Coal Consumption

Physical units

Coal in the United States is mostly consumed by the electric power sector. Data are collected by the U.S. Energy Information Administration (EIA) on Form EIA-923, "Power Plant Operations Report," and predecessor forms. "ZZ" in the variable name is used to represent the two-letter state code:

CLEIPZZ = coal consumed by the electric power sector in each state, in thousand short tons.
CLEIPUS = ΣCLEIPZZ

Seven data series are used to estimate state coal consumption for the other sectors. They are derived from various coal consumption and distribution surveys conducted by EIA. Four are U.S. level consumption data series, available in thousands of short tons:

CLACPUS = coal consumed by the transportation sector in the United States;
CLHCPUS = coal consumed by the residential and commercial sectors (commercial sector from 2008 forward) in the United States;
CLKCPUS = coal consumed by coke plants in the United States; and
CLOCPUS = coal consumed by other industrial users in the United States.

The other three series contain state-level data by sector. Prior to 2008, most of these data are coal distribution data. The state shares of these series are calculated and applied to the U.S. consumption to derive the state-level consumption estimates. In 2008, the survey collecting coal distribution data, Form EIA-6A, "Coal Distribution Report—Annual," was discontinued. Form EIA-3, "Quarterly Coal Consumption and Quality Report, Manufacturing and Transformation/Processing Coal Plants and Commercial and Institutional Coal Users," becomes the primary source. Residential consumers are not covered in the survey frame of EIA-3, and the combined residential and commercial sector is replaced by the "commercial and institutional" sector, which is the same as the commercial sector in SEDS. Instead of introducing new data series, the same series are used to distinguish them from the final consumption series. Data are available in thousand short tons:

CLHDPZZ = coal distributed to the residential and commercial sectors (commercial sector from 2008 forward) in each state;
CLKDPZZ = coal distributed to coke plants in each state; and
CLODPZZ = coal distributed to other industrial users in each state.

The U.S. totals for the three state-level series are calculated by summing the state data.

Before 2008, state estimates of coal consumed by the residential and commercial sectors combined are made by assuming that coal is consumed in proportion to the amount of coal distributed to the residential and commercial sectors in each state:

CLHCPZZ = (CLHDPZZ/CLHDPUS) * CLHCPUS

To estimate residential coal consumption, EIA calculates the residential share of the combined residential and commercial series at the national level, CLRCSUS (see explanation on page 21). This series, as shown in Table TN2.1, is applied to the combined series to derive the residential consumption, and the remaining quantity is assumed to be for commercial use:

CLRCPZZ = CLHCPZZ * CLRCSUS
CLRCPUS = ΣCLRCPZZ
CLCCPZZ = CLHCPZZ - CLRCPZZ
CLCCPUS = ΣCLCCPZZ

From 2008 forward, CLHDPZZ is completely allocated to the commercial sector:

CLCCPZZ = (CLHDPZZ/CLHDPUS) * CLHCPUS
CLCCPUS = ΣCLCCPZZ
CLRCPZZ = 0
CLRCPUS = 0

Consumption in the industrial sector is reported for the U.S. and estimated by state. An assumption is made that coal is consumed by coke plants in proportion to the amount of coal distributed to coke plants in each state. It is

Table TN2.1. Residential sector share of combined residential and commercial coal consumption, 1960 through 2007

Years	CLRCSUS	Years	CLRCSUS	Years	CLRCSUS
1960–1962	0.59	1979	0.20	1994	0.15
1963, 1964	0.58	1980	0.21	1995	0.13
1965–1967	0.57	1981	0.18	1996	0.12
1968–1970	0.56	1982	0.17	1997, 1998	0.11
1971	0.49	1983	0.16	1999	0.12
1972	0.43	1984	0.19	2000, 2001	0.11
1973	0.37	1985	0.22	2002	0.12
1974	0.32	1986, 1987	0.23	2003	0.13
1975	0.30	1988	0.22	2004	0.10
1976	0.29	1989	0.21	2005	0.08
1977	0.28	1990	0.20	2006	0.09
1978	0.23	1991–1993	0.18	2007	0.10

also assumed that the consumption of coal by industrial users other than coke plants is in proportion to the amount of coal delivered to the other industrial users in each state. The industrial sector consumption is the sum of coal consumed by coke plants and other industrial users in each state:

CLKCPZZ = (CLKDPZZ/CLKDPUS) * CLKCPUS
CLOCPUS = (CLODPZZ/CLODPUS) * CLOCPUS
CLICPZZ = CLKCPZZ + CLOCPZZ

There are no data available for estimating the transportation sector's consumption of coal by state. The quantity would be very small. The transportation sector accounted for only 1% of the national total consumption in 1960 and none since 1978. An assumption is made that when transportation sector consumption exists, the consumption by state, CLACPZZ, is in proportion to the share of the U.S. industrial sector attributed to each state:

CLACPZZ = (CLICPZZ/CLICPUS) * CLACPUS

Total consumption in each state, CLTCPZZ, is the sum of the sectors' consumption:

CLTCPZZ = CLRCPZZ + CLCCPZZ + CLICPZZ + CLACPZZ + CLEIPZZ

The U.S. total consumption estimates for each of the sectors and the total are calculated as the sum of the states' values.

British thermal units (Btu)

Five factors are used to convert coal from physical units to Btu:

CLACKZZ = the factor for converting coal consumed by transportation sector in each state from short tons to Btu;
CLEIKZZ = the factor for converting coal consumed by the electric power sector in each state from short tons to Btu;
CLHCKZZ = the factor for converting coal consumed by the residential and commercial sectors in each state from short tons to Btu;
CLKCKZZ = the factor for converting coal consumed at coke plants in each state from short tons to Btu; and
CLOCKZZ = the factor for converting coal consumed by other industrial users in each state from short tons to Btu.

The electric power sector conversion factor for each state is applied to the physical unit value to estimate coal consumed in Btu:

CLEIBZZ = CLEIPZZ * CLEIKZZ

The residential and commercial sectors' state conversion factor is applied to the physical unit values to estimate coal consumed by the two sectors in Btu:

CLRCBZZ = CLRCPZZ * CLHCKZZ
CLCCBZZ = CLCCPZZ * CLHCKZZ

The industrial sector Btu consumption is estimated in three steps. Coal consumed at coke plants and by all industrial users other than coke plants are converted to Btu using their individual state conversion factors. The industrial sector consumption in Btu is then calculated as the sum of the two industrial components:

CLKCBZZ = CLKCPZZ * CLKCKZZ
CLOCBZZ = CLOCPZZ * CLOCKZZ
CLICBZZ = CLKCBZZ + CLOCBZZ

The transportation sector conversion factor for each state is applied to the physical unit value to estimate coal consumed in Btu:

CLACBZZ = CLACPZZ * CLACKZZ

Total consumption for each state is the sum of the sectors' consumption:

CLTCBZZ = CLRCBZZ + CLCCBZZ + CLICBZZ + CLACBZZ + CLEIBZZ

The U.S. consumption estimates in Btu are calculated by summing the state values for each of the data series. The U.S. average conversion factor for each

of the five factors is calculated as the U.S. consumption in Btu divided by the U.S. consumption in physical units for each of the factors.

Additional notes

1. The national-level coal consumption data series for the residential and commercial sectors (CLHCPUS), coke plants (CLKCPUS), and industries other than coke plants (CLOCPUS) are from a continuous data source. However, the data series used to develop state-level allocators by end-use sector (CLHDPZZ, CLKDPZZ, and CLODPZZ) vary for different time periods.

   For 1960 through 1979, U.S. coal consumption is allocated by state based on the proportion of coal distributed to each state.

   Beginning with 1980, state-level total coal consumption data are available; however, many of these data are withheld at the sector level. Withheld data are estimated by substituting residential and commercial coal distribution data for residential and commercial coal consumption. In many states, this leaves only one other sector withheld, which is derived by subtracting the other known sectors from the state total. In some cases withheld Census division values need to be subtracted out from known U.S. totals before the state-level estimates can be derived.

   Beginning with 2001, additional state coal consumption values are withheld, making it no longer possible to subtract out estimates of coal consumed by coke plants for some states. To estimate the withheld consumption values, the known state-level coke plant coal consumption values are subtracted from the known Census division totals leaving a value to be distributed to the states that have withheld values in that division. Data for the same states from a different EIA data series on distribution of coal to coke plants are used to estimate the withheld consumption data. Distribution data for the three years prior to the year being estimated are summed for each state and its division and each state's share of its division subtotal is used to allocate the withheld coke plant coal consumption to that state. For 2001, Utah was grouped with New York and Pennsylvania to create the subtotal used in the percentage calculations.

   Beginning with 2006, some state-level total coal consumption values that are withheld are first estimated by applying published year-on-year percent changes onto earlier years' published consumption values. In some cases, this would leave only one sector withheld, which is derived by subtracting the other known sectors from the state total.

   In 2008, Form EIA-6A, "Coal Distribution Report—Annual," was discontinued. From 2008 forward, estimates for coal consumption by sector are derived from Form EIA-3, "Quarterly Coal Consumption and Quality Report, Manufacturing and Transformation/Processing Coal Plants and Commercial and Institutional Coal Users." Data for residential consumption are no longer covered and are assumed to be zero.

   These derived series for the residential/commercial (before 2008), commercial/institutional (2008 forward), coke plant, and other industrial sectors are used in SEDS as the distribution data series to calculate coal consumption estimates by state and sector that are consistent with state-level total coal consumption data published in other EIA reports. From 2012 forward, state-level consumption data are no longer withheld.

2. Total coal consumption by state for 1980 through 1989 published in the EIA *Quarterly Coal Report* does not sum to the U.S. totals due to a quantity called "Unknown" in the source tables. This unknown coal consumption is added to the residential, commercial, and "other industrial" sectors of Alabama, Illinois, Kentucky, Pennsylvania, Tennessee, and West Virginia in proportion to their total distribution of all coal.

3. Prior to 1974, data for distribution of bituminous coal and lignite by state include several groupings of states for which separate state data are not available. These groupings are: (1) Maine, New Hampshire, Vermont, and Rhode Island; (2) North Dakota and South Dakota; (3) Delaware and Maryland; (4) Georgia and Florida; (5) Alabama and Mississippi; (6) Arkansas, Louisiana, Oklahoma, and Texas; (7) Montana and Idaho; (8) Arizona and Nevada; and (9) Washington and Oregon. Beginning with 1974, individual state distribution data became available. To estimate the 1960 through 1973 state distribution data, the states are disaggregated in proportion to the individual states' shares of each similar state grouping in 1974.

4. The sources used to develop thermal conversion factors for bituminous coal and lignite consumed by the electric power sector—the National Coal Association report and the Federal Power Commission's (FPC) Form 423 and Federal Energy Regulatory Commission (FERC) Form 423—exclude Alaska. However, Alaska reported consumption of bituminous coal and lignite at electric utilities for all years, 1960 forward. Unpublished FPC heat rates for coal at electric utilities in Alaska were used for 1960 through 1972. The 1972 conversion factor (the last year for which a conversion factor was reported for Alaska) was used for 1973 through 1978. According to industry sources, new mines were opened in 1978 and a more representative factor was used for 1979

through 1997. For 1998 forward, the Alaska factor is calculated using the same methodology as used for other states.

Data sources for coal

CLACKZZ — Factor for converting coal consumed by the transportation sector from physical units to Btu by state.

- 1960 through 1977: Assumed by EIA to be equal to the Btu conversion factor for bituminous coal and lignite consumption by industrial users other than coke plants:
  - 1960 through 1973: Estimated by EIA by adjusting the 1974 average heat value of bituminous coal and lignite consumed by industrial users other than coke plants by the ratios of 1960 through 1973 national averages for the other industrial users to its 1974 average.
  - 1974 through 1977: Calculated by EIA by assuming that the bituminous coal and lignite consumed by industrial users other than coke plants in each state contained heating values equal to those of bituminous coal and lignite received at electric utilities in each state from identified coal-producing districts as reported on Federal Energy Regulatory Commission (FERC) Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." The average Btu content of coal delivered from each coal-producing district was applied to deliveries to other industrial users in each state and the sum total of the heat content was divided by total tonnages, yielding a weighted average. The coal distribution data by coal-producing district are reported on Form EIA-6, "Coal Distribution Report," and predecessor Bureau of Mines Form 6-1419-Q.
- 1978 forward: Transportation sector coal is included in the other industrial category. Zero is entered for this variable.

CLACPUS — Coal consumed by the transportation sector in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, chapter "Coal-Bituminous and Lignite," table titled, "Consumption of bituminous coal and lignite, by consumer class, and retail deliveries in the United States," column "Bunker, lake vessel and foreign."
- 1976 and 1977: EIA, *Energy Data Reports*, "Coal-Bituminous and Lignite," table titled, "Consumption of bituminous coal and lignite, by consumer class, and retail deliveries in the United States," column "Bunker, lake vessel and foreign."
- 1978 forward: Small amounts of bituminous coal and lignite consumed by the transportation sector are included in the other industrial category (see CLOCPUS). Zero is entered for this variable.

CLEIKZZ — Factor for converting coal consumed by the electric power sector from physical units to Btu by state.

- 1960 through 1988: Calculated by EIA as the consumption-weighted average of national-level anthracite conversion factors and state-level bituminous coal and lignite factors using factors and consumption from SEDS.

  Anthracite conversion factors:
  - 1960 through 1972: EIA assumed that all anthracite consumed at electric utilities was recovered from culm banks and river dredging and was estimated to have an average heat content of 17.500 million Btu per short ton.
  - 1973 through 1988: Calculated annually by EIA by dividing the heat content of anthracite receipts at electric utilities by the quantity of anthracite received at electric utilities. These data are reported on the FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants," and predecessor forms.

  Bituminous coal and lignite conversion factors:
  - 1960 through 1972: EIA adopted the average thermal conversion factor of the Bureau of Mines, which used the National Coal Association (NCA) average thermal conversion factor for electric utilities calculated from FPC Form 1 and published in Steam Electric Plant Factors, an NCA annual report. The specific tables are:
    - 1960 and 1961: Table 1.
    - 1962 through 1972: Table 2.
  - 1973 through 1982: The average heat content of coal received at steam electric plants 25 megawatts or greater from FPC Form 423 and published in Btu per pound in EIA, *Cost and Quality of Fuels for Electric Utility Plants*, tables titled "Destination and Origin of Coal 'Delivered to' (1973-1979) 'Receipts to' (1980) 'Received at' (1981-1982) Steam-Electric Plants 25-MW or Greater."
  - 1983 through 1988: The average heat content of coal received at steam electric plants 50 megawatts capacity or larger from FERC Form 423 and published in Btu per pound in the EIA, *Cost and Quality of Fuels for Electric Utility Plants*. The specific tables are:
    - 1983 and 1984: Table 58.
    - 1985 through 1988: Table 48.

  Note: The state conversion factors for 1960 through 1972 are derived from actual consumption data, while the conversion factors for 1973 to

1988 are based on receipts of coal. The factors for 1960 through 1972 also may include some quantities of anthracite. These breaks in the series create some data discrepancies. In instances where a state had no receipts for a particular year but did report consumption, it is assumed that the coal received in one year is consumed during the following year and the Btu value of the previous year's receipts is used. See Additional Note 4 on page 15 for Alaska calculations.

- 1989 forward: Calculated by dividing the total heat content of coal received at electric power plants (including electric utilities and independent power producers) by the total quantity consumed in physical units collected on Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/electricity/data/eia923/index.html. See Additional Note 4 on page 15 for Alaska factors.

CLEIPZZ — Coal consumed by the electric power sector by state.

- EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/electricity/data/eia923/index.html.

CLHCKZZ — Factor for converting coal consumed by the residential and commercial sectors from physical units to Btu by state.

- 1960 through 1997: Calculated by EIA as the consumption-weighted average of national-level anthracite conversion factors and state-level bituminous coal and lignite factors using factors and consumption from SEDS.

  Anthracite conversion factors:
  - Calculated annually by EIA by dividing the heat content of anthracite produced less the heat content of the anthracite consumed at electric utilities, net exports, and shipments to U.S. Armed Forces overseas by the quantity of anthracite consumption by all sectors other than the electric utility sector less the quantity of anthracite stock changes, losses, and "unaccounted for."

  Bituminous coal and lignite conversion factors:
  - 1960 through 1973: Estimated by EIA by adjusting the 1974 average heat value of bituminous coal and lignite consumed in the residential and commercial sector by the ratios of 1960 through 1973 national averages for the sector to its 1974 average.
  - 1974 through 1997: Calculated by EIA by assuming that the bituminous coal and lignite consumed in the residential and commercial sector in each state contained heating values equal to those of bituminous coal and lignite received at electric utilities in each state from identified coal-producing districts as reported on the FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." The average Btu content of coal delivered from each coal-producing district was applied to deliveries to the residential and commercial sector in each state and the sum total of the heat content was divided by total tonnages, yielding a weighted average. The coal distribution data by coal-producing district are reported on Form EIA-6, "Coal Distribution Report," and predecessor Bureau of Mines Form 6-1419-Q.
- 1998 through 2000: Calculated by EIA from the average heat content of coal received for the residential and commercial sectors combined as reported on Form EIA-860, "Annual Electric Generator Report." For states that are not represented in data on the Form EIA-860, it is assumed that the heat content of the coal receipts in residential and commercial sectors are equivalent to the heat content of coal received in the other industrial sector as reported on Form EIA-3A, "Annual Coal Quality Report—Manufacturing." For states that are not represented in either Form EIA-3A data or Form EIA-860 data (CT, NH, RI, VT, and DC), the heat content of coal receipts in MA is used for CT, NH, RI, and VT and the heat content of coal receipts in MD is used for DC, since the origin of the coal receipts are similar.
- 2001 through 2007: Calculated by EIA from the coal distribution data reported on Form EIA-6A, "Coal Distribution Report— Annual," and the average heat content of coal reported on FERC Form 423 and Form EIA-423, "Monthly Cost and Quality of Fuels for Electric Plants." Form EIA-6A provides distribution data for the combined residential and commercial sectors by state of origin to the destination state. FERC Form 423 and Form EIA-423 provide the average heat content of coal produced in the state of origin.
- 2008 forward: Calculated by EIA using unpublished data as the average heat content of coal received at commercial and institutional establishments consuming more than 1,000 short tons of coal annually from Form EIA-3, "Quarterly Coal Consumption and Quality Report, Manufacturing and Transformation/Processing Coal Plants and Commercial and Institutional Coal Users."

CLHCPUS — Coal consumed by the residential and commercial sectors (commercial sector from 2008 forward) in the United States.

- 1960 through 1972: U.S. Department of the Interior, Bureau of

Mines, *Minerals Yearbook*, Chapter "Coal—Pennsylvania Anthracite Annual" and Chapter "Coal—Bituminous and Lignite," Table titled, "Consumption of bituminous coal and lignite, by consumer class, with retail deliveries in the United States" column titled "Retail deliveries to other consumers" or "Retail sales."

- 1973 through 1984: EIA, *Weekly Coal Production*, August 9, 1986, Table 7.
- 1985 through 1987: EIA, *Weekly Coal Production*, July 16, 1988, Table 6.
- 1988 through 1990, 1992 through 1995: EIA, *Quarterly Coal Report, October-December* for each year. Data are from the report of the following year, i.e., 1988 final data are published in the *Quarterly Coal Report, October-December 1989*. The specific tables are:
  - 1988 through 1990: Table 29.
  - 1992 through 1994: Table 51.
  - 1995: Table 43.
- 1991, 1996 through 1999: EIA, *Coal Industry Annual 2000*, Table 75.
- 2000: EIA, *Annual Coal Report 2001*, Table 27.
- 2001 forward: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report*, Table 26, http://www.eia.gov/coal/annual/.

CLHDPZZ — Coal distributed to the residential and commercial sectors (commercial sector from 2008 forward) by state.

- 1960 through 1979: No data available. The 1980 state data are used for years 1960 through 1979.
- 1980 forward: The distribution data are published in:
  - 1980 through 1984: EIA, *Coal Distribution, January-December 1984*, Table 21.
  - 1985 through 1989: EIA, *Coal Distribution, January-December 1989*, Table 15.
  - 1990 and 1991: EIA, *Coal Distribution, January-December* for each year, Table 16.
  - 1992 through 1994: EIA, *Quarterly Coal Report, October-December* for the following year, Table 10.
  - 1995 through 1997: Unpublished data from Form EIA-6.
  - 1998 through 2000: EIA, *Coal Industry Annual* for each year, Table 64.
  - 2001 forward: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report*, Table 26, http://www.eia.gov/coal/annual/. EIA, *Annual Coal Distribution Report*, Domestic Distribution of U.S. Coal by Destination State, Consumer, Destination and Method of Transportation, http://www.eia.gov/coal/distribution/annual/ and http://www.eia.gov/coal/distribution/annual/archive.html.

CLKCKZZ — Factor for converting coal carbonized at coke plants from physical units to Btu by state.

- 1960 through 1997: Calculated by EIA as the consumption-weighted average of national-level anthracite conversion factors and state-level bituminous coal and lignite factors using factors and consumption from SEDS.

  Anthracite conversion factors:
  - Calculated annually by EIA by dividing the heat content of anthracite produced less the heat content of the anthracite consumed at electric utilities, net exports, and shipments to U.S. Armed Forces overseas by the quantity of anthracite consumption by all sectors other than the electric utility sector less the quantity of anthracite stock changes, losses, and "unaccounted for."

  Bituminous coal and lignite conversion factors:
  - 1960 through 1972: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite," sum of columns "Beehive coke plants" and "Oven coke plants."
  - 1973 through 1984: EIA, *Weekly Coal Production*, August 9, 1986, Table 8.
  - 1985 through 1987: EIA, *Weekly Coal Production*, July 16, 1988, Table 7.
  - 1988 through 1997: EIA, Unpublished data from Form EIA-5, "Coke Plant Report, Quarterly."
- 1998 through 2000: Calculated by EIA for 1998 using unpublished data from Form EIA-5, "Coke Plant Report, Quarterly." The 1998 state factors are used for 1999 and 2000.
- 2001 forward: Calculated by EIA from data reported on Form EIA-5, "Quarterly Coal Consumption and Quality Report, Coke Plants." Coke plant data on tons of coal carbonized to create coke, the volatilities of the coal carbonized, and conversion factors based on coal volatility are used to calculate average conversion factors by state.

CLKCPUS — Coal carbonized by coke plants in the United States.

- 1960 through 1972: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, chapter "Coal—Pennsylvania Anthracite Annual," and chapter "Coal—Bituminous and Lignite," table titled, "Consumption of Bituminous coal and lignite, by consumer class, and

retail deliveries in the United States," sum of columns titled "Beehive coke plants" and "Oven coke plants."

- 1973 through 1984: EIA, *Weekly Coal Production*, August 9, 1986, Table 7.
- 1985 through 1987: EIA, *Weekly Coal Production*, July 16, 1988, Table 6.
- 1988 through 1995: EIA, *Quarterly Coal Report, October-December* for each year. Data are from the report of the following year, i.e., 1988 final data are published in the *Quarterly Coal Report, October-December 1989*. The specific tables are:
  - 1988 through 1990: Table 27.
  - 1991 through 1994: Table 48.
  - 1995: Table 40.
- 1996 through 1999: EIA, *Coal Industry Annual 2000*, Table 73.
- 2000: EIA, *Annual Coal Report 2001*, Table 27.
- 2001 forward: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report*, Table 26, http://www.eia.gov/coal/annual/.

CLKDPZZ — Coal distributed to coke plants by state.

- 1960 through 1979: Series is the sum of an anthracite data series and a bituminous coal and lignite data series:

  Anthracite:
  - No data available. The 1980 state data are used for years 1960 through 1979.

  Bituminous coal and lignite:
  - 1960 through 1976: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite."
  - 1977 through 1979: EIA, *Energy Data Reports*, "Coal-Bituminous and Lignite." The specific tables are:
    - 1977: "Comparative Summary of Distribution of Bituminous Coal and Lignite Produced in the United States During the First Nine Months of 1977" and "Distribution of Bituminous Coal and Lignite Produced in the United States During October-December 1977, by Geographic Division and State Destination."
    - 1978: "Distribution of Bituminous Coal and Lignite Produced in the United States."
    - 1979: "Overall Summary of Distribution of Bituminous, Subbituminous, and Lignite Coal Produced in the United States."
    - 1980 forward: Consumption data became available for some states and are used for this distribution series when available. See Additional Note 1 on page 15 for an explanation of the estimation methodology.
  - 1980 through 1995: EIA, *Quarterly Coal Report, October-December* for each year. Data are from the report of the following year, i.e., 1982 final data are published in the *Quarterly Coal Report, October-December 1983*. The specific tables are:
    - 1980: Unpublished data.
    - 1981 through 1983: Table 25.
    - 1984, 1985, and 1987: Table 27.
    - 1986, 1988, and 1989: Unpublished state revisions that are components of the U.S. revisions published in the *Quarterly Coal Report, October-December 1991*, Table 45.
    - 1990: Table 27.
    - 1991 through 1994: Table 48.
    - 1995: Table 40.
  - 1996 through 1999: EIA, unpublished data in short tons as pub-lished rounded to thousand short tons in EIA, *Coal Industry Annual 2000*, Table 73.
  - 2000: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report 2001*, Table 27.
  - 2001 forward: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report*, Table 26, http://www.eia.gov/coal/annual/. EIA, *Annual Coal Distribution Report*, Domestic Distribution of U.S. Coal by Destination State, Consumer, Destination and Method of Transportation, http://www.eia.gov/coal/distribution/annual/ and http://www.eia.gov/coal/distribution/annual/archive.html.

CLOCKZZ — Factor for converting coal consumed by industrial users other than coke plants from physical units to Btu by state.

- 1960 through 1997: Calculated by EIA as the consumption-weighted average of national level anthracite conversion factors and state-level bituminous coal and lignite factors using factors and consumption from SEDS.

  Anthracite conversion factors:
  - Calculated annually by EIA by dividing the heat content of anthracite produced less the heat content of the anthracite consumed at electric utilities, net exports, and shipments to U.S. Armed Forces overseas by the quantity of anthracite consumption by all sectors other than the electric utility sector less the quantity of anthracite stock changes, losses, and "unaccounted for."

Bituminous coal and lignite conversion factors:
- 1960 through 1973: Estimated by EIA by adjusting the 1974 average heat value of bituminous coal and lignite consumed by industrial users other than coke plants by the ratios of 1960 through 1973 national averages for the other industrial users to its 1974 average.
- 1974 through 1997: Calculated by EIA by assuming that the bituminous coal and lignite consumed by industrial users other than coke plants in each state contained heating values equal to those of bituminous coal and lignite received at electric utilities in each state from identified coal-producing districts as reported on FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." The average Btu content of coal delivered from each coal-producing district was applied to deliveries to other industrial users in each state and the sum total of the heat content was divided by total tonnages, yielding a weighted average. The coal distribution data by coal-producing district are reported on Form EIA-6, "Coal Distribution Report," and predecessor Bureau of Mines Form 6-1419-Q.

- 1998 through 2000: Calculated by EIA from unpublished data as the average heat content of coal received at manufacturing plants (other than coke plants) consuming more than 1,000 short tons of coal reported on Form EIA-3A, "Annual Coal Quality Report—Manufacturing Plants."
- 2001 forward: Calculated by EIA using unpublished data as the average heat content of (1) coal received at manufacturing plants (other than coke plants) consuming more than 1,000 short tons of coal annually from Form EIA-3, "Quarterly Coal Consumption and Quality Report, Manufacturing and Transformation/Processing Coal Plants and Commercial and Institutional Coal Users," and predecessor forms; (2) coal consumed by coal mining facilities reported on Form EIA-7A, "Coal Production Report," with heat contents for the coal producing state reported on Form EIA-923, "Power Plant Operations Report," and predecessor forms; and, prior to 2007, (3) coal distributed to agricultural, mining, and construction sectors reported on Form EIA-6A, "Coal Distribution Report—Annual" with heat contents for the coal producing state reported on FERC Form 423 and Form EIA-423, "Monthly Cost and Quality of Fuels for Electric Plants."

CLOCPUS — Coal consumed by industrial users other than coke plants in the United States.

- 1960 through 1972: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, Chapter "Coal—Pennsylvania Anthracite, Annual" and chapter "Coal—Bituminous and Lignite," table titled "Consumption of bituminous coal and lignite, by consumer class, and retail deliveries in the United States." Sum of columns titled "Steel and rolling mills," "Cement mills," and "Other manufacturing and mining industries."
- 1973 through 1984: EIA, *Weekly Coal Production*, August 9, 1986, Table 7.
- 1985 through 1987: EIA, *Weekly Coal Production*, July 16, 1988, Table 6.
- 1988 through 1999: EIA, *Quarterly Coal Report, October-December* for each year. Data are from the report of the following year, i.e., 1988 final data are published in the *Quarterly Coal Report, October-December 1989*. The specific tables are:
  - 1988 through 1990: Table 28.
  - 1991 through 1994: Table 49.
  - 1995: Table 41.
  - 1996 through 1999: Table 42.
- 2000: EIA, *Annual Coal Report 2001*, Table 27.
- 2001 forward: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report*, Table 26, http://www.eia.gov/coal/annual/.

CLODPZZ — Coal distributed to industrial plants (other than coke plants) by state.

- 1960 through 1979: Series is the sum of an anthracite data series and a bituminous coal and lignite data series:

  Anthracite:
  - No data available. The 1980 state data are used for years 1960 through 1979.

  Bituminous coal and lignite:
  - 1960 through 1976: U.S. Department of the Interior, Bureau of Mines, Minerals Yearbook, "Coal—Bituminous and Lignite."
  - 1977 through 1979: EIA, *Energy Data Reports*, "Coal—Bituminous and Lignite." The specific tables are:
    - 1977: "Comparative Summary of Distribution of Bituminous Coal and Lignite Produced in the United States During the First Nine Months of 1977" and "Distribution of Bituminous Coal and Lignite Produced in the United States During October-December 1977, by Geographic Division and State Destination."
    - 1978: "Distribution of Bituminous Coal and Lignite Produced in the United States."

- 1979: "Overall Summary of Distribution of Bituminous, Subbituminous, and Lignite Coal Produced in the United States."
- 1980 forward: Consumption data became available for some states and are used for this distribution series when available. See Additional Note 1 on page 15 for an explanation of the estimation methodology.
  - 1980 through 1995: EIA, *Quarterly Coal Report, October-December* for each year. Data are from the report of the following year, i.e., 1982 final data are published in the *Quarterly Coal Report, October-December 1983*. The specific tables are:
    - 1980: Unpublished data.
    - 1981 through 1983: Table 26.
    - 1984 through 1990: Table 28.
    - 1991 through 1994: Table 49.
    - 1995: Table 41.
  - 1996 through 1999: EIA, unpublished data in short tons as pub-lished rounded to thousand short tons in EIA, *Coal Industry Annual 2000*, Table 71.
  - 2000: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report 2001*, Table 27.
  - 2001 forward: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, Annual Coal Report, Table 26, http://www.eia.gov/coal/annual/.

CLRCSUS — Residential sector share of coal consumed by the residential and commercial sectors combined.

- 1960 through 2007: Calculated by EIA. It is first assumed that an occupied coal-heated housing unit consumes fuel at the same Btu rate as an oil-heated housing unit. Then, for the years in which data are available on the number of occupied housing units by heating source (1960, 1970, 1973 through 1981, and subsequent odd-numbered years), residential use of coal is estimated by the following steps: a ratio is created of the number of occupied housing units heated by coal to the number of housing units heated by oil; the ratio is multiplied by the Btu quantity of distillate fuel oil used by the residential sector to estimate the Btu quantity of coal used by the residential sector; and the residential sector's share of residential and commercial use is calculated. The missing years' shares are interpolated.
- 2008 forward: Discontinued.

Coal Coke Imports and Exports

Physical units

Net imports of coal coke is a component of total U.S. energy consumption. There is no attempt to estimate state allocations of this energy source and all of it is considered to be used by the industrial sector. Net imports of coal coke are included in the U.S. data but not in the state-level data in all tables of total energy consumption and industrial sector energy consumption. Variables for net imports of coal coke into the United States are:

CCIMPUS = coal coke imported into the United States, in thousand short tons; and

CCEXPUS = coal coke exported from the United States, in thousand short tons;

Net imports is calculated:

CCNIPUS = CCIMPUS - CCEXPUS

British thermal units (Btu)

The factor for converting coal coke from short tons to Btu is 24.80 million Btu per short ton:

CCIMBUS = CCIMPUS * 24.80
CCEXBUS = CCEXPUS * 24.80
CCNIBUS = CCIMBUS - CCEXBUS

Data sources for net imports of coal

CCEXPUS — Coal coke exported from the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, "Coke and Coal Chemicals Annual."
- 1976 through 1979: EIA, *Energy Data Reports*, "Coke and Coal Chemicals Monthly."
- 1980 through 1990: EIA, *Quarterly Coal Report* (October-December of the following year). The specific tables are:
  - 1980: Table 7.
  - 1981 through 1984: Table A10.
  - 1985 through 1990: Table A9.
- 1991 and 1992: Unpublished revisions from the EIA, Office of Energy Markets and End Use, Integrated Modeling Data System.

- 1993 through 1997: Unpublished revisions from the EIA, Office of Energy Markets and End Use, Integrated Modeling Data System, as pub- lished rounded in the EIA, *Quarterly Coal Report October-December 1999*, Table 2.
- 1998 forward: EIA, *Quarterly Coal Report* (October-December of the following year), Table 15 (1998 and 1999), Table 16 (2000), Table 17 (2001 through 2005), Table 14 (2006 through 2008), and Table 16 (2009 forward), http://www.eia.gov/coal/production/quarterly/.

CCIMPUS — Coal coke imported into the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, "Coke and Coal Chemicals Annual."
- 1976 through 1979: EIA, *Energy Data Reports*, "Coke and Coal Chemicals Monthly."
- 1980 through 1990: EIA, *Quarterly Coal Report* (October-December of the following year). The specific tables are:
  - 1980: Table 8.
  - 1981 through 1984: Table A12.
  - 1985 through 1987: Table A11.
  - 1988 through 1990: Table A10.
- 1991 and 1992: Unpublished revisions from the EIA, Office of Energy Markets and End Use, Integrated Modeling Data System.
- 1993 through 1997: Unpublished revisions from the EIA, Office of Energy Markets and End Use, Integrated Modeling Data System, as published rounded in the EIA, *Quarterly Coal Report October-December 1999*, Table 2.
- 1998 forward: EIA, *Quarterly Coal Report* (October-December of the following year), Table 19 (1998 and 1999), Table 20 (2000), Table 21 (2001 through 2005), Table 18 (2006 through 2008), and Table 21 (2009 forward), http://www.eia.gov/coal/production/quarterly/.