hour has almost doubled since 1979 (*see page 11*), thus maintaining production (*see page 7*) while mining costs have been contained to match coal prices that have fallen below 1979 price levels. (*See page 18*)

The amount of sulfur dioxide emitted from burning coal in Kentucky has been reduced by more than 1/2 since 1976, and the trend is continuing. (*see page 32*)

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

Kentucky coal exports of 7.2 million tons in 1994 fell to less than half its usual level of over 15 million tons. (*see page 27*)

Kentucky ships over 5 times as much coal to its neighboring states as it receives from them. (*see page 24*)

Natural gas costs to U.S. electric utilities in 1993 increased higher than petroleum while coal costs continued to decrease. (*see page 19*)

**Is there a Trend?**

More of the coal severance tax money is being returned to the coal counties for economic development. (*see page 16*)

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

$3.3 billion continues to be brought into Kentucky each year from coal sales to 30 other states and 14 foreign countries. (*see page 17*)

The number of successful mining reclamation-primacy bond releases in Kentucky continues to grow each year. (*see page 30*)

The AML reclamation accomplishments in Kentucky during the last 15 years are impressive, and more continues to be completed yearly. (*see page 35*)

Source: See individual reference pages as listed.

# References

| | | |
|---|---|---|
| **Governor's Office** | Phone: | 502-564-2611 |
| Capitol Building - Frankfort, KY 40601 | Fax: | 502-564-2517 |
| Department of Local Government | Phone: | 502-573-2382 |
| 1024 Capital Center Drive - Frankfort, KY 40601 | Fax: | 502-573-2512 |
| **Lt. Governor's Office** | Phone: | 502-564-7562 |
| Capitol Building, Room 142 - Frankfort, KY 40601 | Fax: | 502-564-5959 |
| **Cabinet for Human Resources** | Phone: | 502-564-5331 |
| Department for Employment Services | Fax: | 502-564-7452 |
| 275 East Main Street - Frankfort, KY 40621 | | |
| **Department of Mines and Minerals** | Phone: | 606-254-0367 |
| P.O. Box 14080, 3572 Iron Works Pike | Fax: | 606-233-4243 |
| Lexington, KY 40512-4080 | | |
| **Kentucky Geological Survey** | Phone: | 606-257-5500 |
| 228 Mining and Mineral Resources Building | Fax: | 606-257-1147 |
| Lexington, KY 40506-0107 | | |
| **Legislative Research Commission** | Phone: | 502-564-8100 |
| Capitol Building, Room 300 - Frankfort, KY 40601 | Fax: | 502-223-5094 |
| **Natural Resources and Environmental Protection Cabinet** | Phone: | 502-564-3350 |
| Capital Plaza Tower - Frankfort, KY 40601 | Fax: | 502-564-3354 |
| Department for Surface Mining Reclamation | Phone: | 502-564-6940 |
| and Enforcement | Fax: | 502-564-5848 |
| Division of Abandoned Lands | Phone: | 502-564-2141 |
| Division of Field Services | Phone: | 502-564-2340 |
| Division of Permits | Phone: | 502-564-6940 |
| #2 Hudson Hollow - Frankfort, KY 40601 | Fax: | 502-564-6764 |
| Department for Environmental Protection | Phone: | 502-564-2150 |
| Division of Waste Management | Phone: | 502-564-6716 |
| Division of Water | Phone: | 502-564-3410 |
| 14 Reilly Rd., Ash Bldg. - Frankfort, KY 40601 | Fax: | 502-564-4245 |
| Division of Air Quality Control | Phone: | 502-573-3382 |
| 803 Schenkel Lane - Frankfort, KY 40601 | Fax: | 502-564-4245 |
| **Revenue Cabinet** | Phone: | 502-564-5556 |
| Department of Administrative Services | Phone: | 502-564-6866 |
| Division of Severance Tax | Phone: | 502-564-3362 |
| P.O. Box 181, Station 54 - Frankfort, KY 40602 | Fax: | 502-564-3392 |
| Department of Property Taxation | Phone: | 502-564-8334 |
| Div. of Technical Support, Mineral Valuation Section | Fax: | 502-564-5977 |
| 592 East Main Street - Frankfort, KY 40601 | | |
| **Transportation Cabinet** | Phone: | 502-564-7183 |
| Dept. of Highways, Coal Haul Highway Section | Fax: | 502-564-2865 |
| 125 Holmes Street - Frankfort, KY 40622 | | |
| **UK - Center for Applied Energy Research** | Phone: | 606-257-0305 |
| 3572 Iron Works Pike - Lexington, KY 40511-8433 | Fax: | 606-257-0220 |
| **United States Department of Energy** | Phone: | 202-586-8800 |
| National Energy Information Center, EI-231 | Fax: | 202-586-0727 |
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**Other Contributors**

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# Table of Contents

# History of Coal

| | |
|---|---|
| 1701 | Coal discovered in Virginia. |
| **1748** | **First recorded U.S. coal production .** |
| 1750 | April 13th Dr. Thomas Walker 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 opened in Kentucky - near the Green River and known as the "McLean drift bank" near Paradise in Muhlenberg County.<br>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.<br>Lexington and Big Sandy Railroad proposed.<br>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 (1861-1865). On April 15, 1865 he was assassinated by John Wilkes Booth in Washington, D.C., just a few days after the Union victory.** |
| 1866 | Surface mining begins near Danville, Illinois. |
| 1870 | Post-Civil War Kentucky production decline to 150,582 tons. |
| 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.<br>Mine Ventilation Law.<br>First train from Williamson, West Virginia to Pike County, Kentucky.<br>Coal mining machines come into general use. |
| 1890 | N&W Railroad's first mine at Goody in Pike County.<br>Miner Pay Law.<br>United Mine Workers of America formed.<br>Machines developed to undercut coalbeds.<br>5,000 kilowatt steam turbine generates electricity. |
| 1900 | Child Labor Law.<br>Edgewater Coal Company's first production in Pike County.<br>First train off the Lexington and Eastern Railroad.<br>Independent Geological Survey established. |
| 1910 | First train from the Cumberland Valley Railroad.<br>Fordson Coal Company's first production at Pond Creek.<br>Pike-Floyd Coal Company's first production at Betsy Layne. |
| 1914 | **World War I increases demand for coal; Kentucky production 20.3 million tons.**<br>Short-flame or "permissible" explosives developed.<br>Mine Safety Law. |
| 1918 | First pulverized coal firing in electric power plants. |
| 1920 | Federal Mineral Leasing Act.<br>**42.1 million tons of Kentucky production.** |
| 1923 | All-time high U.S. employment of 704,793 bituminous coal and lignite miners.<br>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.**<br>Auger surface mining introduced. |

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

# History of Coal

| | |
|---|---|
| 1942 | Kentucky Coal Association founded. |
| | Republic Steel Company 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. |
| **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 (1983-1987). |
| | 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. |
| | The average mine size by production in Kentucky has almost tripled over the last 15 years. |
| | The number of Kentucky mine licenses issued per year have also declined by 2,000 licenses from the 1975 OPEC induced peak of 3,357 licenses. |
| | Island Creek is sold after 30 years of mining in Kentucky. |
| 1993 | CEDAR, Inc. (Coal Education Development and Resources) formed in Pike County. |
| 1994 | Western Kentucky CEDAR, Inc. was formed in Webster and Union Counties. |
| | As Kentucky coal companies consolidate into a globally competitive industry, the number of mines in Kentucky has declined from 2,249 mines in 1976 to 673 mines in 1994; the number of direct mining employees in Kentucky have been reduced by half in the last 15 years (1979 to 1994); productivity per hour has almost doubled, thus maintaining production, and mining costs have been contained to match coal prices that have fallen below 1979 price levels. |
| 1995 | Kentucky, even with a large drop in coal mine employment, continues to employ more coal miners today than any other state in the U.S. |

# 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 mountain top 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 161.6* million tons of 1994 coal production, 95.4 million tons were produced by underground mining methods and 66.2 million tons were produced by surface mining methods.

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

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

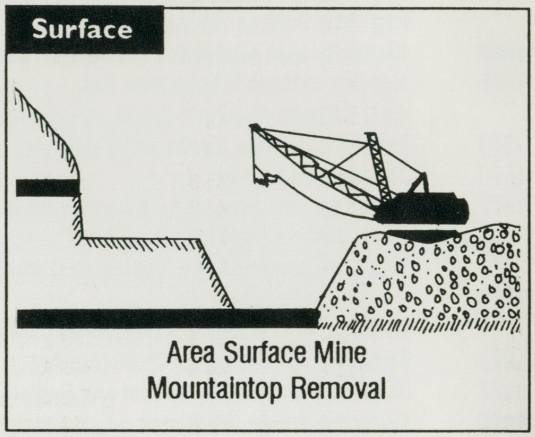
### 1994 Mining Type Estimates

| Mine Type | No. of Mines | Production (million tons) |
|---|---|---|
| **Surface** | 248 | 66.2 |
| Surface Only* | - | 18 |
| Surface & Auger* | - | 47 |
| Auger Mining* | - | 1 |
| **Underground** | 425 | 95.4 |
| Continuous** | -- | 64.0 |
| Conventional** | -- | 16.3 |
| Longwall** | -- | 14.4 |
| Other** | -- | 0.6 |
| State Totals | 673 | 161.6 |

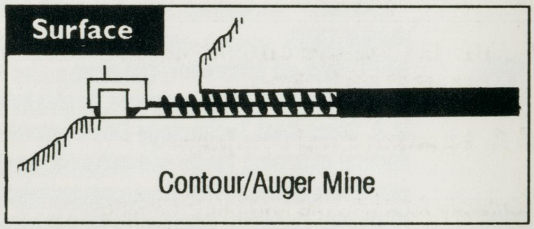
* **NOTE:** Surface mining type estimates are based upon Kentucky Department of Mines and Minerals' License data.

** **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.

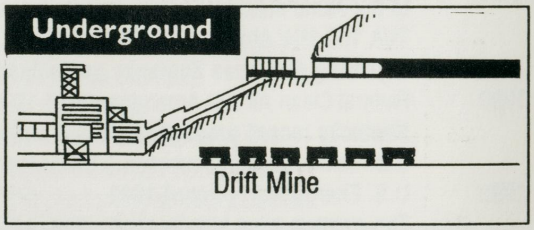
Sources: Kentucky Department of Mines and Minerals, Annual Report, 1994. U.S. DOE Energy Information Administration, Coal Industry Annual, 1994.



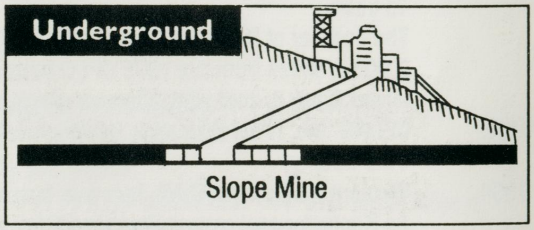
Area Surface Mine
Mountaintop Removal



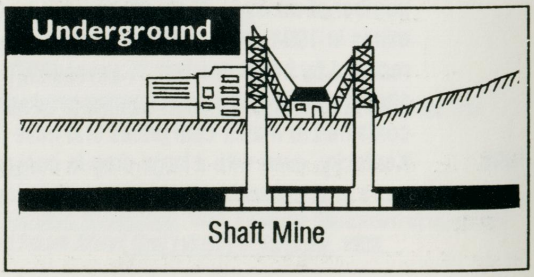
Contour/Auger Mine



Drift Mine



Slope Mine



Shaft Mine

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

# U.S. Coal Production

## Kentucky and U.S. Coal Production,* 1970 -1994 (millions of tons)

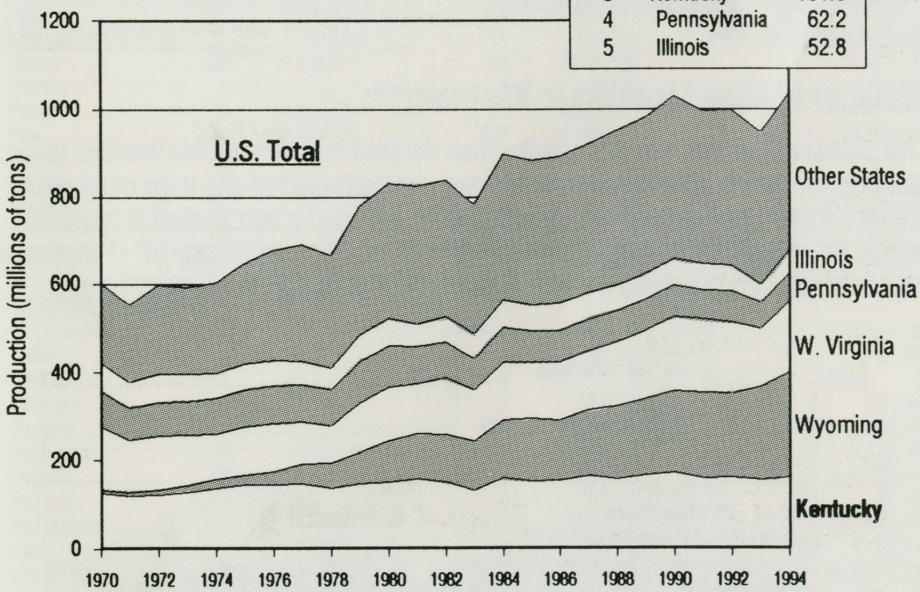
| Year | Kentucky Eastern | Kentucky Western | Kentucky Total | United States | Kentucky as % of U.S. |
|---|---|---|---|---|---|
| 1970 | 72.5 | 52.8 | 125.3 | 602.9 | 20.8 |
| 1971 | 71.6 | 47.8 | 119.4 | 552.2 | 21.6 |
| 1972 | 68.9 | 52.3 | 121.2 | 595.4 | 20.4 |
| 1973 | 74.0 | 53.7 | 127.6 | 591.7 | 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 |

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

## U.S. Leading Coal Producers**

Kentucky regained the number 2 ranking during 1993 but finished number 3 in 1994.

| 1994 Rank | State | Millions of Tons |
|---|---|---|
| 1 | Wyoming | 237.1 |
| 2 | West Virginia | 161.8 |
| 3 | Kentucky | 161.6 |
| 4 | Pennsylvania | 62.2 |
| 5 | Illinois | 52.8 |

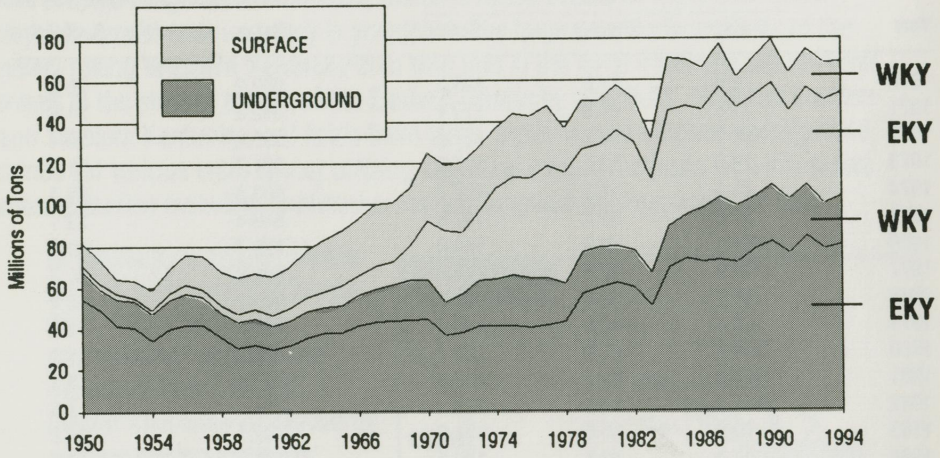



** **NOTE:** Wyoming was not one of the top five coal producers until 1978, when it surpassed Virginia and Ohio, but is included before 1978 to show its rise to the leading coal-production state.

Sources: U.S. DOE - Energy Information Administration; Coal Industry Annual, 1993-1994, Coal Production, 1977-1992. U.S. Bureau of Mines, Minerals Yearbook, 1970-1976.

# Kentucky Production

Kentucky produced 168.5* million tons of bituminous coal in 1994, 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 coal). 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, 1950-1994

## Number of Mines and Mine Size - Production Range, 1994

There were 673 coal mines in Kentucky during 1994.

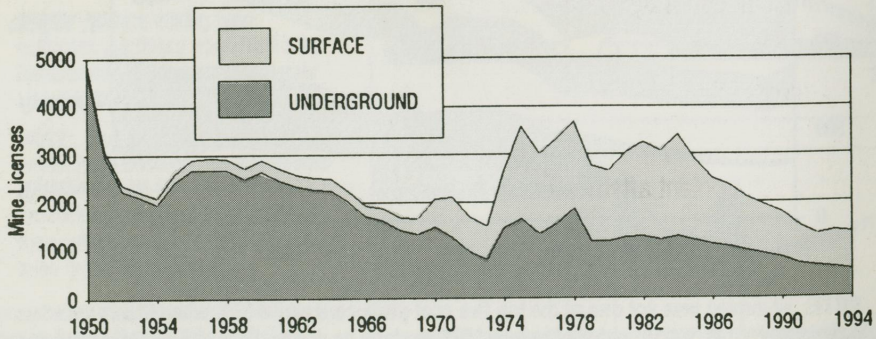
| Region | Underground | Surface | Total |
|---|---|---|---|
| Eastern Kentucky | 401 | 206 | 607 |
| Western Kentucky | 24 | 42 | 66 |
| Kentucky total | 425 | 248 | 673 |

Source: U.S. DOE - Energy Information Administration, Coal Industry Annual, 1994

| # Mines | Million Tons | |
|---|---|---|
| 29 | produced | 51.8 |
| 59 | produced | 41.6 |
| 130 | produced | 41.2 |
| 107 | produced | 15.4 |
| 258 | produced | 11.2 |
| 90 | produced | 0.4 |
| 673 | Mines with total production | 161.6 |

## Number of Mine Licenses in Kentucky**

The number of actual mines is smaller than the final number of mine licenses issued each year. This is because several licenses can be issued to one large multi-seam surface mine. A mine license is renewed each year and a new license is required within the current year when certain changes occur, such as change of: (1) company or ownership; (2) company name; (3) operator or principal; or (4) mine type.

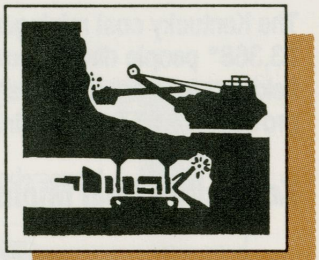



** **NOTE:** Several licenses can be issued to one large multi-seam surface mine.

Source: Kentucky Department of Mines and Minerals, Annual Reports, 1950-1994.

# County Production

There were 673 mines in Kentucky during 1994. These 673 mines were issued 1,343 Kentucky mine licenses and produced 168.5 million tons.



425 underground mines (563 licenses) accounted for 61% of Kentucky's production and 248 surface mines (780 licenses) accounted for 39% of Kentucky's production.

Eastern Kentucky's coal production was 77% of the total 1994 Kentucky coal production.

**Do You Know?** How long would a coal train be that carried all the coal produced in Kentucky in 1994?

*Answer:* A coal train stretching 15,000 miles---from Kentucky across the Atlantic Ocean, across Europe and Russia, and well past Japan would carry all the coal produced in Kentucky in 1994!

## 1994 Production by County and Type of Mine License*

| | Underground | | Surface | | Total | |
|---|---|---|---|---|---|---|
| County | Licenses | Tonnage | Licenses | Tonnage | Licenses | Tonnage |
| **EASTERN KENTUCKY** | | | | | | |
| Bell | 26 | 3,955,036 | 18 | 1,597,822 | 44 | 5,552,858 |
| Breathitt | - | - | 55 | 5,066,322 | 55 | 5,066,322 |
| Clay | 2 | 86,019 | 12 | 502,547 | 14 | 588,566 |
| Floyd | 63 | 4,354,204 | 59 | 3,824,737 | 122 | 8,178,941 |
| Greenup | - | - | 1 | 9,881 | 1 | 9,881 |
| Harlan | 87 | 13,890,996 | 20 | 1,504,186 | 107 | 15,395,182 |
| Jackson | - | - | 3 | 88,793 | 3 | 88,793 |
| Johnson | 7 | 1,395,769 | 11 | 85,522 | 18 | 1,481,291 |
| Knott | 44 | 7,068,356 | 76 | 3,736,506 | 120 | 10,804,862 |
| Knox | 25 | 807,670 | 13 | 278,614 | 38 | 1,086,284 |
| Laurel | - | - | 3 | 55,550 | 3 | 55,550 |
| Lawrence | - | - | 5 | 241,424 | 5 | 241,424 |
| Lee | - | - | 1 | 16,788 | 1 | 16,788 |
| Leslie | 12 | 6,819,055 | 14 | 1,468,110 | 26 | 8,287,165 |
| Letcher | 25 | 3,459,940 | 75 | 4,644,778 | 100 | 8,104,718 |
| Magoffin | 1 | 56,231 | 11 | 576,332 | 12 | 632,563 |
| Martin | 34 | 9,840,071 | 24 | 5,021,168 | 58 | 14,861,239 |
| Owsley | - | - | 4 | 129,580 | 4 | 129,580 |
| Perry | 18 | 4,842,038 | 85 | 8,529,874 | 103 | 13,371,912 |
| Pike | 181 | 22,658,079 | 187 | 11,592,814 | 368 | 34,250,893 |
| Pulaski | - | - | 1 | 0 | 1 | 0 |
| Whitley | 14 | 710,435 | 41 | 763,817 | 55 | 1,474,252 |
| Wolfe | - | - | 6 | 524,895 | 6 | 524,895 |
| EKY Total | 539 | 79,943,899 | 725 | 50,260,060 | 1,264 | 130,203,959 |
| **WESTERN KENTUCKY** | | | | | | |
| Butler | - | - | 2 | 25,525 | 2 | 25,525 |
| Caldwell | - | - | 1 | 0 | 1 | 0 |
| Christian | - | - | 1 | 380,393 | 1 | 380,393 |
| Daviess | - | - | 12 | 1,376,329 | 12 | 1,376,329 |
| Henderson | 4 | 1,361,140 | 3 | 1,759,661 | 7 | 3,120,801 |
| Hopkins | 8 | 3,533,776 | 11 | 5,856,810 | 19 | 9,390,586 |
| McLean | - | - | 2 | 65,199 | 2 | 65,199 |
| Muhlenberg | 1 | 1,533,129 | 7 | 895,103 | 8 | 2,428,232 |
| Ohio | 1 | 283,666 | 13 | 3,540,122 | 14 | 3,823,788 |
| Union | 3 | 6,414,724 | - | - | 3 | 6,414,724 |
| Webster | 7 | 10,287,619 | 3 | 1,014,263 | 10 | 11,301,882 |
| WKY Total | 24 | 23,414,054 | 55 | 14,913,405 | 79 | 38,327,459 |
| KY Totals | 563 | 103,357,953 | 780 | 65,173,465 | 1,343 | 168,531,418 |

* **NOTE:** Several licenses can be issued to one large multi-seam surface mine.

Source: Kentucky Department of Mines and Minerals, Annual Report, 1994.

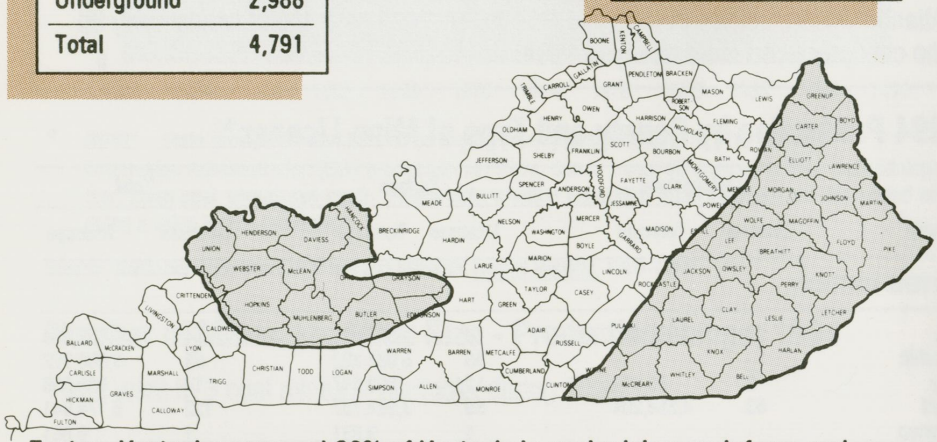
# Employment

The Kentucky coal mining industry has a current work force of approximately 23,368* people directly employed in coal mining jobs. The Western Kentucky coal field employs approximately 4,791 persons, while the Eastern Kentucky coal field provides 18,577 direct mining jobs.

## Kentucky's Coal Mining Work Force, 1994

| Western Kentucky Coal Field | |
|---|---|
| Surface | 1,803 |
| Underground | 2,988 |
| Total | 4,791 |

| Eastern Kentucky Coal Field | |
|---|---|
| Surface | 5,728 |
| Underground | 12,849 |
| Total | 18,577 |




Eastern Kentucky averaged 80% of Kentucky's coal mining work force and accounted for about 77% of Kentucky's total coal production in 1994.

Western Kentucky averaged 20% of Kentucky's coal mining work force and accounted for about 23% of Kentucky's total coal production in 1994.

Due to continued productivity gains, Kentucky maintained 161.6 million tons of production during 1994 while direct mining employment continued to decline to less than half the people directly employed in coal mining jobs in 1981.

## Kentucky Coal Mining Employment, 1979-1994

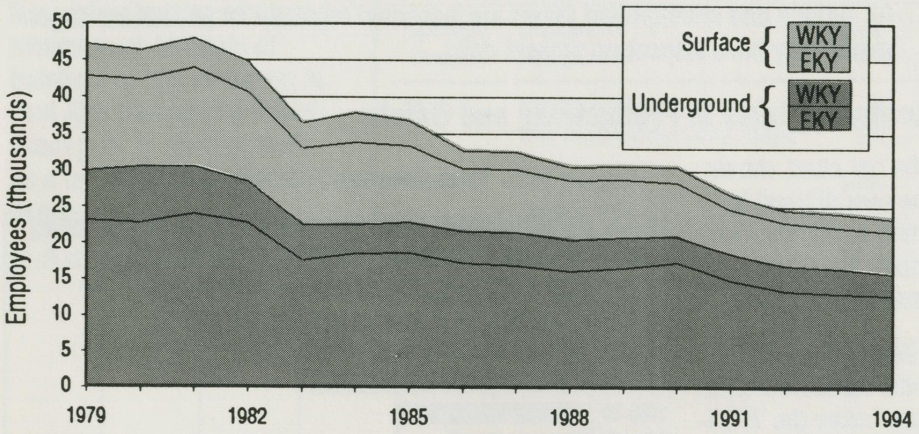
| | Western Kentucky | | | Eastern Kentucky | | | Kentucky |
|---|---|---|---|---|---|---|---|
| Year | Surface | Underground | Total | Surface | Underground | Total | Totals |
| 1979 | 4,343 | 6,945 | 11,288 | 12,838 | 23,064 | 35,902 | 47,190 |
| 1980 | 3,995 | 7,879 | 11,874 | 11.819 | 22,702 | 34,521 | 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 |

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

Source: U.S. DOE - EIA; Coal Industry Annual, 1993-1994, Coal Production, 1979-1992.

# Employment/Productivity

## Kentucky Coal Mine Employment, 1979 - 1994 *

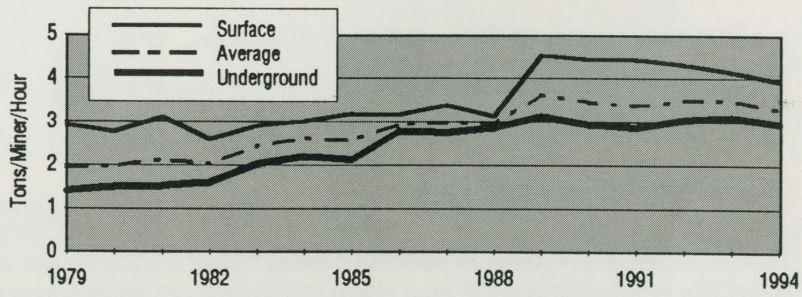



*State employment numbers (page 14) differ from federal EIA numbers.

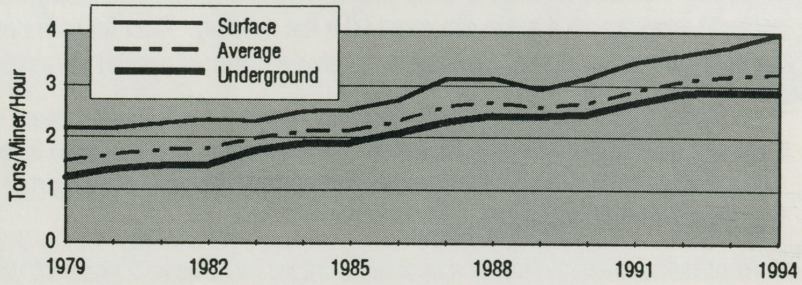
## Mine Productivity, 1977-1994 (tons/miner/hour)

| 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 |

**Western Kentucky Coal Mine Productivity 1979-1994**




**Eastern Kentucky Coal Mine Productivity 1979-1994**




Source: U.S. Department of Energy - Energy Information Administration; Coal Industry Annual, 1993-1994, Coal Production, 1977-1992.

# Safety and Training

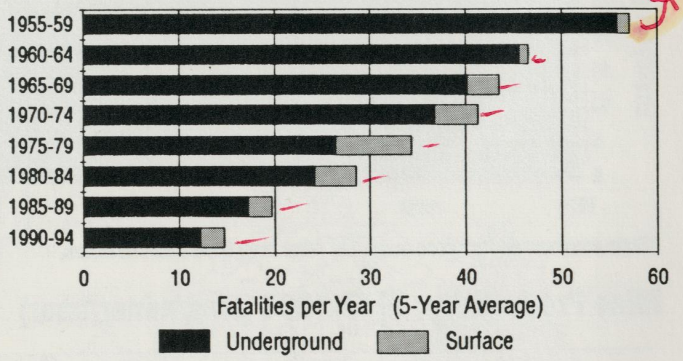
Safety and health standards are highly regulated by the National Mine Safety and Health Administration (MSHA) and the Kentucky Department of Mines and Minerals.

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

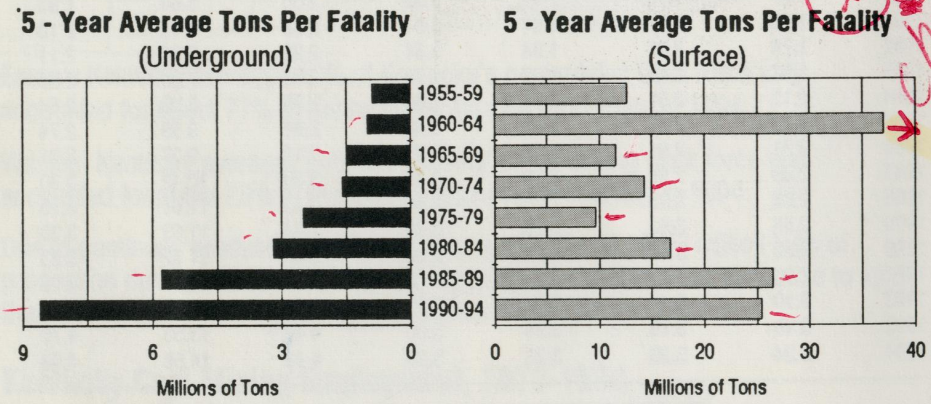
## Kentucky Gains in Productivity and Safety

The bar chart shows the overall trend in mine safety improvements by averaging erratic yearly data.

1994 ended with 10 mine fatalities which was below the 1990-1994 five-year average of almost 15 and also below any preceding five-year average.




The bar charts (below) indicate safety improvements both in underground and surface mines, with steady improvement in underground mines, and an improvement trend in surface mines.




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 miner training requires 24 hours of training before employment at a surface mine; this includes workers at prep plants, rail sidings, and river terminals. All contract workers on a mine site must take the training. After initial training, each surface mine employee is required to receive 8 hours of annual retraining.

To obtain a surface foreman certification, a miner must have 2 years of surface mining experience and pass a written examination. Surface mine foremen are also required to take 4 hours of supervisory training annually in addition to the regular 8 hours of annual retraining.

To obtain a surface blaster's license, a miner must have 2 years of work experience under an experienced blaster and pass a written examination.

# Safety and Training

## Training for Underground Miners

New miner training requires a minimum of 48 hours of training (10 hrs. minimum in First Aid) plus pass a written exam prior to starting work as a certified inexperienced miner.

A certified inexperienced miner must work a minimum of 90 days in an underground mine and pass a written examination 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) receives 8 hours of minesite-specific new miner training.

**Underground Miner Classifications**
(October, 1995)

| Experience Required | Underground Mining Position | Miners Certified |
|---|---|---|
| 10 Yrs. | Electrical Inspector* | 11 |
| | Mine Inspector/Mine Safety Analyst* | 659 |
| 5 Yrs. | Mine Foreman** | 9,854 |
| | Electrical Instructor* | 85 |
| 3 Yrs. | Asst. Mine Foreman** | 2,976 |
| | Fire Boss | 22 |
| | Instructor | 589 |
| | Belt Examiner | 2,794 |
| 1 Yr. | Electrical Worker* | 7,660 |
| | Shot Firer/Solid Blasting* | 4,346 |
| | Drill Operator/Solid Blasting* | 3,811 |
| | Hoisting Engineer* | 1,178 |
| 90 days | Mine Rescue | 243 |
| | Conventional Shot Firer* | 13,310 |
| | Gas Detection | 18,848 |
| | Certified Miners | 25,570 |
| SPECIAL TRAINING | | |
| EMT - Emergency Medical Technician | | 1,543 |
| First Aid | | 2,097 |

* **NOTE:** Tests are required in addition to years of experience.
** **NOTE:** Includes fire boss and first aid.

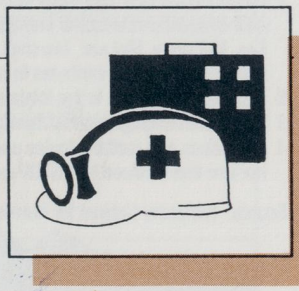
Source: Kentucky Department of Mines and Minerals.

Underground mine foremen must receive 4 hours of supervisory training in addition to the regular 16 hours of annual retraining, plus an additional 5 hours of Mine Safety and Health Administration (MSHA) required supervisor first aid training.

Each miner receives new work assignment training of 20 hours minimum to become certified for each new job classification.

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

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



EMT - An emergency medical technician is required at underground coal mines employing 12 or more employees, with an additional EMT per each additional 50 miners or majority fraction thereof.

EMT certification requires 110 hours of instruction and 10 hours of emergency room intern observations and training (4 written tests) plus 24 hours of retraining every 2 years, in addition to maintaining a cardiopulmonary resuscitation (CPR) certification.

Kentucky adopted, effective July, 1996, the revised 1994 Department of Transportation National Standard Curriculum for EMT's. Training to update existing EMT's to the National Standards can be counted as continuing education.

# Employment/Wages by County

## Coal County Employment and Wages, 1994[4]

| 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 | 967 | 9.6% | 10.4% | $33,855,877 | 18.8% | $673.29 |
| Boyd | 845 | 3.8% | 4.0% | $29,124,119 | 3.9% | $662.82 |
| Breathitt | 781 | 15.9% | 17.2% | $34,071,276 | 38.6% | $838.95 |
| Carter | 57 | 0.5% | 0.6% | $1,056,971 | 1.4% | $356.60 |
| Clay | 178 | 2.6% | 2.7% | $5,246,023 | 6.8% | $566.77 |
| Floyd | 1,163 | 8.2% | 8.9% | $33,672,731 | 13.7% | $556.79 |
| Harlan | 2,175 | 21.8% | 24.2% | $84,558,110 | 40.4% | $747.64 |
| Johnson | 355 | 3.7% | 3.9% | $11,779,540 | 9.6% | $638.11 |
| Knott | 865 | 15.3% | 16.6% | $26,538,257 | 41.6% | $590.00 |
| Knox | 200 | 1.9% | 2.0% | $4,709,993 | 4.0% | $452.88 |
| Laurel | 221 | 1.1% | 1.2% | $7,166,734 | 2.2% | $623.63 |
| Lawrence | 97 | 2.0% | 2.2% | $2,728,368 | 5.6% | $540.91 |
| Leslie | 1,328 | 30.2% | 32.9% | $51,782,360 | 59.3% | $749.86 |
| Letcher | 1,077 | 13.8% | 15.4% | $37,070,639 | 30.6% | $661.93 |
| Magoffin | 78 | 1.8% | 2.0% | $2,794,320 | 7.3% | $688.93 |
| Martin | 1,295 | 40.5% | 43.7% | $60,859,426 | 67.6% | $903.76 |
| Perry | 1,723 | 15.4% | 16.6% | $61,493,968 | 25.1% | $686.35 |
| Pike | 4,781 | 17.9% | 19.5% | $176,589,307 | 33.9% | $710.30 |
| Pulaski | 23 | 0.1% | 0.1% | $867,584 | 0.2% | $725.40 |
| Whitley | 514 | 3.8% | 4.1% | $17,331,182 | 9.0% | $648.43 |
| Subtotal | 18,723 | - | - | $683,296,785 | - | $651.17 |
| EKY Total[2] | 18,777 | - | - | $684,461,794 | - | $701.00 |
| Fayette | | | | | | $906.47 |
| Jefferson | | | | | | $1,505.38 |

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

| | | | | | | |
|---|---|---|---|---|---|---|
| **WESTERN KENTUCKY** | | | | | | |
| Christian | 125 | 0.5% | 0.5% | $4,352,671 | 1.0% | $669.64 |
| Daviess | 254 | 0.5% | 0.6% | $8,122,037 | 1.0% | $614.93 |
| Henderson | 509 | 2.2% | 2.3% | $23,972,851 | 5.4% | $905.73 |
| Hopkins | 1,010 | 4.9% | 5.2% | $42,530,168 | 11.6% | $809.79 |
| Muhlenberg | 319 | 2.7% | 2.9% | $15,344,365 | 10.2% | $925.03 |
| Ohio | 374 | 4.2% | 4.6% | $15,865,101 | 16.6% | $815.77 |
| Union | 1,292 | 19.3% | 20.4% | $68,703,122 | 41.6% | $1,022.61 |
| Webster | 1,343 | 23.4% | 24.9% | $72,637,525 | 53.8% | $1,040.12 |
| Subtotal | 5,226 | - | - | $251,527,840 | - | $850.45 |
| WKY Total[2] | 5,262 | - | - | $252,728,032 | - | $923.63 |
| State Total[2] | 24,133 | - | - | $942,817,789 | - | $751.30 |

1 Counties with less than three employers or one employer with 80% of the total county miner work force were withheld to avoid disclosure of individual company data. The counties are as follows: Butler, Elliott, Estill, Jackson, Lee, McCreary, McLean, Marshall, Mason, Morgan, Nelson, Owsley, Wolfe. It is suspected that multi-county mining employment attributes to some counties being "under reported" and others being over reported.

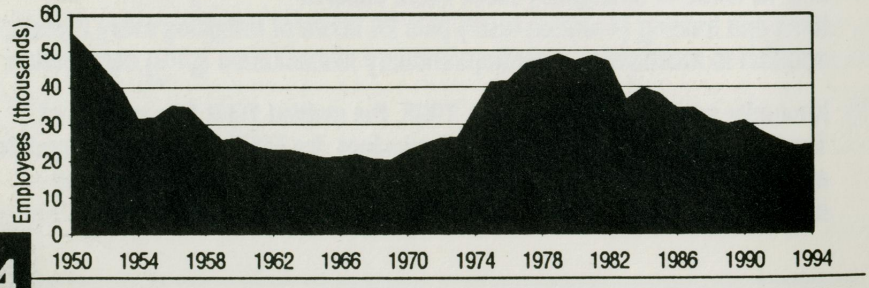
2 Columns do not add to the totals due to withheld data.

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

4 The values and methodologies used in this table may not be consistent with LGEDF regulations (see page 16). Do not use these values for LGEDF estimates.

Source: Kentucky Cabinet for Human Resources, Employment and Wages Section

## Coal Mining Employees in Kentucky, 1950 -1994



# Severance Tax by County

## Coal Severance Tax Revenue by County, Fiscal Year 1994-1995

| County | Gross Value of Severed Coal | Tax on Severed Coal | Gross Value of Processing | Total Tax Receipts |
|---|---|---|---|---|
| **EASTERN KENTUCKY** | | | | |
| Bell | $129,206,348 | $5,798,975 | $16,067,714 | $6,520,817 |
| Boyd | $144,531 | $6,494 | $14,548,219 | $637,443 |
| Breathitt | $72,235,375 | $3,239,205 | $18,764,841 | $4,085,499 |
| Clay | $10,431,607 | $444,320 | $1,476,392 | $507,082 |
| Estill | ---- | ---- | $60,825 | $38,754 |
| Floyd | $131,673,932 | $5,457,873 | $9,508,730 | $5,884,323 |
| Harlan | $333,843,117 | $15,045,041 | $23,587,655 | $16,109,405 |
| Johnson | $17,927,420 | $806,784 | $2,253,524 | $908,192 |
| Knott | $218,145,052 | $9,809,241 | $21,944,201 | $10,795,116 |
| Knox | $21,632,211 | $924,560 | $1,109,791 | $974,456 |
| Laurel | $399,224 | $19,484 | $552,337 | $44,339 |
| Lawrence | $5,441,743 | $244,848 | $191,571 | $252,878 |
| Leslie | $221,227,712 | $9,952,636 | $15,229,630 | $10,637,765 |
| Letcher | $149,921,463 | $6,731,297 | $28,337,244 | $8,005,364 |
| McCreary | $831,993 | $48,133 | $219,241 | $56,229 |
| Magoffin | $17,170,130 | $531,844 | $1,478,226 | $597,537 |
| Martin | $338,597,907 | $15,276,773 | $43,701,003 | $17,243,530 |
| Perry | $291,352,983 | $13,156,167 | $51,978,232 | $15,476,180 |
| Pike | $832,140,935 | $36,911,658 | $107,250,157 | $41,696,097 |
| Whitley | $47,944,051 | $2,109,783 | $12,849,739 | $2,687,835 |
| EASTERN KY Total* | $2,849,671,172 | $126,909,902 | $371,900,665 | $143,589,008 |
| **WESTERN KENTUCKY** | | | | |
| Butler | $760,771 | $33,787 | $744,349 | $67,243 |
| Christian | $4,908,061 | $220,863 | $812,622 | $257,431 |
| Daviess | $13,520,946 | $607,422 | $3,812,023 | $770,001 |
| Henderson | $61,561,788 | $2,656,262 | $4,391,213 | $2,841,989 |
| Hopkins | $161,775,183 | $7,245,355 | $18,050,954 | $8,052,495 |
| McLean | $441,380 | $12,531 | $28,330 | $4,771 |
| Muhlenberg | $47,111,956 | $2,104,602 | $3,459,644 | $2,261,150 |
| Ohio | $60,728,809 | $2,708,528 | $6,669,671 | $2,997,967 |
| Union | $141,587,841 | $6,397,736 | $11,243,058 | $6,903,674 |
| Webster | $204,811,839 | $9,216,538 | $21,921,872 | $10,202,862 |
| WESTERN KY Total* | $697,228,774 | $31,204,532 | $71,133,736 | $34,360,492 |
| STATE TOTALS* | $3,546,899,946 | $158,114,435 | $443,034,401 | $177,949,500 |

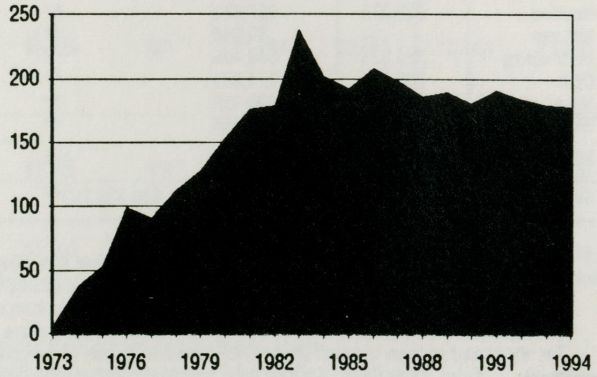
* Columns do not add to State Totals because of Carter, Elliott, Greenup, Hancock, Jackson, Lee, Owsley, Pulaski, and Wolfe Counties' information being withheld to avoid disclosure of individual company data.

Source: Kentucky Revenue Cabinet

The gross value of coal mined and processed in Kentucky during Fiscal Year 1994-1995 was $3.99 billion.

**The Kentucky coal industry paid $177.9 million in coal severance taxes in Fiscal Year 1994-1995.**

**Severance Tax Revenues (millions of dollars)**



# Coal Taxes Returned

## Coal Severance Taxes Returned to Counties, FY 1992 - FY 1995

| Fiscal Year | Local Government Economic Assistance Fund (LGEAF)* | | Local Government Economic Development Fund (LGEDF)** | | Total Percent Returned |
|---|---|---|---|---|---|
| 1991-92 | $22,120,783 | 12% | $0 | -- | 12% |
| 1992-93 | $21,559,445 | 12% | $4,105,100 | 3% | 15% |
| 1993-94 | $19,403,593 | 12% | $9,236,600 | 6% | 18% |
| 1994-95 | $18,981,314 | 12% | $15,052,300 | 9% | 21% |
| 1995-96 | -- | 12% | -- | 13% | 25% |

* **NOTE:** Established by the 1980 General Assembly; however, this column only includes fiscal years 1992 through 1995, and includes coal severance taxes only.

** **NOTE:** Totals $32.7 million with interest.

## Coal Taxes Returned to Coal Producing Counties

| | TABLE 1 | TABLE 2 | | TABLE 3 | |
|---|---|---|---|---|---|
| PRODUCING COUNTIES | LGEAF* (FY 95) | LGEDF (FY 93, 94, 95) Single County | Multi-County | Unmined Minerals Tax (FY 93) State Share | County Share ≅ 4X State Share |
| **EASTERN KY** | | | | | |
| Bell | $615,002 | $645,411 | (see Harlan) | $87,415 | $*** |
| Boyd | -- | 114,063 | ** | 785 | *** |
| Breathitt | 451,787 | 696,570 | (see Perry & Wolfe) | 25,354 | *** |
| Carter | -- | 125,882 | ** | 479 | *** |
| Clay | 205,568 | 482,414 | ** | 3,702 | *** |
| Clinton | -- | 89,021 | ** | -- | -- |
| Elliott | -- | 174,417 | ** | 192 | *** |
| Floyd | 859,351 | 887,329 | ** | 147,618 | *** |
| Greenup | 45,235 | 114,163 | ** | 3,973 | *** |
| Harlan | 1,474,108 | 1,583,025 | $396,006 | 169,981 | *** |
| Jackson | 127,588 | 140,227 | ** | 144 | *** |
| Johnson | 361,106 | 245,247 | ** | 11,573 | *** |
| Knott | 1,026,858 | 1,124,737 | ** | 224,826 | *** |
| Knox | 245,754 | 279,440 | ** | 9,636 | *** |
| Laurel | -- | 98,533 | ** | 219 | *** |
| Lawrence | 470,930 | 200,341 | ** | 6,424 | *** |
| Lee | -- | 259,776 | ** | 160 | *** |
| Leslie | 965,217 | 1,132,012 | ** | 99,352 | *** |
| Letcher | 698,698 | 1,037,624 | ** | 104,436 | *** |
| McCreary | 94,449 | 121,650 | ** | 96 | *** |
| Magoffin | 284,185 | 356,252 | ** | 7,436 | *** |
| Martin | 1,391,787 | 1,903,171 | ** | 125,768 | *** |
| Menifee | -- | 39,880 | ** | -- | *** |
| Morgan | -- | 131,853 | ** | -- | *** |
| Owsley | 109,990 | 172,968 | ** | 100 | *** |
| Perry | 1,364,167 | 1,425,842 | $1,000,000 | 140,172 | *** |
| Pike | 3,397,189 | 2,793,369 | ** | 621,883 | *** |
| Pulaski | -- | 62,660 | ** | 34 | *** |
| Rockcastle | -- | 62,255 | ** | -- | *** |
| Wayne | -- | 72,141 | ** | -- | *** |
| Whitley | 342,259 | 340,271 | ** | 18,580 | *** |
| Wolfe | 146,818 | 130,541 | $458,387 | 102 | *** |
| **EKY Total** | $14,678,046 | $17,043,085 | N/A | 1,810,440 | -- |
| **WESTERN KY** | | | | | |
| Butler | $107,150 | $97,001 | ** | 863 | *** |
| Caldwell | -- | 72,145 | ** | 48 | *** |
| Christian | 269,535 | 110,363 | ** | 3,715 | *** |
| Daviess | 364,803 | 138,266 | ** | 2,889 | *** |
| Edmonson | -- | 73,978 | ** | -- | *** |
| Hancock | -- | 74,840 | ** | -- | *** |
| Henderson | 395,906 | 296,904 | ** | 30,688 | *** |
| Hopkins | 833,275 | 767,473 | ** | 49,087 | *** |
| McLean | -- | 89,868 | ** | 1,967 | *** |
| Muhlenberg | 325,373 | 544,469 | ** | 42,871 | *** |
| Ohio | 383,774 | 374,689 | ** | 15,003 | *** |
| Union | 712,759 | 1,028,158 | ** | 39,496 | *** |
| Webster | 910,692 | 1,067,344 | ** | 59,637 | *** |
| **WKY Total** | $4,303,267 | $4,735,498 | N/A | $246,264 | -- |
| **State Total** | $18,981,314 | $21,778,583 | $10,889,292** | $2,056,705 | $8,000,000 |

* County and municipal totals for FY 1994-95.

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

*** Revenue generated from the Unmined Minerals Tax for each coal county 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 an average of 4 times the state share. Revenues from the Unmined Minerals Tax are treated as "new monies" and are not considered a part of the counties' tax base each year.

**Note:** Table doesn't include non-producing counties impacted by coal transportation, referred to as "Impacted Counties;" these 52 counties received $2.36 Million in coal severance taxes during FY 95.

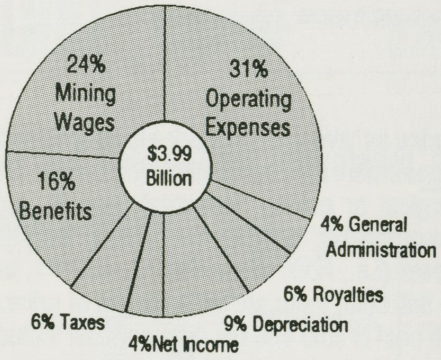
# Economic Impact

The Kentucky coal industry in 1994:

- employed 24,100 miners earning over $943 million per year.
- created a total of 95,500 jobs statewide.
- paid over $179 million in severance taxes and generated total state tax revenues of about $524 million.
- was a $3.99 billion industry which brought into Kentucky receipts totaling about $3.3 billion from 30 states and 14 countries. The five leading states were: Tennessee ($490 million), Georgia ($453 million), Florida ($393 million), North Carolina ($323 million), and South Carolina ($316 million).*
- created economic activity throughout Kentucky totaling $8.965 billion.

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

## 1994 Estimated Distribution of $3.99 Billion




Of the $3.99 billion in receipts from coal produced and processed, the largest part, 40 percent, went to miner's wages and benefits. Another 31 percent went to operating costs, including fuel, materials, maintenance, etc., and the remaining 29 percent went to depreciation (9%), taxes (6%), royalties (6%), net income (4%), and general administration (4%).

## 1994 Estimated Impact of $3.99 Billion

The $3.99 billion in receipts from coal produced and processed in Kentucky in 1994 generated additional economic activity totaling $4.975 billion and 71,400 jobs. This additional economic activity plus coal production and processing yielded total economic activity in Kentucky of $8.965 billion and 95,500 jobs.

| | Coal Industry | | Indirect | | Coal Industry and Indirect | |
|---|---|---|---|---|---|---|
| | Output (billion $) | Jobs | Output (billion $) | Jobs | Output (billion $) | Jobs |
| Mining Wages and Benefits (40%) | $1.576 | 24,100 | $1.753 | 27,300 | $3.329 | 51,400 |
| Operating Costs (31%) | $1.229 | N/A* | $1.854 | 22,300 | $3.083 | 22,300 |
| Other** (29%) | $1.185 | N/A* | $1.368 | 21,800 | $2.553 | 21,800 |
| Total | $3.990 | 24,100 | $4.975 | 71,400 | $8.965 | 95,500 |

* **NOTE:** Not Applicable.
** **NOTE:** Royalties, net income, depreciation, general administration, taxes.
Source: University of Kentucky Center for Business and Economic Research, Economic Impact Analysis of Coal in Kentucky, 1995.

# Economic Impact/Coal Prices

## Benefits Throughout the Kentucky Economy

Due to the economic impact of the coal industry throughout Kentucky in 1994, in addition to 24,100 persons working at the mines, 9,300 persons worked in factories making everything from mining equipment to home appliances; 4,000 persons drove coal trucks and cargo trucks, worked at rail yards, etc.; 19,700 persons worked in warehouses, sold clothing, appliances, furniture, in retail stores, etc.; 19,300 persons worked in banks, law offices, engineering firms, accounting firms, and other service businesses; 6,800 persons built homes, offices, factories, and highways; and 12,300 others were teachers, government officials, and a wide variety of other professions and occupations.

| Industry | Employment | Value of Product |
|---|---|---|
| Coal mining, processing | 24,100 jobs | $3.990 billion |
| Manufacturing | 9,300 jobs | 1.320 billion |
| Transportation | 4,000 jobs | .320 billion |
| Wholesale/retail trade | 19,700 jobs | .747 billion |
| Services | 19,300 jobs | .769 billion |
| Construction | 6,800 jobs | .427 billion |
| Other | 12,300 jobs | 1.399 billion |
| Total | 95,500 jobs | $8.972 billion* |

* **NOTE:** Does not total to $8.965 due to rounding.

Source: University of Kentucky Center for Business and Economic Research, Economic Impact Analysis of Coal in Kentucky, 1995.

## Coal Prices

There is no such thing as an average coal price as "average" coal price is an ambiguous term. 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* mine, FAS**, CIF***, total delivered). Within each of these ways to sell coal, there are wide ranges of price. A further review of the major points at which coal is sold and the different cost included during the mine-to-market process of coal in Kentucky are as follows:

- Coal sold in place (reserves)
- Coal sold in pit
- Gross value severed coal
- Gross value of the severed coal plus transportation and processing
- Total delivered price
- Gross value of the severed coal plus transportation
- *FOB (Free on Board) the mine, railcar, river terminal, export terminal
- **FAS (Free Along Side)
- ***CIF (Cargo Cost/Insurance/Freight)

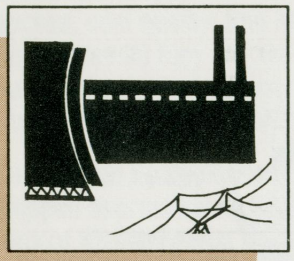
## Average Value of Kentucky Coal FOB Mine (dollars per ton)

| Year | Eastern Kentucky Underground | Eastern Kentucky Surface | Eastern Kentucky Average | Western Kentucky Underground | Western Kentucky Surface | Western Kentucky Average | KY 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 |

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, 1993-1994.

# Coal - Low Cost Energy

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



95% of Kentucky's electricity was generated from coal in 1994. (Hydro provided 4.8%; oil and gas together provided 0.2%.)

Utilities in Kentucky generated about 84.1 billion kilowatt-hours of electricity in 1994. Kentucky typically exports around 20% of the electricity produced in the state, with 68.7 billion kilowatt-hours being sold within Kentucky during 1994.
Source: U.S. DOE-EIA, Electric Power Annual, 1994, Volume I.

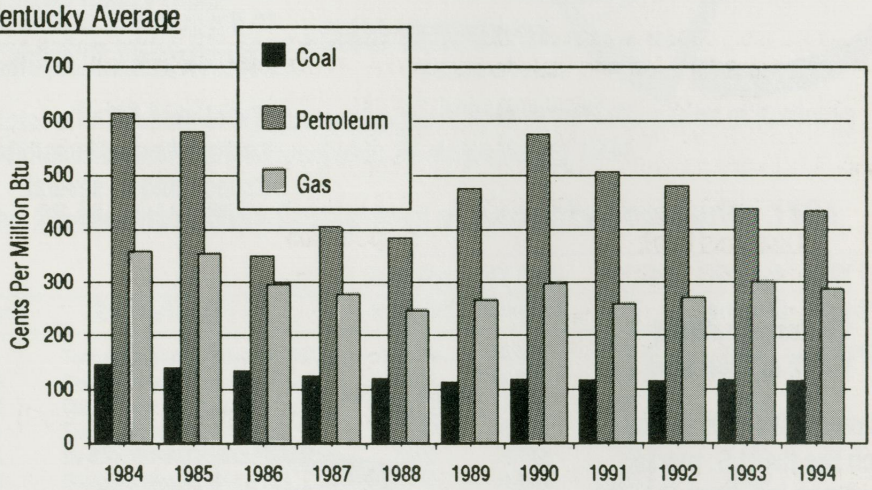
A comparison of fuel prices shows not only the fuel cost advantage of coal, but the more stable price dependability of coal.

**How To Calculate Cents Per Million Btu**

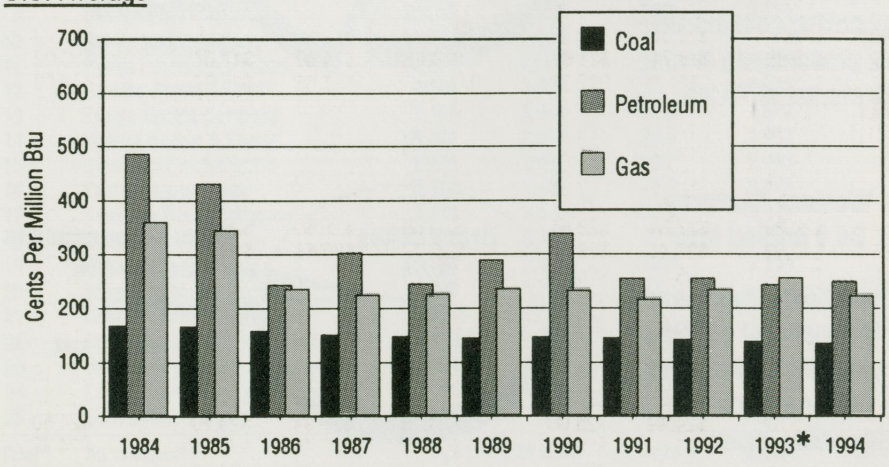
$$\frac{\text{Cents}}{\text{million Btu}} = \frac{\$\_\_\_\_ \text{ ton} \times 100 \text{ cents/dollar} \times 1{,}000{,}000}{(2{,}000 \text{ lbs/ton}) \times (\_\_\_\_\_ \text{ Btu/lb})}$$

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

Kentucky Average



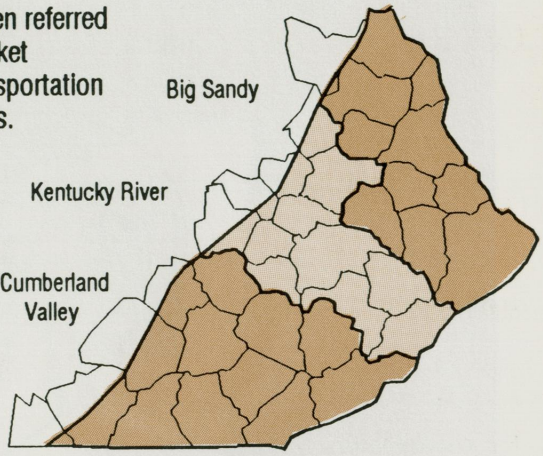

U.S. Average




* **NOTE:** In 1993 gas cost rose above petroleum for the first time while coal cost continued to decrease.
Source: U.S. DOE - Energy Information Administration, Cost and Quality of Fuels for Electric Utility Plants, 1994.

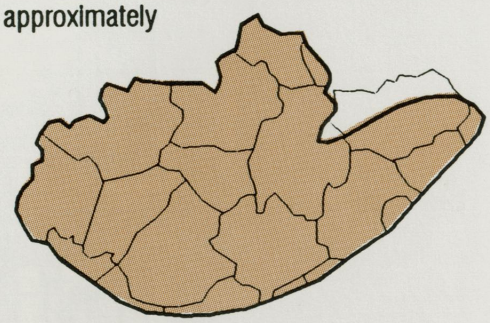
# Top Utility Consumers

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 93 million tons of Kentucky coal to 61 electric utility companies for use at 132 electric power plants located in 25 states during 1994.

The Western Kentucky coal field sold approximately 33 million tons of coal to 21 electric utility companies for use at 33 power plants in 10 states during 1994. Seven utility companies purchased 97% of Western Kentucky's coal, including the Tennessee Valley Authority which purchased over half of the coal mined in Western Kentucky during 1994.



Source: Analysis from U.S. DOE - Energy Information Administration, Form 423 Data, 1994, with computer assistance from UK-CAER.

A total of 69 electric utility companies purchased 126.6 million tons of Kentucky coal for 152 electric plants located in 25 states during 1994.

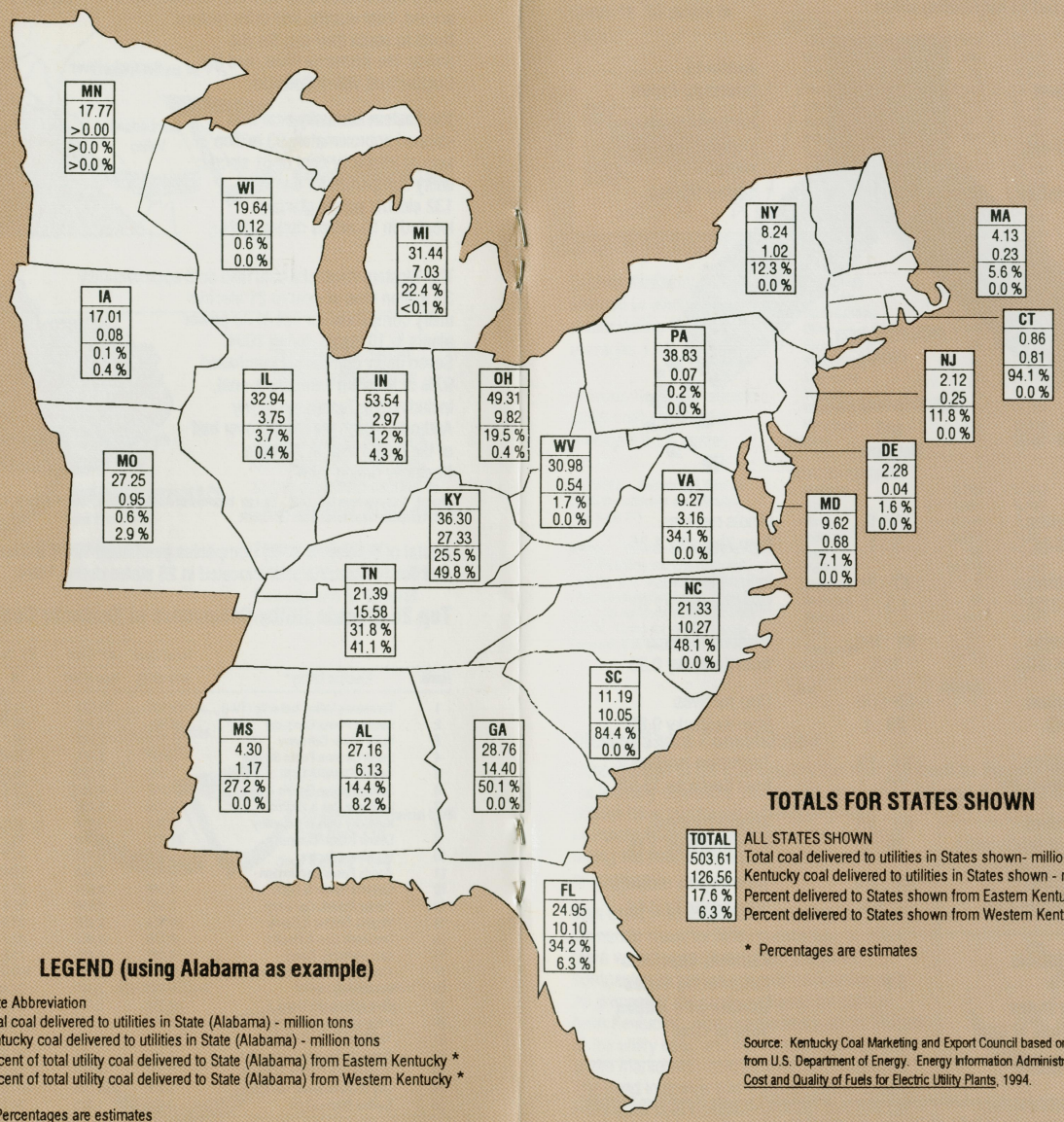
## Top 25 Electric Utility Consumers of Kentucky Coal during 1994

| Rank | Electric Utility* | Total Coal tons (000) | KY Coal tons (000) | KY Coal % | EKY Coal tons (000) | WKY Coal tons (000) |
|---|---|---|---|---|---|---|
| 1 | Tennessee Valley Authority (TVA) | 39,135 | 28,029 | 71.6 | 10,035 | 17,995 |
| 2 | Georgia Power Company | 28,461 | 14,129 | 49.6 | 14,129 | -- |
| 3 | Duke Power Company | 12,121 | 7,118 | 58.7 | 7,118 | -- |
| 4 | South Carolina Public Service | 5,401 | 5,401 | 100.0 | 5,401 | -- |
| 5 | Dayton Power & Light | 7,900 | 4,485 | 56.8 | 4,485 | -- |
| 6 | South Carolina Electric & Gas | 5,247 | 4,169 | 79.4 | 4,169 | -- |
| 7 | Louisville Gas & Electric | 5,904 | 4,138 | 70.1 | 69 | 4,069 |
| 8 | Kentucky Utilities Company | 6,631 | 4,112 | 62.0 | 3,114 | 997 |
| 9 | Detroit Edison Company | 21,037 | 3,924 | 18.7 | 3,924 | -- |
| 10 | Big Rivers Electric | 4,808 | 4,130 | 79.7 | 83 | 4,047 |
| 11 | Florida Power Corporation | 5,254 | 3,684 | 70.1 | 3,684 | -- |
| 12 | Carolina Power & Light | 9,748 | 3,621 | 37.2 | 3,621 | -- |
| 13 | Tampa Electric Company | 7,180 | 3,646 | 50.8 | 1,672 | 1,974 |
| 14 | Virginia Electric & Power | 10,254 | 2,952 | 28.9 | 2,952 | -- |
| 15 | Cincinnati Gas & Electric | 8,778 | 2,963 | 33.7 | 2,905 | 58 |
| 16 | East Kentucky Power | 3,416 | 2,485 | 72.8 | 2,478 | 7 |
| 17 | Kentucky Power Company | 2,449 | 2,449 | 100.0 | 2,449 | -- |
| 18 | Consumers Power | 7,375 | 2,390 | 32.4 | 2,390 | -- |
| 19 | Ohio Edison Company | 7,453 | 2,154 | 28.9 | 2,154 | -- |
| 20 | Indiana-Kentucky Electric | 4,228 | 1,790 | 42.3 | -- | 1,790 |
| 21 | Alabama Power Company | 18,531 | 1,506 | 8.1 | 1,402 | 104 |
| 22 | Seminole Electric Cooperative | 3,403 | 1,476 | 43.4 | -- | 1,476 |
| 23 | Jacksonville Electric Authority | 3,734 | 1,107 | 29.7 | 1,107 | -- |
| 24 | City of Owensboro, Kentucky | 1,046 | 1,045 | 100.0 | -- | 1,045 |
| 25 | Central Illinois Light | 2,582 | 1,025 | 39.7 | 1,025 | -- |
| Total* | 69 Utilities* | n/a | 126,555 | n/a | 93,400** | 33,200** |

* **NOTE:** Receiving Kentucky Coal (columns do not add to totals due to 44 utilities not being listed.
** **NOTE:** Eastern and Western Kentucky totals are estimates.

# Kentucky Coal Shipments to Electric Utility Plants by State in 1994

**Kentucky Coal was shipped to electric plants in 25 states in 1994.**




## TOTALS FOR STATES SHOWN

| | |
|---|---|
| TOTAL | ALL STATES SHOWN |
| 503.61 | Total coal delivered to utilities in States shown- million tons |
| 126.56 | Kentucky coal delivered to utilities in States shown - million tons |
| 17.6 % | Percent delivered to States shown from Eastern Kentucky * |
| 6.3 % | Percent delivered to States shown from Western Kentucky * |

* Percentages are estimates

## LEGEND (using Alabama as example)

| | |
|---|---|
| AL | State Abbreviation |
| 27.16 | Total coal delivered to utilities in State (Alabama) - million tons |
| 6.13 | Kentucky coal delivered to utilities in State (Alabama) - million tons |
| 14.4 % | Percent of total utility coal delivered to State (Alabama) from Eastern Kentucky * |
| 8.2 % | Percent of total utility coal delivered to State (Alabama) from Western Kentucky * |

* Percentages are estimates

Source: Kentucky Coal Marketing and Export Council based on data from U.S. Department of Energy. Energy Information Administration, Cost and Quality of Fuels for Electric Utility Plants, 1994.

# Distribution - Utility Coal

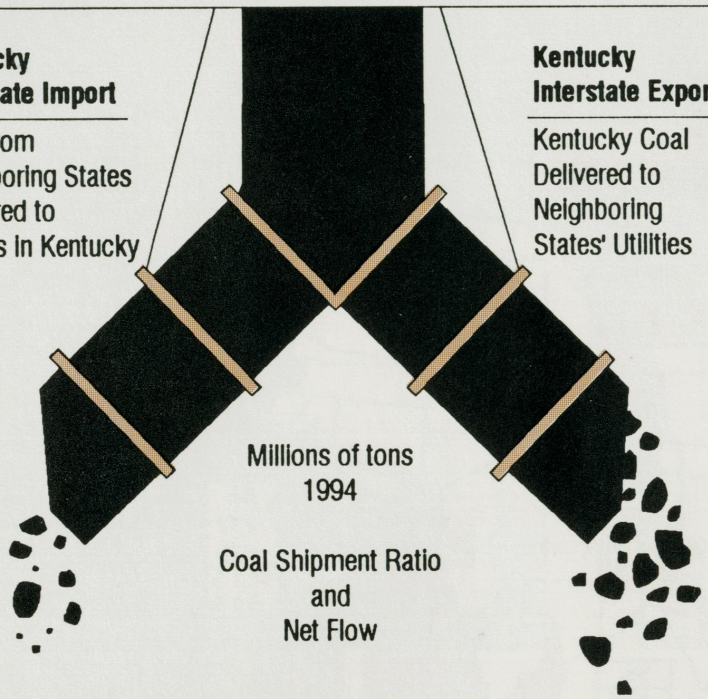
Kentucky exports over 5 tons of utility coal to neighboring states for every ton imported. The chart below shows the ***Interstate Imports and Exports*** of utility coal between Kentucky and its neighboring states.*

**Kentucky Interstate Import**

Coal from Neighboring States Delivered to Utilities in Kentucky

**Kentucky Interstate Export**

Kentucky Coal Delivered to Neighboring States' Utilities



Millions of tons
1994

Coal Shipment Ratio
and
Net Flow

| | | |
|---|---|---|
| Kentucky receives from Illinois 0.44 | KY : IL 3 : 1 | Illinois receives from Kentucky 1.35 |
| Kentucky receives from Indiana 2.34 | KY : IN 1.3 : 1 | Indiana receives from Kentucky 2.97 |
| Kentucky receives from Missouri 0.0 | KY : MO N/A | Missouri receives from Kentucky 0.95 |
| Kentucky receives from Ohio 0.43 | KY : OH 23 : 1 | Ohio receives from Kentucky 9.82 |
| Kentucky receives from Tennessee 0.12 | KY : TN 130 : 1 | Tennessee receives from Kentucky 15.58 |
| Kentucky receives from Virginia 0.04 | KY : VA 79 : 1 | Virginia receives from Kentucky 3.16 |
| Kentucky receives from West Virginia 3.50 | KY : WV 1 : 6.5 | West Virginia receives from Kentucky 0.54 |

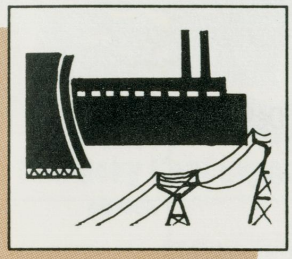
| | | |
|---|---|---|
| **Kentucky's Utilities Import from Neighboring States 6.9 Million Tons of Coal** | 5.0 : 1 → | **Kentucky Exports to Neighboring States' Utilities 34.4 Million Tons of Coal** |

* Does not include metallurgical or industrial coal shipments, or Kentucky's imports of coal from Colorado (1.18 million tons), Pennsylvania (0.56 million tons), and Utah (0.37 million tons).

Source: U.S. Department of Energy - Energy Information Administration, Cost and Quality of Fuels, 1994.

# Distribution Utility Coal

**Kentucky coal was shipped to electric utility plants in 25 states in 1994.**



Eastern Kentucky coal shipped to electric utility plants during 1994 averaged 1.1% sulfur.

Western Kentucky electric utility coal shipments averaged 3.1% sulfur.

* **NOTE:** Eastern and Western Kentucky subtotals are estimates. (see page 21)

Source: Estimated by the Kentucky Coal Marketing and Export Council from the U.S. DOE - Energy Information Administration, Form 423 data with computer assistance from the UK - Center for Applied Energy Research (UK-CAER).

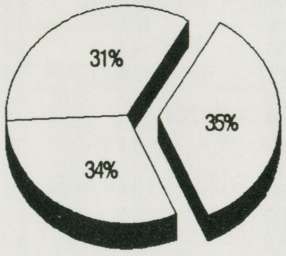
| Coal Field / Destination (State) | Receipts Thousand Tons * | Average Btu/lb | Average Percentage Sulfur | Ash |
|---|---|---|---|---|
| **EASTERN KENTUCKY** | | | | |
| Alabama | 3,903 | 12,110 | 1.1 | 11.3 |
| Connecticut | 809 | 13,080 | 0.5 | 7.4 |
| Delaware | 36 | 12,916 | 0.6 | 6.8 |
| Florida | 8,520 | 12,738 | 1.0 | 8.4 |
| Georgia | 14,277 | 12,474 | 1.1 | 9.9 |
| Illinois | 1,593 | 13,050 | 0.8 | 6.4 |
| Indiana | 705 | 12,399 | 1.3 | 9.4 |
| Iowa | 4 | 12,600 | 1.3 | 9.8 |
| Kentucky | 10,059 | 12,130 | 1.1 | 10.8 |
| Maryland | 679 | 12,998 | 0.7 | 7.7 |
| Massachusetts | 230 | 12,593 | 0.7 | 8.2 |
| Michigan | 7,017 | 12,693 | 0.9 | 8.6 |
| Minnesota | 0.4 | 11,789 | 1.1 | 11.7 |
| Mississippi | 1,171 | 12,463 | 0.8 | 9.0 |
| Missouri | 48 | 13,629 | 0.9 | 6.8 |
| New Jersey | 251 | 13,158 | 0.7 | 7.5 |
| New York | 1,015 | 12,950 | 0.6 | 7.8 |
| North Carolina | 10,265 | 12,429 | 1.0 | 9.4 |
| Ohio | 9,759 | 11,936 | 1.0 | 12.3 |
| Pennsylvania | 65 | 13,078 | 0.6 | 7.1 |
| South Carolina | 10,045 | 12,747 | 1.2 | 8.8 |
| Tennessee | 6,799 | 12,561 | 1.4 | 9.4 |
| Virginia | 3,170 | 12,561 | 1.4 | 9.4 |
| West Virginia | 539 | 12,581 | 0.9 | 8.4 |
| Wisconsin | 121 | 13,015 | 0.9 | 7.5 |
| **Subtotal** | * | **12,458** | 1.1 | **9.7** |
| **WESTERN KENTUCKY** | | | | |
| Alabama | 2,235 | 11,813 | 3.1 | 11.0 |
| Florida | 1,561 | 12,457 | 2.9 | 8.2 |
| Illinois | 2,158 | 12,163 | 2.7 | 7.5 |
| Indiana | 2,277 | 11,302 | 3.2 | 10.8 |
| Iowa | 82 | 11,474 | 2.8 | 8.9 |
| Kentucky | 17,173 | 11,285 | 3.4 | 14.1 |
| Maryland | 7 | 12,726 | 1.0 | 10.2 |
| Michigan | 12 | 11,910 | 3.0 | 8.0 |
| Missouri | 904 | 11,534 | 3.0 | 8.1 |
| Ohio | 51 | 11,113 | 2.4 | 8.8 |
| Tennessee | 8,757 | 11,903 | 2.6 | 8.3 |
| **Subtotal** | * | **11,586** | 3.1 | **11.4** |
| **Total** | **126,555** | | | |

## Market Share Consolidation

Consolidation of the coal industry has been the trend for the past several years. As the industry constricts, companies are being purchased or combined. Several large utilities have purchased existing long-term contracts from coal companies, thereby eliminating the need to operate a particular mine or company.

This trend is clearly evident in the distribution of market share for utility purchases. In 1994, there were approximately 300 producing companies; however, six coal companies sold 35 percent of the coal purchased by utilities from Kentucky. Nine companies sold 31 percent of the utility coal, and the remaining 34 percent of the market was sold by over 60 companies. The trend indicates that a small number of large, multi-state coal companies furnish the bulk of the coal for the utility market, and the smaller coal companies serve as contractors for those larger producers with large combined sales.

**1994 Electric Utility Sales by Kentucky Producers**

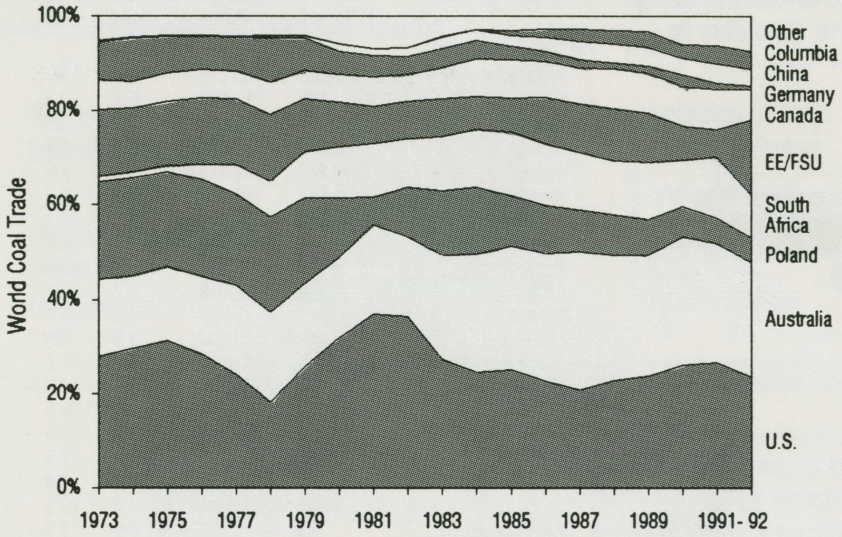



35% = 6 Companies
31% = 9 Companies
34% = > 60 Companies

Source: Resource Data International, Inc.

# U.S. Coal Exports

## The U.S. Plays a Major Role in World Coal Trade




The United States continued to be of world wide importance as a source of coal ranking second to Australia in the amount exported in 1992.

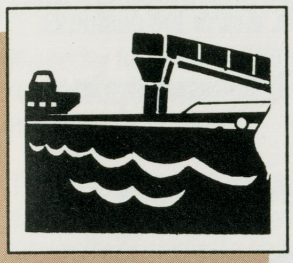
The United States exports coal to over 30 countries with six countries; Canada, Japan, Italy, Netherlands, Belgium-Luxemburg, and Spain, accounting for more than half of the total.

## Destination of U.S. Coal Exports (million tons)

| Year | Canada | Brazil | Europe | Japan | Other | Total |
|---|---|---|---|---|---|---|
| **1960** | 12.8 | 1.1 | 17.1 | 5.6 | 1.3 | 38.0 |
| 1961 | 12.1 | 1.0 | 15.7 | 6.6 | 1.0 | 36.4 |
| 1962 | 12.3 | 1.3 | 19.1 | 6.5 | 1.0 | 40.2 |
| 1963 | 14.6 | 1.2 | 27.7 | 6.1 | 0.9 | 50.4 |
| 1964 | 14.8 | 1.1 | 26.0 | 6.5 | 1.1 | 49.5 |
| **1965** | 16.3 | 1.2 | 25.1 | 7.5 | 0.9 | 51.0 |
| 1966 | 16.5 | 1.7 | 23.1 | 7.8 | 1.0 | 50.1 |
| 1967 | 15.8 | 1.7 | 19.4 | 12.2 | 1.0 | 50.1 |
| 1968 | 17.1 | 1.8 | 15.5 | 15.8 | 0.9 | 51.2 |
| 1969 | 17.3 | 1.8 | 15.2 | 21.4 | 1.2 | 56.9 |
| **1970** | 19.1 | 2.0 | 21.8 | 27.6 | 1.2 | 71.7 |
| 1971 | 18.0 | 1.9 | 16.6 | 19.7 | 1.1 | 57.3 |
| 1972 | 18.7 | 1.9 | 16.9 | 18.0 | 1.2 | 56.7 |
| 1973 | 16.7 | 1.6 | 14.4 | 19.2 | 1.6 | 53.6 |
| 1974 | 14.2 | 1.3 | 16.1 | 27.3 | 1.8 | 60.7 |
| **1975** | 17.3 | 2.0 | 19.0 | 25.4 | 2.6 | 66.3 |
| 1976 | 16.9 | 2.2 | 19.9 | 18.8 | 2.1 | 60.0 |
| 1977 | 17.7 | 2.3 | 15.0 | 15.9 | 3.5 | 54.3 |
| 1978 | 15.7 | 1.5 | 11.0 | 10.1 | 2.5 | 40.7 |
| 1979 | 19.5 | 2.8 | 23.9 | 15.7 | 4.1 | 66.0 |
| **1980** | 17.5 | 3.3 | 41.9 | 23.1 | 6.0 | 91.7 |
| 1981 | 18.2 | 2.7 | 57.0 | 25.9 | 8.7 | 112.5 |
| 1982 | 18.6 | 3.1 | 51.3 | 25.8 | 7.5 | 106.3 |
| 1983 | 17.2 | 3.6 | 33.1 | 17.9 | 6.1 | 77.8 |
| 1984 | 20.4 | 4.7 | 32.8 | 16.3 | 7.2 | 81.5 |
| **1985** | 16.4 | 5.9 | 45.1 | 15.4 | 9.9 | 92.7 |
| 1986 | 14.5 | 5.7 | 42.6 | 11.4 | 11.4 | 85.5 |
| 1987 | 16.2 | 5.8 | 34.2 | 11.1 | 12.3 | 79.6 |
| 1988 | 19.2 | 5.3 | 45.1 | 14.1 | 11.3 | 95.0 |
| 1989 | 16.8 | 5.7 | 51.6 | 13.8 | 12.9 | 100.8 |
| **1990** | 15.5 | 5.8 | 58.4 | 13.3 | 12.8 | 105.8 |
| 1991 | 11.2 | 7.1 | 65.5 | 12.3 | 12.9 | 109.0 |
| 1992 | 15.1 | 6.4 | 57.3 | 12.3 | 11.4 | 102.5 |
| 1993 | 8.9 | 5.2 | 37.6 | 11.9 | 10.9 | 74.5 |
| 1994 | 9.2 | 5.5 | 35.8 | 10.2 | 10.7 | 71.4 |

Source: U.S. DOE Energy Information Administration; Coal Data: A Reference, 1989, Quarterly Coal Report, October - December, 1994, International Energy Annual, 1993.

# Coal Exports/Imports



The U.S. exported 71.4 million tons of coal in 1994, down by 31 million tons from 1992. Imports totaled 7.6 million tons.

Kentucky's 1994 exports of 7.2 million tons were 10% of total U.S. exports. This lowest export total in several years corresponds to recent decreases in U.S. exports. The value of Kentucky's coal exports is estimated at $274 million.

## Kentucky Coal Exports, 1994

| 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 | 501,000 | $ 16,778,490 | 81,000 | $ 3,650,670 | 583,000 | $ 20,429,160 |
| Brazil | -- | -- | 29,000 | 1,225,540 | 29,000 | 1,225,540 |
| Canada | 26,000 | 790,660 | 1,073,000 | 37,104,340 | 1,099,000 | 37,895,000 |
| China (Taiwan) | 3,140,000 | 120,199,200 | 120,000 | 5,097,600 | 3,260,000 | 125,296,800 |
| France | -- | -- | 196,000 | 8,694,560 | 196,000 | 8,694,560 |
| Iceland | -- | -- | 9,000 | 342,000 | 9,000 | 342,000 |
| Italy | 941,000 | 36,040,300 | 52,000 | 2,356,640 | 993,000 | 38,396,940 |
| Jamaica | 32,000 | 1,131,840 | -- | -- | 32,000 | 1,131,840 |
| Japan | 41,000 | 1,381,290 | 83,000 | 3.367,310 | 124,000 | 4,748,600 |
| Netherlands | 276,000 | 9,922,200 | 55,000 | 2,478,850 | 331,000 | 12,401,050 |
| Norway | -- | -- | 91,000 | 4,310,670 | 91,000 | 4,310,670 |
| Portugal | 30,000 | 1,087,500 | -- | -- | 30,000 | 1,087,500 |
| Sweden | -- | -- | 19,000 | 865,640 | 19,000 | 865,640 |
| United Kingdom | -- | -- | 371,000 | 16,750,650 | 371,000 | 16,750,650 |
| **KENTUCKY** | 4,987,000 | $187,331,480 | 2,180,000 | $86,244,470 | 7,167,000 | $273,575,950 |

* **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 Marketing and Export Council using data from the Energy Information Administration, Coal Industry Annual, 1994

Kentucky ranked third in the U.S. in 1994 for exports behind West Virginia (36.2 million tons) and Virginia (11.7 million tons). Appalachian coal accounts for over 90% of U.S. exports.

## U.S. Bituminous Coal Exports, Steam and Metallurgical

Metallurgical coal has historically dominated U.S. bituminous exports, and is expected to continue to do so through the remainder of the century.

In 1994 the U.S. exported 71.4 million tons of coal (24.0 million steam coal and 47.3 million metallurgical coal). Metallurgical coal remained the majority of U.S. exports, with its share at 66% in 1994.

## U.S. Imports*

Columbia, Venezuela, and Canada were the largest suppliers of imported coal in 1994. Their share was 3.4 million, 1.5 million, and 1.3 million short tons, respectively.

One electric utility plant (Jacksonville Electric Authority, St. Johns River Plant) received 2.03 million short tons from Columbia during 1994.

* **NOTE:** Includes Puerto Rico and Virgin Islands

Source: U.S. DOE Energy Information Administration, Quarterly Coal Report, October - December, 1994.

U.S. Import Totals *

| 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 |

# Transportation

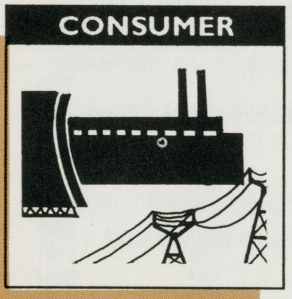
Most Kentucky coal is transported by more than one mode of transportation because of cost considerations, the location of the minesite, and/or the customer.

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 System Distribution Estimates


**Kentucky's 1994 Coal Production was 168.5 Million Tons**

| Initial Distribution Modes (% Production) | |
|---|---|
| **83%** | **Minesite To State-Maintained Highway (140 Million Tons)** |
| 5% | Kentucky power plants and other Ky. consumers |
| 12% | Coal river terminals |
| 7% | State line |
| 6% | Truck Sites |
| 53% | Rail loading facilities |
| **7%** | **Other Known Direct Minesite Distribution Modes (12 Million Tons)** |
| <1% | Minesite to barge facility via conveyor |
| 7% | Loaded directly to rail at the minesite |
| **10%** | **Unknown, Unreported, or Unclassified** |
| | (17 Million Tons - i. e., refuse, raw coal losses, other differences in reporting methods, etc.) |




In multimodal coal transportation the "initial" transportation mode from the minesite 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.

**Primary Distribution Modes to Consumers** (million of tons)

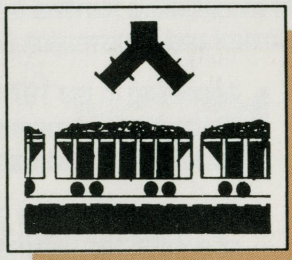
| | Domestic Distribution | | | Foreign Distribution | | |
|---|---|---|---|---|---|---|
| MODE | EKY | WKY | KY | EKY | WKY | KY |
| Railroad | 87.8 | 9.5 | 97.3 | 0.1 | -- | 0.1 |
| River | 15.9 | 19.0 | 34.8 | -- | -- | -- |
| Great Lakes | 1.3 | 0.1 | 1.3 | 1.0 | -- | 1.0* |
| Tidewater | 2.6 | 0.2 | 2.8 | 5.9 | 0.1 | 6.0* |
| Truck | 8.2 | 6.1 | 14.2 | -- | -- | -- |
| Conveyor | -- | -- | -- | -- | -- | -- |
| Unknown | 1.5 | 0.1 | 1.5 | -- | -- | -- |
| Total | 117.2 | 34.7 | 152.0 | 7.0 | 0.1 | 7.2 |

* **NOTE:** Primary Modes of Foreign Distribution include secondary coal transportation modes of approximately 5.2 million tons being moved by rail and approximately 1.9 million tons being moved by barge to tidewater ports and ports on the Great Lakes for export.

Sources: Kentucky Coal Marketing and Export Council estimates based on data from: Kentucky Transportation Cabinet's Coal Haul Highway System, 1995 Report; U.S. DOE-EIA, Quarterly Coal Report October-December, 1994; Coal Industry Annual, 1994; Kentucky Department of Mines and Minerals, Annual Report, 1994.

# Transportation

## Coal Transportation by Rail in Kentucky



Kentucky has over 2,700 miles of railroad lines, over which 102.5 million tons of Kentucky coal were transported in 1994.

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

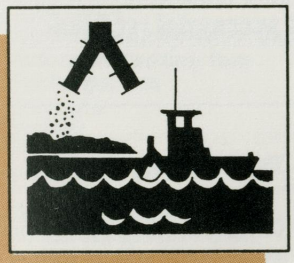
These railroads have in excess of 100,000 hopper cars dedicated to the transport of coal.

Kentucky has approximately 200 coal rail loading facilities.

Over 90% 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 37 million tons of Kentucky coal were shipped in 1994.



Statewide, 55 coal river terminals on the Ohio River and its tributaries serve Kentucky coal shippers (42 within Kentucky).

In total, 22 coal river terminals are located near Eastern Kentucky, 6 in Central Kentucky, and 27 near Western Kentucky.

Of these, 22 of the coal river terminals have rail access, 47 have truck access, 18 have barge off-loading access, and 3 have conveyor access. Automated blending is found in 34 of the coal river terminals with 35 having automatic sampling, 29 having some coal crushing equipment, and 11 having stoker preparation equipment.

Source: Kentucky Coal Marketing and Export Council, Kentucky Coal Marketing Updates - Coal River Terminals, 1995.

## Coal Transportation by Truck in Kentucky

Over 5,000 miles of state-maintained highways are used for transporting coal.

Truck shipments are a very important mode of coal transportation in Kentucky. In 1994, approximately 140 million tons or 83 % of Kentucky's coal used trucks in at least one leg of the many different types of multimodal coal transportation market routes.

Over 3 billion ton-miles of coal transportation by truck were reported during 1994.

Over 3,700 coal trucks were registered during 1994 in Kentucky, indicating that over 3,700 coal truck drivers were employed in Kentucky. The sale of extended weight coal decals generated $993,000 in 1994.

Sources: Kentucky Transportation Cabinet, Official Coal Haul Highway System 1995; Department of Vehicle Regulation - Division of Motor Vehicle Licensing.

# Reclamation

Mined land must be returned to its approximate original contours, 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, operations, 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 $625.5 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 $768.5 million of reclamation bonds outstanding to assure timely and successful reclamation.**

| Bond Release Phase | Reclamation Release Type | % of Bond Released | Time/Phase Requirement |
|---|---|---|---|
| Phase I | Backfilling, Grading 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, 1984-94

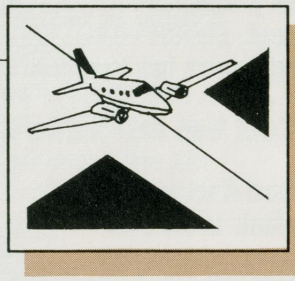
| | Phase I | | | Phase II | | | Phase III | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | # of Releases | Acres* Released | Bond | # of Releases | Acres* Released | Bond | # of Releases | Acres* Released | Bond |
| 1984 | 4 | 123 | $277,886 | - | - | - | - | - | - |
| 1985 | 40 | 767 | $1,946,323 | 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 |
| Total | 4,410 | 126,119 | $253,762,124 | 2,030 | 60,064 | $53,522,643 | 1,299 | 43,038 | $32,962,131 |

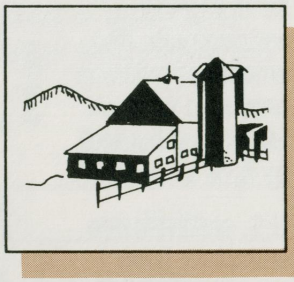
* **NOTE:** Includes surface acreage over underground mines.

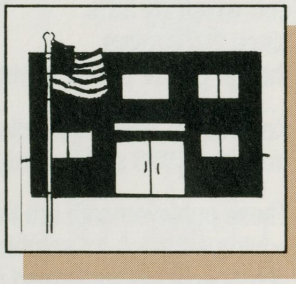
Source: Kentucky Natural Resources and Environmental Protection Cabinet, Department for Surface Mining, Reclamation and Enforcement.

# 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 land for development is still a premium.







| Post Mining Land Use | County |
|---|---|
| **Regional Airports** | |
| Big Sandy Regional Airport | Martin |
| Hatcher Field Airport | Pike |
| Carroll Field Airport | Perry |
| Ohio County Airport | Ohio |
| Manchester Airport | Clay |
| **Correctional Facilities** | |
| Federal Correctional Institute | Clay |
| East Kentucky Correctional Complex | Morgan |
| Medium Security Prison | Muhlenberg |
| Private Prison | Floyd |
| **Government Facilities** | |
| Earle C. Clements Job Corps Center | Muhlenberg |
| Army National Guard Training Center | Muhlenberg |
| U.S. Postal Service | Laurel |
| County Park | Ohio, Webster |
| Madisonville South By-pass | Hopkins |
| Solid Waste Landfills | Clay, Daviess, Greenup, Ohio, Hopkins |
| Hazard Armory | Perry |
| **Mountaintop Farms** | |
| Starfire Project | Perry |
| MAPCO/Morehead Agriculture Center | Martin |
| Martin County Coal Corp. Farm | Martin |
| D&R Brangus Farm | Perry |
| Avian Farms | Wayne |
| Hog Farm | Hopkins, Knox |
| Livestock Feed | Lee |
| Chicken/Broiler Houses | Hopkins, Muhlenberg |
| **Industrial/Commercial** | |
| Electric Utility Operations Center | Hopkins |
| Industrial Scrubber Sludge Disposal | Ohio, Daviess, Webster |
| Explosive Manufacturing | Muhlenberg |
| Wood Fabrication Plant | Breathitt (Proposed), Perry |
| Apparel Manufacturing | Perry |
| Mine Shops/Welding/Machine/Equipment | Johnson, Hopkins, Knox, Muhlenberg, Ohio, Union, Whitley |
| 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 |
| **Fish & Wildlife** | |
| Duck Refuge Areas | Ohio, Perry, Breathitt, Knott, Martin, Muhlenberg |
| Goose Down Production | Greenup |
| Catfish Farming | Greenup, McLean |
| Trout Farm | Bell |
| Wildlife Management Area | Muhlenberg |
| Wetland Development | Muhlenberg |
| **R&R/Sport** | |
| State Park (Proposed) | Knott |
| Recreation Areas | Greenup |
| Golf Courses | Clay, Laurel, Letcher, Martin (Proposed), McLean |
| Golf (drive & putt) | Webster |
| Recreational Area & Fishing Lake | Pike |
| **Structural Building Sites** | |
| High Schools | Bell, Harlan, Pike |
| Middle School | Bell |
| Athletic Complexes | Bell, Letcher, Perry |
| Appalachian Regional Hospital | Perry |
| Housing Developments | Clay, Letcher, Perry, Pike |
| Church, School Daycare | Laurel |
| Mobile Home Sales | Laurel |
| Shopping Centers | Breathitt, Clay, Knox, Laurel, Leslie, Letcher, Pike, Perry |
| Car/Truck/Equipment Sales | Perry |
| Motel | Laurel, Perry |
| Numerous small businesses in East Kentucky | |

Sources: Natural Resources and Environmental Protection Cabinet - DSMRE.
Kentucky Coal Marketing and Export Council.

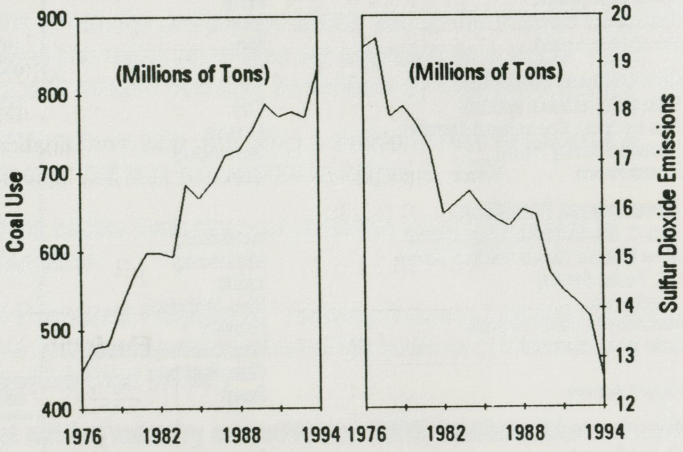
# Air Quality

## Coal is being burned more cleanly today than ever before.

Air pollution from coal is decreasing, while coal use is increasing. The major source of air pollution from coal is electric utility plants, because they are the major users of coal. Electric utilities are using less-polluting coal, and their use of pollution control equipment has increased dramatically.

### Coal Use and Sulfur Dioxide Emissions from Electric Utility Plants

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 63% since 1977.




U.S. sulfur dioxide emissions have decreased by 35% since 1977, even though power plants increased their 1977 coal use level by 74%.

Kentucky's 1994 sulfur dioxide emissions of 685,000 tons have been reduced by 54% from the 1976 sulfur dioxide emission level of 1,496,417 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 have scrubbers on 42% of their coal-fired generating capacity, compared to the national average of 22%.

Sources: National Acid Precipitation Assessment Program, Acid Deposition; State of Science and Technology, Summary Report, 1991 and Interim Assessment, 1987; Oak Ridge National Laboratory, Utility FGD Survey, 1991; Argonne National Laboratory, Current Emission Trends (ANL/EAIS/TM-25); Kentucky Division of Air Pollution Control; Environmental Quality Commission, The State of Kentucky's Environment: 1994 Status Report; U.S.DOE - EIA, Coal Industry Annual, 1994; Electric Power Annual, 1989-91.

## Clean Air Act Amendments 1990 (Phase I 1995/Phase II 2000)

After five years, initial results of the effects of the Clean Air Act Amendments of 1990 (CAAA) indicate a much greater overcompliance than originally anticipated. Phase I of the CAAA took effect on 1/1/95 and affected a base inventory of 261 utility units. Phase I lasts until the year 2000 when Phase II will begin. First phase trends indicate:

Emission Credit Exchange Values have dropped over 30% since 1993.

A massive overcompliance with Phase I emission allowances has created a bank of 14 to 15 million $SO_2$ credits, and the market for these credits and Phase II credits has dropped.*

With this large buildup of credits, utilities may not need to install scrubbers until well into Phase II.

Compliance (1.2 lbs/mm Btu of $SO_2$) and super-compliance (under 1.2 lbs) coals may not command higher prices since utilities can essentially use their own banked credits or purchase credits, acquire basic low-sulfur coal, and achieve their compliance needs.

* NOTE: Historical exchange values calculated as a cash, spot market price reference by Emissions Exchange Corp., Denver, CO.

Source: Based on work done by Resource Data International, Inc., Boulder, CO.

# Clean Coal Technology

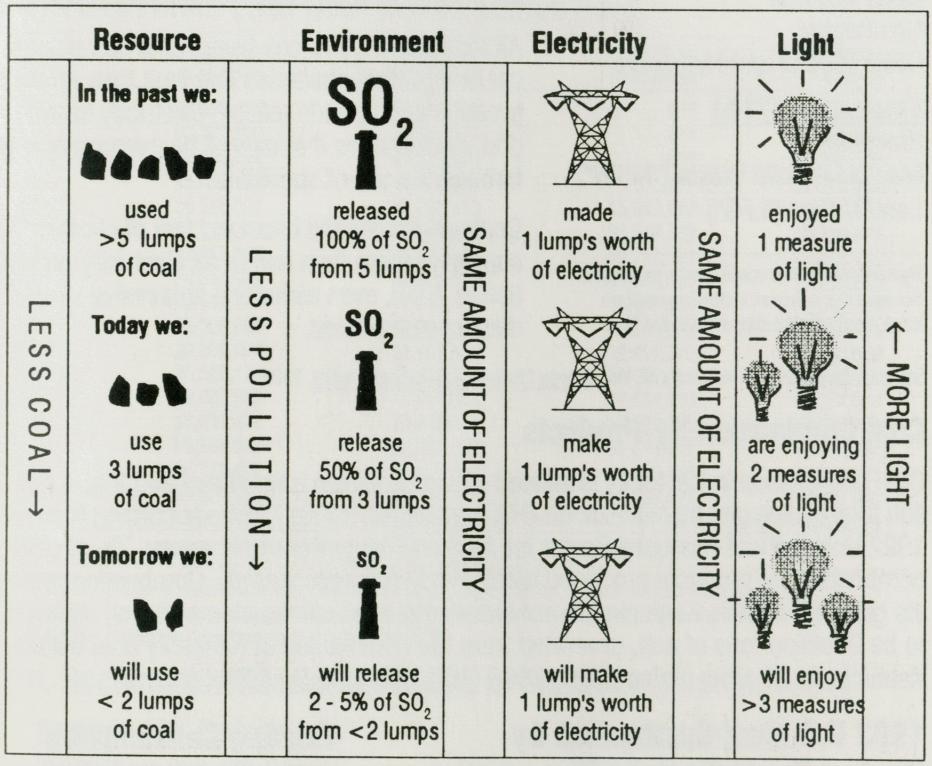
## Clean Coal Technology and the Future Role of Coal

Clean Coal Technologies are ensuring that America can rely increasingly on coal, the nation's most abundant and lowest-cost energy resource, to meet its growing electricity needs while also greatly improving the environment.

In the U.S. DOE Clean Coal Technology Program, government and industry since 1986 have allocated $2.4 billion and $4.7 billion respectively to develop 45 technologies such as advanced coal-washing processes, advanced flue gas scrubbers, coal gasifiers, and fluidized bed boilers. These will ensure that coal can meet every environmental standard and greatly exceed many.

The chart below illustrates that Clean Coal Technologies work in two major ways: (a) pollutants are removed before (e.g., coal-washing, gasification) or while coal is burned (fluidized-bed, scrubbing): (b) pollutants are reduced as more efficient and technologically advanced plants use less coal.

## Coal-to-Electricity and Electricity-to-Light




## 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. Recently-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. About two-thirds of the states have begun considering also opening their electric utility systems to nationwide competition for retail customers such as industrial plants and even residential customers.

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.

# Electric Utilities/By-Products

## Renewable Fuels for Electricity

The Public Utility Regulatory Policy Act of 1978 (PURPA), in conjunction with the energy crises of that decade, spawned the commercial development of a wide variety of alternative energy technologies. In 1993, the total installed electric generating capacity of all alternative, renewable sources of energy represented 2% of total U.S. generating capacity and generation. Assuming a best case scenario for further development of these technologies by the years 2000, 2005, and 2010, the combined total for all renewable resources could represent 4%, 8%, and 11%, respectively, of all U.S. electricity generation.

### Renewable Energy Technologies

**Non-Combustion (29%)**
Wind Turbines
Solar Photovoltaic
Solar Thermal
Geothermal
Other (Ocean and Hydrogen)

**Combustion (71%)**
Biomass
Municipal Solid Waste ("MSW")
Landfill Gas ("LFG")

Hydroelectric is not considered a renewable because it is a proven technology and no large, undeveloped sites exist in the U.S.

However, under current levels of tax incentives and regulatory support, renewable energy (excluding hydro technologies) is projected to grow to 4% by 2010. In fact, the most ambitious scenario which gives renewables an 11% market share by 2010 could cost taxpayers, consumers, and/or utilities about $203 billion in subsidies.

All renewable resources have some technological or logistical obstacles that limit their ability to produce and provide reliable electricity to the grid --- obstacles that cannot be overcome, even through the use of subsidies.

Coal will remain the baseload fuel of choice, supplying more than half of all electricity generation in 2010, even assuming aggressive subsidies for renewables.

Source: Resource Data International, Inc., Energy Choices in a Competitive Era, 1995

## Coal Combustion By-Products

Coal combustion in Kentucky produced almost 4 million tons of ash and 2 to 4 million tons of flue gas desulfurization (FGD) materials during 1994. According to a 1992 University of Kentucky Center for Applied Energy Research survey, 7% of coal combustion by-products produced within Kentucky were reused. Combustion materials generated within Kentucky do not include the coal combustion material, estimated to be 9 million tons of ash, generated from the combustion of Kentucky coal outside Kentucky in 25 other states during 1994 (16% of total U.S. utility coal).

### 1993 U.S. Coal Combustion By-Product Production and Consumption (million tons)

| | Production | Consumption | %Used |
|---|---|---|---|
| Fly Ash | 47.8 | 10.5 | 22.0 |
| Bottom Ash | 14.2 | 4.2 | 29.8 |
| Boiler Slag | 6.2 | 3.4 | 55.0 |
| Subtotal | 68.2 | 18.2 | 26.6 |
| FGD Material | 20.3 | 1.2 | 5.7 |
| Total | 88.5 | 19.3 | 21.7 |

### Existing Consumption

Cement and concrete products
Structural fill/Flowable fill
Road base/Subbase
Mineral filler in asphalt
Snow and ice control
Blasting grit/roofing granules
Grouting/Wallboard
Waste stabilization
Coal mining applications/other

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.

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

# AML Reclamation

## Abandoned Mine Land (AML) Reclamation

The Federal Surface Mining Control and Reclamation Act of 1977 establishes 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 deep-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 $625.5 million to the Abandoned Mine Land (AML) Reclamation Fund since 1978, and nationally $3.9 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, $77.4 million (September, 1995) is unallocated due to the federal appropriation process (see Kentucky State Share Balance column in table below).

**$977.5 million of AML taxes remain unallocated for reclaiming abandoned mines across the United States.**

## Abandoned Mine Land (AML) Reclamation Fund

| Fiscal Year | Kentucky Collection | Kentucky State Share* | KY State Share Allocation | KY State Share Balance |
|---|---|---|---|---|
| 1978 | $29,966,438 | $14,981,014 | $ 0** | $14,981,014 |
| 1979 | 33,702,502 | 16,848,579 | 0** | 31,829,594 |
| 1980 | 35,028,033 | 17,510,931 | 0** | 49,340,525 |
| 1981 | 35,819,239 | 17,906,720 | 0** | 67,247,245 |
| 1982 | 36,588,637 | 18,290,813 | 15,893,953 | 69,644,105 |
| 1983 | 31,136,314 | 15,564,205 | 28,547,738 | 56,660,573 |
| 1984 | 37,757,638 | 18,872,676 | 30,717,141 | 44,816,108 |
| 1985 | 34,614,559 | 17,299,511 | 30,730,933 | 31,384,685 |
| 1986 | 34,514,743 | 17,249,466 | 16,993,952 | 31,640,199 |
| 1987 | 35,228,098 | 17,609,447 | 12,539,885 | 36,709,761 |
| 1988 | 26,339,994 | 13,168,400 | 12,412,279 | 37,465,882 |
| 1989 | 35,387,170 | 17,422,508 | 16,393,455 | 38,494,936 |
| 1990 | 38,439,852 | 19,414,611 | 14,634,933 | 43,274,614 |
| 1991 | 37,041,434 | 18,447,844 | 13,923,680 | 47,798,777 |
| 1992 | 35,595,377 | 17,822,309 | 10,675,702 | 54,945,384 |
| 1993 | 36,176,437 | 18,035,894 | 10,195,176 | 62,786,102 |
| 1994 | 36,820,286 | 18,242,157 | 10,336,811 | 70,691,448 |
| 1995*** | 35,365,121 | 17,610,310 | 10,377,854 | **77,358,773** |
| Totals | $625,521,873 | $312,297,396 | $234,373,492 | |

* NOTE: Includes reclamation fees, interest, and audit adjustments, and will not equal exactly 50%.
** NOTE: Does not include Federal Cooperative Agreement Grants managed by Kentucky for OSM.
*** NOTE: Collection data through September 30, 1995.

## AML Reclamation Accomplishments in Kentucky (through 1994)

**Kentucky AML Projects**

350 Multi-site State AML Projects.
$269 million in expenditures.
13,400 acres reclaimed.
(plus various projects currently under construction).

**Federal AML Projects**

590 Multi-site AML Projects.
$79 million in expenditures.
5,161 acres reclaimed.
Rural Abandoned Mine Program, Emergency, and Non-Emergency.

940 multi-site AML projects have been undertaken in Kentucky by both the state of Kentucky and federal programs from 1978-1994 reclaiming over 18,560 acres and expending $348 million in AML reclamation funds.

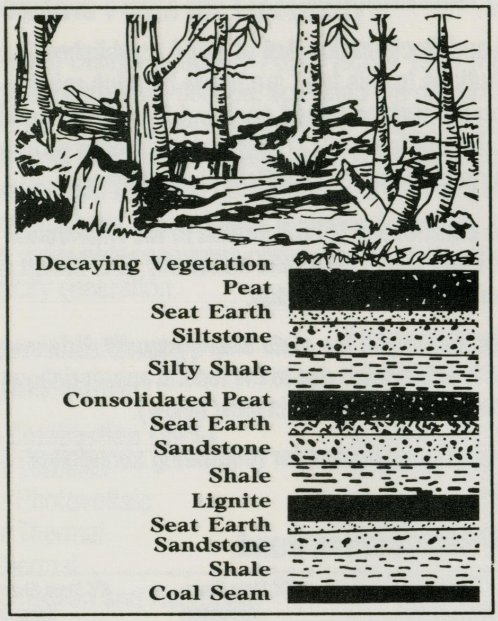
Some accomplishments to date of the state's AML Projects in Kentucky are:

18 water line projects - $29.3 million.
Over 21,100 feet of highwall eliminated.
Over 130 hazardous structures removed.
Over 1,550 acres of landslide projects stabilized.
1,180 mine portal closures.
65 vertical shafts sealed.
34 miles of stream restoration.
288 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 Origin and Properties




It is generally accepted that coal originated from plant debris including ferns, trees, bark, leaves, and seeds that 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 over millions of years. 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

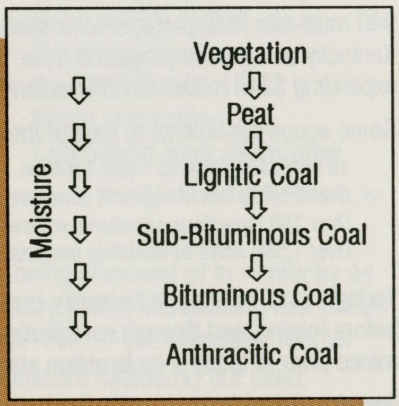
Coal usually is divided into two main classes - anthracite (hard coal) and bituminous (soft coal). When anthracite was formed, it was squeezed under greater pressure than was bituminous. As a result anthracite contains the highest percentage of carbon and the lowest percentage of moisture. Anthracite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

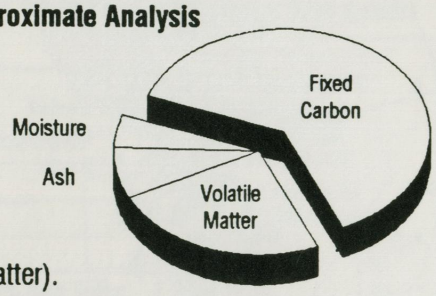


# Coal Properties/Improvements

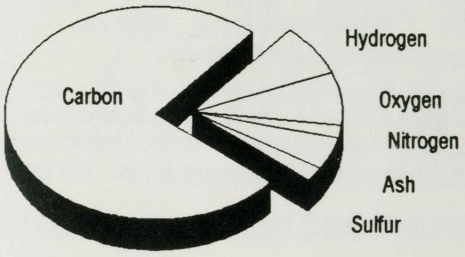
There are two different types of analyses used to determine the nature of bituminous coal: proximate and ultimate analysis. Proximate analysis determines (on an as-received basis):

- **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**

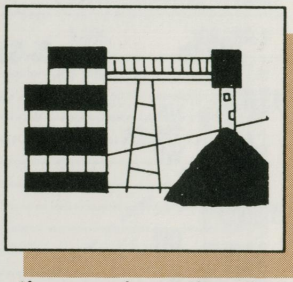



Ultimate analysis determines the amount of carbon, hydrogen, oxygen, nitrogen, and sulfur.

**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 - Energy Information Administration, 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.

Kentucky has 70,000 tons per hour of coal preparation design capacity at approximately 130 coal preparation plants, 101 in Eastern Kentucky and 29 in Western Kentucky (1993 data).

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.

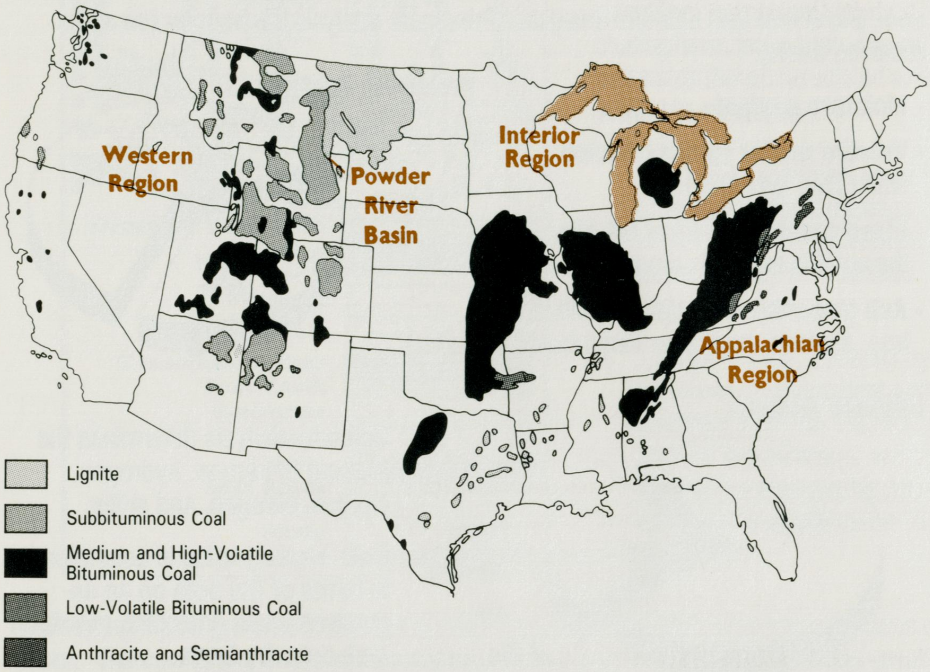
In Western Kentucky, sulfur (inorganic sulfur) and ash are the two main impurities removed. Considering the 7 principal mined seams in this area, 0.5% to 2.5% can be subtracted from the average sulfur content and 9% to 13% can be subtracted from the ash content after the coal washing process.

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 Marketing and Export Council's Kentucky Coal Marketing Information System.

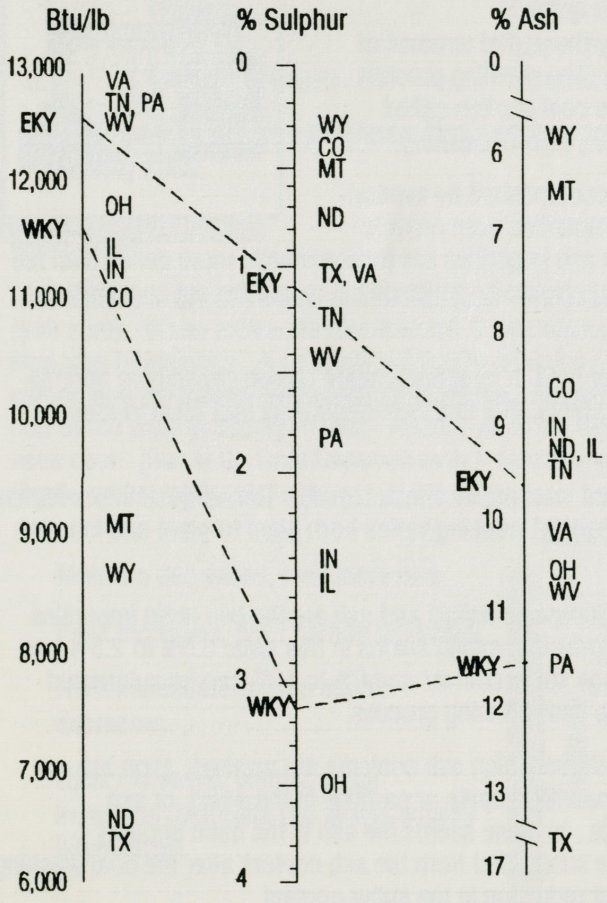
# U.S. Comparisons

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



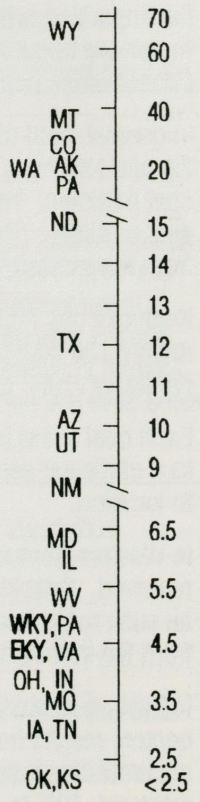

Source: Developed from the U.S. Geological Survey

## Average Quality of Coal Produced for Power Plants by Selected Producing States, 1994




Source: Energy Information Administration, Cost and Quality of Fuels for Electric Utility Plants, 1994.

Average* Coalbed Thickness Mined in 1993




*weighted average

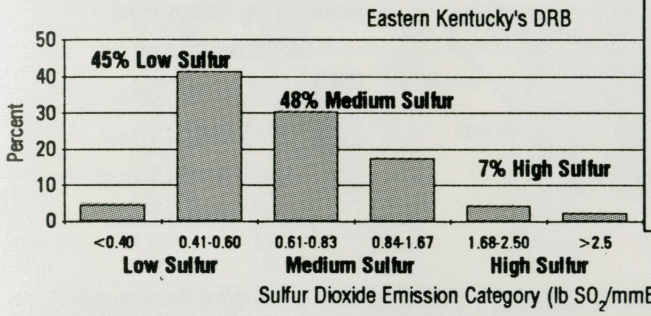
Source: EIA - Coal Data: A Reference, 1989.

# U.S. Coal Resources

## Eastern Kentucky Low-Sulfur Coal

The U.S. Department of Energy estimates that over 45% of Eastern Kentucky's Demonstrated Reserve Base (DRB) would meet a 1.2 pounds of sulfur dioxide per million Btu emissions limit (Low Sulfur), and that 48% would meet a 3.34 lb/mm Btu emissions limit (Medium Sulfur).

### Summary Sulfur Content Categories*




Converting "Percent Sulfur" to "lb $SO_2$ per million Btu"

lb/mm Btu = %S X 19,500 / 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 $SO_2$/mmBtu) comparisons.

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

Source: U.S. DOE - EIA, U.S. Coal Reserves: An Update by Heat and Sulfur Content, Feb., 1993.

## 1992 U.S. Demonstrated Coal Reserve Base* (millions of tons)

The U.S. Demonstrated Coal Reserve Base is an estimate of the tonnage that can be economically *mined with today's technology.**

| Coal Producing Region and State | Anthracite | Bituminous | Subbituminous | Lignite | Total** (millions of tons) |
|---|---|---|---|---|---|
| Appalachian Total | 6.9% | 92.1% | | 1.0% | 106,799.6 |
| Alabama | | 77.0% | | 23.0% | 4,717.6 |
| Georgia | | 100.0% | | | 3.6 |
| Kentucky, Eastern | | 100.0% | | | 8,600.8* |
| Maryland | | 100.0% | | | 744.1 |
| North Carolina | | 100.0% | | | 10.7 |
| Ohio | | 100.0% | | | 23,845.4 |
| Pennsylvania | 24.9% | 75.1% | | | 29,071.2 |
| Tennessee | | 100.0% | | | 841.5 |
| Virginia | 5.1% | 94.9% | | | 2,466.5 |
| West Virginia | | 100.0% | | | 36,498.2 |
| Interior Total | 0.1% | 89.6% | | 10.3% | 133,250.9 |
| Arkansas | 25.0% | 68.9% | | 6.1% | 417.1 |
| Illinois | | 100.0% | | | 78,006.9 |
| Indiana | | 100.0% | | | 10,070.7 |
| Iowa | | 100.0% | | | 2,189.7 |
| Kansas | | 100.0% | | | 976.4 |
| Kentucky, Western | | 100.0% | | | 20,203.5 |
| Louisiana | | | | 100.0% | 479.6 |
| Michigan | | 100.0% | | | 127.7 |
| Missouri | | 100.0% | | | 5,997.5 |
| Oklahoma | | 100.0% | | | 1,584.4 |
| Texas | | | | 100.0% | 13,197.6 |
| Western Total | <0.1% | 10.2% | 77.0% | 12.8% | 234,004.5 |
| Alaska | | 11.4% | 88.4% | 0.2% | 6,133.9 |
| Arizona | | 100.0% | | | 220.4 |
| Colorado | 0.1% | 52.2% | 22.9% | 24.8% | 16,924.6 |
| Idaho | | 100.0% | | | 4.4 |
| Montana | | 1.2% | 85.7% | 13.1% | 119,870.3 |
| New Mexico | <0.1% | 43.6% | 56.4% | | 4,399.1 |
| North Dakota | | | | 100.0% | 9,550.3 |
| Oregon | | | 100.0% | | 17.5 |
| South Dakota | | | | 100.0% | 366.1 |
| Utah | | >99.9% | <0.1% | | 6,047.1 |
| Washington | | 21.5% | 77.9% | 0.6% | 1,412.4 |
| Wyoming | | 6.3% | 93.7% | | 69,058.5 |
| U.S. Total | 1.6% | 51.0% | 38.0% | 9.4% | 474,054.9 |

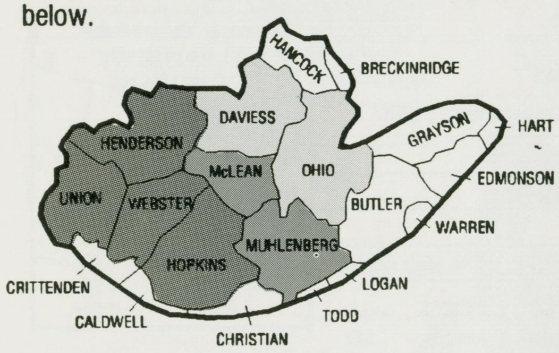
* Kentucky coal resource values are considered by some to be too high of a value, while the Eastern Kentucky "Demonstrated Coal Reserve Base" value is openly rejected by many others as being too low.

Source: U.S. DOE - Energy Information Administration, Coal Production, 1992.

# Kentucky Coal Resources

## Western Kentucky Coal Field

The Western Kentucky coal field covers 6,400 square miles and contains over 36 billion tons of remaining resources. (Part of this cannot be mined economically using today's technology.) The remaining resources and their locations are illustrated below.




**Remaining Resources**
**Billions of Tons**

- > 5 Billion Tons
- 3 - 5 Billion Tons
- 1 - 3 Billion Tons
- < 1 Billion Tons

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

Over 4.7 billion tons of coal have been mined or lost due to mining, amounting to only about 11.4% of total Western Kentucky coal resources.

**How To Calculate Tons Per Acre - Inch**

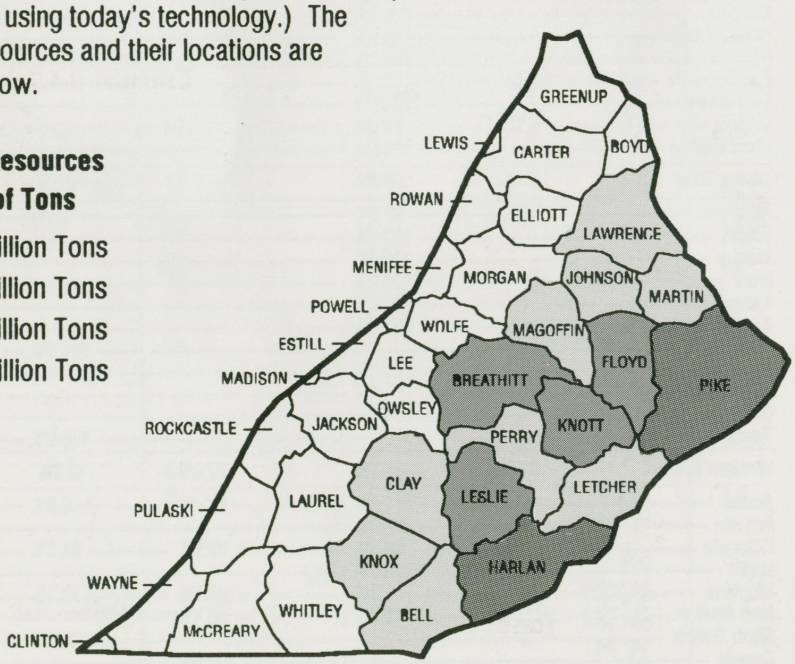
**Total Tons** = _____ Acres **x** _____ Inches **x** 135 tons per acre - inch
(acres of coal) **x** (height of coal) **x** (density of coal)

## Eastern Kentucky Coal Field

The Eastern Kentucky coal field covers 10,500 square miles and contains approximately 54.1 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.

**Remaining Resources**
**Billions of Tons**

- > 5 Billion Tons
- 3 - 5 Billion Tons
- 1 - 3 Billion Tons
- < 1 Billion Tons




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

Approximately 10 billion tons of coal have been mined or lost due to mining, amounting to only about 15.6% of total Eastern Kentucky coal resources.

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

# Kentucky Coal Resources

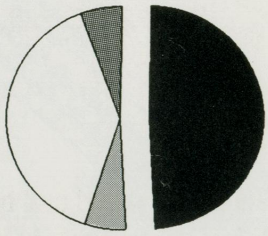
Original resource estimates for Western and Eastern Kentucky were 41 and 64 billion tons respectively. The resources currently remaining after 200 years of mining are estimated to be 36.3 billion tons in Western Kentucky and 54.1 billion tons in Eastern Kentucky. As shown in the Demonstrated Reserve Base (DRB) tables on page 39, assumptions on the percentage available for development reduce those values even further.

## Western Kentucky Coal Resources

| County | Original | Mined | Lost | Remaining |
|---|---|---|---|---|
| Butler | 413.69 | 29.65 | 29.65 | 354.39 |
| Daviess | 1,330.32 | 56.94 | 56.94 | 1,216.44 |
| Henderson | 6,852.78 | 51.56 | 51.56 | 6,749.66 |
| Hopkins | 8,814.80 | 702.19 | 702.19 | 7,410.42 |
| McLean | 3,576.41 | 14.96 | 14.96 | 3,546.50 |
| Muhlenberg | 4,723.84 | 710.59 | 710.59 | 3,302.66 |
| Ohio | 1,824.55 | 255.54 | 255.54 | 1,313.46 |
| Union | 6,506.98 | 275.79 | 275.79 | 5,955.39 |
| Webster | 6,322.95 | 224.07 | 224.07 | 5,874.81 |
| Other* | 623.08 | 23.49 | 23.49 | 576.09 |
| **WKY Total** | **40,989.40** | **2,344.80** | **2,344.80** | **36,299.81** |

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

**Original Coal Resources Estimate (41 Billion Tons)**



20.2 Billion Tons in DRB **

2.3 Billion Tons Lost Due to Mining

2.3 Billion Tons Mined 1790-1994

16.1 Billion Tons Remaining, But Not in DRB **

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

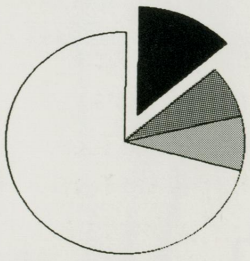
54 billion tons of coal resources (84%) in Eastern Kentucky are not considered to be part of the "DRB". That is over 5 times the amount of coal that has been mined and lost in the past 200 years.

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

## Eastern Kentucky Coal Resources

| County | Original | Mined | Lost | Remaining |
|---|---|---|---|---|
| Bell | 3,194.70 | 260.74 | 260.74 | 2,673.22 |
| Boyd | 630.68 | 19.93 | 19.93 | 590.82 |
| Breathitt | 4,112.20 | 175.35 | 175.35 | 3,761.50 |
| Carter | 501.96 | 18.60 | 18.60 | 464.76 |
| Clay | 1,536.11 | 59.83 | 59.83 | 1,416.45 |
| Elliott | 316.32 | 9.83 | 9.83 | 296.66 |
| Floyd | 4,168.08 | 412.52 | 412.52 | 3,343.04 |
| Greenup | 204.87 | 10.41 | 10.41 | 184.05 |
| Harlan | 7,881.12 | 810.82 | 810.82 | 6,259.48 |
| Jackson | 375.87 | 11.17 | 11.17 | 353.53 |
| Johnson | 1,419.44 | 86.17 | 86.17 | 1,247.10 |
| Knott | 4,385.10 | 218.72 | 218.72 | 3,947.66 |
| Knox | 1,381.93 | 69.76 | 69.76 | 1,242.41 |
| Laurel | 408.04 | 35.58 | 35.58 | 336.88 |
| Lawrence | 2,024.68 | 19.62 | 19.62 | 1,985.44 |
| Lee | 363.98 | 8.40 | 8.40 | 347.18 |
| Leslie | 3,554.65 | 185.63 | 185.63 | 3,183.39 |
| Letcher | 3,692.80 | 463.16 | 463.16 | 2,766.48 |
| McCreary | 444.97 | 55.34 | 55.34 | 334.29 |
| Magoffin | 1,969.10 | 51.43 | 51.43 | 1,866.24 |
| Martin | 3,319.97 | 288.24 | 288.24 | 2,743.49 |
| Morgan | 849.40 | 15.06 | 15.06 | 819.28 |
| Owsley | 574.14 | 9.19 | 9.19 | 555.76 |
| Perry | 3,596.70 | 474.29 | 474.29 | 2,648.12 |
| Pike | 11,391.70 | 1,085.01 | 1,085.01 | 9,221.68 |
| Whitley | 987.44 | 87.00 | 87.00 | 813.44 |
| Wolfe | 443.92 | 7.15 | 7.15 | 429.62 |
| Other*** | 334.89 | 33.11 | 33.11 | 268.67 |
| **EKY Total** | **84,064.76** | **4,982.04** | **4,982.04** | **54,100.68** |

**Original Coal Resources Estimate (64.1 Billion Tons)**



8.6 Billion Tons in DRB **

5 Billion Tons Lost Due to Mining

5 Billion Tons Mined 1790-1994

54 Billion Tons Remaining, But Not in DRB **

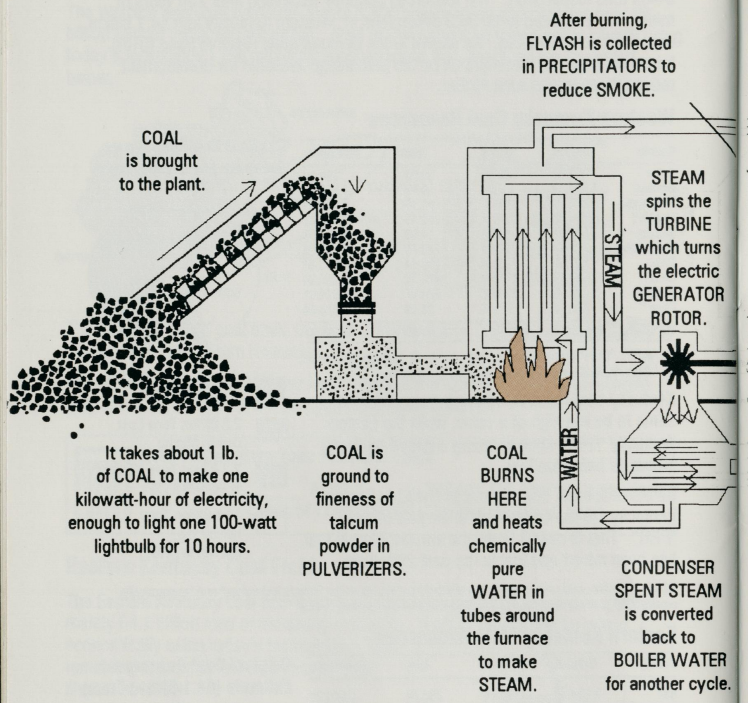
Source for DRB: U.S. DOE -EIA, Coal Production, 1992.

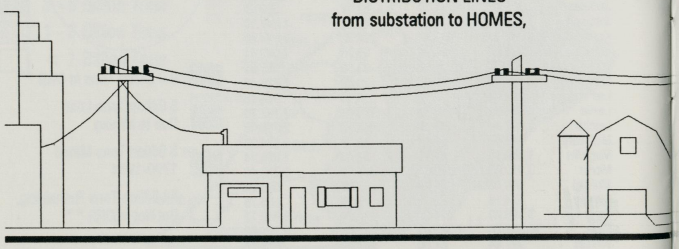
** **NOTE:** Kentucky coal resource values are considered by some to be too high of a value, while the Eastern Kentucky "DRB" value is openly rejected by many as being too low. See page 39

*** **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 Marketing and Export Council from Kentucky Department of Mines and Minerals Annual reports.

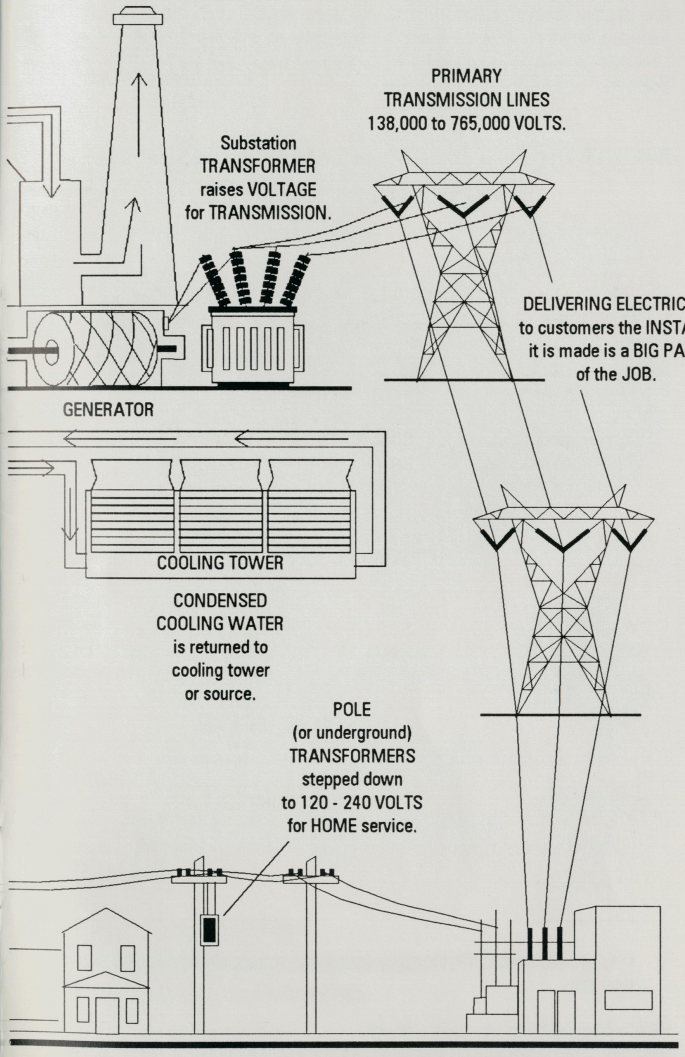
# Coal into Kilowatts






# Coal into Kilowatts



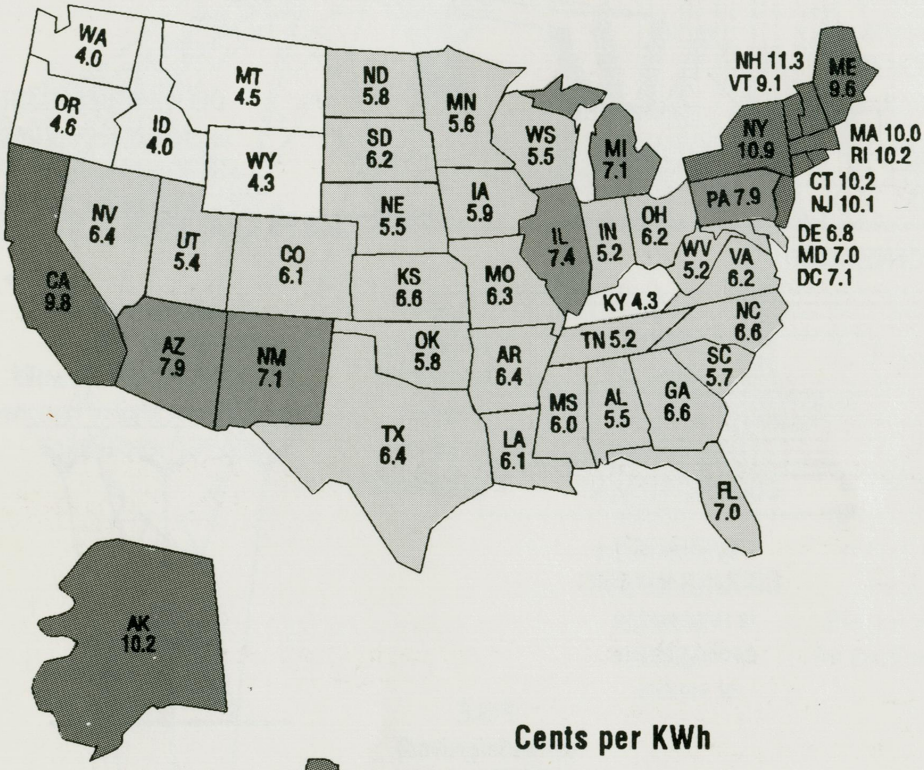

Source: American Electric Power

# Electricity Costs

Average electricity costs in Kentucky were 4.3 cents per kilowatt-hour during 1994, **the third lowest** in the United States. Kentucky's average electricity costs are lower than all other states except two Northwestern *hydro* states and the same as one western coal state. 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, 1994

*U.S. Average Revenue per KWh is 6.91 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: Energy Information Administration, Electric Power Annual, Volume I, July 1995

# Information Assistance

## *KENTUCKY COAL INFO*

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

**KENTUCKY COAL MARKETING AND EXPORT COUNCIL**
Cabinet for Economic Development
302 Wilkinson Blvd., Frankfort, Kentucky 40601 **(502) 564-2562**
(502) 564-8073 FAX

**William H. Bowker**, Executive Director
**J. Dan Guffey**, P.E., P.L.S., Coal Development Projects

**Thomas E. Hughes**, Eastern Kentucky Coal Representative
Mines and Minerals Building
101 Quail Walk, Pikeville, Kentucky 41501 **(606) 437-1510**

**Dennis McCully**, Western Kentucky Coal Representative
State Office Building
625 Hospital Drive, Madisonville, Kentucky 42431 **(502) 824-7543**

**KENTUCKY COAL ASSOCIATION**
340 South Broadway, Lexington, Kentucky 40508 **(606) 233-4743**
(606) 233-4745 FAX

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

### *1995-1996 KENTUCKY COAL FACTS Ordering Information*

**KENTUCKY GEOLOGICAL SURVEY**
University of Kentucky - Publication Section
228 Mining and Minerals Resources Bldg., Lexington, Kentucky 40506
**(606) 257-3896**

**KENTUCKY CABINET FOR ECONOMIC DEVELOPMENT**
Maps and Publications, 133 Holmes Street, Frankfort, Kentucky 40601
**(502) 564-4715**

### *COAL TEACHING MATERIALS*

**Kentucky Coal Marketing and Export Council**
http://www.state.ky.us/edc/cmec.htm

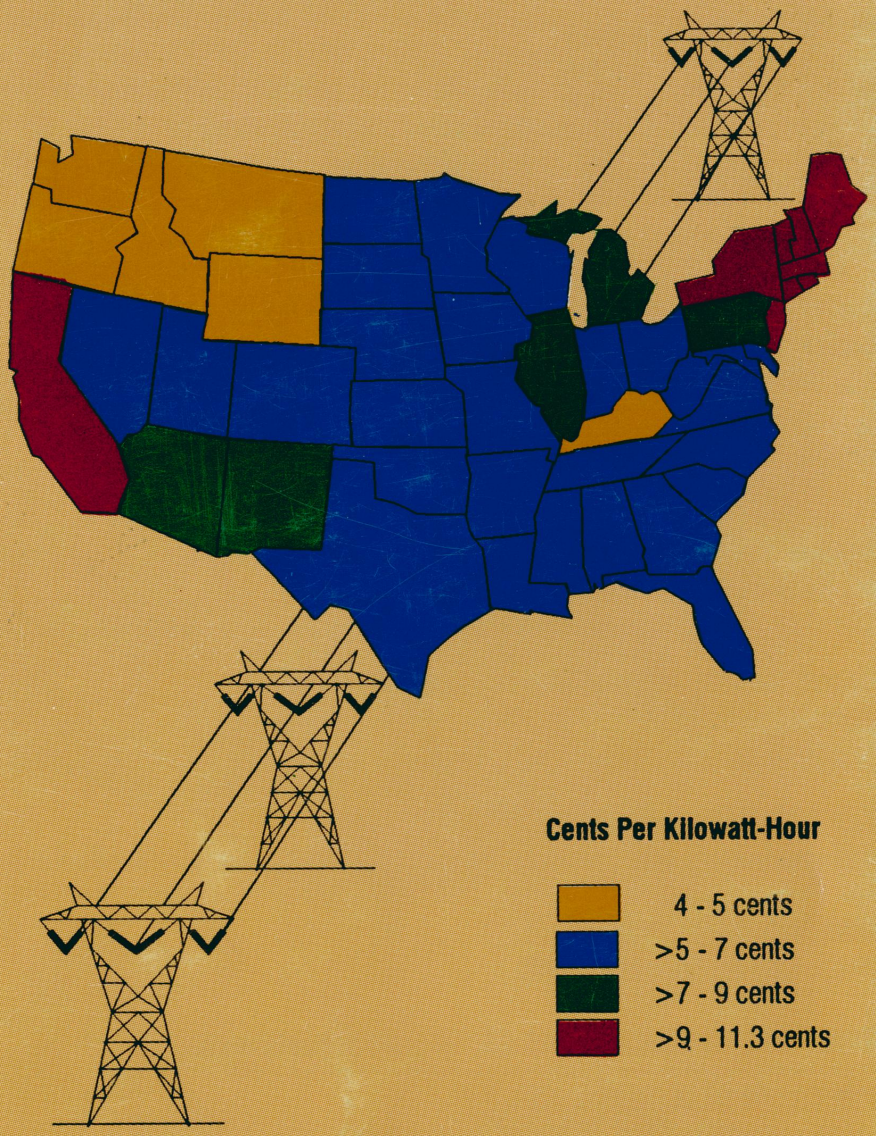
**American Coal Foundation**
1130 Seventeenth St., N.W.
Suite 220
Washington, DC 20036
(202) 466-8630

**KET, The Kentucky Network**
http://www.ket.org/Trips/Coal/Index.html

**Center for Energy & Economic Develop.**
http://www.conx.com/ceed

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

## Average Electricity Costs per Kilowatt-Hour 1994

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Source: U.S. DOE - Energy Information Administration, Electric Power Annual, Volume I, July 1995.

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**Paul E. Patton, Governor**