

# State Energy Data System 2005: Prices and Expenditures

## Introduction to the Technical Notes

The State Energy Data System (SEDS) provides annual energy price and expenditure estimates for all energy sources by major economic sectors for the 50 States and the District of Columbia and in aggregate for the United States. These data are available on Energy Information Administration's (EIA) website at <http://www.eia.doe.gov/emeu/states/seds.html>. Companion tables containing State-level consumption data can also be found at the same Web site. In addition, tables showing State-level consumption, price, and expenditure estimates by energy source as they are updated for the most current year can be found at [http://www.eia.doe.gov/emeu/states/seds\\_updates.html](http://www.eia.doe.gov/emeu/states/seds_updates.html).

These Technical Notes contain information on the data sources, estimation procedures and assumptions for the State-level price and expenditure estimates. Technical Notes for State-level consumption also are available at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).

### Purpose

SEDS was developed and is maintained and operated by EIA. The goal in maintaining SEDS is to create historical time series of energy consumption, prices and expenditures by State that are defined as consistently as possible over time and across sectors. SEDS exists for two principal reasons: (1) to provide State energy consumption, price and expenditure estimates to Members of Congress, Federal and State

agencies, and the general public and (2) to provide the historical series necessary for EIA's energy models.

### Data System

Due to page-size constraints, the SEDS PDF tables show data for selected years from 1970 through 1990; thereafter, data are shown consecutively through 2005. However, data for all years from 1970 forward are maintained in SEDS, and are included in the HTML versions of the tables and in the CSV data files available via EIA's Web site. All years are covered by the documentation in this report.

Expenditures are calculated by multiplying the price estimates by the consumption estimates found in SEDS. In some cases, consumption is adjusted to remove process fuel; intermediate petroleum products; other consumption that has no direct fuel costs, i.e., hydroelectric, geothermal, wind, solar, and photovoltaic energy sources; and wood and waste obtained at no cost. (See the discussion in Section 7, "Consumption Adjustments for Calculating Expenditures," at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).)

All prices and expenditures are in nominal dollars that have not been adjusted to reflect changes in the purchasing power of the dollar. All expenditures are consumer expenditures; that is, they represent estimates of money spent directly by consumers to purchase energy, generally including taxes. (See box on page 2.)

Note: Throughout this report, the term "State" includes the District of Columbia.

The following Technical Notes describe how the price estimates are developed, including sources of data, methods of estimation, and

conversion factors applied. These notes are an update of those provided with the last release of these data in June 2007.

## Taxes in the Price and Expenditure Data

The objective in developing State energy prices is to provide estimates that include all taxes, but data sources often do not treat taxes uniformly. Where taxes are included in the source data, they are included in the price and expenditure tables. Where taxes are not included but can be separately estimated, they are added, with some exceptions listed below. In many cases, States and some localities provide tax exemptions for various kinds of activities or classes of end users. These complex exemptions are not incorporated into the State energy prices. The Energy Information Administration (EIA) is continuing to analyze these cases to see if a better representation can be made. A comprehensive and detailed study of taxes in EIA data is available in the report *End-Use Taxes: Current EIA Practices*, DOE/EIA-0583 (Washington, DC, August 1994). The report is available from EIA's Internet site at <http://tonto.eia.doe.gov/FTPROOT/financial/0583.pdf>.

The status of tax data in this year's price and expenditure tables is summarized below and described more fully in the sections for each energy source and sector.

### **End-Use Sectors**

**Coal.** All steam coal and coking coal prices include taxes in all years. Appropriately, coal imports and exports in the industrial sector do not include end-user taxes.

**Natural Gas.** Natural gas prices are intended to include all Federal, State, and local taxes, surcharges, and adjustments billed to consumers. Although the EIA data collection form states that taxes are to be included in the reported gross revenues, it is most likely that respondents would not consider sales taxes as part of their company's gross revenues, and some may not be reporting them. As a result, consumer sales taxes may not be covered in full. For more information

see *End-Use Taxes: Current EIA Practices*, page 23 of 134 in the pdf file, <http://tonto.eia.doe.gov/FTPROOT/financial/0583.pdf>.

**Petroleum.** Prices of motor gasoline, diesel fuel, and liquefied petroleum gases used for transportation include excise and other per-gallon taxes but do not include general sales taxes due to wide variation at the local level. Other liquefied petroleum gases, distillate fuel oil, kerosene, and residual fuel oil prices include sales taxes in all years. Jet fuel, aviation gasoline, asphalt and road oil, lubricants and other petroleum products do not include taxes. Other petroleum products are miscellaneous products, petrochemical feedstocks (naphtha, other oils, and still gas), industrial petroleum coke, special naphthas, and waxes.

**Wood and Waste.** Wood and waste prices for the residential, commercial, and industrial sectors include taxes.

**Electricity.** Taxes paid directly by the electric power sector (rather than end users) are considered operating costs and are passed on to the end users as part of the price. Sales and other use taxes are included in the prices.

### **Electric Power Sector**

Coal, natural gas, petroleum coke, nuclear, and wood and waste prices include all taxes, transportation, and handling costs. There are no direct fuel costs (or taxes) for hydroelectric, geothermal, centralized solar, or wind energy. Capital, operation, and maintenance costs and related taxes associated with these energy sources are included indirectly because electricity prices reflect their presence in the rate base.

Appendix B gives detailed information about all data revisions in the this edition of the price and expenditure estimates. All data revised since the previous release that are large enough to be seen in the PDF tables' level of rounding are marked with an "R" in the table.

Reliable data for State-level prices rarely exist, especially as series that are consistent over a long period. Estimates and assumptions are applied to fill data gaps and to maintain consistent definitions in the data series over time. SEDS incorporates the most consistent series and procedures possible. Users should recognize the limitations imposed on the system due to changing and inadequate data sources. Estimates often are based on a variety of surrogate measures that are selected on the basis of availability, applicability as indicators, continuity over time, and consistency among the various energy commodities. Original source documents for data used in SEDS (cited in this documentation) include descriptions of collection methodologies, universes, imputation or adjustment techniques (if any), and errors associated with the individual processes. Due to the numerous collection forms and procedures associated with these reports, it is not possible to develop a meaningful numerical estimate of the overall statistical errors of the material published in the SEDS price and expenditure tables.

It is also important to note that, even within a State, a single average price may have limited meaning in that it represents a consumption-weighted average over a whole State. For example, urban and rural electricity prices can vary significantly from a State's weighted average, and prices in one region of a State may differ from those in another because of access to less expensive hydroelectricity. Differences within a State may also be greater than differences among adjacent States. Thus, the principal value of the estimates in these tables lies in general comparisons among the States, interstate comparisons for a given year, and the analysis of trends over several years.

The five economic sectors used in the SEDS price and expenditure tables correspond to those used in the consumption tables as follows:

- **Residential Sector:** An energy-consuming sector that consists of living quarters for private households. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a variety of other appliances. The residential sector excludes institutional living quarters.
- **Commercial Sector:** An energy-consuming sector that consists of service-providing facilities and equipment of: businesses; Federal, State, and local governments; and other private and public organizations, such as religious, social, or fraternal groups. The commercial sector includes institutional living quarters. It also includes sewage treatment facilities. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a wide variety of other equipment. *Note:* This sector includes generators that produce electricity and/or useful thermal output primarily to support the activities of the above-mentioned commercial establishments.
- **Industrial Sector:** An energy-consuming sector that consists of all facilities and equipment used for producing, processing, or assembling goods. The industrial sector encompasses the following types of activity: manufacturing (NAICS codes 31–33); agriculture, forestry, fishing and hunting (NAICS code 11); mining, including oil and gas extraction (NAICS code 21); and construction (NAICS code 23). Overall energy use in this sector is largely for process heat and cooling and powering machinery, with lesser amounts used for facility heating, air conditioning, and lighting. Fossil fuels are also used as raw material inputs to manufactured products. *Note:* This sector includes generators that produce electricity and/or useful thermal output primarily to support the above-mentioned industrial activities.
- **Transportation Sector:** An energy-consuming sector that consists of all vehicles whose primary purpose is transporting people and/or goods from one physical location to another. Included are automobiles; trucks; buses; motorcycles; trains, subways, and other rail vehicles; aircraft; and ships, barges, and other waterborne vehicles. Vehicles whose primary purpose is not transportation (e.g., construction cranes and bulldozers, farming vehicles, and warehouse tractors and forklifts) are classified in the sector of their primary use. In this report, natural gas used in the operation of natural gas pipelines is included in the transportation sector.
- **Electric Power Sector:** An energy-consuming sector that consists of electricity-only and combined-heat-and-power plants within the NAICS (North American Industry Classification System) 22 cate-

gory whose primary business is to sell electricity, or electricity and heat, to the public. *Note:* This sector includes electric utilities and independent power producers.

Although end-use allocations of energy consumption and expenditures follow those guidelines as closely as possible, some data are collected by using different classifications. For example, electric utilities often classify commercial and industrial users by the quantity of electricity purchases rather than by the business activity of the purchaser. Agricultural use of natural gas is collected and reported in the commercial sector through 1995 and in the industrial sector for 1996 forward. Since agricultural use of natural gas cannot be identified separately, the discrepancy cannot be reconciled. Another example is master-metered condominiums, apartments, and buildings with a combination of residential and commercial units. In many cases, billing and metering practices cause residential energy usage of electricity, natural gas, or fuel oil to be included in the commercial sector. In those cases, there is no basis for separating residential from commercial use. Readers are advised to consult the consumption Technical Notes for specific assumptions regarding the consumption estimates.

Where prices for an energy source and sector are not available, comparable prices are substituted. For example, the transportation sector motor gasoline prices are applied to the commercial and industrial sectors. In some cases, the average of adjacent States' prices is assigned to

a missing State price. The documentation elaborates on these price assumptions.

Except where specified, it is generally not possible to describe the prices in these tables as entirely "wholesale" or "retail." The prices paid in each consuming sector are usually a combination of both sets of prices, depending on a number of closely interrelated factors. Almost all residential sector prices are close to retail prices, reflecting the relatively small quantities of individual purchases and the increased costs of extensive, multilayered distribution systems. Similarly, in the transportation sector almost everyone pays the same retail-like price for motor gasoline, regardless of volume purchased or location of purchase. Conversely, residual fuel oil prices in the transportation sector are certainly more wholesale-like as a result of large deliveries to bulk facilities in major ports. In the same manner, most large industrial and many large commercial expenditures can be thought of as near wholesale, frequently involving direct access to a producer or bulk distribution facility for very large quantities. Many smaller industrial and commercial facilities pay something much closer to retail prices as a result of the small quantities involved and their institutional distance from primary suppliers. Notable exceptions to these relationships include natural gas and electricity suppliers, which typically establish fixed rates for each of several classes of service, depending on representative quantities, service factors, and distribution expenses.

## Section 1. Overview

The Technical Notes document data sources and procedures used to develop the price and expenditure estimates in the State Energy Data System (SEDS.) Information is provided for each of the major energy sources: coal, natural gas, petroleum, wood and waste, and electricity. The last section describes adjustments for consumption of industrial process fuel and intermediate products and other uncosted energy sources.

### *Price Estimation Methodologies*

Price data in the SEDS price and expenditure tables are expressed in dollars per million Btu. If the source data are in physical units, they are divided by the appropriate conversion factors to create the Btu prices. Estimated prices are used only when specific State-level prices are not available for a given energy source and sector. In some cases, prices for energy consumed in one sector in a State are assigned to another sector in the same State. Specific examples are: industrial steam coal prices are assigned to the commercial and transportation sectors' steam coal use; industrial lubricants prices are assigned to transportation lubricants uses; and transportation motor gasoline prices are assigned to commercial and industrial use of motor gasoline.

In addition, there are a few cases where State-level prices could not be identified for any economic sector for a given energy source for some or all years. In these instances, a national-level price is used for all States for a given year. The procedures for estimating these national-level prices are presented in the body of the Technical Notes under each energy source as appropriate. The cases where a national-level price is assigned to all States in all years are: transportation use of aviation gasoline; industrial and transportation use of lubricants; and some components of other petroleum products used in the industrial sector.

Finally, within a given energy source and sector where price data are usually available, there are some cases of missing prices. Two general approaches are used to assign or estimate prices in cases where consumption occurs but no price is directly available from the data sources. The first approach is to assign an adjacent State price or the simple average of adjacent States' prices. When this approach is not feasible, the consumption-weighted price from the Census division or region or the Petroleum Administration for Defense district or subdistrict in which the State is located is assigned.

Three State groupings used in the report—U.S. Census regions and divisions, Federal regions, and Petroleum Administration for Defense districts—are shown in Figures TN1, TN2, and TN3, respectively, on the following pages. States are often designated by their two-letter postal code abbreviations shown in the map legends. Throughout the Technical Notes, the term “State” includes the District of Columbia.

### *Expenditures*

Full documentation of the data sources and the methods used to estimate energy consumption are described in the SEDS consumption Technical Notes, located on EIA's website at <http://www.eia.doe.gov/emeu/states/seds.html>.

To calculate energy expenditures, SEDS consumption is adjusted to remove quantities of process fuel and intermediate products used in the industrial and transportation sectors that are not purchased directly by end users. Electricity exported to Canada and Mexico are excluded from expenditure calculations. Use of hydroelectric, geothermal, wind, and solar energy sources are also removed from SEDS expenditure calculations since there are no direct fuel costs for those energy sources. SEDS consumption of wood in the residential sector and wood and

waste consumption in the industrial and commercial sectors are adjusted to remove estimated quantities that were obtained at no cost. Adjusted energy consumption estimates used to calculate expenditures are explained in detail at EIA's website: [http://www.eia.doe.gov/emeu/states/sep\\_prices/notes/pr\\_consum\\_adjust.pdf](http://www.eia.doe.gov/emeu/states/sep_prices/notes/pr_consum_adjust.pdf).

Energy expenditures, in million dollars, are calculated by multiplying SEDS prices for each fuel in dollars per million Btu by the SEDS adjusted consumption in billion Btu.

Figure TN1. U.S. Census Regions and Divisions



**Region 1  
Northeast**

- Division 1  
(New England)**  
Connecticut (CT)  
Maine (ME)  
Massachusetts (MA)  
New Hampshire (NH)  
Rhode Island (RI)  
Vermont (VT)

- Division 2  
(Middle Atlantic)**  
New Jersey (NJ)  
New York (NY)  
Pennsylvania (PA)

**Region 2 Midwest**

- Division 3  
(East North Central)**  
Illinois (IL)  
Indiana (IN)  
Michigan (MI)  
Ohio (OH)  
Wisconsin (WI)

- Division 4  
(West North Central)**  
Iowa (IA)  
Kansas (KS)  
Minnesota (MN)  
Missouri (MO)  
Nebraska (NE)  
North Dakota (ND)  
South Dakota (SD)

**Region 3 South**

- Division 5  
(South Atlantic)**  
Delaware (DE)  
District of Columbia (DC)  
Florida (FL)  
Georgia (GA)  
Maryland (MD)  
North Carolina (NC)  
South Carolina (SC)  
Virginia (VA)  
West Virginia (WV)

- Division 6  
(East South Central)**  
Alabama (AL)  
Kentucky (KY)  
Mississippi (MS)  
Tennessee (TN)
- Division 7  
(West South Central)**  
Arkansas (AR)  
Louisiana (LA)  
Oklahoma (OK)  
Texas (TX)

**Region 4 West**

- Division 8  
(Mountain)**  
Arizona (AZ)  
Colorado (CO)  
Idaho (ID)  
Montana (MT)  
Nevada (NV)  
New Mexico (NM)  
Utah (UT)  
Wyoming (WY)
- Division 9  
(Pacific)**  
Alaska (AK)  
California (CA)  
Hawaii (HI)  
Oregon (OR)  
Washington (WA)

Figure TN2. Federal Regions



**Region 1**

**New England**

- Connecticut (CT)
- Maine (ME)
- Massachusetts (MA)
- New Hampshire (NH)
- Rhode Island (RI)
- Vermont (VT)

**Region 2**

**New York/New Jersey**

- New Jersey (NJ)
- New York (NY)

**Region 3**

**Mid Atlantic**

- Delaware (DE)
- District of Columbia (DC)
- Maryland (MD)
- Pennsylvania (PA)
- Virginia (VA)
- West Virginia (WV)

**Region 4**

**South Atlantic**

- Alabama (AL)
- Florida (FL)
- Georgia (GA)
- Kentucky (KY)
- Mississippi (MS)
- North Carolina (NC)
- South Carolina (SC)
- Tennessee (TN)

**Region 5**

**Midwest**

- Illinois (IL)
- Indiana (IN)
- Michigan (MI)
- Minnesota (MN)
- Ohio (OH)
- Wisconsin (WI)

**Region 6**

**Southwest**

- Arkansas (AR)
- Louisiana (LA)
- New Mexico (NM)
- Oklahoma (OK)
- Texas (TX)

**Region 7**

**Central**

- Iowa (IA)
- Kansas (KS)
- Missouri (MO)
- Nebraska (NE)

**Region 8**

**North Central**

- Colorado (CO)
- Montana (MT)
- North Dakota (ND)
- South Dakota (SD)
- Utah (UT)
- Wyoming (WY)

**Region 9**

**West**

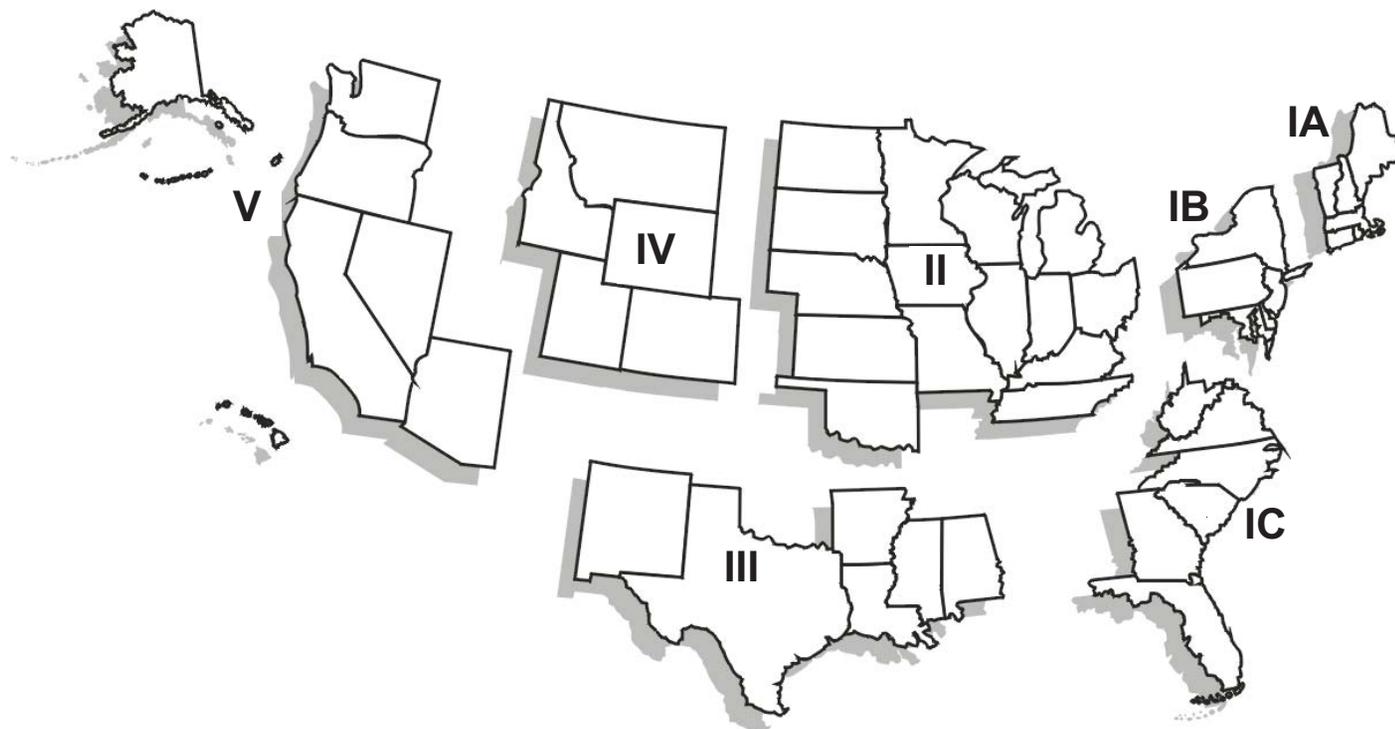
- Arizona (AZ)
- California (CA)
- Hawaii (HI)
- Nevada (NV)

**Region 10**

**Northwest**

- Alaska (AK)
- Idaho (ID)
- Oregon (OR)
- Washington (WA)

Figure TN3. Petroleum Administration for Defense Districts and Subdistricts



**Subdistrict IA**

- Connecticut (CT)
- Maine (ME)
- Massachusetts (MA)
- New Hampshire (NH)
- Rhode Island (RI)
- Vermont (VT)

**Subdistrict IB**

- Delaware (DE)
- District of Columbia (DC)
- Maryland (MD)
- New Jersey (NJ)
- New York (NY)
- Pennsylvania (PA)

**Subdistrict IC**

- Florida (FL)
- Georgia (GA)
- North Carolina (NC)
- South Carolina (SC)
- Virginia (VA)
- West Virginia (WV)

**District II**

- Illinois (IL)
- Indiana (IN)
- Iowa (IA)
- Kansas (KS)
- Kentucky (KY)
- Michigan (MI)
- Minnesota (MN)
- Missouri (MO)
- Nebraska (NE)
- North Dakota (ND)
- Ohio (OH)
- Oklahoma (OK)
- South Dakota (SD)
- Tennessee (TN)
- Wisconsin (WI)

**District III**

- Alabama (AL)
- Arkansas (AR)
- Louisiana (LA)
- Mississippi (MS)
- New Mexico (NM)
- Texas (TX)

**District IV**

- Colorado (CO)
- Idaho (ID)
- Montana (MT)
- Utah (UT)
- Wyoming (WY)

**District V**

- Alaska (AK)
- Arizona (AZ)
- California (CA)
- Hawaii (HI)
- Nevada (NV)
- Oregon (OR)
- Washington (WA)



## Section 2. Coal

Coal prices are developed for the following three categories: coking coal; steam coal (all noncoking coal); and coal coke imports and exports.

Coking coal, used in the industrial sector only, is a high-quality bituminous coal that is used to make coal coke. Steam coal, which may be used by all sectors, includes anthracite, bituminous coal, subbituminous coal, and lignite. In the industrial sector, coal consumption is the sum of coking coal and steam coal. The industrial coal price is the quantity-weighted average price of these two components.

Imports and exports of coal coke are available only on the national level and are accounted for in the industrial sector. Coal coke imports and exports are reported separately and are not averaged with other coal prices and expenditures.

### Coking Coal

Coking coal is generally more expensive than steam coal; therefore, it is identified separately in the development of the price estimates. Coking coal prices are those paid at coke plants for coal received and include insurance, freight, and taxes.

#### **Physical Unit Prices: 2005**

The source publication contains physical unit prices for States and Census divisions, most of which are withheld to avoid disclosure of proprietary company-level data. In 2005, coking coal prices are

available only for the United States and the East North Central Census Division. The East North Central price is assigned to the individual States in that division. States in all other Census divisions are assigned a consumption-weighted price calculated using the U.S. data excluding the East North Central data.

#### **Physical Unit Prices: 1970 Through 2004**

Source publications contain physical unit prices for States, groups of States, or Census divisions. Individual State prices are used directly for their respective States. Where individual State prices are not available, the associated group or Census division prices are assigned. Wherever individual State, group, or Census division prices are unavailable, prices are assigned from adjacent or nearby States or Census divisions or from States with similar coal use patterns as shown in Table TN1.

#### **Btu Prices: All Years**

Btu prices for States are calculated from the physical unit prices and the conversion factors for coking coal. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from the State Energy Data System (SEDS).

#### **Data Sources**

##### **Prices**

2000 forward: Energy Information Administration (EIA), *Annual Coal Report* for the following year (i.e., 2005 data were obtained from the

**Table TN1. Coking Coal State Group Price and Adjacent State Price Assignments, 1970-2004**

State	Years	State or Division Prices Assigned
AL	1999, 2001–2004 2000	East South Central U.S.
CA	1970–1982	CA, CO, UT
CO	1970–1982	CA, CO, UT
IL	1986–1998	IN
IN	1999–2004 1997–2000	East North Central East North Central
KY	1970–1987 1988–1998	KY, MO, TN, TX OH
MD	1999–2004 1970, 1971 1983–1991, 1993	East South Central MD, NJ, NY PA
MI	1979 1980–1985, 1987 1988–1991, 1993–1998	MI, MN, WI MI, WI OH
MN	1999–2004 1970–1978 1979	East North Central MN, WI MI, MN, WI
MO	1970–1987 1988	KY, MO, TN, TX AL
NJ	1970, 1971	MD, NJ, NY
NY	1970, 1971 1972–1982 1983–1998 1999	MD, NJ, NY MD, NY PA Middle Atlantic
OH	2000–2004 1997–2004	East North Central East North Central
PA	1997–1999 2000–2004	Middle Atlantic East North Central
TN	1970–1987 1988–1991	KY, MO, TN, TX AL
TX	1970–1987	KY, MO, TN, TX
UT	1970–1982 1983–1986 1988–1998	CA, CO, UT TX IN
VA	1999–2001 1970, 1971, 1976, 1977 1978–1982 1983–1986 1987–1998	East North Central WV VA, WV KY OH
WI	1999–2004 1970–1978 1979	East North Central MN, WI MI, MN, WI
WV	1980–1985, 1987 1978–1982 1983–1986 1987–1998 1999–2004	MI, WI VA, WV KY OH East North Central

*Annual Coal Report 2006*), Table 35 (2000), Table 34 (2001 forward), [http://www.eia.doe.gov/cneaf/coal/page/acr/acr\\_sum.html](http://www.eia.doe.gov/cneaf/coal/page/acr/acr_sum.html).

1996 through 1999: EIA, *Coal Industry Annual 2000*, Table 96.

1981 through 1995: EIA, *Quarterly Coal Report*, October-December issue, Table A3 (1981–1991), Table 39 (1992–1994), and Table 31 (1995), <http://tonto.eia.doe.gov/FTP/ROOT/coal/qcrhistory.htm>.

1977 through 1980: EIA, *Coke and Coal Chemicals*, Table 19 (1977), Table 15 (1978), and Table 7 (1979, 1980).

1970 through 1976: Bureau of Mines, U.S. Department of the Interior, *Minerals Yearbook*, “Coke and Coal Chemicals” chapter, Table 22.

**Consumption**

1970 forward: EIA, State Energy Data System, coking coal consumption.

**Conversion Factors: All Years**

Conversion factors for all States and years can be found in the ASCII comma-delimited data file at [http://www.eia.doe.gov/emeu/states/\\_seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/_seds_tech_notes.html).

**Steam Coal**

Steam coal is used in all sectors. Price data are generally available in the electric power, residential, and industrial sectors. However, no price data are directly available in the transportation and commercial sectors, and industrial sector steam coal prices are assigned to these two sectors. Data sources and calculations for estimating coal prices are discussed by sector. Estimates of the amount of steam coal consumed by sector are taken from SEDS and are adjusted for process fuel consumption in the industrial sector. (See the discussion in Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/\\_seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/_seds_tech_notes.html).)

## Residential Sector

Residential sector steam coal price estimates are intended to represent the average prices for coal purchased by residential customers and include taxes.

### Physical Unit Prices: 1979 Forward

Residential steam coal Btu prices for 1979 forward are not available. Spot prices for coal paid by the electric power sector are used in a regression equation to estimate residential steam coal prices for 1979 forward. The residential steam coal prices calculated for 1974 through 1978 from the American Gas Association *Gas Househeating Survey (GHS)* and the average Btu spot prices from the EIA *Cost and Quality of Fuels for Electric Utility Plants (C&Q)* for 1974 through 1978 are used to develop the regression equation. Electric power coal spot prices from the *C&Q* for 1979 forward are converted from cents per million Btu to dollars per million Btu.

Some States have *GHS* residential prices during the 1974 through 1978 period to use in the regression analysis, but are missing electric power sector prices in the 1979 forward data used to calculate prices. For these missing data, spot prices are assigned from other States for use in the regression, as shown in Table TN2. *C&Q* prices for ND and MT for some years result in a negative price when used in the regression; therefore MN spot prices are assigned to ND for use in the regression and the WY final residential sector steam coal price is assigned to MT as shown in Tables TN2 and TN3.

Price estimates for 1974 through 1978 for some States are not available because there was no consumption. To calculate prices for 1979 forward, these States are assigned the final prices from selected States as shown in Table TN3. In addition, several States are assigned the simple average of the final prices of adjacent States as shown in Table TN3. Alaska residential coal prices are estimated by using a different methodology, described on page 14.

Table TN2. Residential Sector: Electric Power Coal Spot Price Assignments, 1979 Forward

State	Years	State Prices Assigned
CO	1979, 1981	KS
CT	1975	NY
	1976–1979, 2001–2005	NH
	1980–1987, 1993–1995, 2000	MA
DC	1976–1999	MD
	2001–2005	VA
ID	1974, 1979–1982, 1996–2005	NV
	1975–1977	SD
	1978	ND
	1983–1995	CO
MA	1975	VT
	1976–1979, 2001	NH
MD	2001–2005	VA
ME	1974, 1975, 1981, 1983	VT
	1976–1980, 1982, 1986, 1996–2005	NH
	1984, 1985	MA
MN	2005	IA
MT	1974, 1975, 1978	ND
	1976, 1977	SD
	1979–1982	NV
ND	1976, 1977	SD
	1979–2001	MN
NH	1974, 1975, 1981, 1983	VT
	1984, 1985	MA
NV	1975–1978, 1983–1989, 1992, 1993, 1995	CO
RI	1974	CT
	1975	VT
	1976–1979, 2001–2005	NH
	1980–2000	MA
SD	1978, 1984	ND
	1979–1983, 1986, 1987, 1989, 1991–2001	MN
	2005	IA
UT	1975–1978, 1980, 1983, 2000	CO
	1979	NV
VT	1976, 1980, 2001–2005	NH
	1984–2000	MA
WA	1970, 2001–2005	OR
	1974–1978, 1983–1985	CO
	1979–1982	NV
WY	1974–1976, 1978, 1982, 1983, 1985, 2005	CO

**Table TN3. Residential Sector Coal Final Price Assignments, 1979 Forward**

State	Years	State and Averaged Final Prices Assigned
AR	1980, 1982, 1984, 1985, 1987–1995, 1998 2002, 2004, 2005	AL
	1999	MO
	1981	MO, OK, TN, TX
	1983	MO, MS, OK, TN
AZ	1982, 1984, 1985	CA, NM, NV, UT
	1987, 1988, 1990–1995, 1998–2005	UT
CA	1979–1985	NV
	1987–2004	WA
	2005	UT
FL	1980–1996, 1998, 1999–2002 2003–2005	GA AL
LA	1980, 1982, 1984, 1986, 1988, 1991, 1993, 1995, 1997, 2000	AL
MS	1979, 1980, 1983, 1984, 1986–1995, 1997 1985	AL AL, AR, TN
MT	1986–2002	WY
	2003, 2004	CO
NM	1979–2005	CO
OK	1979–1999, 2001–2005	CO
OR	1979, 1980, 1982–2000	WA
	1981	CA, ID, NV, WA
TX	1980–1982, 1985–2005	CO

**Physical Unit Prices: 1971 Through 1978**

For 1971 through 1978, Btu steam coal prices are calculated by using data from *GHS*. The price for a State is equal to the simple average of the city/utility price observations for that State. For 1971 and 1972, *GHS* reports physical unit prices rather than Btu prices (as published for 1973 through 1978) and, therefore, the State-level conversion factors for this sector from SEDS are used to convert to Btu prices for those years. AK residential coal prices are estimated by using a different methodology, described on page 14.

A simple average of price observations in CT, MA, ME, NH, RI, and VT is assigned to each of these States. To impute other missing prices

in the 1971 through 1978 period, States are assigned simple averages of adjacent State prices or are directly assigned the single price of an adjacent or nearby State as listed in Table TN4.

**Physical Unit Prices: 1970**

Since State-level coal price data for 1970 are not available from either *GHS* or *C&Q*, the 1970 residential sector coal prices are calculated by using the 1971 through 1978 data from the *Statistical Yearbook* for the 39 States, with some reported coal use from 1971 through 1983 and regression analysis.

For estimating the 1970 prices, States missing *Statistical Yearbook* data are assigned prices as follows: ID for 1970 through 1978 from MT; MA for 1976 through 1978 from CT; ME for 1970 through 1978 from NH; RI for 1973 and 1975 through 1978 from CT; and WA for 1970 through 1972 from OR. DC, DE, and MD are all assigned the combined *Statistical Yearbook* price for those States. Wherever individual State prices are unavailable, prices are assigned from an adjacent or nearby State as follows: CA from NV; NM from CO; OK from CO; OR from WA; and TX from CO. AK residential coal prices are estimated by using a different methodology, described as follows.

**Alaska Prices: All Years**

The AK residential coal prices for 1994 forward are estimated from an informal survey of the single coal supplier in the State.

The AK residential Btu prices for 1978 through 1993 are estimated from the WA State prices during that period. To estimate the AK price for each year that AK has consumption, the average ratio of AK-to-WA prices during 1970 through 1977 is applied to the WA price.

AK physical unit prices for 1970 through 1977 are estimated by using the ratio of AK-to-U.S. electric utility sector prices.

**Table TN4. Residential Sector Spot Coal Price Assignments, 1971-1978**

State	Years	State Assigned or Averaged Prices
AL	1971	TN
AR	1977, 1978	AL
CA	1971, 1972, 1974, 1978	NV
DC	1971-1978	MD
DE	1971, 1972, 1974, 1976, 1977	MD
GA	1971	NC, TN
	1972	AL, NC, TN
ID	1977	MT, UT, WY
KS	1971, 1972	CO, MO
MN	1971	IA, ND, WI
	1972	IA, WI
MS	1978	AL
MT	1971	ID, ND, WY
	1972, 1973	ID, WY
ND	1972	IA, WI
	1973	MN, SD
	1974	MN, MT, SD
NE	1971, 1972	CO, IA, MO, WY
	1975	CO, IA, KS, MO, SD, WY
NJ	1971, 1972, 1974, 1977, 1978	DE, NY, PA
NM	1971	CO
NV	1971, 1972, 1975	ID, UT
	1973	ID, OR, UT
OK	1971-1978	CO
OR	1971-1978	WA
SC	1971, 1972	NC
SD	1971	IA, ND, WY
	1972	IA, WY
TX	1971-1974, 1977	CO
UT	1974, 1978	CO, ID, NV, WY
WA	1971, 1972, 1974	ID
	1977	MT, UT, WY
WV	1971, 1972	KY, MD, OH, PA, VA

**Btu Prices: All Years**

Btu prices for States are calculated from the physical unit prices and the conversion factors for coking coal. U.S. Btu prices are calculated as the

average of the State Btu prices, weighted by consumption data from SEDS.

**Data Sources**

**Prices**

1994 forward: Alaska price estimated from informal discussions with Usibelli Coal Mine Co., the only coal supplier in Alaska.

1974 forward: EIA, *Cost and Quality of Fuels for Electric Plants*, average spot coal prices, [http://www.eia.doe.gov/cneaf/electricity/cq/cq\\_sum\\_backissues.html](http://www.eia.doe.gov/cneaf/electricity/cq/cq_sum_backissues.html), Table 2 (1974-1979), Table 44 (1980 through 1982), Table 49 (1983, 1984), Table 39 (1985-1989), Table 8 (1990, 1991), and Table 3 (1992 forward).

1971 through 1978: American Gas Association, *Gas Househeating Survey*, table titled “Competitive Fuel Prices.”

1970 through 1978: Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry*, Table 43S.

**Consumption**

1970 forward: EIA, State Energy Data System, residential sector coal consumption.

**Conversion Factors: 1971, 1972**

Conversion factors can be found in the ASCII comma-delimited data file at [http://www.eia.doe.gov/emeu/states/sep\\_use/total/csv/use\\_convfac.csv](http://www.eia.doe.gov/emeu/states/sep_use/total/csv/use_convfac.csv).

**Commercial Sector**

Commercial sector prices are assigned industrial steam coal prices. States without Btu industrial steam coal prices are assigned the prices from adjacent States, as shown in Table TN5. The Alaska prices for 1994 forward are estimated from an informal survey of the single coal

**Table TN5. Commercial Sector Final Price Assignments**

State	Years	State Prices Assigned
CT	1980	NY
	1995–2004	MA
DC	1980–2005	MD
NH	1994, 1996–2005	MA
OK	1970	KS
OR	1999–2000	WA
RI	1982, 1983, 1991–2005	MA
VT	1993–1997, 2000, 2005	MA

supplier in the State. U.S. Btu prices are calculated as the average of all States' Btu prices, weighted by consumption data from SEDS.

## Industrial Sector

Industrial coal prices from 1980 forward are taken from Form EIA-3, "Quarterly Coal Consumption and Quality Report, Manufacturing Plants," and predecessor forms, which collects quarterly data on manufacturers' coal stocks, receipts, prices, and consumption. From 1980 through 1988, all manufacturers that consumed coal were required to respond to Form EIA-3. Beginning in 1989, data are collected from only those manufacturers that consumed 1,000 or more tons per year. Data prior to 1980 are based on the average cost of coal sold to manufacturing firms, which was reported on a monthly basis.

### Physical Unit Prices: 1980 Forward

For 1984 forward, State prices are published in the EIA *Annual Coal Report* and predecessor publications. Prices include insurance, freight, and taxes. Price data for 1980 through 1983 are taken directly from Form EIA-3, and predecessor forms.

Prices for States in which data are withheld or unavailable are estimated by using simple averages of the published data for adjacent States. In a few cases, only a single adjacent State or Census division price is

published and, therefore, available for the estimation. The adjacent State and Census division price assignments used for estimations are shown in Table TN6. Washington prices are withheld for 1999 forward. Washington prices are historically higher than the Census division price; therefore, the average ratio of the Washington to the Pacific Division prices for 1995 through 1998 is applied to the 1999 forward Pacific Division prices to estimate the Washington prices for those years. In 2002, the price for the Pacific Division is withheld and is estimated using the average Pacific Division price from 1999 through 2001. In 2002, the price for the New England Division also is withheld and is estimated by applying the average ratio of the New England Division price to the East North Central price from 1995 through 1998 to the 2002 East North Central Division price. Price estimates for Alaska are explained on page 18.

### Physical Unit Prices: 1971, 1974 Through 1979

For 1971, and 1974 through 1979, available cost and quantity of bituminous coal, lignite, and anthracite from the *Annual Survey of Manufacturers (ASM)* or *Census of Manufacturers (CM)* are used to calculate prices as average cost per unit of sales for covered States. (States with undisclosed data are not considered covered.) Although it is not clear from the data sources, the prices probably include taxes.

For States with industrial steam coal use and for which *ASM* or *CM* data are not available in 1971 and 1974 through 1979, adjacent State simple averages of available *ASM/CM* data are used to impute prices. The assigned prices from adjacent States are shown in Table TN7.

### Physical Unit Prices: 1970, 1972, 1973

Steam coal industrial sector prices for 1970, 1972, and 1973 (years for which no *ASM/CM* prices are available) are estimated by using regression techniques. Values for the independent variable are steam coal electric utility sector physical unit prices, and values for the dependent variable are the steam coal industrial physical unit prices (from *ASM* or estimated, as described above) for 1971, and 1974 through 1977. A few States are assigned electric utility prices for the dependent variable in the regression, as shown in Table TN8 on page 19. Wherever individual State prices remain unavailable after the estimation that used the above

**Table TN6. Industrial Sector Steam Coal Price Assignments, 1980 Forward**

State	Years	Prices Used in the Assignment	State	Years	Prices Used in the Assignment
AZ	1980	CA, UT	NJ	1980–1997, 2000–2005	NY, PA
	1981, 1984–1986	CA, CO, UT		1998, 1999	PA
CO	1980	KS, UT	NM	1980	TX, UT
	2000	UT, WY		1981	CO, OK, TX
	2001	KS, NE, OK, UT, WY		1982, 1983	AZ, CO, OK, TX
	2002, 2003	KS, NE, UT, WY		1984–1986	CO, OK, TX, UT
	2004, 2005	AZ, KS, NE, OK, UT, WY		1987	AZ, CO, OK, TX, UT
CT	1981–1994, 2005	New England		1988–1999	AZ, CO, TX, UT
DC	1980, 1981	MD		2000, 2002, 2003	AZ, TX, UT
DE	1980–2003	MD		2001, 2004, 2005	AZ, OK, TX, UT
	2004, 2005	MD, PA	NV	1980, 1981, 1984–1986	CA, ID, UT
FL	1980	AL, GA		1983, 1987–1998, 2000–2005	AZ, CA, ID, UT
HI	1982, 1983, 1987–2005	CA		1999	AZ, CA, UT
ID	1999	UT, WY	NY	1998, 1999	PA
KS	2000	MO	OK	1980	AR, KS, MO, TX
LA	1980–2005	AR, TX		1984–1999	AR, CO, KS, MO, TX
MA	1980–1983	NY		2000	AR, MO, TX
	1984–2005	New England		2002, 2003	AR, KS, TX
ME	1980–1983	NY	OR	1980, 1981, 1983–1998	CA, ID, WA
	1984–2005	New England		1982	CA, ID, NV, WA
MS	1980–2005	AL, AR, TN		2002–2005	CA, ID
MT	1983, 1987–1990, 1992,	ID, WY	RI	1980, 1981	NY
	2003–2005			1984–1990	New England
	1984–1986	ID	SD	1980	IA, MN, MT
	1991, 1993–1998, 2000–2002	ID, SD, WY		1981	IA, MN, MT, NE
	1999	SD, WY		1982	IA, MN, MT, WY
ND	1980–1982	MN, MT		1983, 1987–1990, 1992–1995	IA, MN, WY
	1983–1990, 1992, 2003, 2005	MN		1984–1986	IA, MN, NE
	1991, 1993–1998, 2000–2002	MN, SD		2003–2005	IA, MN, NE, WY
	1999	MN, SD, WY	VT	1980–1983	NY
NE	1980	IA, KS, MO		1984–1992, 1997–1999	New England
	1982, 1983, 1987–1990, 1992	CO, IA, KS, MO, WY	WV	1980	KY, MD, OH, PA, VA
	1991, 1993–1999	CO, IA, KS, MO, SD, WY	WY	1980	ID, MT, UT
	2000	IA, MO, SD, WY		1981	CO, ID, MT, NE, UT
NH	1980–1983	NY		1984–1986	CO, ID, NE, UT
	1984–1993, 1995	New England			

regression techniques, prices are assigned from adjacent or nearby States, as shown in Table TN9 on page 19.

**Table TN7. Industrial Sector Steam Coal Price Assignments for 1971 and 1974-1979**

State	Years	State Prices Used in the Assignment	State	Years	State Prices Used in the Assignment
AR	1971, 1972, 1974, 1975 1979	MO, TN MO, TN, TX	MT	1974-1978 1979	MN, NE, UT MN, UT
AZ	1971 1974-1978	CA, NV, UT CA, UT	ND	1974-1979	MN
CO	1974-1978 1979	KS, NE, UT UT	NE	1979	IA, MO
CT	1974-1978 1979	MA, NY NY	NH	1971, 1974-1979	MA
DC	1971, 1974-1979	MD, VA	NM	1971 1974, 1976-1978	CO, OK, TX, UT KS, UT
DE	1971, 1974-1979	MD, NJ, PA	NV	1974 1975-1979	CA, OR, UT CA, UT
FL	1979	AL, GA	OK	1974, 1975 1976-1978	KS, MO AR, KS, MO
ID	1974 1975-1978	OR, UT UT		1979	MO, TX
KS	1979	UT, WA	OR	1975-1978	CA
LA	1978 1979	MO AR	RI	1979 1971, 1974-1978	CA, WA MA
MA	1979	TX NY	SD	1979 1971, 1974	NY IA
ME	1975-1978 1979	MA NY		1975-1978 1979	IA, MN, NE IA, MN
MS	1971, 1974, 1975, 1979 1976-1978	AL, TN AL, AR, TN	TX	1974, 1975 1976-1978	KS AR, KS
MT	1974-1978 1979	MN, NE, UT MN, UT	VT	1971, 1974-1978 1979	MA NY
ND	1974-1979	MN	WA	1974 1975-1978	CA, OR CA
NE	1979	IA, MO	WY	1974-1978 1979	NE, UT UT
NH	1971, 1974-1979	MA			
NM	1971 1974, 1976-1978 1979	CO, OK, TX, UT KS, UT UT			

**Physical Unit Prices: Alaska, All Years**

The Alaska steam coal industrial sector prices for 1994, and 1996 forward, are estimated from an informal survey of the single coal supplier in the State. There is no steam coal consumption reported Alaska's industrial sector for 1995. For all other years with industrial steam coal use in Alaska (1993, and 1970 through 1977), prices are estimated by

assuming that the ratio of the Alaska price to the U.S. price in the industrial sector is the same as the ratio of the Alaska and U.S. prices in the electric power sector.

**Table TN8. Industrial Sector Price Assignments Used in the Regression Equation for 1971, and 1974-1979**

State	Years	State Prices Assigned
AR	1973–1977	MO
CA	1970–1977	NV
CT	1975–1977	NY
DC	1976, 1977	MD
ID	1970–1977	MT
MA	1976, 1977	NH
ME	1970–1977	NH
OK	1973–1975	KS
OR	1973–1977	WA
TX	1970	NM
WA	1970–1972	OR

**Btu Prices: All Years**

Btu prices for States are calculated from the physical unit prices and the conversion factors, which vary by State and by year. U.S. Btu prices are calculated as the average of all States' Btu prices, weighted by consumption data from SEDS, adjusted for process fuel and coking coal consumption.

**Data Sources**

**Prices**

2000 forward: EIA, *Annual Coal Report* for the following year (i.e., 2005 data were obtained from the *Annual Coal Report 2006*), Table 35 (2000), Table 34 (2001 forward), [http://www.eia.doe.gov/cneaf/coal/page/acr/acr\\_sum.html](http://www.eia.doe.gov/cneaf/coal/page/acr/acr_sum.html) and <http://www.eia.doe.gov/cneaf/coal/page/acr/backissues.html>.

1991, 1996 through 1999: EIA, *Coal Industry Annual 2000*, Table 94.

1988, 1993 through 1995: EIA, *Coal Industry Annual 1997*, Table 94.

1987 and 1992: EIA, *Coal Industry Annual 1996*, Table 94.

**Table TN9. Industrial Sector Final Price Assignments for 1970, 1972 and 1973**

State	Years	State Prices Assigned
AR	1972	MO, TN
NH	1970, 1972, 1973	MA
RI	1970, 1972, 1973	MA
SD	1970, 1972, 1973	IA
VT	1970, 1972, 1973	MA

1985 and 1990: EIA, *Coal Industry Annual 1994*, Table 94.

1984 and 1989: EIA, *Coal Industry Annual 1993*, Table 94.

1986: EIA, *Coal Industry Annual 1995*, Table 94.

1980 through 1983: Form EIA-3, "Quarterly Coal Consumption Report–Manufacturing Plants," Table 25 (1980), Table 11 (1981 and 1982), and Table 2 (1983).

1971, 1974 through 1979: Bureau of the Census, U.S. Department of Commerce, *Annual Survey of Manufacturers* and *Census of Manufactures*, Table 4 (1971) and Table 3 (1974–1979).

1970, 1972, 1973: Steam coal electric utility sector physical unit prices used in a regression equation with industrial sector prices from 1971 and 1974 through 1979.

**Consumption**

1970 forward: EIA, State Energy Data System, industrial (other than coke plants) coal consumption.

**Conversion Factors: All Years**

Conversion factors for all States and years can be found in the ASCII comma-delimited data file at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).

## Transportation Sector

Transportation use of coal accounted for 298 thousand short tons out of a total of 523,231 thousand short tons in 1970 and declined to none after 1977. Transportation sector steam coal prices are assigned from industrial sector steam coal prices. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by SEDS consumption data.

## Electric Power Sector

### **Btu Prices: 2002 Forward**

State Btu prices, including insurance, freight, and taxes, are based on unpublished cost data from the Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Utility Plants," and Form EIA-423, "Monthly Cost and Quality of Fuels for Electric Plants Report," and are converted from cents per million Btu to dollars per million Btu. Where individual State prices for the electric power sector are withheld or unavailable, coal prices for the electric utility sector are used instead. When coal prices for both the electric power sector and electric utility sectors are not available, Census division electric power sector prices are assigned as shown in Table TN10.

### **Btu Prices: 1973 Through 2001**

State Btu prices, including insurance, freight, and taxes, are taken from the *EIA Cost and Quality of Fuels for Electric Utility Plants* for 1973 through 2001 and are converted from cents to dollars per million Btu. Where individual State prices are withheld or unavailable, quantity-weighted Census division prices are assigned as shown in Table TN11. Price estimates for Alaska are explained below.

### **Btu Prices: 1970 Through 1972**

Btu prices for States are taken from the Edison Electric Institute's *Statistical Yearbook* and are converted from cents to dollars. Delaware, DC, and Maryland are each assigned the combined price for the three States.

**Table TN10. Electric Power Sector Price Assignments, 2002 Forward**

State	Years	Prices Assigned
AL	2002, 2005	Electric utility
CA	2005	Electric power, Pacific
CT	2002, 2005	Electric power, New England
DE	2002, 2005	Electric power, South Atlantic
HI	2002, 2005	Electric power, Pacific
IN	2002, 2005	Electric utility
KY	2005	Electric utility
LA	2002, 2005	Electric utility
MA	2005	Electric utility
ME	2002, 2005	Electric power, New England
MI	2002, 2005	Electric utility
MN	2005	Electric utility
MS	2002, 2005	Electric utility
MT	2002, 2005	Electric utility
NC	2002, 2005	Electric utility
OH	2002, 2005	Electric utility
OK	2002, 2005	Electric utility
TX	2005	Electric utility
UT	2005	Electric utility
WA	2002, 2005	Electric power, Pacific
WI	2005	Electric utility

The steam coal electric utility sector Alaska price for 1971 is estimated as discussed below.

### **Alaska Prices: All Years**

The sources do not collect or publish prices for Alaska. The Alaska prices for 1994 forward are estimated from an informal survey of the single coal supplier in the State. Prior to that, Btu prices for Alaska are based on data from the Edison Electric Institute's *Statistical Yearbook*. For the years 1970, 1972, 1974, 1976, 1977, and 1979 through 1993, prices were taken directly from the *Statistical Yearbook*. Prices for 1971, 1973, 1975, and 1978 are estimated from the *Statistical Yearbook* prices for the United States and the average ratio of AK-to-U.S. prices for the

**Table TN11. Electric Power Sector Price Assignments, 1973 Through 2001**

State	Years	State/Census Division Prices Assigned
CA	1989–2001	Pacific
CT	1975–1979, 2000, 2001	New England
DC	1976	MD, VA
HI	1990–2001	Pacific
MA	2001	New England
MD	2001	South Atlantic
ME	1990–2001	New England
OK	1973, 1974 1975	West South Central CO, KS, MO, NM, TX
OR	1983, 1989	Pacific
RI	1974	MA
VT	1980, 1983–1986	New England
WA	2001	Pacific

years when AK prices are available. The 1971 and 1973 estimated prices are based on the average ratio for 1970 and 1972; the 1975 price is based on the average ratio for 1974 and 1976; and the 1978 price is based on the average ratio for 1977 and 1979.

#### **U.S. Prices: All Years**

U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

#### **Data Sources**

##### **Prices**

2002 Forward: Unpublished data from the Federal Energy Regulatory Commission, FERC Form 423, “Monthly Report of Cost and Quality of Fuels for Electric Utility Plants,” and Form EIA-423, “Monthly Cost and Quality of Fuels for Electric Plants Report.”

1994 forward: Alaska price estimated from informal discussions with Usibelli Coal Mine Co., the only coal supplier in Alaska

2001: FERC Form 423, “Monthly Report of Cost and Quality of Fuels for Electric Plants,” database, available via the EIA Web site at <http://www.eia.doe.gov/cneaf/electricity/page/ferc423.html>.

1973 through 2000: EIA, *Cost and Quality of Fuels for Electric Utility Plants*, <http://www.eia.doe.gov/cneaf/electricity/cq/backissues.html>, Table 3 (1973–1979), Table 51 (1980–1982), Table 50 (1983, 1984), Table 40 (1985–1989), Table 7 (1990, 1991), and Table 2 (1992 through 2000).

1970 through 1993: Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry*, table titled “Analysis of Fuel for Electric Generation: Total Electric Utility Industry” (1970–1988), Table 29 (1989–1993).

#### **Consumption**

1970 forward: EIA, State Energy Data System, electric power sector coal consumption.

#### **Conversion Factors: All Years**

Btu prices are taken directly from the data sources; no explicit conversion factors are used.

## Coal Coke, Imports and Exports

Imports and exports of coal coke are components of total U.S. energy consumption and are accounted for in the industrial sector. Prices and values of imports and exports are developed only for the United States; no attempt is made to estimate State-level prices or expenditures. Prices are f.a.s. (free alongside ship) values and do not include taxes. The quantities of U.S. coal coke imports and exports are taken from SEDS.

**Physical Unit Prices: All Years**

For 1980 forward, the EIA *Coke Plant Report*, the EIA *Quarterly Coal Report*, and Bureau of the Census computer tapes provide physical unit coal coke import and export prices in dollars per short ton. For 1970 through 1979, *Coke and Coal Chemicals*, *International Coal*, and the *Minerals Yearbook* provide coal coke import and export physical unit quantities and values in short tons and dollars, respectively. Values are equivalent to expenditures.

**Btu Prices: All Years**

For 1980 forward, Btu prices are computed by dividing the physical unit prices by the conversion factor to calculate prices in dollars per million Btu. For 1970 through 1979, physical unit prices are computed by dividing the import and export values by their respective quantities, and Btu prices are computed by dividing the physical unit prices by the conversion factor.

**Data Sources****Prices**

1989 forward: Calculated by EIA using data from the Bureau of the Census, U.S. Department of Commerce, "Monthly Report IM 145" and "Monthly Report EM 545."

1981 through 1988: EIA, *Quarterly Coal Report*, October-December issues, Tables A11 and A13 (1981-1985) and Tables A10 and A12 (1986-1988).

1980: EIA, *Coke Plant Report*, Tables 7 and 8.

1978 through 1979: EIA, *Coke and Coal Chemicals 1979*, Tables 5 and 6.

1977: National Coal Association, *International Coal 1980*, tables titled "U.S. Imports of Solid Fuels and Customs Value" and "U.S. Exports of Coke and Value."

1976: EIA, *Coke and Coal Chemicals*, Tables 19 and 20.

1970 through 1975: Bureau of Mines, U.S. Department of the Interior, *Minerals Yearbook*, "Coke and Coal Chemicals" chapter, Tables 19 and 20.

**Consumption**

1970 forward: EIA, State Energy Data System, U.S. imports and exports of coal coke.

**Conversion Factor: All Years**

24.8 million Btu per short ton.

## Section 3. Natural Gas

Natural gas prices are developed for the residential, commercial, industrial, transportation, and electric power sectors. Reported natural gas prices are retail prices for sales of natural gas to ultimate users.

Natural gas prices are intended to include all Federal, State, and local taxes, surcharges, and adjustments billed to consumers. Although the EIA data collection form states that taxes are to be included in the reported gross revenues, it is most likely that respondents would not consider sales taxes as part of their company's gross revenues, and some may not be reporting them. As a result, consumer sales taxes may not be covered in full. For more information see *End-Use Taxes: Current EIA Practices*, page 23 of 134 in the pdf file, <http://tonto.eia.doe.gov/FTP/ROOT/financial/0583.pdf>.

Estimates of the amount of natural gas consumed by the residential, commercial, industrial, and electric power sectors are taken from the State Energy Data System (SEDS). Estimates for the industrial sector are adjusted to remove estimated refinery consumption and lease and plant use of natural gas, and estimates of transportation sector use are adjusted to remove pipeline fuel in each State. (See the discussion in Section 7, "Consumption Adjustments for Calculating Expenditures," at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).)

### Residential, Commercial and Industrial Sectors

#### **Prices: 1987 Forward**

All natural gas physical unit prices by State for the residential, commercial, and industrial sectors are taken from data collected on the Form EIA-176, "Annual Report of Natural and Supplemental Gas Supply and

Disposition." These prices are available on the Energy Information Administration's (EIA) Web site through the Natural Gas Navigator, and published in Tables 26 through 76 of the EIA *Natural Gas Annual*.

#### **Prices: 1970 Through 1986**

All natural gas physical unit prices for the residential, commercial, and industrial sectors are calculated from value and quantity of sales data from the EIA *Natural Gas Annual* or its predecessor report, *Natural Gas Production and Consumption*. State prices are calculated directly from the data sources as average revenue per unit of sales by natural gas utilities. Prices for each of the three sectors are calculated by dividing the value of natural gas, reported in thousands of dollars, by the quantity of natural gas sold, as reported in million cubic feet.

For 1970 through 1979, both the value and quantity of sales data from the *HNGA* are reported as composites for Maryland and the District of Columbia, and for Maine, New Hampshire, and Vermont. In each case, the combined prices are assigned to each of the States in the composite.

#### **Btu Prices: All Years**

State Btu prices for all years are calculated by using the physical unit price series and the State-level average conversion factors for sectors other than electric power. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS and adjusted for process fuel consumption in the industrial and transportation sectors.

## Data Sources

### Prices

1997 forward: EIA, Natural Gas Navigator, [http://tonto.eia.doe.gov/dnav/ng/ng\\_pri\\_sum\\_dcu\\_nus\\_a.htm](http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm) (use drop-down menu to select area, then click on icon that says “Download Series History”) and published in the EIA, *Natural Gas Annual*, Tables 26 through 76.

1989 through 1996: Residential and Commercial — EIA, Natural Gas Navigator, [http://tonto.eia.doe.gov/dnav/ng/ng\\_pri\\_sum\\_dcu\\_nus\\_a.htm](http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm) (use drop-down menu to select area, then click on icon that says “Download Series History”). Industrial — EIA, *Historical Natural Gas Annual, 1930 Through 2000*, [http://www.eia.doe.gov/oil\\_gas/natural\\_gas/data\\_publications/historical\\_natural\\_gas\\_annual/hnga\\_historical.html](http://www.eia.doe.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga_historical.html), Tables 31 and 32.

1987 and 1988: EIA, *Historical Natural Gas Annual, 1930 Through 2000*, [http://www.eia.doe.gov/oil\\_gas/natural\\_gas/data\\_publications/historical\\_natural\\_gas\\_annual/hnga\\_historical.html](http://www.eia.doe.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga_historical.html), Table 26 (residential), Table 28 (commercial); and Table 31 (industrial).

1980 through 1986: Calculated from quantity and value data published in the EIA *Natural Gas Annual, Volume 1*, Table 11 (1980), Table 14 (1981 through 1985), and Table 15 (1986). Comparable price data are available in the EIA *Historical Natural Gas Annual, 1930 Through 2000*, Table 26 (residential), Table 28 (commercial), and Table 31 (industrial).

1970 through 1979: Calculated from quantity and value data published in the Bureau of Mines, U.S. Department of the Interior, *Natural Gas Production and Consumption*, Table 6 (1970 and 1979) and Table 7 (1971 through 1978). Comparable price data are available in the EIA *Historical Natural Gas Annual, 1930 Through 2000*, Table 26 (residential), Table 28 (commercial), and Table 31 (industrial).

### Consumption

1970 forward: EIA, State Energy Data System, residential, commercial, and industrial natural gas consumption.

## Conversion Factors: All Years

EIA, conversion factors published in State Energy Data System Consumption Technical Notes, Tables B4 and B5, [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).

## Transportation Sector

Most of the natural gas used for transportation is consumed in pipeline operations and is discussed in Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html). Data for natural gas delivered for use as vehicle fuel are available beginning in 1990. In prior years, these data are included in the commercial sector. Much of the natural gas delivered for vehicle fuel represents deliveries to fueling stations that are used primarily by fleet vehicles.

For 1992 forward, vehicle fuel prices are not available for some States. When that occurs, the average price of neighboring States is assigned as shown in Table TN12. The South Carolina price in 1998 is out of range and the price of natural gas used as vehicle fuel in Georgia for 1998 is assigned.

### Data Sources

#### Prices

1990 forward: EIA, Natural Gas Navigator, [http://tonto.eia.doe.gov/dnav/ng/ng\\_pri\\_sum\\_dcu\\_nus\\_a.htm](http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm) (use drop-down menu to select area, then click on icon that says “Download Series History”) and published in the EIA *Natural Gas Annual*, Tables 26 through 76. Comparable price data through 1996 are available in the *Historical Natural Gas Annual 1930 Through 2000*, Table 34.

#### Consumption

1990 forward: EIA, State Energy Data System, natural gas vehicle consumption.

**Table TN12. Natural Gas Vehicle Fuel Price Assignments, 1992 Forward**

State	Years	State Prices Used
AK	1997–2005	WA
AL	2000–2005	FL, TN
DE	1994	MD
GA	1999	AL, FL, SC, TN
	2000–2005	FL, NC, SC, TN
HI	2005	CA
IA	2001–2005	IL, MO, MN, WI
ID	2003–2005	MT, NV, OR, UT, WA, WY
KS	2004, 2005	CO, MO, OK
KY	2004, 2005	IL, IN, OH, MO, TN, VA
ME	1992–2002	MA
MI	2000–2005	IN, OH
MS	2002–2005	AR, LA, TN
NC	1996, 1997, 1999	SC, TN, VA
	1998	TN, VA
NE	1992, 1993	CO, IA, SD, WY
	1995–2000	CO, IA, KS, MO, SD, WY
	2001–2003	CO, KS, MO, WY
	2004, 2005	CO, MO, WY
NH	1996–2005	MA
NJ	2002	DE, NY, PA
NM	1992, 1993	AZ, CO, OK, TX
SC	1998	GA
SD	2001, 2003, 2004	MN, MT, ND, WY
VT	1992–2005	MA
WV	2000–2005	MD

**Conversion Factors: All Years**

EIA, conversion factors published in the State Energy Data System Consumption Technical Notes, Tables B4 and B5, [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).

**Electric Power Sector**

**Prices: 2002 Forward**

All natural gas physical unit prices by State for the electric power sector are taken from Tables 26 through 76 of the EIA *Natural Gas Annual*. Where individual State prices are unavailable, they are developed by calculating the average price of all available surrounding States. Table TN13 lists the States and years where price assignments are made.

**Prices: 1973, 1974, 1983 Through 2001**

Natural gas prices by State are reported in the EIA *Cost and Quality of Fuels for Electric Plants (C&Q)* for gas consumed at steam-electric plants only. Btu prices are taken from the *C&Q*, and converted from cents to dollars per million Btu.

Where individual State prices are unavailable from *C&Q*, they are developed from physical unit prices published in Tables 26 through 76 of the *NGA* (from 1997 forward), or the *Historical Natural Gas Annual, 1930 Through 2000 (HNGA)*, from 1987 through 1996). Physical unit prices prior to 1987 are calculated by dividing the value of natural gas, reported in thousands of dollars, by the quantity of natural gas sold, reported in million cubic feet.

Prices are not available from either *C&Q* or the *NGA* and *HNGA* for some years. In these cases, quantity-weighted Census division prices from *C&Q* are assigned. In addition, prices for Montana in 1997, Vermont in 1986, and Washington in 1986, 1987, 1990, and 1997 use quantity-weighted Census division prices from *C&Q* for more consistent prices than those available from the *HNGA* or more consistent with values in previous and later years. Table TN13 lists the States and years for which *HNGA* or *C&Q* Census division prices are used.

**Prices: 1980 Through 1982**

State-level Btu and physical unit prices for 1980 through 1982 are taken from *C&Q* for all reporting plants. Physical unit prices are taken directly from the data source, while Btu prices are converted from cents to dollars per million Btu. Where individual state prices are unavailable from

**Table TN13. Natural Gas Electric Power Sector Price Assignments, 1973 Forward**

State	Years	Price Source	State	Years	Price Source
AK	1973–1990	<i>HNGA</i>	NM	2003–2005	AZ, CO, OK, TX
CT	1974–1976	<i>HNGA</i>	OR	1983, 1984, 1986, 1989, 199	<i>C&amp;Q Pacific</i>
	1973, 2000, 2001	<i>C&amp;Q, New England</i>	PA	1973	<i>HNGA</i>
	2003, 2004	MA, NY, RI	RI	1976, 1980	<i>HNGA</i>
DE	2003–2005	MD, NJ, PA		1999–2001	<i>C&amp;Q, New England</i>
ID	1983–1986	<i>HNGA</i>	SC	1977	<i>HNGA</i>
	1974, 1987, 1996–2001	<i>C&amp;Q, Mountain</i>		2003, 2004	GA, NC
	2003–2005	NV, OR, WA, WY		2005	GA
KY	2003–2005	IL, IN, OH, VA, WV	SD	1983–1990	<i>HNGA</i>
MD	1973, 1974, 1983–1985	<i>HNGA</i>		1997, 1999–2001	<i>C&amp;Q, West North Central</i>
	2001	<i>C&amp;Q, South Atlantic</i>		2002	IA, MT, ND, NE, WY
ME	1997–2001	<i>C&amp;Q, New England</i>		2003–2005	IA, ND, NE, WY
MN	2003–2005	IA, ND, WI	TN	1976, 1980, 1981, 1983, 1988–1996	<i>HNGA</i>
ME	1997–2001	<i>C&amp;Q, New England</i>		1997–2001	<i>C&amp;Q, East South Central</i>
MN	2003–2005	IA, ND, WI		2003, 2004	AL, AR, GA, MS, NC, VA
MO	2003–2005	AR, IA, IL, KS, NE, OK		2005	AL, AR, GA, MS, VA
MT	1997	<i>C&amp;Q, Mountain</i>	UT	1988, 1989	<i>HNGA</i>
	2003–2005	ND, WY		2003–2005	AZ, CO, NV, WY
NC	1983–1990	<i>HNGA</i>	VT	1983–1985, 1989, 1990	<i>HNGA</i>
	2005	GA, VA		1986	<i>C&amp;Q, New England</i>
ND	1973, 1974, 1976–1986	<i>HNGA</i>		2003, 2004	MA, NY
NH	1973, 1974, 1987–1989	<i>HNGA</i>	WA	1978, 1983–1985, 1988, 1989	<i>HNGA</i>
	1983, 1996, 1998	<i>C&amp;Q, New England</i>		1986, 1987, 1990, 1997, 1999–2001	<i>C&amp;Q, Pacific</i>
	2003, 2004	MA, ME		2002	OR
	2005	MA, VT			

*C&Q*, they are computed from value and quantity of sales data from *HNGA*.

**Prices: 1973 Through 1979**

State-level prices are reported separately by *C&Q* for gas consumed at steam-electric plants and gas consumed at combustion turbine and internal combustion units. Weighted-average Btu prices are calculated by using the two *C&Q* prices and the respective gas deliveries for steam-electric and combustion use. Where individual state prices are unavailable from *C&Q*, they are computed from value and quantity of

sales data from *HNGA*. For the New Hampshire price in 1977 a combined price is computed from value and quantity of sales data from the *HNGA* data for Maine, New Hampshire, and Vermont.

**Prices: 1970 Through 1972**

State-level prices for 1970 through 1972 are taken from *Natural Gas Production and Consumption* and are calculated similarly to the way prices for the residential, commercial, and industrial sectors are calculated. Prices, as average revenue per unit of sales, are computed from value and quantity of sales data from the source reports. A combined price is

reported for New Hampshire and Vermont for 1971 and 1972, and each of these States is assigned the combined price. State Btu prices are calculated from the physical unit prices by using the State-level electric power conversion factors.

### U.S. Prices: All Years

U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

### Data Sources

#### Prices

Primary Sources:

2002 forward: EIA, Natural Gas Navigator, [http://tonto.eia.doe.gov/dnav/ng/ng\\_pri\\_sum\\_dcu\\_nus\\_a.htm](http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm) (use drop-down menu to select area, then click on icon that says “Download Series History”) and published in the EIA, *Natural Gas Annual*, Tables 26 through 76.

1973 through 2001: EIA, *Cost and Quality of Fuels for Electric Power Plants*, [http://www.eia.doe.gov/cneaf/electricity/cq/cq\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/cq/cq_sum.html) (table numbers shown in Table TN14).

Secondary Sources:

1997 through 2001: EIA, Natural Gas Navigator, [http://tonto.eia.doe.gov/dnav/ng/ng\\_pri\\_sum\\_dcu\\_nus\\_a.htm](http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm) (use drop-down menu to select area, then click on icon that says “Download Series History”) and published in the EIA, *Natural Gas Annual*, Tables 26 through 76.

1990 through 1996: EIA, *Historical Natural Gas Annual 1930 Through 2000*, [http://www.eia.doe.gov/oil\\_gas/natural\\_gas/data\\_publications/historical\\_natural\\_gas\\_annual/hnga\\_historical.html](http://www.eia.doe.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga_historical.html), Table 31.

1980 through 1989: EIA, *Natural Gas Annual 1992, Volume 2*, Table 23.

1976 through 1979: EIA, Energy Data Reports, *Natural Gas Production and Consumption*, Table 7 (1976 through 1978) and Table 6 (1979).

**Table TN14. Tables from EIA Cost and Quality of Fuels for Electric Plants Used as Data Sources**

Years	Price Data	Volume Data
1973, 1974	Table 10	Table 9
1975–1979	Table 10, 16	Table 9, 15
1980–1982	Table 48	-
1983, 1984	Table 53	-
1985–1987	Table 43	-
1988, 1989	Table 44	-
1990–1994	Table 12 (1994 edition)	-
1995–1996	Table 12 (1999 edition)	-
1997–2001	Table 12 (2001 edition)	-

Comparable price data are available in the *Historical Natural Gas Annual, 1930 Through 2000*, Table 35.

1970 through 1975: Bureau of Mines, U.S. Department of the Interior, *Natural Gas Production and Consumption*, Table 6 (1970) and Table 7 (1971 through 1975). Comparable price data are available in the *Historical Natural Gas Annual, 1930 Through 2000*, Table 35.

#### Consumption

1970 forward: EIA, State Energy Data System, electric power sector natural gas consumption.

#### Conversion Factors

Btu prices that are calculated directly from *Cost and Quality of Fuels for Electric Plants (C&Q)* require no conversion factors. When *Natural Gas Annual* data are used to develop prices that are missing from C&Q, conversion factors are used from the following source:

1970 forward: EIA, State Energy Data System Consumption Technical Notes, Tables B2 and B3, [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).



## Section 4. Petroleum

### Asphalt and Road Oil

The State Energy Data System (SEDS) assumes that all asphalt and road oil consumption occurs in the industrial sector. Asphalt and road oil are used primarily for paving (79 percent of consumption in 1970 and 88 percent in 2005), with the remaining products used for roofing and sealing. Taxes are not included in the prices because most street and highway paving is done under contract to State, county, and other public authorities who are typically exempted from paying taxes.

#### **Physical Unit Prices: All Years**

Asphalt prices in physical units are developed from monthly reports in the *Engineering News-Record*, a construction industry weekly magazine published by McGraw-Hill, Inc. The source data consist of monthly reports from correspondents in 20 U.S. cities with price quotes for tank cars, drums, or both, for the three major types of asphalt products: asphalt cement (AC-20), asphalt emulsion (rapid set and slow set), and asphalt cutback.

For 1986 forward, the tank car price is used. However, for 1986 and 1987, the drum price is used if a tank car price is not available. For 1970 through 1985, when both tank car and drum prices are available, a simple average of the two prices is used. When only one price is available, that price is used.

Asphalt prices are developed by calculating a simple average annual price from the monthly prices for each city for the three products. City prices are assigned to States. California, Ohio (1970 through 1985, 1992 forward), and Pennsylvania have prices from two cities; in these cases, simple averages of the two city prices are used. No States have prices

from more than two cities. Kansas City prices are assigned to Kansas and not used in the Missouri price estimates. An outlier data value for Minneapolis in June 1995 was omitted and the Minnesota price for 1995 is an 11-month average. States with no prices are assigned a Census division simple average price. If there is no Census division price, the simple average of the prices for the other Census divisions within that Census region is used.

State average asphalt prices are calculated as the quantity-weighted average prices of the three products for each State. Quantity data for 1970 through 1980 are taken from the Bureau of Mines and Energy Information Administration (EIA) reports on sales of asphalt. Quantity data for 1981 forward are taken from the *Report on Sales of Asphalt in the U.S.*, published by the Asphalt Institute. Non-paving asphalts are assumed to have the prices of paving asphalt cement.

For 1970 through 1982, asphalt and road oil are estimated as separate data series. Asphalt prices are estimated as discussed above. Road oil prices are assumed to equal asphalt emulsion prices because specific prices are not available from any source.

#### **Btu Prices: All Years**

Asphalt prices in dollars per ton are converted to dollars per gallon by dividing by 235 gallons per ton for asphalt cement, 241 gallons per ton for emulsion, and 248.6 gallons per ton for cutback. These prices are then multiplied by 42 gallons per barrel and divided by 6.636 million Btu per barrel to get dollars per million Btu. Road oil unit prices of dollars per ton are converted to dollars per million Btu by using the constant conversion factors of 5.5 barrels per ton and 6.636 million Btu

per barrel. The average price of all asphalt and road oil is the consumption-weighted average of the individual product prices.

U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

### **Data Sources**

#### **Prices**

1970 forward: McGraw-Hill, Inc., *Engineering News-Record*, <http://www.enr.com>.

#### **Quantities for Calculating Weighted Average Prices**

1981 forward: Asphalt Institute, *Asphalt Usage for the United States and Canada*, table titled "U.S. Asphalt Usage."

1977–1980: EIA, Energy Data Reports, *Sales of Asphalt* (1978-1980) and *Asphalt Sales, Annual* (1977), Table 2.

1970–1976: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Survey, *Asphalt Sales, Annual* (1971-1976) and *Asphalt Shipments, Annual* (1970), Table 2.

#### **Consumption**

1970 forward: EIA State Energy Data System, industrial sector, asphalt and road oil consumption.

#### **Conversion Factors: All Years**

Conversion factors used are: 235 gallons per ton of asphalt cement; 241 gallons per ton of emulsion; 248.6 gallons per ton of cutback; 42 gallons per barrel; 5.5 barrels per ton of road oil; 6.636 million Btu per barrel.

## Aviation Gasoline

Aviation gasoline prices are developed for the transportation sector. Estimates of the amount of aviation gasoline consumed by the transportation sector are taken from the State Energy Data System (SEDS). Aviation gasoline prices are national averages, excluding taxes, developed from several sources, depending on the years. In all cases, physical unit prices are developed and then converted to Btu prices. Federal and State excise taxes, as well as State and local sales taxes, are not included.

#### **Physical Unit Prices: 1976 Forward**

Aviation gasoline prices for 1978 forward are assumed to be the national average refiners sales prices to end users published in the Energy Information Administration (EIA) *Annual Energy Review*. The 1976 and 1977 prices are assumed to be the national average retail prices published in the EIA's *Monthly Energy Review*.

#### **Physical Unit Prices: 1970 Through 1975**

For 1970 through 1975, aviation gasoline prices are not available. Prices are derived by dividing the national motor gasoline prices for those years by the 1976 national motor gasoline price and applying those percent changes to the 1976 national aviation gasoline price.

#### **Btu Prices: All Years**

Aviation gasoline Btu prices are calculated by converting the physical unit prices from cents per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu (5.048 million Btu per barrel).

**Data Sources**

**Prices**

1991 forward: EIA, *Annual Energy Review*, <http://www.eia.doe.gov/emeu/aer/contents.html>, Petroleum chapter Table 5.22, row titled “Sales Prices to End Users: Aviation Gasoline.”

1979–1990: EIA, *Annual Energy Review 1994*, Table 5.20, row titled “Sales Prices to End Users: Aviation Gasoline.”

1978: EIA, *Annual Energy Review 1993*, Table 5.21, row titled “Sales Prices to End Users: Aviation Gasoline.”

1976, 1977: EIA, *Monthly Energy Review*, April 1984, page 106, column titled “Aviation Gasoline, Retail.”

1970–1975: EIA, *Annual Energy Review 1989*, Table 70, column titled “Motor Gasoline, Leaded Regular, Nominal.”

**Consumption**

1970 forward: EIA, State Energy Data System, transportation sector, aviation gasoline consumption.

**Conversion Factor: All Years**

5.048 million Btu per barrel.

**Distillate Fuel**

Distillate fuel prices are developed for all sectors. Distillate fuel in the transportation sector is assumed to be diesel fuel. Estimates of the amount of distillate fuel consumed in each sector are taken from the State Energy Data System (SEDS). Estimated consumption for the industrial sector is adjusted to remove the estimated refinery consumption of distillate fuel in each State. (See the discussion in Section 7, “

Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).)

**Residential Sector**

Residential distillate fuel prices are developed by using a variety of data sources and several estimation methods, depending on the years involved. In all cases, physical unit prices for States are developed first, then Btu prices are calculated by using the physical unit prices and the conversion factor. The prices contained in this series are the retail prices paid by consumers for residential heating oil, including taxes.

**Physical Unit Prices: 2005**

For 2005, physical unit distillate fuel prices in cents per gallon (excluding taxes) are generally available for 23 States from the Energy Information Administration (EIA) *Petroleum Marketing Annual (PMA)*. State-level prices for the States without *PMA* prices are estimated by using the *PMA* Petroleum Administration for Defense (PAD) district or subdistrict prices. The estimation procedures are described below and include the addition of State general sales taxes.

1. State prices in cents per gallon are generally available from the *PMA* for the following 23 States: AK, CT, DE, ID, IL, IN, MA, MD, ME, MI, MN, NH, NJ, NY, OH, OR, PA, RI, VA, VT, WA, WI, and WV. Prices for these States are converted from cents to dollars per gallon, and State general sales taxes from the Bureau of the Census and successor sources are added.
2. States that do not have prices in the *PMA* are assigned a *PMA* PAD district or subdistrict price, and State general sales taxes are added. For 2005, the PAD district III price is withheld in the *PMA* and the PAD district IV price is used instead. The States with assigned PAD district or subdistrict prices are as shown in Table TN15.

**Table TN15. Distillate Residential Sector PAD District and Subdistrict Price Assignments, 1983–1990 and 1992 Forward**

State	Years	Assignments
AL	2000–2002	District III
	2003–2005	District IV
AR	1988, 1993–2002	District III
	2003–2005	District IV
AZ	1992–1999, 2004, 2005	District V
CA	1984, 1992–2005	District V
CO	1999, 2002, 2004, 2005	District IV
DC	2000, 2003–2005	Subdistrict IB
FL	1993, 1997–2005	Subdistrict IC
GA	1996, 1997, 2002–2005	Subdistrict IC
HI	1983–1990, 1992–2005	District V
IA	1997–1999, 2002, 2004, 2005	District II
IL	1986	District II
KS	1986, 1989, 1996–1999, 2002, 2005	District II
KY	1999–2000, 2003–2005	District II
LA	1986, 1996–2002	District III
	2003–2005	District IV
MO	2002, 2005	District II
MS	1983, 1985, 1986, 1995–2002	District III
	2003–2005	District IV
MT	1994, 1995, 2000, 2002–2005	District IV
NC	2005	Subdistrict IC
ND	1994, 1995, 1997–2005	District II
NE	1996, 1998, 1999, 2002, 2004, 2005	District II
NM	1984–1990, 1992–2002	District III
	2003–2005	District IV
NV	1994, 1995, 1997, 2000–2003, 2005	District V
OK	1986, 1989, 1990, 1992, 1993, 1995–2005	District II
SC	1997, 1998, 2005	Subdistrict IC
SD	1986, 1995–2005	District II
TN	2005	District II
TX	1992–1995, 1997–2002	District III
	2003–2005	District IV
UT	1985, 1995, 1999–2005	District IV
WY	1994, 2000–2005	District IV

**Physical Unit Prices: 1983 Through 1990 and 1992 Through 2004**

For 1983 through 1990 and 1992 forward, physical unit distillate fuel prices in cents per gallon (excluding taxes) are generally available for 23 States from the Energy Information Administration (EIA) *Petroleum Marketing Annual (PMA)*. For 1989 through 1993, prices represent No. 2 fuel oil, only. For 1994 forward, prices include other No. 2 distillates. State-level prices for the States without *PMA* prices are estimated by using price data from the American Gas Association (AGA), SEDS consumption data, and *PMA* Petroleum Administration for Defense (PAD) district or subdistrict prices. The estimation procedures are described below and include the addition of State general sales taxes.

1. State prices in cents per gallon are generally available from the *PMA* for the following 23 States: AK, CT, DE, ID, IL, IN, MA, MD, ME, MI, MN, NH, NJ, NY, OH, OR, PA, RI, VA, VT, WA, WI, and WV. Prices for these States are converted from cents to dollars per gallon, and State general sales taxes from the Bureau of the Census and successor sources are added.
2. For the States that do not have prices in the *PMA*, prices are estimated by using AGA fuel oil prices, SEDS consumption data, and *PMA* PAD district or subdistrict prices. The following steps are used to estimate the prices:
  - a. Distillate prices from the *PMA* for PAD districts or subdistricts are converted from cents per gallon to dollars per gallon.
  - b. For 1983 through 1990 and 1992 through 1997, the AGA lists fuel oil prices by company for the principal city served in dollars per million Btu, including State sales taxes. A simple average of the city-level prices is used to derive a State-level price for each of the States without *PMA* prices for these years. Beginning in 1998, the AGA directly publishes State-level data. These AGA State values are converted from dollars per million Btu to dollars per gallon by using the conversion factor of 7.21 gallons per million Btu. State general sales taxes are subtracted to give State averages comparable to the *PMA* prices.
  - c. The AGA State prices derived in step 2b are combined into PAD district or subdistrict averages by using SEDS consumption to

weight each State's values. This procedure gives AGA consumption-weighted average prices for PAD districts and sub-districts comparable to the volume-weighted prices published in the *PMA*. The AGA PAD district and subdistrict averages are calculated by using only the available States; if a State does not appear in the survey, it is not included in the PAD district or sub-district calculation.

- d. Adjustment factors, ratios of the *PMA* PAD district or subdistrict price divided by the AGA derived PAD district or subdistrict price, are calculated.
- e. Prices for the States not published in the *PMA* are calculated by multiplying the AGA State prices derived in step 2b by the appropriate PAD district or subdistrict adjustment factor from step 2d and then adding State general sales taxes.
- f. States that do not have prices in either the *PMA* or the AGA are assigned a *PMA* PAD district or subdistrict price, and State general sales taxes are added. The States with assigned PAD district or subdistrict prices are as shown in Table TN15.

#### **Physical Unit Prices: 1991**

Physical unit distillate fuel prices in cents per gallon (excluding taxes) are available for 24 States from the *PMA*. Because prices are not available from AGA for 1991, State-level prices for the remaining 27 States are estimated by using physical unit prices derived for 1990 in SEDS and the 1991 *PMA* PAD district or subdistrict prices. The estimation procedures, including the addition of State general sales taxes, are described as follows:

1. State prices in cents per gallon are available from the *PMA* for the following 24 States: AK, CT, DC, DE, ID, IL, IN, MA, MD, ME, MI, MN, NH, NJ, NY, OH, OR, PA, RI, VA, VT, WA, WI, and WV. Prices for these States are converted from cents to dollars per gallon, and State general sales taxes from the Bureau of the Census' *State Government Tax Collections (SGTC)* are added.
2. For the remaining 27 States that do not have prices in the *PMA*, prices are estimated by using the 1990 SEDS physical unit prices

and *PMA* PAD district or subdistrict prices for 1990 and 1991. The following steps are used to estimate the prices:

- a. For 1990, the Subdistrict IC price is withheld in the *PMA* and the average of the VA and WV prices is used as the Subdistrict IC price.
- b. The 1990 State prices derived from AGA and *PMA*, as described below, are adjusted by the percentage change in the 1990 and 1991 prices for each State's *PMA* PAD district or subdistrict.
- c. The State general sales taxes from *SGTC* are added.

#### **Physical Unit Prices: 1978 Through 1982**

Procedures for the 1978 through 1982 period are similar to those for 1983 forward except for changes in data sources. Annual physical unit prices are either taken directly from the *Monthly Energy Review (MER)* or calculated from monthly regional price data, also from the *MER*. These data were collected on Form EIA-9A (formerly EIA Form 9 and FEA Form P112—1) and include taxes. Price data from *Platt's Oil Price Handbook and Oilmanac (Platt's)* and SEDS consumption data for 1978 through 1982 are used to compute State prices when only regional data are available. These calculations are described step-by-step below.

1. Annual State physical unit prices are generally available from the *MER* for the same 23 States covered by the *PMA* in 1983 and forward. These 23 States compose all of Federal Regions 1, 2, 3, 5, and 10 (see Figure TN2 on page 8 of [http://www.eia.doe.gov/emeu/states/sep\\_prices/notes/pr\\_guide.pdf](http://www.eia.doe.gov/emeu/states/sep_prices/notes/pr_guide.pdf)). Prices for these States exclude taxes and are converted to dollars per gallon.
2. Of the States without *MER* prices, the 22 in Federal Regions 4, 7, 8, and 9 have annual prices estimated from the monthly Federal regional prices published in the *MER*. No regional prices are available for Federal Region 6 for the 1978 through 1982 period, and some monthly prices are missing in regions 7, 8, and 9 in 1980, 1981, and 1982.

- a. Missing monthly prices for Federal regions are estimated with assigned prices as follows: the Region 9 November 1980 price is assigned to December 1980; an average of the Region 7 July and October 1982 prices is assigned to August and September 1982; an average of Region 8 June and September 1982 prices is assigned to July and August 1982; and an average of Region 3 August and October 1982 prices is assigned to September 1982. Imputation of missing Region 6 prices for 1978 through 1982 and missing Region 9 prices for 1981 and 1982 is discussed later.
- b. The simple average of monthly State-level normal heating degree-day data is averaged for all the States within each of the 10 Federal regions and is used to estimate average Federal region heating degree-days. AK, DC, and HI are assigned the monthly heating degree-days from MN, MD, and FL, respectively.
- c. Weighted average annual physical unit distillate prices for the residential sector are calculated for Federal Regions 4, 7, 8, and 9 (except for Region 9 in 1981 and 1982) by using the regional normal heating degree-days and the monthly regional prices from the *MER*.
- d. In 1981, only March and May prices are available for Federal Region 9. To estimate the average annual price for this region, the relationship between the U.S. annual heating oil price (from the *MER*) and the U.S. March and May prices is expressed as a ratio and is used with the Region 9 March and May prices to estimate the 1981 annual Region 9 price.
- e. City-level prices from *Platt's* are assigned to States as shown in Table TN16. The assigned State-level *Platt's* prices for States are consumption-weighted into Federal regions by using residential sector consumption data from SEDS.
- f. Adjustment factors, ratios of the regional *MER* distillate prices to the regional *Platt's*-based distillate prices, are calculated for Federal Regions 4, 7, 8, and 9 (except for 1982).
- g. Since there are no monthly regional distillate prices from the *MER* for Federal Region 6 for 1978 through 1982 and Federal Region 9 for 1982, the adjustment factors for these regions are

based on the adjustment factors for previous time periods. The Region 6 adjustment factor for each of the years in the 1978 through 1982 period is equal to 1.1313, which is the average of the adjustment factor for the West South Central Census Division for 1976 and 1977. The Region 9 adjustment factor for 1982 is equal to 1.1995, which is the average adjustment factor for Region 9 from 1978 through 1981.

- h. The residential sector distillate State prices for the 27 States in Federal Regions 4, 6, 7, 8, and 9 are calculated by multiplying the regional adjustment factors for each year and the State-level assigned *Platt's* prices.

**Physical Unit Prices: 1975 Through 1977**

For the years 1975 through 1977, no State-level data are available, and regional data from Form EIA-9A are available only at the Census division level, except for Federal region prices for November and December of 1977. Using a methodology similar to that described above for the allocation of regional data to States, adjustment factors are calculated at the regional level and applied to *Platt's* price data assigned to States. The resulting prices implicitly include average regional taxes but do not reflect individual State differences.

- 1. Monthly regional price data for 1975 and 1976 are reported in the *MER* only for Census divisions. In 1977, however, monthly price data are reported for Census divisions for January through October and for Federal regions for November and December. The Federal region prices for November and December are assigned to their respective States and reaggregated into Census divisions in order to create a consistent set of monthly Census division prices for 1977. Annual residential sector distillate consumption data from SEDS are used to do the reaggregation.
- 2. The Census division monthly price data from the *MER* for 1975, 1976, and the first 10 months of 1977 are used with the estimated Census division price data for November and December 1977 to estimate State-level prices.
  - a. Missing monthly prices in the East South Central Division for June and November 1975 and the Mountain Division for March

**Table TN16. Platt's Prices for No. 2 Fuel Assigned to States, 1970–1982**

State	Years	Assigned City or State Prices	State	Years	Assigned City or State Prices
AK	1970–1976	Los Angeles/San Francisco, CA	NC	1970–1973	Greensboro/Wilmington/Charlotte/Salisbury/Selma
	1977, 1978	Portland, OR		1974–1975	Greensboro/Wilmington/Charlotte
	1979, 1980	Seattle, WA		1976–1982	Greensboro/Wilmington
	1981, 1982	Seattle-Tacoma/Spokane, WA	ND	1970–1982	Minneapolis-St. Paul, MN
AL	1970–1974	Birmingham/Mobile/Montgomery	NE	1970	Baton Rouge/New Orleans, LA
	1975–1977	Mobile/Birmingham		1971–1973	New Orleans, LA
	1978–1982	Birmingham		1974–1982	St. Louis, MO
AR	1970–1982	Arkansas	NH	1970–1982	Portland, ME
AZ	1970–1978	Los Angeles/San Francisco, CA	NJ	1970–1975	New York/Albany/Buffalo, NY
	1979–1982	Phoenix		1976–1982	New York/Albany, NY
CA	1970–1982	Los Angeles/San Francisco	NM	1970–1972	New Mexico-West Texas
CO	1970–1976	Minneapolis-St. Paul, MN		1973–1976	Los Angeles/San Francisco, CA
	1977–1982	Denver		1977–1980	Albuquerque
CT	1970–1982	New Haven		1981, 1982	Albuquerque/Farmington
DC	1970–1982	Baltimore, MD	NV	1970–1982	Los Angeles/San Francisco, CA
DE	1970–1982	Baltimore, MD	NY	1970–1975	New York/Albany/Buffalo
FL	1970–1972	Jacksonville/Miami/Tampa/Pensacola/Panama City/Port Everglades		1976–1982	New York/Albany
	1973	Miami/Tampa/Pensacola	OH	1970–1972	Toledo/Cleveland/Zanesville/Columbus/Dayton
	1974–1975, 1981–1982	Miami/Tampa		1973–1982	Detroit, MI
	1976–1980	Miami	OK	1970–1982	Oklahoma (Group 3)
GA	1970–1973	Atlanta/Savannah/Albany/Athens/Bainbridge/Columbus/ Macon	OR	1970–1976	Los Angeles/San Francisco, CA
	1974–1982	Atlanta/Savannah		1977–1982	Portland
HI	1970–1982	Los Angeles/San Francisco, CA	PA	1970–1978	Philadelphia
IA	1970–1981	Chicago, IL		1979–1982	Philadelphia/Pittsburgh
	1982	Des Moines	RI	1970–1975	Providence
ID	1970–1976	Los Angeles/San Francisco, CA		1976–1982	New Haven, CT
	1977–1982	Portland, OR	SC	1970–1975	Charleston/Spartanburg/Belton
IL	1970–1982	Chicago		1976–1982	Charleston/Spartanburg
IN	1970–1982	Chicago, IL	SD	1970–1982	Minneapolis-St. Paul, MN
KS	1970–1973	Los Angeles/San Francisco, CA	TN	1970–1973	Chattanooga
	1974–1982	St. Louis, MO		1974–1982	New Orleans, LA
KY	1970	Baton Rouge/New Orleans, LA	TX	1970–1972	New Mexico-West Texas
	1971–1982	New Orleans, LA		1973–1978	New Orleans, LA
LA	1970	Baton Rouge/New Orleans		1979, 1980	Houston
	1971–1982	New Orleans		1981	Dallas-Fort Worth/Houston
MA	1970–1982	Boston		1982	Amarillo/Corpus Christi/Dallas-Fort Worth/Houston
MD	1970–1982	Baltimore	UT	1970–1976	Minneapolis-St. Paul, MN
ME	1970–1982	Portland		1977–1982	Salt Lake City
MI	1970–1982	Detroit	VA	1970–1973	Norfolk/Roanoke
MN	1970–1982	Minneapolis-St. Paul		1974–1982	Norfolk
MO	1970	Baton Rouge/New Orleans, LA	VT	1970–1982	Portland, ME
	1971–1973	New Orleans, LA	WA	1970–1976	Los Angeles/San Francisco, CA
	1974–1982	St. Louis		1977, 1979, 1980	Seattle
MS	1970–1973	Greenville/Meridian		1978	Portland, OR
	1974–1982	New Orleans, LA		1981–1982	Seattle-Tacoma/Spokane
MT	1970–1976	Minneapolis-St. Paul, MN	WI	1970–1982	Chicago, IL
	1977–1982	Billings	WV	1970–1973	Norfolk/Roanoke, VA
				1974–1982	Norfolk, VA
			WY	1970–1976	Minneapolis-St. Paul, MN
				1977–1982	Cheyenne

and July 1975 are estimated by using an average of the prices for the month preceding and the month following the missing month. Missing November and December West South Central Division prices in 1977 are estimated with the assignment of the October price to both months. No monthly price data are available for the West South Central Division in 1975; step 2f., below, discusses how the calculations are handled for this division.

- b. The monthly State-level normal heating degree-day data are averaged for the States within each Census division to estimate regional monthly heating degree-days. AK, DC, and HI are assigned the monthly heating degree-days from MN, MD, and FL, respectively.
- c. Weighted average annual distillate prices for Census divisions are calculated by using the monthly Census division price data from the *MER* and the normal heating degree-days estimated for Census divisions.
- d. City-level No. 2 fuel oil refinery and terminal prices from *Platt's* for 1975 through 1977 are assigned to States as shown in Table TN16. The assigned *Platt's* prices for States are consumption-weighted into Census divisions by using residential sector consumption data from SEDS.
- e. Adjustment factors are calculated as the ratios of the *MER* distillate Census division prices to the *Platt's* distillate Census division prices.
- f. Since there are no 1975 *MER* price data for the West South Central Division from which to calculate an adjustment factor, the 1975 adjustment factor for this region is assumed to be equal to the simple average of the West South Central adjustment factors for 1976 and 1977 (i.e., 1.1313).
- g. The residential sector distillate State prices for all States are calculated by multiplying the regional adjustment factors for each year by the State-level assigned *Platt's* prices.

### **Physical Unit Prices: 1970 Through 1974**

There are no regional or State-level distillate fuel price data directly available for the 1970 through 1974 period. To estimate State prices, regional average prices are first derived from the relationship between U.S. prices and Federal region prices for 1975 through 1980. State prices are then estimated from the regional prices by using a methodology similar to that described for 1978 through 1982. The resulting prices implicitly include average regional taxes but do not reflect individual State differences.

1. The first step in the estimation of residential distillate prices for the 1970 through 1974 time period is to develop an equation that uses U.S. prices to estimate prices for Federal regions. Regression techniques are used for this purpose. U.S. prices for 1975 through 1980 from the *Annual Energy Review (AER)* are used as the independent variable for developing the equation; annual Federal region prices are used as the dependent variable. Federal region prices for 1978 through 1980 are calculated above, but *MER* prices for 1975 through 1977 are for Census divisions. To convert these annual Census division prices into Federal region prices, the estimated State prices for 1975 through 1977 are aggregated into Federal regions by using SEDS consumption data.
2. Regression techniques are applied to the pooled Federal region price data (dependent variable) and the U.S. prices from the *AER* (independent variable) for 1975 through 1980. U.S. prices for 1970 through 1974 are input to estimate annual Federal region prices for 1970 through 1974.
3. City-level prices from *Platt's* for 1970 through 1974 are assigned to States as shown in Table TN16. The assigned State-level *Platt's* prices are consumption-weighted into Federal regions by using residential sector distillate consumption data from SEDS.
4. Adjustment factors, which are ratios of the regional *MER* distillate Federal region prices to the *Platt's*-based distillate Federal region prices, are calculated.
5. The residential sector distillate prices for all States are calculated by multiplying the regional adjustment factors for each year by the State-level assigned *Platt's* prices.

## **Btu Prices: All Years**

Btu prices for States are calculated by converting the physical unit prices from dollars per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu (5.825 million Btu per barrel). U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

## **Data Sources**

### **Prices**

1983 forward: EIA, *Petroleum Marketing Annual 1985*, Volume 1, Table 25 (1983–1985) and annual issues of the *Petroleum Marketing Annual*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_marketing\\_annual/pma\\_historical.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html), Table 36 (1986–1988), Table 38 (1989–1993), and Table 39 (1994 forward), column titled “To Residential Consumers.”

1983–1990, 1992 through 2004: AGA, *Residential Natural Gas Market Survey* (1989, 1990, 1992 forward), and *Gas Househeating Survey* (1983–1988), Appendix titled, “Competitive Fuel Prices,” column titled “Distillate.”

1970–1982: McGraw-Hill, Inc., *Platt’s Oil Price Handbook and Oilmanac*, refinery and terminal prices for No. 2 fuel oil, average of highs and lows.

1975–1982: National Oceanic and Atmospheric Administration, U.S. Department of Commerce, *State, Regional, and National Monthly and Seasonal Heating Degree-Days Weighted by Population (1980 Census)*, Historical Climatology Series 5-1, table titled “1951-80 State Pop. Wgt’d Heating Degree-Days.”

1975–1982: EIA, *Monthly Energy Review*, table titled “Residential Heating Oil Prices by Region,” February 1978, page 67 (1975, 1976); April 1980, page 83 (1977, 1978); July 1982, page 87 (1979–1982).

1970–1982: EIA, *Annual Energy Review 1988*, Table 67, “Motor Gasoline and Residential Heating Oil Prices, 1949–1988.”

## **Taxes**

For 1992 forward, an annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the State general sales tax as of September 1 of each year is used.

1996 forward: Federation of Tax Administrators, <http://www.taxadmin.org/fta/rate/sales.html>.

1995: The Council of State Governments, *The Book of the States 1994–95* and *1996–97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

1993: Bureau of the Census, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled “State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993.”

1983–1992: Bureau of the Census, U.S. Department of Commerce, *State Government Tax Collections*, table titled “State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year,” column “Percentage rate, Sept. 1.”

## **Consumption**

1970 forward: EIA, State Energy Data System, residential sector distillate consumption.

## **Conversion Factor: All years**

5.825 million Btu per barrel

## **Commercial Sector**

Commercial sector distillate prices are estimated by using several different data sources and estimation methodologies, depending on the years involved. For 1983 forward, retail prices paid by commercial/institutional establishments (excluding taxes) for No. 2 distillate fuel are taken

from the EIA's *Petroleum Marketing Annual (PMA)*. State general sales taxes from the Bureau of the Census and successor sources are added. For 1970 through 1982, commercial distillate prices are based on refinery and terminal (wholesale) prices from *Platt's* and markups from Foster Associates, Inc. *Energy Prices: 1960-73* that include taxes. For both time periods, physical unit prices are calculated from the data sources, and Btu prices are computed by using the physical unit prices and the conversion factor.

#### **Physical Unit Prices: 1983 Forward**

Physical unit No. 2 distillate prices in cents per gallon (excluding taxes) are generally available for 24 States from the *PMA*. State-level prices for the remaining 27 States are estimated by using the *PMA* Petroleum Administration for Defense (PAD) district or subdistrict prices as shown in Table TN17. State general sales taxes are then added.

#### **Physical Unit Prices: 1970 Through 1982**

Commercial sector distillate physical unit prices for 1970 through 1982 are calculated by using *Platt's* prices assigned to States and commercial sector markups estimated from *Energy Prices: 1960-73*. The resulting estimates implicitly include State-specific taxes.

1. The first step is to compute the markups. *Energy Prices* contains single price estimates for small commercial users and two price estimates for large commercial users for 10 cities: Boston, MA; Albany, NY; New York, NY; Charlotte, NC; Washington, DC; Chicago, IL; Detroit MI; Minneapolis/St. Paul, MN; St. Louis, MO; and Seattle, WA. First, a simple average of the two large commercial prices is calculated for each city except for Albany and New York. In this case, all four large commercial prices are averaged together, since cities are assigned to their respective States.
2. For the nine States covered by the *Energy Prices* data (noted in step 1), the markup of the reported prices from *Energy Prices* over the assigned *Platt's* prices (Table TN16 on page 35) and the markup of the residential prices calculated above for 1970 through 1972 over the *Platt's* prices is calculated.

**Table TN17. Distillate Commercial Sector PAD District and Sub-district Price Assignments, 1983 Forward**

State	Years	Assignments
AL	1983–2005	District III
AR	1983–2005	District III
AZ	1983–2005	District V
CA	1983–2005	District V
CO	1983–2005	District IV
FL	1983–2005	Subdistrict IC
GA	1983–2005	Subdistrict IC
HI	1983–2005	District V
IA	1983–2005	District II
KS	1983–2005	District II
KY	1983–2005	District II
LA	1983–2005	District III
MO	1983–2005	District II
MS	1983–2005	District III
MT	1983–2005	District IV
NC	1983–2005	Subdistrict IC
ND	1983–2005	District II
NE	1983–2005	District II
NM	1983–2005	District III
NV	1983–2005	District V
OK	1983–2005	District II
SC	1983–2005	Subdistrict IC
SD	1983–2005	District II
TN	1983–2005	District II
TX	1983–2005	District III
UT	1983–2005	District IV
WY	1983–2005	District IV

3. At this point, residential and commercial sector retail markups have been computed for nine States for each of the years 1970 through 1972. The next step is to calculate the average retail markup for the 3-year period for each sector. A simple average of the markup ratios is calculated.
4. The average commercial and residential sector retail markups for the nine available States are assigned, as shown in Table TN18.

**Table TN18. Distillate Fuel Commercial Sector Average Retail Markup Price Assignments, 1970-1972**

State	City Price Assignments
AK	Seattle, WA
AL	Charlotte, NC
AR	St. Louis, MO
AZ	Seattle, WA
CA	Seattle, WA
CO	Minneapolis-St. Paul, MN
CT	Boston, MA
DC	Washington, DC
DE	Washington, DC
FL	Charlotte, NC
GA	Charlotte, NC
HI	Seattle, WA
IA	St. Louis, MO
ID	Seattle, WA
IL	Chicago, IL
IN	Chicago, IL
KS	St. Louis, MO
KY	Chicago, IL
LA	St. Louis, MO
MA	Boston, MA
MD	Washington, DC
ME	Boston, MA
MI	Detroit, MI
MN	Minneapolis-St. Paul, MN
MO	St. Louis, MO
MS	Charlotte, NC
MT	Minneapolis-St. Paul, MN
NC	Charlotte, NC
ND	Minneapolis-St. Paul, MN
NE	St. Louis, MO
NH	Boston, MA
NJ	Albany and New York, NY
NM	Seattle, WA
NV	Seattle, WA
NY	Albany and New York, NY
OH	Detroit, MI
OK	St. Louis, MO
OR	Seattle, WA
PA	Albany and New York, NY
RI	Boston, MA
SC	Charlotte, NC
SD	Minneapolis-St. Paul, MN
TN	Chicago, IL
TX	St. Louis, MO
UT	Minneapolis-St. Paul, MN
VA	Washington, DC
VT	Boston, MA
WA	Seattle, WA
WI	Chicago, IL
WV	Washington, DC
WY	Minneapolis-St. Paul, MN

5. To translate the average commercial and residential markups for 1970 through 1972 into the estimated commercial sector retail markups to be used for 1970 through 1982, the relationship between these two markups is used, with the residential markups calculated for all States for each year. The calculation of the residential markups follows the same procedure used in step 2.

6. The commercial sector adjustment factors for each State for each of the years 1970 through 1982 are multiplied by the corresponding *Platt's* prices for 1970 through 1982 to calculate the final commercial sector physical unit prices.

**Btu Prices: All Years**

Btu prices for States are calculated by converting the physical unit prices from cents to dollars per gallon, then to dollars per barrel (42 gallons per barrel) and, finally, to dollars per million Btu (5.825 million Btu per barrel). U.S. prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

**Data Sources**

**Prices**

1983 forward: EIA, *Petroleum Marketing Annual 1985, Volume 1*, Table 25 (1983–1985) and annual issues of the *Petroleum Marketing Annual*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_marketing\\_annual/pma\\_historical.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html), Table 36 (1986–1988), Table 38 (1989–1993), and Table 39 (1994 forward), column titled “To Commercial/Institutional Consumers.”

1970–1982: McGraw-Hill, Inc., *Platt's Oil Price Handbook and Oilmanac*, refinery and terminal prices for No. 2 fuel oil, average of highs and lows.

1970–1982: Foster Associates, Inc., 1974, *Energy Prices 1960-73*, Tables 4-c and 5-b.

## Taxes

For 1992 forward, an annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the State general sales tax as of September 1 of each year is used.

1996 forward: Federation of Tax Administrators, <http://www.taxadmin.org/fta/rate/sales.html>.

1995: The Council of State Governments, *The Book of the States 1994–95* and *1996–97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

1993: Bureau of the Census, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled “State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993.”

1983–1992: Bureau of the Census, U.S. Department of Commerce, State Government Tax Collections, table titled “State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year,” column “Percentage rate, Sept. 1.”

## Consumption

1970 forward: EIA State Energy Data System, commercial sector distillate consumption.

## Conversion Factor: All Years

5.825 million Btu per barrel

## Electric Power Sector

The price of distillate fuel used for electric power is the average delivered cost of No. 2 distillate fuel oil receipts at electric plants. For 1973 forward, these prices are taken from the EIA *Cost and Quality of Fuels (C&Q)*. For 1970 through 1972, prices from Edison Electric Institute’s

*Statistical Yearbook of the Electric Utility Industry* are used with regression analysis. Btu prices are developed directly from the data sources and include all applicable taxes.

## Prices: 1973 Forward

### Contiguous 48 States

Btu prices for 1973 forward are reported in the EIA *C&Q*. For 1973, 1974, and 1980 forward, Btu prices are taken directly from the data source and are converted from cents per million Btu to dollars per million Btu. For 1975 through 1979, consumption-weighted average Btu prices are calculated from prices and consumption reported separately for steam-electric plants and for combustion turbine and internal combustion units. Wherever individual State prices are unavailable, quantity-weighted Census division prices are assigned, as shown in Table TN19.

### Alaska

Btu price for Alaska for 2005 is reported in *C&Q*. But *C&Q* does not have prices for Alaska from 1973 through 2004. Prices for Alaska from 1994 forward are estimated as the simple averages of prices reported to EIA by selected power plants on FERC Form 1 and Form EIA-412 (1994–2000). Additional data is taken from the Alaska Department of Community and Regional Affairs publication, *Statistical Report of the Power Cost Equalization Program* for 1994 forward.

Prior to 1994, prices are estimated each year by calculating the ratio of the Alaska price from the *Statistical Yearbook* to the *Statistical Yearbook* U.S. price and multiplying the ratio by the *C&Q* U.S. price for that year. Alaska prices for 1973, 1975, and 1978 are not published in the *Statistical Yearbook* and are estimated by calculating an average of the ratios of the Alaska to U.S. *Statistical Yearbook* prices in adjacent years. The 1973 estimated price is based on the average ratio for 1972 and 1974, the 1975 price is based on the average ratio for 1974 and 1976, and the 1978 price is based on the average ratio for 1977 and 1979. The average ratio is then applied to the U.S. *C&Q* price for the missing year.

**Table TN19. Distillate Electric Plant Census Division Price Assignments, 1973 Forward**

State	Years	Census Division
CA	1983–1985, 1987, 1988 1990–1992, 1995–1997, 2002	Pacific Pacific Contiguous
CO	1996–1998	Mountain
CT	1973, 2000–2005	New England
DC	1973, 2002–2005	South Atlantic
DE	1973	South Atlantic
ID	1973, 1974, 1976, 1980–2005	Mountain
MD	1973, 2002–2005	South Atlantic
ME	1973, 1974, 1999–2005	New England
MT	1973–1975, 1977, 1983, 2000, 2001	Mountain
NH	1973, 1974	New England
NJ	1973, 1974	Mid-Atlantic
NY	2002	Mid-Atlantic
OR	1987, 1988	Pacific
OR	1996	Pacific Contiguous
RI	1976–1994, 1997–2005	New England
SD	1973, 1974, 1992, 1994, 1995, 1997–2002	W. North Central
TN	1973	E. South Central
VT	1973, 1974, 1978, 1983–1992, 1999, 2001–2004	New England
WA	1973–1977	Pacific
WA	2002–2005	Pacific Contiguous
WV	1973	South Atlantic
WY	1973	Mountain

### Hawaii

The C&Q does not have prices for Hawaii from 1973 through 1982, 1992 through 1996, and 2002 forward. For 2005, Hawaii is assigned the C&Q Pacific Noncontiguous average price. For 2002 through 2004, it is assigned the C&Q Pacific Contiguous average prices. Prices for Hawaii from 1994 through 1996 are estimated as the simple averages of prices reported to EIA by selected power plants on FERC Form 1 and Form EIA-412. Prior to 1994, prices are estimated each year by calculating the ratio of the Hawaii price from the *Statistical Yearbook* to the *Statistical Yearbook* U.S. price and multiplying the ratio by the C&Q U.S. price for that year.

### U.S. Prices

U.S. Btu prices for all years are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

#### Prices: 1970 Through 1972

Btu prices for 1970 through 1972 are estimated by using data from *Statistical Yearbook of the Electric Utility Industry*. U.S. prices are then computed by using the State-level prices and the electric utility distillate consumption data from SEDS.

1. Regression techniques are used to arrive at the equation for estimating electric utility sector distillate prices for the 1970 through 1972 period. Alabama is treated as the reference State. The regression equation uses *Statistical Yearbook* State-level prices for 1974 through 1980 as the independent variable and the State-level prices calculated above for 1974 through 1980 as the dependent variable. Substituting Btu prices for 1970 through 1972 from the *Statistical Yearbook* into the regression equation yields the estimated electric utility sector State-level distillate prices.
2. Wherever individual State prices are unavailable, quantity-weighted Census division prices are assigned as follows: ID in 1970 through 1972; TN in 1970; and WA in 1970 and 1971. AK in 1971 is calculated as the average of the AK price in 1970 and 1972.
3. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

#### Data Sources

##### Prices

1973 forward: EIA, *Cost and Quality of Fuels for Electric Plants*, [http://www.eia.doe.gov/cneaf/electricity/cq/cq\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/cq/cq_sum.html), Table 6 (1973, 1974); Tables 5, 6, 12, 13 (1975–1979); Table 45 (1980–1982); Table 51 (1983, 1984); Table 41 (1985–1989); Table 14 (1990, 1991); Table 8 (1992–2000), Table 9 (2001), Table 7.B (2002 and 2003), Table 7.A (2004 and 2005).

1994 through 2004 (Alaska) and 1994 through 1996 (Hawaii): EIA, unpublished prices reported by electric power plants in AK and HI on FERC Form 1, "Annual Report of Major Electric Utilities, Licensees, and Others," <http://www.eia.doe.gov/cneaf/electricity/page/ferc1.html>; Form EIA-412, "Annual Electric Industry Financial Report" (previously, "Annual Report of Public Electric Utilities,") <http://www.eia.doe.gov/cneaf/electricity/page/eltrad.html> (1994–2000), and AK's *Statistical Report of the Power Cost Equalization Program*, <http://www.state.ak.us/rca/Reporting/>.

1970 through 1993: Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry*, table titled, "Analysis of Fuel for Electric Generation-Total Electric Utility Industry" (1970–1988) and table titled, "Fossil Fuels Used for Electric Generation Total Electric Utility Industry" (1990–1993).

### Consumption

1970 forward: EIA, State Energy Data System, electric power sector distillate consumption.

### Conversion Factors

Btu prices are developed directly from data sources, except for AK for 1994 forward. The conversion factor used in these instances is 5.825 million Btu per barrel.

## Industrial Sector

The industrial sector distillate fuel prices are developed by using a variety of data sources and several estimation methods, depending on the years involved. For 1983 forward, prices of No. 2 distillate fuel (excluding taxes) are reported by the *Petroleum Marketing Annual (PMA)*. State general sales taxes from the Bureau of the Census and successor sources are added. For 1970 through 1982, prices are the average cost of distillate to manufacturing firms and implicitly include taxes that reflect individual State differences.

### Physical Unit Prices: 1983 Forward

Physical unit distillate fuel prices in cents per gallon (excluding taxes) are generally available for 24 States from the *PMA*. State-level prices for the remaining 27 States are estimated by using the *PMA* Petroleum Administration for Defense (PAD) district or subdistrict prices, as shown in Table TN20. State general sales taxes are then added.

In 2000, the PAD District IV average industrial sector price was withheld in the *PMA*. PAD District IV commercial and industrial sector prices for 1995 through 1999 were compared and the average percentage difference between the sectors' prices was applied to the 2000 commercial sector PAD District IV price to derive an industrial sector PAD District IV price.

### Physical Unit Prices: 1982

In 1984, the Bureau of the Census announced that State-level fuel cost and quantity information would no longer be published in either the *Annual Survey of Manufacturers (ASM)* or *Census of Manufactures (CM)*. In addition, the *PMA*, the source for 1983 forward industrial sector distillate price data, did not contain 1982 prices. Because of this lack of price data, the 1982 industrial sector distillate prices are estimated on the basis of the relationship of industrial sector prices to electric power sector prices for 1978 through 1981. The 1983 prices are not used in the estimation because they exclude taxes, while the 1978 through 1981 prices include taxes.

1. In order to calculate the average ratios of industrial-to-electric power distillate prices, electric power sector price assignments are made for: AK in 1978 through 1982 from WA; ID in 1979 through 1982 from MT; RI in 1978 through 1982 from CT; and VT in 1978 from ME.
2. The average 1978 through 1981 ratios of industrial-to-electric power sector distillate prices are calculated for each State.
3. Prices for 1982 are estimated by multiplying the average ratios by the electric power data for 1982.

**Table TN20. Distillate Industrial Sector PAD District and Subdistrict Price Assignments, 1983 Forward**

State	Years	Assignments
AL	1983–2005	District III
AR	1983–2005	District III
AZ	1983–2005	District V
CA	1983–2005	District V
CO	1983–2005	District IV
DC	1994, 1997–2001, 2003–2005	Subdistrict IB
FL	1983–2004	Subdistrict IC
	2005	District I
GA	1983–2004	Subdistrict IC
	2005	District I
HI	1983–2005	District V
IA	1983–2005	District II
KS	1983–2005	District II
KY	1983–2005	District II
LA	1983–2005	District III
ME	1997	Subdistrict IA
MI	2001	District II
MO	1983–2005	District II
MS	1983–2005	District III
MT	1983–2005	District IV
NC	1983–2004	Subdistrict IC
	2005	District I
ND	1983–2005	District II
NE	1983–2005	District II
NM	1983–2005	District III
NV	1983–2005	District V
NY	1987	Subdistrict IB
OH	1983	District II
OK	1983–2005	District II
RI	2003	Subdistrict IA
SC	1983–2004	Subdistrict IC
	2005	District I
SD	1983–2005	District II
TN	1983–2005	District II
TX	1983–2005	District III
UT	1983–2005	District IV
WY	1983–2005	District IV

**Physical Unit Prices: 1971, 1974 Through 1981**

For the years 1971 and 1974 through 1981, industrial sector distillate prices are calculated directly from cost and quantity data from the *Annual Survey of Manufacturers (ASM)* or *Census of Manufactures (CM)* for all States where data are available. Taxes are included in the prices. There are no missing prices for 1971. Six States are missing some *ASM* cost and quantity data for the 1974 through 1981 period. Cost and quantity data for these States are estimated as the simple average of the cost and quantity data for their adjacent States. The States, the years for which data are estimated, and the adjacent States used to make the estimation are shown in Table TN21.

**Table TN21. Distillate Industrial Sector Price Assignments, 1974-1981**

State	Years	State Prices Used
HI	1979–1981	CA
ND	1979–1981	MN, MT, SD
NM	1974–1979	AZ, CO, TX
NV	1974–1981	AZ, CA, ID, OR, UT
OK	1974–1978	AR, CO, KS, MO, TX
WY	1974–1981	CO, ID, MT, NE, SD, UT

**Physical Unit Prices: 1970, 1972, 1973**

Since *ASM* and *CM* data are not available for these years, the prices must be estimated. Physical unit prices are based on the ratio of 1971 *CM* prices to the 1971-assigned *Platt's* prices (Table TN16 on page 35). The resulting ratios for each State are used with the *Platt's* assigned prices for 1970, 1972, and 1973 to impute prices.

1. The first step is to calculate State-level ratios between prices calculated from the 1971 *CM* cost and quantity data and the 1971 assigned *Platt's* prices. There are no missing States in either of these two sets of prices.

2. State-level physical unit prices for 1970, 1972, and 1973 are estimated by multiplying the 1971 ratio by the assigned State-level *Platt's* prices for each respective year.

### **Btu Prices: All Years**

Btu prices for States are calculated by converting the physical unit prices from cents to dollars per gallon, then to dollars per barrel (42 gallons per barrel) and, finally, to dollars per million Btu (5.825 million Btu per barrel). U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS, adjusted for process fuel consumption.

### **Data Sources**

#### **Prices**

1983 forward: EIA, *Petroleum Marketing Annual 1985, Volume 1*, Table 25 (1983–1985), and annual issues of the *Petroleum Marketing Annual*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_marketing\\_annual/pma\\_historical.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html), Table 36 (1986–1988), Table 38 (1989–1993), and Table 39 (1994 forward), column titled “To Industrial Consumers.”

1970–1982: McGraw–Hill, Inc., *Platt's Oil Price Handbook and Oilmanac*, refinery and terminal prices for No. 2 fuel oil, average of highs and lows.

1971, 1977, and 1981: Bureau of the Census, U.S. Department of Commerce, *Census of Manufactures*, Table 4 (1971) and Table 3 (1977, 1981).

1974–1976 and 1978–1980: Bureau of the Census, U.S. Department of Commerce, *Annual Survey of Manufacturers*, Table 3.

#### **Taxes**

For 1992 forward, an annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the State general sales tax as of September 1 of each year is used.

1996 forward: Federation of Tax Administrators, <http://www.taxadmin.org/fta/rate/sales.html>.

1995: The Council of State Governments, *The Book of the States 1994–95* and *1996–97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

1993: Bureau of the Census, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled “State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993.”

1983–1992: Bureau of the Census, U.S. Department of Commerce, *State Government Tax Collections*, table titled “State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year,” column “Percentage rate, Sept. 1.”

### **Consumption**

1970 forward: EIA, State Energy Data System, industrial sector distillate consumption.

### **Conversion Factor: All Years**

5.825 million Btu per barrel

## **Transportation Sector**

Consumption of distillate fuel in the transportation sector includes distillate fuel used for vessel bunkering and for military and railroad use, plus on-highway diesel fuel use. Because on-highway diesel fuel use accounts for the largest portion of this sector—increasing from 55 percent in 1970 to 87 percent in 2005—prices and expenditures are calculated by using diesel fuel prices to end users through retail outlets. State physical unit prices for 1986 forward are taken from the EIA *Petroleum Marketing Annual (PMA)*. Physical unit prices for earlier years are calculated by using *PMA* prices and consumption data from the U.S. Department of Transportation's *Highway Statistics* to weight monthly or quarterly prices from the U.S. Department of Agriculture's *Agricultural Prices* into annual

prices. Btu prices for all years are calculated by using the physical unit prices and the distillate conversion factor.

### **Physical Unit Prices: 1986 Forward**

Diesel fuel physical unit prices for 1986 forward are based on the annual State-level price data available from the *PMA* for approximately 23 States and monthly tax rate information from *Highway Statistics*. State and Federal excise taxes on diesel fuel are added to *PMA* prices to derive final physical unit prices, which are converted to dollars per gallon. In cases where the tax rate is not constant throughout the year, an annual average tax is calculated on the basis of the number of months each rate was in effect. State and local sales and other general taxes are not included.

For the remaining States for which no prices are published, the *PMA* PAD district or subdistrict prices for diesel fuel and motor gasoline and State motor gasoline prices are used. The State diesel fuel price is estimated as the ratio of the PAD district or subdistrict diesel fuel price to the PAD district or subdistrict motor gasoline price times the State motor gasoline price. The use of the ratio assumes that the relationship between the motor gasoline State and PAD district or subdistrict prices is similar to that of the diesel fuel State and PAD district or subdistrict prices. Motor gasoline prices to end users at all refiners' company outlets are used. When a State has no price available in either data series, the motor gasoline price to end users by all types of sellers through company outlets is used as the State motor gasoline price. The District of Columbia has no published diesel fuel or motor gasoline prices for 1991–1999, 2001 and 2003–2005 and is assigned the Maryland diesel fuel price. State and Federal excise taxes are added as described above.

### **Physical Unit Prices: 1983 Through 1985**

Diesel fuel physical unit prices for 1983 through 1985 are based on the annual State-level price data available from the *PMA* and monthly State and Federal tax rate information from *Highway Statistics* for 24 States. The prices for the remaining 27 States are calculated by using *Agricultural Prices* as outlined in the 1977 through 1982 methodology.

The *PMA* provides physical unit prices for approximately 24 States, excluding taxes. In 1983 through 1985, the DC price is missing, and the MD price is assigned. In 1983, RI has no price and the PAD Subdistrict IA average is assigned. A simple average of monthly State and Federal excise taxes is calculated as a combined average tax and added to the *PMA* price for a final physical unit price. State and local sales and other general taxes are not included.

### **Physical Unit Prices: 1977 Through 1982**

Monthly prices from *Agricultural Prices* and monthly special fuels consumption data from *Highway Statistics* are collected for the States. MD prices are assigned to DC. Prices include State and local per-gallon taxes. Federal taxes and State and local sales and other general taxes are not included.

The volume-weighted annual diesel physical unit prices for States and the United States are calculated by using the monthly *Agricultural Prices* price data, weighted by the monthly *Highway Statistics* consumption data. The AK 1977 through 1982 prices are estimated on the basis of the assumption that the ratio of AK-to-U.S. diesel fuel price is the same as the ratio of the AK-to-U.S. motor gasoline price each year.

### **Physical Unit Prices: 1970 Through 1976**

Quarterly prices from *Agricultural Prices* and monthly special fuels consumption data from *Highway Statistics* are collected for the States. Prices include State and local per-gallon taxes. Federal taxes and State and local sales taxes and other general taxes are not included.

1. Prices for 1970 through 1972 are reported in cents per gallon and must be converted to dollars per gallon. Prices for 1973 through 1976 are already reported in dollars per gallon.
2. For 1971 through 1973, State-level prices are not available for CT, MA, ME, NH, RI, and VT. Each is assigned the New England regional price for the 3 years.
3. The third quarter DE price is assigned to the missing fourth quarter DE price in 1972.

4. The combined MD/DE prices reported in 1973 are assigned to each of the States.
5. For 1970 through 1976, MD (or MD/DE) prices are assigned to DC.

The monthly special fuels consumption for 1970 through 1976 are converted into quarterly consumption by summing the months for each quarter.

The consumption-weighted annual diesel physical unit prices for the States are calculated by using the quarterly weights and quarterly prices. For 1970 through 1972, the quarterly prices from *Agriculture Prices* are converted from cents per gallon to dollars per gallon. For 1973 forward, the prices are already in dollars per gallon in the source. AK/1970 through 1976 prices are estimated on the basis of the assumption that the ratio of AK-to-U.S. diesel fuel price is the same as the ratio of AK-to-U.S. motor gasoline price each year.

#### **Btu Prices: All Years**

Btu prices for States are calculated by converting the physical unit prices from cents per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu (5.825 million Btu per barrel). U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption from SEDS.

#### **Data Sources**

##### **Prices**

1986 forward: EIA, *Petroleum Marketing Annual*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_marketing\\_annual/pma\\_historical.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html), Table 36 (1986–1988), Table 38 (1989–1993), column titled “Sales to End Users, Through Company-Operated Retail Outlets,” and Table 39 (1994 forward), column titled “Sales to End Users, Through Retail Outlets,” for diesel fuel prices.

1986 forward: EIA, *Petroleum Marketing Annual*, Table 29 (1986–1988) and Table 30 (1989–1993), column titled “All Refiners, Sales to End Users, Through Company Outlets,” and Table 35 (1994 forward), column titled “All Grades, Sales to End Users, Through Retail Outlets,” for motor gasoline prices.

1986 forward: EIA, *Petroleum Marketing Annual*, Table 28 (1986–1988) and Table 29 (1989–1993), column titled “Motor Gasoline Average, Through Company Outlets,” and Table 31 (1994 forward), column titled “All Grades, Sales to End Users, Through Retail Outlets,” for additional motor gasoline prices.

1983–1985: EIA, *Petroleum Marketing Annual 1985*, Volume 1, Table 25, column titled “Sales to End Users, Sales Through Company-Operated Retail Outlets.”

1970–1985: Crop Reporting Board, U.S. Department of Agriculture, *Agriculture Prices*, tables generally titled “Motor Supplies: Average Price Paid by Farmers for Motor Fuel” for 1970–1979, and “Diesel Fuel: Average Price Paid by States” for 1980–1985.

1970–1985: Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics*, Table MF-25 for special fuels consumption data. Table MF-25 is not included in the 1976 volume but is publicly available directly from the Federal Highway Administration.

##### **Taxes**

1970 forward: Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics*, Table MF-121T for State tax rates. Federal taxes are from *Highway Statistics* Table FE-101 (1970 through 1992) and Table MF-121T (1993 forward).

##### **Consumption**

1970 forward: EIA, State Energy Data System, transportation sector distillate consumption.

#### **Conversion Factor: All Years**

5.825 million Btu per barrel.

## Heavy Oil (Electric Power Sector)

For all years, the price of heavy oil consumed at electric power plants is the average cost of No. 6 fuel oil (residual fuel oil) as reported in *Cost and Quality of Fuels for Electric Plants*. (See **Residual Fuel, Electric Power Sector** on page 78.)

## Jet Fuel

Jet fuel prices are estimated for all years in the transportation sector and for 1972 through 1982 in the electric power sector.

### Transportation Sector

Prices are developed for kerosene-type jet fuel in the State Energy Data System (SEDS) and are used as the price for both kerosene and naphtha-type jet fuels. Since 1997, virtually all jet fuel used for transportation is kerosene-type. Taxes are not included in the prices.

#### Physical Unit Prices: 1983 Forward

Transportation sector jet fuel prices for 1983 forward are based on data from Energy Information Administration (EIA)'s *Petroleum Marketing Annual*. Annual prices to end users are available for most States. Prices are converted to dollars per gallon. States without prices are assigned adjacent State or PAD district or subdistrict prices, as shown in Table TN22.

#### Physical Unit Prices: 1976 Through 1982

State-level jet fuel prices for 1976 through 1982 are calculated from the *Producer Prices and Price Indexes (PPI)* monthly indices for Census divisions and the jet fuel base prices by State for July 1975. The monthly price for each Census division is equal to the *PPI* monthly index times the jet fuel base price for July 1975 for that Census division. Census

**Table TN22. Jet Fuel Transportation Sector Price Assignments, 1983 Forward**

State	Years	Assignment
AR	2001-2003	PAD District III
DC	1983-1988, 1990, 1993, 1995, 1997, 1998	MD
DE	1987, 2003-2005	PAD Subdistrict IB
HI	2000-2005	PAD District V
KS	1996	PAD District II
MA	1996, 2003-2005	PAD Subdistrict IA
ME	1985, 1990, 1991, 1993-2005	PAD Subdistrict IA
MS	2002	PAD District III
NE	2004	PAD District II
ND	2002-2005	PAD District II
NH	1987, 1995, 2000, 2004, 2005	PAD Subdistrict IA
RI	1983-1988, 1998-2000, 2002-2005	PAD Subdistrict IA
VT	1984-1988, 1991, 1992, 1999, 2003-2005	PAD Subdistrict IA
WI	2003	PAD District II
WV	1993-2000, 2003-2005	PAD Subdistrict IC
WY	2003, 2005	PAD District IV

division monthly prices are assigned to each State within the Census division, and annual jet fuel prices are computed as simple averages of the monthly State prices.

#### Physical Unit Prices: 1970 Through 1975

Jet fuel physical unit State-level prices for the 1970 through 1975 period are based on U.S. annual wholesale prices from the *PPI* and the relationship of these prices to wholesale kerosene prices reported in *Platt's*. The U.S. prices are converted to Census division prices, which are then assigned directly to States.

Preliminary U.S. jet fuel prices from the *PPI* for 1973 through 1980 are calculated by using the annual jet fuel price indices, the jet fuel U.S. base price for July 1975 (0.276 dollars per gallon) and the U.S. index for July 1975 (235.8). The index for 1973 is assumed to be equal to a simple average of the 11 available monthly indices.

The calculated preliminary U.S. jet fuel prices from the *PPI* are used as the dependent variable in a regression equation for 1973 through 1980, where the wholesale kerosene prices from *Platt's* are the independent variable. The regression equation is used to estimate U.S. annual jet fuel prices for 1970 through 1972.

Jet fuel prices for Census divisions are estimated by using the preliminary U.S. prices derived above for 1970 through 1975 (calculated directly from the *PPI* data for 1973 through 1975 and estimated for 1970 through 1972). These prices are used as inputs to a regression equation which establishes a linear relationship between preliminary U.S. prices and Census division prices for the years 1970 through 1975. Census division prices are assigned to each State within the Census division.

### **Btu Prices: All Years**

Btu prices for States are calculated from the physical unit prices and the Btu conversion factor (5.670 million Btu per barrel). U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

### **Data Sources**

#### **Prices**

1985 forward: EIA, *Petroleum Marketing Annual*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_marketing\\_annual/pma\\_historical.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html), Table 21, column titled “Kerosene-Type Jet Fuel” (1985), Table 33, column titled “Kerosene-Type Jet Fuel, Sales to End Users,” (1986–1988), Table 35 (1989–1993), and Table 36 (1994 forward).

1983, 1984: EIA, *Petroleum Marketing Annual 1994*, Table A2, column titled “Kerosene-Type Jet Fuel, Sales to End Users.”

1973–1982: Bureau of Labor Statistics, U.S. Department of Labor, *Producer Prices and Price Indexes, Supplement*, table titled “Producer price indexes for refined petroleum products by region.”

1970–1975: McGraw Hill, Inc., *Platt's Oil Price Handbook and Oilmanac*, 57th Edition, page 480.

### **Consumption**

1970 forward: EIA, State Energy Data System, transportation sector jet fuel consumption.

### **Conversion Factor: All Years**

5.670 million Btu per barrel.

## **Electric Power Sector**

Jet fuel electric power consumption estimates are available in SEDS for 1972 through 1982 only. For 1970 and 1971, no parallel series is available; and for the years after 1982, the series is a part of “light oil” and assigned the electric power distillate fuel price by State. (See **Distillate Fuel, Electric Power Sector** on page 40). All applicable taxes are included in the prices.

### **Btu Prices: 1975 Through 1982**

For the States that consumed kerosene-type jet fuel at electric utilities during these years, the Btu prices are taken directly from EIA's *Cost and Quality of Fuels for Electric Plants (C&Q)*.

### **Btu Prices: 1972 Through 1974**

Because *C&Q* prices are not available for 1972 through 1974, prices are estimated from *C&Q* prices for 1975 and 1976 and the U.S. Department of Agriculture's *Agricultural Prices* data for 1972 through 1976.

1. Simple annual averages of *Agricultural Prices* quarterly values are calculated for 1972 through 1976. New England Census Division prices are assigned to CT, MA, ME, NH, RI, and VT.
2. The average annual prices based on *Agricultural Prices* values for 1975 and 1976 are used as the independent variables in a regression

where the dependent variables are State-level prices based on *C&Q* prices for 1975 and 1976.

3. State-level price estimates for 1972 through 1974 are derived from the results of the regression analysis and the *Agricultural Prices* values for 1972 through 1974.

### **U.S. Btu Prices: All Years**

U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

### **Data Sources**

#### **Prices**

1975–1982: EIA, *Cost and Quality of Fuels for Electric Plants*, <http://www.eia.doe.gov/cneaf/electricity/cq/backissues.html>, Tables 6 and 13 (1975), Table 13 (1976–1979), and Table 47 (1980–1982).

1972–1976: Crop Reporting Board, U.S. Department of Agriculture, *Agriculture Prices*, table titled “Household Supplies: Average Prices Paid by Farmers for Lawn Mowers and Petroleum Products.”

#### **Consumption**

1972–1982: EIA, State Energy Data System, electric power sector kerosene-type jet fuel consumption.

### **Conversion Factors: All Years**

Because Btu prices are available directly from the data sources, no conversion factors are used.

## **Kerosene**

Kerosene prices are developed for the residential, commercial, and industrial sectors. For 1970 through 1982, prices are developed for the residential and industrial sectors, and the industrial sector prices are assigned to the commercial sector. For 1983 forward, end-user prices are used for the residential and commercial sectors and prices of kerosene sold for resale are used for the industrial sector. Estimates of the amount of kerosene consumed by the residential, commercial, and industrial sectors are taken from the State Energy Data System (SEDS).

### **Residential Sector**

Residential sector kerosene prices are estimated by using several data sources and estimation methodologies, depending on the year. For 1983 forward, prices of kerosene sales to end-users (excluding taxes) are taken from the Energy Information Administration’s (EIA) *Petroleum Marketing Annual (PMA)*. State general sales taxes from the Bureau of the Census and successor sources are added. For 1970 through 1982, residential kerosene prices are developed from the U.S. Bureau of Labor Statistics *Producer Prices and Price Indexes (PPI)* data series and the U.S. Department of Agriculture *Agricultural Prices* for kerosene. For both time periods, physical unit prices are calculated from the data sources, and Btu prices are computed by using the physical unit prices and the conversion factor.

### **Physical Unit Prices: 1983 Forward**

Prices of kerosene sold to end users, published in the EIA *PMA* are used as residential sector prices. The prices, in cents per gallon (excluding taxes) are available for as few as 5 or as many as 30 States, depending on the year. States with residential kerosene consumption, but no *PMA* published prices are assigned their Petroleum Administration for Defense (PAD) district or subdistrict prices as shown in Table TN23.

In 1990 and 1991, the PAD District IV prices of kerosene sold to end users are out-of-range. In 1990, the ratio between the 1989 PAD District IV end-user price and the U.S. end-user price is applied to the 1990 U.S. end-user price to estimate the PAD District IV end-user price. Similarly,

**Table TN23. Kerosene Residential and Commercial Sectors PAD District and Subdistrict Price Assignments, 1983 Forward**

State	Years	Assignments	State	Years	Assignments
AK	1983–2005	District V	MO	1987–1989, 1991–2005	District II
AL	1986, 1991, 1993, 1996, 1997, 2002–2005	District III	MS	1988, 1989, 1991–2005	District III
AR	1984, 1986–2005	District III	MT	1983–2005	District IV
AZ	1983–2005	District V	ND	1983–2005	District II
CA	1983–2005	District V	NE	1983–2005	District II
CO	1985–2005	District IV	NH	1983, 1984, 1986–1995, 1997, 1998, 2001–2005	Subdistrict IA
CT	1983, 1987–1992, 1994–2005	Subdistrict IA	NJ	1983, 1984, 1987, 1989, 1994, 1996–1998, 2002–2005	Subdistrict IB
DC	1983–2005	Subdistrict IB	NM	1983, 1985, 1987–2005	District III
DE	1991–2005	Subdistrict IB	NV	1983–2005	District V
FL	1985, 2005	Subdistrict IC	OH	2004, 2005	District II
GA	1993, 2000, 2004, 2005	Subdistrict IC	OK	1983, 1987–1998, 2000–2005	District II
HI	1983–2005	District V	OR	1983–2005	District V
IA	1983–2005	District II	RI	1983, 1988–1992, 1994–2005	Subdistrict IA
ID	1983–2005	District IV	SC	1993, 2004, 2005	Subdistrict IC
IL	1987, 2000, 2003–2005	District II	SD	1983–2005	District II
IN	1996, 1997, 1999–2005	District II	TN	2004, 2005	District II
KS	1983–2005	District II	TX	1993–1996, 1998, 1999, 2002–2005	District III
KY	1983, 1999–2005	District II	UT	1983–2005	District IV
LA	1991–2000, 2004, 2005	District III	VA	2000	Subdistrict IB
MA	2002, 2004, 2005	Subdistrict IA	VT	1984, 1985, 1989–1998, 2000–2004	Subdistrict IA
MD	1998–2005	Subdistrict IB	WA	1983–2005	District V
ME	1986–2005	Subdistrict IA	WI	1983–1997, 1999–2005	District II
MI	1993, 2004, 2005	District II	WV	2005	Subdistrict IC
MN	1983, 1985, 1990, 1992–1998, 2000–2005	District II	WY	1983–2005	District IV

in 1991, the ratio between the 1992 PAD District IV end-user price and the U.S. end-user price is applied to the 1991 U.S. end-user price to estimate the PAD District IV end-user price.

For 1998 through 2002, the PAD District IV prices of kerosene sold to end users are withheld. The average of the ratios between the end-user price of kerosene and the price of kerosene sold for resale in PAD Subdistricts IA through IC and PAD District II is applied to the PAD District IV resale price to estimate the PAD District IV end-user price for each year.

In 2003, the PAD District III, IV, and V prices of kerosene sold to end users are withheld. For PAD Districts III and IV, the average of the

ratios between the end-user price and the resale price in PAD Subdistricts IA through IC and PAD District II is applied to the PAD Districts III and IV resale prices to estimate their end-user prices. The PAD District V end-user price is assigned the average of the District's end-user prices in 2001 and 2002.

For 2004 and 2005, only PAD District I, Subdistrict IB, and Subdistrict IC end-user prices are available. For PAD Subdistrict IA, the PAD District I end-user prices are assigned. For the other PAD Districts, the average of the ratios between the end-user price and the resale price in PAD Subdistricts IB and IC is applied to the Districts' resale prices to estimate their end-user prices for each year.

Once missing prices have been assigned, State general sales taxes are then added.

### **Physical Unit Prices: 1977 Through 1982**

Monthly Census division prices and price indices from the Bureau of Labor Statistics *PPI* are used as the basis for the residential kerosene series from 1977 through 1982. To maintain consistency in the agricultural price series used for 1970 through 1976, the *PPI* prices are multiplied by an adjustment factor that accounts for the relationship between *PPI* and *Agricultural Prices* data for quarters in which the two series overlap. In the description of computational procedures below, the adjustment factor is derived first, the *PPI* prices for 1977 through 1982 are estimated, and the final kerosene physical unit and Btu prices for States are calculated. The final residential sector kerosene prices approximate the average prices paid by farmers. Taxes are included in the source data from *Agricultural Prices* and are, therefore, reflected in the final price estimates.

The first step is to compute the adjustment factor relating *PPI* and *Agricultural Prices* data.

1. Monthly *PPI* prices for the 18 months covered from July 1975 through December 1976 are calculated from the July 1975 base prices and monthly indices for Census divisions.
2. The calculated Census division monthly prices are assigned to each State within the respective Census division.
3. Volume-weighted quarterly *PPI*-based prices for States are calculated by using the monthly volume weights developed from *Retail Sales and Inventories* sales data for "other distillate fuel oil."
4. The adjustment factor relating *PPI* and *Agricultural Prices* data is calculated as the simple average of the ratios of the quarterly kerosene price by State from *Agricultural Prices* to the calculated quarterly *PPI*-based kerosene prices by State.

The next step is the calculation of monthly State-level prices from *PPI* kerosene Census division data for 1977 through 1982.

1. Monthly Census division *PPI* prices are calculated by using the July 1975 base prices and the monthly price indices for 1977 through 1982. The missing monthly indices for February, June, July, and October 1980 for the East South Central Division are assumed to be equal to the index for the preceding month.
2. Each State is assigned its respective Census division monthly prices.

The next step is the calculation of annual physical unit State prices.

1. Annual *PPI*-based physical unit prices for States are computed from the monthly *PPI* prices and the monthly consumption weights.
2. Final residential kerosene prices for States are estimated as the product of the annual *PPI*-based State price and the adjustment factor calculated above.

### **Physical Unit Prices: 1970 Through 1976**

Physical unit prices for States are calculated from quarterly price data from the U.S. Department of Agriculture's *Agricultural Prices* and consumption weights derived from EIA's *Retail Sales and Inventories of Fuel Oil*. Taxes are included in the source data.

The quarterly physical unit price data from *Agricultural Prices* for 1970 through 1976 are published in several different forms. The first step in the calculation of prices for these years is to organize the published *Agricultural Prices* data into a consistent form.

1. For 1971 through 1973, no quarterly prices are available for CT, MA, ME, NH, RI, and VT. Each of these States is assigned the quarterly prices reported for the New England Census Division.
2. For 1973, combined MD/DE quarterly prices are reported instead of separate State prices. For this year, the combined prices are assigned to both States.
3. No prices are reported for AK and DC for 1970 through 1976. Quarterly weighted Census division prices are assigned to AK, and MD prices are assigned to DC for all 7 years.

In order to weight the quarterly prices from *Agricultural Prices* into annual State prices, monthly quantity weights are calculated from *Retail Sales and Inventories of Fuel Oil*. This assumes that the “other distillate oil” consumption data by PAD districts or subdistricts is kerosene.

1. Monthly weights are computed by using simple averaging of all available “other distillate oil” sales data for each month for each PAD district or subdistrict. Since data are available from November 1978 to March 1981, some months have averages based on three data points, while others are based on one or two data points. For example, the average weight for March is the simple average of the 1979, 1980, and 1981 March volumes published in *Retail Sales and Inventories of Fuel Oil*.
2. Each month’s share of average annual sales is calculated by PAD district or subdistrict from the average monthly sales figures. These shares, which become the monthly weights, are then assigned to each State within its respective district or subdistrict.

Final State annual kerosene physical unit prices are calculated as the weighted average of the *Agricultural Prices* quarterly prices. The monthly weights (shares) are converted to quarterly weights by summing the shares for months within a particular quarter. These same weights are used with the State-level price data for each year from 1970 to 1976.

### **Alaska Btu Prices: 1970 Through 1979**

Kerosene residential prices for AK are estimated on the basis of the assumption that the ratio of AK-to-U.S. kerosene residential prices is the same as the ratio of AK-to-U.S. distillate fuel residential prices.

### **Btu Prices: All Years**

Btu prices for States are computed by converting the physical unit prices in dollars per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu (5.670 million Btu per barrel). U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

## **Data Sources**

### **Prices**

1983 forward: EIA, *Petroleum Navigator*, [http://tonto.eia.doe.gov/dnav/pet/pet\\_pri\\_refoth\\_a\\_EPPK\\_PTG\\_cpgal\\_a.htm](http://tonto.eia.doe.gov/dnav/pet/pet_pri_refoth_a_EPPK_PTG_cpgal_a.htm), select Excel file labeled “Download Series History.”

1975–1982: Bureau of Labor Statistics, U.S. Department of Labor, *Producer Prices and Price Indexes, Supplement*, table titled “Producer price indexes for refined petroleum products by region.”

1978–1981: EIA, *Retail Sales and Inventories of Fuel Oil*, Table 2.

1970–1976: Crop Reporting Board, U.S. Department of Agriculture, *Agricultural Prices*, table titled “Household Supplies: Average Price Paid by Farmers for Lawn Mowers and Petroleum Products.”

### **Taxes**

For 1992 forward, an annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the State general sales tax as of September 1 of each year is used.

1996 forward: Federation of Tax Administrators, <http://www.taxadmin.org/fta/rate/sales.html>.

1995: The Council of State Governments, *The Book of the States 1994–95 and 1996–97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

1993: Bureau of the Census, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled “State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993.”

1983–1992: Bureau of the Census, U.S. Department of Commerce, *State Government Tax Collections*, table titled “State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year,” column “Percentage rate, Sept. 1.”

## Consumption

1970 forward: EIA, State Energy Data System, residential sector kerosene consumption.

### **Conversion Factor: All Years**

5.670 million Btu per barrel.

## Commercial Sector

Commercial sector kerosene prices are estimated by using different data sources and estimation methodologies, depending on the year. For 1983 forward, prices of kerosene sales to end-users (excluding taxes) are taken from the EIA *Petroleum Marketing Annual (PMA)*. State general sales taxes from the Bureau of the Census and successor sources are added. For 1970 through 1982, prices for the industrial sector are assigned to the commercial sector.

### **Physical Unit Prices: 1983 Forward**

Prices of kerosene sold to end users, published in the EIA *PMA*, are used as commercial sector prices. The prices, in cents per gallon (excluding taxes) are available for as few as 5 or as many as 30 States, depending on the year. States with commercial kerosene consumption, but no *PMA* published prices are assigned their Petroleum Administration for Defense (PAD) district or subdistrict prices as shown in Table TN23.

In 1990 and 1991, the PAD District IV prices of kerosene sold to end users are out-of-range. In 1990, the ratio between the 1989 PAD District IV end-user price and the U.S. end-user price is applied to the 1990 U.S. end-user price to estimate the PAD District IV end-user price. Similarly, in 1991, the ratio between the 1992 PAD District IV end-user price and the U.S. end-user price is applied to the 1991 U.S. end-user price to estimate the PAD District IV end-user price.

For 1998 through 2002, the PAD District IV prices of kerosene sold to end users are withheld. The average of the ratios between the end-user

price of kerosene and the price of kerosene sold for resale in PAD Subdistricts IA through IC and PAD District II is applied to the PAD District IV resale price to estimate the PAD District IV end-user price for each year.

In 2003, the PAD District III, IV, and V prices of kerosene sold to end users are withheld. For PAD Districts III and IV, the average of the ratios between the end-user price and the resale price in PAD Subdistricts IA through IC and PAD District II is applied to the PAD Districts III and IV resale prices to estimate their end-user prices. The PAD District V end-user price is assigned the average of the District's end-user prices in 2001 and 2002.

For 2004 and 2005, only PAD District I, Subdistrict IB, and Subdistrict IC end-user prices are available. For PAD Subdistrict IA, the PAD District I end-user prices are assigned. For the other PAD Districts, the average of the ratios between the end-user price and the resale price in PAD Subdistricts IB and IC is applied to the Districts' resale prices to estimate their end-user prices for each year.

Once missing prices have been assigned, State general sales taxes are then added.

### **Physical Unit Prices: 1970 Through 1982**

For 1970 through 1982, State prices for kerosene sold to the industrial sector are assigned to the commercial sector.

### **Btu Prices: All Years**

Btu prices for States are computed by converting the physical unit prices in dollars per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu (5.670 million Btu per barrel). U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

## Data Sources

### Prices

1983 forward: EIA *Petroleum Navigator*, [http://tonto.eia.doe.gov/dnav/pet/pet\\_pri\\_refoth\\_a\\_EPPK\\_PTG\\_cpgal\\_a\\_htm](http://tonto.eia.doe.gov/dnav/pet/pet_pri_refoth_a_EPPK_PTG_cpgal_a_htm), select Excel file labeled "Download Series History."

1970–1982: Industrial sector kerosene prices from SEDS.

### Taxes

For 1992 forward, an annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the State general sales tax as of September 1 of each year is used.

1996 forward: Federation of Tax Administrators, <http://www.taxadmin.org/fta/rate/sales.html>.

1995: The Council of State Governments, *The Book of the States 1994–95* and *1996–97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

1993: Bureau of the Census, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled "State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993."

1983–1992: Bureau of the Census, U.S. Department of Commerce, *State Government Tax Collections*, table titled "State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year," column "Percentage rate, Sept. 1."

### Consumption

1970 forward: EIA, State Energy Data System, commercial sector kerosene consumption.

## Conversion Factor: All Years

5.670 million Btu per barrel.

## Industrial Sector

Industrial sector kerosene prices are estimated by using different data sources and estimation methodologies, depending on the year. For 1983 forward, prices of kerosene sold for resale (excluding taxes) are taken from the EIA *PMA*. State general sales taxes from the Bureau of the Census and successor sources are added.

For 1970 through 1982, the industrial sector kerosene prices are based on wholesale price and price index data and on the industrial sector distillate prices. The procedures vary slightly for 1970 through 1974 and 1975 through 1982. In 1970 through 1982, physical unit prices are calculated first; then Btu prices are computed by using the physical unit prices and the conversion factor. Prices approximate an average kerosene price for the manufacturing sector. Taxes are included in the distillate fuel oil prices and are, therefore, reflected in the kerosene price estimates.

### Physical Unit Prices: 1983 Forward

Prices of kerosene sold for resale, published in the EIA, *PMA* are used as industrial sector kerosene prices. The prices, in cents per gallon (excluding taxes) are available for 30 or more States depending on the year. States with industrial kerosene consumption, but no *PMA* published price are assigned their Petroleum Administration for Defense (PAD) district or subdistrict price as shown in Table TN24. In 2003, the PAD District V resale price is withheld and is assigned the average of the 2001, 2002 and 2004 PAD District V resale prices. State general sales taxes are then added.

### Physical Unit Prices: 1975 Through 1982

Physical unit industrial kerosene prices for 1975 through 1982 are estimated from the Bureau of Labor Statistics *Producer Prices and Price Indexes (PPI)* base prices and indices for kerosene and No. 2 distillate oil

**Table TN24. Kerosene Industrial Sector PAD District and Subdistrict Price Assignments, 1983 Forward**

State	Years	Assignments
AK	1983–2005	District V
AR	1997, 1998, 2002	District III
AZ	1983–2005	District V
CA	1992, 1993, 2002, 2003, 2005	District V
CO	1985–1997, 1999–2000	District IV
CT	1995, 1998, 1999–2000	Subdistrict IA
DC	1983, 1986–1999	Subdistrict IB
DE	1995–1998, 2003–2005	Subdistrict IB
HI	1983–2005	District V
ID	1983–1997, 1999–2005	District IV
KY	2000	District II
LA	2003	District III
MA	2001, 2004, 2005	Subdistrict IA
ME	1989	Subdistrict IA
MI	2001, 2003–2005	District II
MN	2000–2002	District II
MS	1987–1994, 1997–2005	District III
MT	1983–1993, 1998–2005	District IV
ND	1983–1993, 1997, 1999–2005	District II
NE	1988, 1991, 2000–2001	District II
NH	1983, 1990, 1992, 1993, 1995–1998, 2000, 2002, 2005	Subdistrict IA
NM	1994, 1995, 1997–1999, 2004, 2005	District III
NV	1983–2005	District V
OH	2005	District II
OR	1983–1993, 1999–2005	District V
RI	1990–1992, 1995, 1998–2003, 2005	Subdistrict IA
SD	1983–1993, 2000–2005	District II
TX	2003–2005	District III
UT	1983–2005	District IV
VT	1992, 1993, 1995, 1998, 2000–2002, 2004, 2005	Subdistrict IA
WA	1983–1991, 1993, 1999–2005	District V
WY	1983–2001, 2003–2005	District IV

and from the industrial sector distillate prices in physical units. The ratio of *PPI* kerosene prices to *PPI* distillate prices is used as an adjustment factor to estimate kerosene prices.

Annual wholesale prices are calculated from *PPI* annual indices for kerosene and No. 2 distillate fuel oil and their respective July 1975 base

prices for Census divisions. Annual average distillate price indices for 1976 are estimated as the simple average of monthly indices. Census division prices for both kerosene and fuel oil No. 2 are assigned to each State within the respective Census divisions. The industrial sector physical unit kerosene prices for States are computed by using the distillate industrial physical unit prices and the ratio of *PPI* kerosene prices to *PPI* fuel oil No. 2 prices.

#### **Physical Unit Prices: 1970 Through 1974**

Physical unit State-level prices for 1970 through 1974 are estimated from the distillate industrial prices and the average ratio of kerosene to distillate prices from *PPI* for 1975 through 1978. The average annual wholesale price ratio between kerosene and fuel oil No. 2 (distillate) is calculated from *PPI*-based data for the years 1975 through 1978. State-level kerosene industrial physical unit prices are calculated as the product of the ratios and the industrial sector distillate prices for 1970 through 1974.

#### **Btu Prices: All Years**

Btu prices for States are computed by converting the physical unit prices in dollars per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu (5.670 million Btu per barrel). U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

#### **Data Sources**

##### **Prices**

1983 forward: EIA *Petroleum Navigator*, [http://tonto.eia.doe.gov/dnav/pet/pet\\_pri\\_refoth\\_a\\_EPPK\\_PTG\\_cpgal\\_a.htm](http://tonto.eia.doe.gov/dnav/pet/pet_pri_refoth_a_EPPK_PTG_cpgal_a.htm), select Excel file labeled "Download Series History."

1970–1982: Industrial sector distillate fuel price estimates for the current and previous year and the industrial sector kerosene price estimates for the previous year are from SEDS.

1975–1982: Bureau of Labor Statistics, U.S. Department of Labor, *Producer Prices and Price Indexes, Supplement*, table titled “Producer price indexes for refined petroleum products by region.”

### Taxes

For 1992 forward, an annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the State general sales tax as of September 1 of each year is used.

1996 forward: Federation of Tax Administrators, <http://www.taxadmin.org/fta/rate/sales.html>.

1995: The Council of State Governments, *The Book of the States 1994–95* and *1996–97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

1993: Bureau of the Census, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled “State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993.”

1983–1992: Bureau of the Census, U.S. Department of Commerce, *State Government Tax Collections*, table titled “State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year,” column “Percentage rate, Sept. 1.”

### Consumption

1970 forward: EIA, State Energy Data System, industrial sector kerosene consumption.

### Conversion Factor: All Years

5.670 million Btu per barrel.

## Light Oil (Electric Power Sector)

In 1970, 1971, and 1983 forward, the price of light oil consumed at electric power plants is the average delivered cost of No. 2 fuel oil as reported in *Cost and Quality of Fuels for Electric Plants*. For 1972 through 1982, the price is the consumption-weighted average of the kerosene-type jet fuel price and No. 2 fuel oil. (See also **Distillate Fuel, Electric Power Sector** on page 40 and **Jet Fuel, Electric Power Sector** on page 48.)

## Liquefied Petroleum Gases

Liquefied petroleum gases (LPG) prices are developed for the residential, commercial, industrial, and transportation sectors. Estimates of the amount of LPG consumed by sector are taken from the State Energy Data System (SEDS) and are adjusted to remove process fuel and intermediate product consumption in the industrial sector. (See the discussion under Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).)

### Residential Sector

For 1994 forward, residential sector LPG prices are derived by EIA from unpublished data collected on Forms EIA-782A and EIA-782B. Physical unit prices are in cents per gallon and taxes are added. Btu prices are then calculated using the physical unit prices and Btu conversion factors. For 1973 through 1993, residential sector LPG prices in dollars per million Btu are the average reported prices of propane delivered to residential consumers in areas where natural gas is available as a competing fuel as reported by natural gas suppliers to the American Gas Association. For 1970 through 1972, physical unit prices from the U.S. Department of Agriculture are calculated first and Btu prices are calculated by using the physical unit prices and Btu conversion factors. Taxes are included in the prices for 1970 through 1993. Prices for AK and HI in 1970 through 1993 are estimated by a different methodology described in a separate section on page 59.

**Prices: 1994 Forward**

Residential LPG prices are estimated in cents per gallon by using data collected on Forms EIA-782A and EIA-782B. No price is reported for the District of Columbia and it is assigned the average price of Maryland and Virginia. State general sales taxes are added and the prices are converted to dollars per barrel (42 gallons per barrel). The prices are converted to dollars per million Btu by using the factors shown in Table TN25.

**Table TN25. LPG Btu Conversion Factors, 1970 Forward**  
(Million Btu per Barrel)

Year	Conversion Factor	Year	Conversion Factor	Year	Conversion Factor
1970	3.779	1982	3.615	1994	3.635
1971	3.772	1983	3.614	1995	3.623
1972	3.760	1984	3.599	1996	3.613
1973	3.746	1985	3.603	1997	3.616
1974	3.730	1986	3.640	1998	3.614
1975	3.715	1987	3.659	1999	3.616
1976	3.711	1988	3.652	2000	3.607
1977	3.677	1989	3.683	2001	3.614
1978	3.669	1990	3.625	2002	3.613
1979	3.680	1991	3.614	2003	3.629
1980	3.674	1992	3.624	2004	3.618
1981	3.643	1993	3.606	2005	3.620

**Btu Prices: 1973 Through 1990, 1992, and 1993**

Propane prices by company are reported by the American Gas Association (AGA) directly in dollars per million Btu, including taxes. The simple average of available company prices is used as the State annual average. Prices that fall outside a reasonable range are omitted from consideration for Central Hudson Gas and Electric for NY in 1979 through 1981; Arkansas Louisiana Gas for AR in 1989; Public Service Electric & Gas for NJ in 1989; Northwestern Public Service for SD in 1989; City of Long Beach for CA in 1989 and 1990; Orange & Rockland Utilities for NY in 1989 and 1990; Pike County Light & Power for PA in

1989 and 1990; Fitchburg Gas & Electric and Commonwealth Gas Co for MA in 1993; and Providence Gas Co. for RI in 1993.

To estimate missing prices (other than Alaska and Hawaii, which are described in a separate section that follows), simple averages of adjacent States' prices are used, as shown in Table TN26. Estimated data for one State are not used to estimate prices for another State.

**Table TN26. LPG Residential Sector Price Assignments, 1973 Through 1993**

State	Years	State Prices Used in the Estimation
AR	1977	MO, MS, OK, TN, TX
CT	1990	MA, NY, RI
DC	1973-1983, 1990	MD
DE	1976, 1984	MD, NJ, PA
ID	1977	MT, NV, OR, UT, WA, WY
LA	1977	MS, TX
ME	1973-1977, 1985, 1986, 1992	MA, NH, VT
MO	1986	IA, IL, KS
ND	1973	MN, MT, SD
NM	1987, 1988	AZ, CO, UT
NV	1973, 1975	AZ, CA, ID, OR, UT, WY
OR	1976	CA, ID, NV, WA
SD	1986	MN, MT, ND
UT	1974, 1978, 1985, 1993	AZ, CO, ID, NV, WY
VT	1979	MA, NH, NY
WV	1992	KY, MD, OH, PA, VA

**Btu Prices: 1991**

Propane prices from the AGA are not available for 1991. Propane prices from the EIA *Petroleum Marketing Annual (PMA)* are used to calculate the percentage change in propane prices between 1990 and 1991 for each Petroleum Administration for Defense (PAD) district or subdistrict. These percentages are applied to the 1990 State residential LPG prices from SEDS to estimate 1991 prices for the contiguous 48 States and the District of Columbia. Prices for LPG in Alaska and Hawaii are developed by using the methodology described on page 59.

Prices for PAD Subdistricts IA and IB and PAD District V are not available for 1990 in the *PMA*, and prices for PAD Subdistrict IA and PAD District V for 1991 are not available. To estimate the missing PAD district or subdistrict prices, a ratio of the end-user price to the resale price for propane published for an adjacent district is calculated and applied to the known resale price for the PAD districts and subdistricts without an end-user price. For 1990, the PAD District I end-user-to-resale ratio is multiplied by the PAD Subdistricts IA and IB resale prices to estimate an end-user price for those Subdistricts. For 1991, the PAD Subdistrict IB end-user-to-resale ratio is multiplied by the PAD Subdistrict IA resale prices to estimate an end-user price. For both years, the U.S. end-user-to-resale price ratio is applied to the PAD District V resale price to estimate a PAD District V end-user price.

**Physical Unit Prices: 1971, 1972**

Physical unit residential LPG prices are based on the city-level propane prices reported by AGA in cents per gallon. Prices for missing States are estimated. The AGA prices are the average delivered prices for propane purchased by residential consumers as of December 31.

1. City-level propane prices from AGA are assigned to their respective States. The AL 1971 price for the Phoenix City Utilities System is omitted because it falls outside a reasonable range.
2. Physical unit prices for a State are calculated directly from the available city/utility price observations reported by AGA. Final physical unit prices are equal to the simple average of the price observations for each State.
3. MD prices are assigned for missing DC prices. AK and HI prices are discussed in a separate section that follows.

**Physical Unit Prices: 1970**

Since AGA did not publish LPG prices prior to 1971, the residential sector LPG prices for 1970 are estimated. To maintain continuity with the AGA prices for 1971 forward, prices for 1970 are estimated by using simple regression analysis. The relationship between AGA data for 1971 and 1972 and corresponding U.S. Department of Agriculture's *Agricultural Prices* data is the basis for the estimation.

1. Before regression analysis can be applied, *Agricultural Prices* data for 1970 through 1972 are prepared for 49 States (no AK or HI prices are available). These prices include taxes. Development of AK and HI prices are described in a separate section on this page.
  - a. State-level prices for small purchases, representing residential end users, for 1970 through 1972 are published by *Agricultural Prices* in cents per pound. When price per pound data are not available, price per gallon data, representing larger volume purchases, are used. These prices per gallon are multiplied by 0.543, the average ratio of price per pound to price per gallon for the United States for 1970 through 1972, to create uniform input data in price per pound.
  - b. For 1971 and 1972, the price reported for the New England Region is assigned to CT, MA, ME, NH, RI, and VT.
  - c. Data in cents per pound are converted to dollars per gallon by multiplying by the propane conversion factor of 4.2 pounds per gallon (taken from the *Petroleum Products Handbook*) and dividing by 100.
  - d. Missing prices use adjacent States' average prices as shown in Table TN27.
2. The physical unit AGA prices and *Agricultural Prices* data for 1971 through 1972 (excluding AK and HI) are used with simple regression analysis to estimate final physical unit LPG residential prices.

**Table TN27. LPG Residential Agricultural Prices Assigned to Estimate 1970 Prices**

State	Years	State Prices Used
DC	1970–1972	MD
NV	1970, 1971	AZ, CA, ID, UT
OR	1971–1972	CA, ID
UT	1972	AZ, CO, ID, NV, WY
WA	1970–1972	CA, ID

### **Btu Prices: 1970 Through 1972**

For 1970 through 1972, Btu prices for States are calculated by converting the physical unit prices by using the factors cited in Table TN25 on page 57. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

### **Alaska and Hawaii Prices: 1970 Through 1993**

Prices cannot be estimated for AK and HI by using adjacent State price assignments. Missing prices for these two States are estimated by computing ratios of the AK or HI prices to the simple average U.S. prices calculated from the AGA data for years when AK or HI prices are available and applying these ratios to the U.S. simple average prices in years when prices need to be estimated.

1. AGA prices for AK are available in 1972 and 1980. The 1972 AK-to-US ratio is used to estimate prices for 1970, 1971, and 1973 through 1979. The 1980 AK-to-US price ratio is used to estimate prices for 1981 through 1993.
2. AGA prices for HI are available in 1971, 1977 through 1979, and 1989. The 1971 HI-to-US AGA is used to estimate prices for 1970 and 1972 through 1974. The average ratio of the HI-to-US prices for 1977 through 1979 is used to estimate prices for 1975, 1976, and 1980 through 1984. The 1989 HI-to-US ratio is used to estimate prices for 1985 through 1988 and 1990 through 1993.

### **Data Sources**

#### **Prices**

1994 forward: EIA, Forms EIA-782A "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," and EIA-782B "Retailers'/Retailers' Monthly Petroleum Product Sales Report."

1971–1990, 1992, 1993: American Gas Association (AGA), *Gas House-heating Survey* (1971-1988), *Residential Gas Market Survey* (1989 and 1990), and *Residential Natural Gas Market Survey* (1992, 1993), Appendix 2, "Competitive Fuel Prices."

1991: EIA, State Energy Data System, 1990 residential sector LPG prices.

1991: EIA, *Petroleum Marketing Annual*, Table 35 (1990 and 1991), columns titled "Propane (Consumer Grade)."

1970–1972: Crop Reporting Board, U.S. Department of Agriculture, *Agricultural Prices*, table titled "Average Price Paid by Farmers for Lawn Mowers and Petroleum Products, Specified Dates, by State," column titled "L.P. Gas."

#### **Taxes**

An annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year.

1996 forward: Federation of Tax Administrators, <http://www.taxadmin.org/fta/rate/sales.html>.

1995: The Council of State Governments, *The Book of the States 1994–95 and 1996–97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

#### **Consumption**

1970 forward: EIA, State Energy Data System, residential sector LPG consumption.

#### **Conversion Factors**

1970–1972, 1994 forward: EIA, State Energy Data System, Consumption Technical Notes, Table B1, as shown in Table TN25.

1970–1972: 4.2 pounds per gallon from Guthrie, Virgil, ed., 1960. *Petroleum Products Handbook*. John Wiley and Sons, Inc., New York, New York, pages 3-5.

Conversion factors are not necessary for other years because Btu prices are available directly from the data sources.

## Commercial Sector

Starting in 1994, commercial sector prices for LPG are estimated from PAD district or subdistrict prices for consumer grade propane sold to commercial and institutional consumers published in cents per gallon in the EIA *Petroleum Marketing Annual*. PAD district or subdistrict prices are assigned to all States within each PAD district or subdistrict and general State sales taxes are added. The prices are converted to dollars per million Btu using 42 gallons per barrel and the Btu conversion factors shown in Table TN25.

For 1970 through 1993, State LPG prices from the industrial sector are assigned to the commercial sector.

### Data Sources

#### Prices

1994 forward: EIA, *Petroleum Marketing Annual*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_marketing\\_annual/pma\\_historical.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html), Table 38, column titled, "Commercial/Institutional Consumers."

1970–1993: EIA, industrial sector LPG prices from the State Energy Data System.

#### Taxes

An annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year.

1996 forward: Federation of Tax Administrators, <http://www.taxadmin.org/fta/rate/sales.html>.

1995: The Council of State Governments, *The Book of the States 1994–95* and *1996–97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

## Consumption

1970 forward: EIA, State Energy Data System, commercial sector LPG consumption.

## Conversion Factors

1994 forward: EIA, State Energy Data System, Consumption Technical Notes, Table B1, as shown in Table TN25.

## Industrial Sector

Industrial sector LPG prices are estimated as the average of LPG prices to industrial customers, petrochemicals, and other end users; to manufacturing firms; to farmers; or refiner and gas plant operator sales to end users, depending on the data sources for the different years. Prices for 1985 forward are based on data from the EIA *Petroleum Marketing Annual (PMA)*. Prices for 1978 through 1981 are taken from the U.S. Department of Commerce, Bureau of the Census, *Annual Survey of Manufacturers (ASM)* or the *Census of Manufactures (CM)* and prices for 1970 through 1977 and 1982 through 1984 are derived from *Agricultural Prices* and scaled to the *ASM/CM* prices by using the ratio of *ASM/CM* to *Agricultural Prices* LPG prices for the years 1978 through 1981, when both price series were available. Taxes are included in the industrial sector prices for all years.

### Physical Unit Prices: 1994 Forward

Starting in 1994, industrial sector physical unit prices are reported by PAD district or subdistrict, but not by State, in *PMA*. Consumer grade propane prices are reported for three industrial sector categories—petrochemical plants, other end users (agricultural consumers), and industrial consumers. The prices for these three categories are consumption-weighted to develop PAD district- or subdistrict-level industrial sector price estimates that are assigned to the States in each PAD district or subdistrict and State general sales taxes are added. In 1997,

out-of-range prices for petrochemicals in PAD Districts IV and V are replaced by the U.S. average price in the calculations.

### **Physical Unit Prices: 1985 Through 1993**

Industrial sector LPG physical unit State prices for 1985 forward are estimated by using physical unit annual prices in *PMA* for consumer grade propane sales to end-users and State general sales taxes are added. Where prices are not available, the PAD district or subdistrict price is assigned to the State, as shown in Table TN28. One exception is Arkansas for 1992 and 1993. Because the neighboring States in PAD District III are LPG producers, the PAD District III price is uncharacteristically lower than previously reported prices for Arkansas. Therefore, the 3 monthly prices available for Arkansas in 1992 are averaged to derive an annual price. In 1993, the Missouri price is assigned to Arkansas.

When a PAD district or subdistrict price is not available, a consumption-weighted average price is calculated by using available prices for States within the district and the SEDS industrial sector LPG consumption for those States. A PAD District V price for 1985 is calculated as a consumption-weighted average of AK, CA, OR, and WA prices; a 1986 PAD Subdistrict IA price uses the average of CT and NH prices; and PAD Subdistrict IA prices for 1987 through 1988 use the average of CT and MA prices.

When a PAD district or subdistrict price is not available and there are no State data within the PAD district or subdistrict to develop a consumption-weighted average, a different methodology is used. The source table also contains resale prices. To estimate the missing sales to end-users PAD district or subdistrict price, a ratio of the end-users price to the resale price for an adjacent PAD district or subdistrict is calculated and applied to the known resale price for the PAD district or subdistrict that does not have an end-users price. PAD district and subdistrict prices used in the estimations are shown in Table TN29.

### **Physical Unit Prices: 1982 Through 1984, 1970 Through 1977**

Industrial sector LPG physical unit prices for 1982 through 1984 and 1970 through 1977 are estimated on the basis of the relationship between State-level LPG prices from *Agricultural Prices* and the prices

**Table TN28. LPG Industrial Sector PAD District and Subdistrict Price Assignments, 1985–1993**

State	Years	Assignments
AK	1986–1988, 1990–1993	District V
AL	1985–1988	District III
AZ	1985–1993	District V
CA	1990–1993	District V
CO	1991	District IV
CT	1990–1993	Subdistrict IA
DC	1985–1993	Subdistrict IB
DE	1986–1993	Subdistrict IB
FL	1990–1993	Subdistrict IC
GA	1985, 1990–1993	Subdistrict IC
HI	1985–1993	District V
IA	1986, 1991–1993	District II
ID	1986, 1990–1993	District IV
IN	1990	District II
KS	1986–1989, 1992	District II
MA	1986, 1990–1993	Subdistrict IA
MD	1988, 1990–1993	Subdistrict IB
ME	1986–1993	Subdistrict IA
MI	1985–1988, 1990	District II
MN	1985, 1986, 1988–1991, 1993	District II
MS	1990–1993	District III
MT	1990–1993	District IV
NC	1991, 1992	Subdistrict IC
ND	1985, 1986, 1991–1993	District II
NE	1986–1992	District II
NH	1987–1993	Subdistrict IA
NM	1993	District III
NV	1985–1988, 1990–1993	District V
NY	1990–1993	Subdistrict IB
OH	1990	District II
OK	1986, 1987	District II
OR	1986, 1990–1993	District V
PA	1990–1993	Subdistrict IB
RI	1986–1993	Subdistrict IA
SC	1992	Subdistrict IC
SD	1985–1993	District II
TN	1990–1993	District II
UT	1986–1988, 1990–1993	District IV
VT	1986–1993	Subdistrict IA
WA	1986–1993	District V
WI	1985, 1986, 1990	District II
WV	1989–1993	Subdistrict IC
WY	1987, 1988	District IV

**Table TN29. LPG Industrial Sector, PAD District and Subdistrict Price Estimates, 1990–1993**

Year	Missing Prices	Prices Used in Estimation
1990	Subdistrict IA	District I
	Subdistrict IB	District I
	District V	U.S.
1991	Subdistrict IA	Subdistrict IB
	District V	U.S.
1992	Subdistrict IA	Subdistrict IC
	Subdistrict IB	Subdistrict IC
1993	Subdistrict IA	Subdistrict IC
	Subdistrict IB	Subdistrict IC

calculated from *Annual Survey of Manufacturers (ASM)* or *Census of Manufactures (CM)* for 1978 through 1981.

1. Before the adjustment factor that relates *Agricultural Prices* and *ASM/CM* data is computed, monthly *Agricultural Prices* data are converted into annual prices and missing data are estimated.
  - a. Annual LPG prices are calculated as simple averages of the monthly prices from *Agricultural Prices* for the years 1977 through 1984. The only States missing data are WV in 1977 through 1981 and AK, DC, and HI in 1977 through 1984. WV is assigned the simple average of the KY, MD, OH, PA, and VA prices. AK, DC, and HI prices are discussed below.
  - b. The average ratio of *ASM/CM*-based final prices for 1978 through 1981 and the 1978 through 1981 *Agricultural Prices* annual prices is calculated for 48 States (excluding AK, DC, and HI) as the simple average of the ratio over the 4 years. This average ratio is used as an adjustment factor.
2. Final industrial sector LPG prices for 1982 through 1984 and 1970 through 1977 are estimated by using the State-level adjustment factors and annual average LPG prices from *Agricultural Prices* for these years.
  - a. Annual average LPG prices are calculated for 1982 through 1984 and 1970 through 1977 as the simple average of the monthly prices.
  - b. *Agricultural Prices* published annual average prices in dollars per gallon for all States in 1975 and 1976. For DE in 1970 through 1974, MD in 1970 through 1974, VA in 1970 through 1974, and WV in 1970 through 1972, only prices for small volume purchases in cents per pound were published. These are converted to cents per gallon by multiplying by 1.96, the average ratio of cents per gallon to cents per pound for the United States for 1970 through 1974.
  - c. For 1970 through 1972, *Agricultural Prices* are converted from cents per gallon to dollars per gallon.
  - d. For 1971 through 1973, the New England price per gallon reported by *Agricultural Prices* is assigned to CT, MA, ME, NH, RI, and VT.
  - e. MD prices are assigned to DC in 1970 through 1972, 1974 through 1977, and 1982 through 1984. The combined MD/DE price in 1973 is assigned to MD, DE, and DC.
  - f. Excluding AK and HI, States missing *Agricultural Prices* LPG prices are assigned the simple average price of adjacent States. The States with missing data and the adjacent State assignments are shown in Table TN30.
  - g. Industrial sector LPG physical unit prices for 1970 through 1977 and 1982 through 1984 for all States (except AK, DC, and HI) are calculated by using the estimated annual *Agricultural Prices* data for the respective year and the State-level average ratios as adjustment factors.
3. AK prices for 1970 through 1977 and 1982 through 1984 and HI prices for 1970 through 1977 and 1982 through 1984 are estimated by using the relationship between *ASM/CM* based prices for these States and the U.S. price reported by *Agricultural Prices* (1979 through 1981 for AK and 1978 through 1981 for HI). The average

**Table TN30. LPG Industrial Sector Price Assignments, 1970–1976**

State	Years	State Prices Used in the Estimation
CT	1974	NY
MA	1974	NY
ME	1974	NY
NH	1974	NY
NV	1970–1971	AZ, CA, ID, UT
	1973–1974	AZ, CA, ID
OR	1970–1974	CA, ID
RI	1974	NY
	1975–1976	CT, MA, NY
UT	1972	AZ, CO, ID, NV, WY
	1973–1974	AZ, CO, ID, WY
VT	1974	NY
WA	1970–1974	CA, ID

ratio for the available years for the two States is calculated and used with the *Agricultural Prices* U.S. prices for the years to be estimated.

### Physical Unit Prices: 1978 Through 1981

For 1978 through 1981, the industrial sector LPG prices are either calculated directly from cost and quantity data from the *ASM* or the *CM* or are estimated by using the relationship of *ASM/CM* data to LPG price data from *Agricultural Prices*.

1. For 1978 through 1981, industrial sector physical unit prices for LPG are calculated as the average cost per unit from cost and quantity data published in *ASM/CM*. Since sales are reported in pounds, the prices are converted to dollars per gallon. The conversion factor of 4.5 pounds per gallon is from *ASM/CM*.
2. The AK price for 1978 is the consumption-weighted average Census division price. In addition, four States have prices estimated as the simple average of the prices of adjacent States, and DC is assigned the MD price, as shown in Table TN31.

### Btu Prices: All Years

**Table TN31. LPG Industrial Sector Price Assignments, 1978–1981**

State	Years	State Prices Used
AR	1978	LA, MO, MS, OK, TX
DC	1978–1981	MD
LA	1980	AR, MS, TX
NM	1979–1981	AZ, CO, OK, TX
WY	1978–1981	CO, ID, MT, ND, NE, SD, UT

Btu prices for States and the United States are calculated from the physical unit prices and the conversion factors shown in Table TN25 on page 57. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS, adjusted for process fuel and intermediate product consumption.

### Data Sources

#### Prices

1994 forward: EIA, *Petroleum Marketing Annual*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_marketing\\_annual/pma\\_historical.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html), prices from Table 38, columns titled “Industrial Consumers,” “Petrochemical,” and “Other End Users” and unpublished associated volumes are used to calculate consumption-weighted average prices.

1985–1993: EIA, *Petroleum Marketing Annual*, Table 21 (1985), Table 33 (1986–1988), and Table 35 (1989–1993), columns titled “Propane (Consumer Grade),” “Sales to End Users,” and “Sales for Resale.”

1970–1984: Crop Reporting Board, U.S. Department of Agriculture, *Agricultural Prices*, tables titled “Average Price Paid by Farmers for Lawn Mowers and Petroleum Products, Specified Dates, by State,” column titled “L.P. Gas,” (1970–1976); “Household Supplies: Average Price Paid by Farmers” (1977–1979); “L.P. Gas: Average Price Paid by States”

(1980); and “L.P. Gas: Average Price Paid by Months by States” (1981-1984).

1981: Bureau of the Census, U.S. Department of Commerce, *1982 Census of Manufactures, Fuels and Electric Energy Consumed, Part 2, States and Standard Metropolitan Statistical Areas by Major Industry Groups*, Table 3, State-level quantity and cost of liquefied petroleum gases.

1978–1980: Bureau of the Census, U.S. Department of Commerce, *Annual Survey of Manufacturers, Fuels and Electric Energy Consumed, States by Industry Group and Standard Metropolitan Statistical Areas by Major Industry Group*, Table 3, State-level quantity and cost of liquefied petroleum gases.

### Taxes

For 1992 forward, an annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the State general sales tax as of September 1 of each year is used.

1996 forward: Federation of Tax Administrators, <http://www.taxadmin.org/fta/rate/sales.html>.

1995: The Council of State Governments, *The Book of the States 1994–95 and 1996–97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

1993: Bureau of the Census, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled “State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993.”

1985–1992: Bureau of the Census, U.S. Department of Commerce, *State Government Tax Collections*, table titled “State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year,” column “Percentage rate, Sept. 1.”

### Consumption

1994 forward: EIA, unpublished volume data for “Industrial Consumers,” “Petrochemical,” and “Other End Users” collected on Form EIA-782B for consumption-weighted average industrial sector price calculations.

1970 forward: EIA, State Energy Data System, industrial sector LPG consumption.

### Conversion Factors

1970 forward: EIA, State Energy Data, Consumption Technical Notes, Table B1, as shown in Table TN25.

1978–1981: 4.5 pounds per gallon from *Annual Survey of Manufacturers*, Appendix C.

## Transportation Sector

Starting in 1994, transportation sector prices are estimated from PAD district or subdistrict prices for consumer grade propane sold through retail outlets published in the EIA *Petroleum Marketing Annual*. Physical unit PAD district or subdistrict prices are assigned to all States within a PAD district or subdistrict and State motor fuel taxes are added. The prices are converted to dollars per million Btu using 42 gallons per barrel and the Btu conversion factors shown in Table TN25.

For 1985 through 1993, State prices from the industrial sector are assigned to the transportation sector and LPG motor fuel taxes are added.

For 1970 through 1984, State prices from the industrial sector, including taxes, are assigned to the transportation sector.

## Data Sources

### Prices

1994 forward: EIA, *Petroleum Marketing Annual*, Table 38, column titled, “Through Retail Outlets.”

### Taxes

1985 forward: Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics*, Table MF-121T for State tax rates on liquefied petroleum gases as motor fuel.

### Consumption

1970 forward: EIA, State Energy Data System, transportation sector LPG consumption.

### Conversion Factors

1994 forward: EIA, State Energy Data, Consumption Technical Notes, Appendix B.

1970–1993: Btu prices are assigned from the industrial sector.

## Lubricants

Lubricant prices are developed for the industrial sector and are assigned to the transportation sector. State-level prices are not available for either sector; national-level prices are assigned to all States and do not include end-user taxes paid at the time of sale. Estimates of lubricant consumption by the industrial and transportation sectors are taken from the State Energy Data System (SEDS).

### Physical Unit Prices: 1983 forward

Prices of lubricants are estimated from U.S. Department of Commerce, Bureau of the Census, *Census of Manufacturers* for 1987 and 1992, the *Economic Census* for 1997, and the *Annual Survey of Manufacturers* for intervening years and 2002 forward by using data for two product categories:

1. Lubricating oils and greases, made in a refinery, NAICS 324110G (SIC 29117 for 1983 through 1996).
2. Lubricating oils and greases, not made in a refinery, NAICS 324191 (SIC 29920 for 1983 through 1996).

The value of the shipments of the two categories are summed. Quantities of these shipments are not published; therefore, lubricants consumption from SEDS is adjusted to estimate the comparable shipment quantities by using a factor developed from the 1982 Census data as described below. The price derived by dividing the value of shipments by the estimated quantity is assumed to be a wholesale price. An end-user price is derived by applying a trade ratio factor, which is developed from the 1977 Census data as described below, to the wholesale price.

### Physical Unit Prices: 1970 through 1982

Prices of lubricants are estimated from U.S. Department of Commerce, Bureau of the Census, data for three product categories:

1. Lubricating oils made in refineries (SIC 29117.21) and not made in refineries (SIC 29920.21).
2. Lubricating greases made in refineries (SIC 29117.31) and not made in refineries (SIC 29920.31).
3. Lubricating oils and greases, not specifically known (n.s.k.), made in refineries (SIC 29117.00) and not made in refineries (SIC 29920.00 for establishments with 10 employees or more and SIC 29920.02 for establishments with fewer than 10 employees).

For the years where *Census of Manufacturers (CM)* data are available (1967, 1972, 1977, and 1982), total shipments are calculated by adding the shipments for the three product categories. Shipments for the third product category are withheld and estimated by dividing their value of shipments sum by the weighted average cost of the product categories SIC 29920.21 and 29920.31.

Total shipments in each year for which *CM* data are available is divided by the estimated SEDS total lubricants consumption (in physical units) for that year to establish a shipments-to-consumption ratio. Ratios for the years not covered by the *CM* (i.e., 1968 through 1971, 1973 through 1976, and 1978 through 1981) are estimated by linear interpolation. Total shipments for the years not covered by the *CM* are estimated by multiplying SEDS consumption data by the appropriate shipment-to-consumption ratio.

Estimated shipment prices are calculated by dividing the value of shipments shown in the *CM* (for 1972, 1977, and 1982) or the *Annual Survey of Manufacturers* (for all other years) by the estimated shipments for each product category. The shipment prices are assumed to represent wholesale prices.

End-user prices in dollars per barrel are estimated by multiplying the shipment (wholesale) prices by trade ratio factors that represent the wholesale-to-retail markup. The trade ratio factors are developed from Bureau of Economic Analysis (BEA) data for 1972 and 1977. For 1972, the sum of data called “purchasers value” for the three product categories is divided by the sum of the “producers value” for the three categories to derive a trade ratio. A similar calculation is made for 1977, but the terms “purchase value” and “basic value” are used in the source data.

The 1972 ratio is used for 1970 through 1972, and the 1977 ratio is used for 1977 forward. The values for 1973 through 1976 are estimated by linear interpolation by using the 1972 and 1977 values. The trade ratio for 1982 is not used because the range of petroleum products included in the ratio was expanded by BEA and the ratio would no longer represent the specific mark-up for lubricants.

### **Btu Prices: All Years**

Btu prices are obtained by dividing the prices in dollars per barrel by the conversion factor (6.065 million Btu per barrel).

### **Data Sources**

#### **Prices**

1997 forward: Bureau of the Census, U.S. Department of Commerce, *1997 Economic Census*, <http://www.census.gov/epcd/www/EC97ST32.HTM> and *Annual Survey of Manufactures, Value of Product Shipments*, <http://www.census.gov/prod/2005pubs/am0431vs1.pdf>, *Manufacturing Industry Series, Petroleum Lubricating Oil and Grease Manufacturing* (NAICS 324191) and *Petroleum Refineries* (NAICS 324110G).

1970, 1971, 1973 through 1976, 1978 through 1981, and 1983 through 1996: Bureau of the Census, U.S. Department of Commerce, *Annual Survey of Manufacturers; Lubricating Oils and Greases* (SIC 29117 and 29920).

1972, 1977, and 1982: Bureau of the Census, U.S. Department of Commerce, *Census of Manufacturers, Petroleum Refining; Lubricating Oils and Greases* (SIC 29117 and 29920).

1972 and 1977: Bureau of Economic Analysis, U.S. Department of Commerce, Input-Output Table Work Tapes for SIC Codes 29117 and 29920).

#### **Consumption**

1970 forward: EIA, State Energy Data System, lubricants consumption.

### **Conversion Factor: All Years**

6.065 million Btu per barrel.

## Motor Gasoline

Motor gasoline prices are developed for the transportation sector, and the transportation sector prices are assigned to the commercial and industrial sectors. Motor gasoline consumed in privately-owned vehicles is accounted for in the transportation sector. Estimates of motor gasoline consumed by the transportation, commercial, and industrial sectors used in calculating expenditures are taken from SEDS. Prices in this series are retail prices (usually service station prices), including taxes.

### Physical Unit Prices: 1983 Forward

Motor gasoline physical unit prices for 1983 forward are based on annual State-level prices or are assigned PAD district or subdistrict prices from the Energy Information Administration (EIA) *Petroleum Marketing Annual (PMA)*, except for prices for certain States and years, as noted in Table TN32, that are derived from sales for resale prices or from the Bureau of Labor Statistics' *Consumer Prices: Energy (CPI)*.

State and Federal motor gasoline taxes are added to the prices from the *PMA*. Monthly State tax information and annual Federal tax information are taken from the U.S. Department of Transportation's *Highway Statistics*. The monthly State taxes are averaged to create an average annual tax for each State which is combined with the Federal tax to adjust the *PMA* price. Due to the lack of uniformity in application, State and local general sales taxes are not included.

The *PMA* average sales price (excluding taxes) of finished motor gasoline to end users through company outlets is used, under the assumption that this price most closely approximates retail motor gasoline prices. Finished motor gasoline includes leaded and unleaded motor gasoline and gasohol.

Motor gasoline prices for sales to end users through company outlets are withheld for Maryland and unavailable for the District of Columbia in all years. To derive end-user prices for Maryland each year, the ratio of the prices for sales for resale to the prices for sales to end users through company outlets in the neighboring States of Delaware, Pennsylvania, Virginia, and West Virginia are averaged and that average ratio applied to the sales for resale prices for Maryland. End-user prices for the

Table TN32. Motor Gasoline Price Assignments, 1983 Forward

State	Years	Source
AK	1983–1986	<i>CPI</i>
AL	2004, 2005	<i>PMA</i> , PAD District III
AR	2004, 2005	<i>PMA</i> , PAD District III
CT	1989–2005	<i>PMA</i> , PAD Subdistrict IA
DC	1983–2005	<i>PMA</i> , Resale/retail adjustment
DE	1991–1993	<i>PMA</i> , PAD Subdistrict IB
HI	1983–1986	<i>CPI</i>
	1987–1990	<i>PMA</i> , PAD District V adjustment
IA	2005	<i>PMA</i> , PAD District II
ID	1993, 1994, 2005	<i>PMA</i> , PAD District IV
MD	1985–2005	<i>PMA</i> , Resale/retail adjustment
ME	1985–1988, 1990–2005	<i>PMA</i> , PAD Subdistrict IA
MI	2005	<i>PMA</i> , PAD District II
MT	1991–2005	<i>PMA</i> , PAD Subdistrict IV
ND	1996, 2003–2005	<i>PMA</i> , PAD District II
NH	1995, 2000	<i>PMA</i> , PAD Subdistrict IA
SD	1987, 1991, 1992, 2001, 2005	<i>PMA</i> , PAD District II
VT	1989–2005	<i>PMA</i> , PAD Subdistrict IA
WI	2001, 2003–2005	<i>PMA</i> , PAD District II
WY	1985	<i>PMA</i> , PAD District IV

District of Columbia are derived using the same method and the ratio of Virginia resale to end-user prices.

Motor gasoline prices for Hawaii are not available in the *PMA* prior to 1991. They are also not collected or published in the *CPI* after December 1986. The following method is used to derive Hawaii prices for 1987 through 1990. The monthly Hawaii *CPI* prices are used to calculate annual averages for 1983 through 1986. The annual averages are divided by the *PMA* PAD District V price (with Hawaii State and Federal taxes added) for each year to develop annual ratios of the two prices. The four ratios for 1983 through 1986 are simple averaged to give one ratio that is multiplied by the *PMA* PAD District V prices for the 1987 through 1990 to estimate Hawaii prices for those years. State and Federal taxes are added to the estimates.

In the States and years (shown in Table TN32) where prices are derived from the *CPI*, monthly *CPI* city prices are weighted by monthly consumption from *Highway Statistics*. All taxes are included in the *CPI* data.

**Physical Unit Prices: 1982**

Monthly physical unit motor gasoline prices for 1982 are taken from the *Platt's Oil Price Handbook and Oilmanac (Platt's)* table "AAA 'Fuel Gauge' Report," the *CPI*, or both. Table TN33 summarizes price data availability by source. The *Platt's* prices are reported for both leaded and unleaded motor gasoline and for both full-service and self-service for all States except AK and HI. All available *Platt's* prices for 1982 are used in the calculation of motor gasoline prices. The continuity of these prices with prices published by *Platt's* in previous years suggests that taxes are included.

The available *CPI* monthly physical unit motor gasoline prices for 1982 are for all types of motor gasoline and cover 25 States, as shown in Table TN34. The *CPI* prices are assigned to any State that has a county included in the Standard Metropolitan Statistical Area (SMSA) definitions used by the Bureau of Labor Statistics. These "all types" prices cover leaded regular, unleaded regular, and leaded premium and include taxes. All the available *CPI* prices for 1982 are also used in the calculation of motor gasoline prices. Complete monthly data exist for the 25 States covered by the *CPI*. The *CPI Detailed Report* of April 1986 explicitly states that Federal, State, and local taxes are included.

To combine the product-specific *Platt's* prices with the "all types" prices published in the *CPI*, the *Platt's* prices are weighted into "all types" prices by using annual U.S. data from the *Monthly Energy Review (MER)* to calculate shares for leaded and unleaded motor gasoline (no breakdowns for regular and premium are possible because of data limitations).

Motor gasoline price data reported by *Platt's* for 1982 cover the following months: February, April, June, August, November, and December. The missing 6 months are assigned prices as follows: January is assigned the February price, and the other missing months are assigned the average price of the preceding and succeeding months. A missing February price for MO is assumed to be equal to the April price, and a

**Table TN33. Summary of Motor Gasoline Price Data by Year, 1970-1982**

Years	Source	Grades Covered	Composite Price	Missing States All Sources
1982	<i>Platt's</i>	leaded	no	none
		unleaded	no	
	<i>CPI</i>	leaded regular	yes	
		leaded premium	yes	
1979-1981	<i>Platt's</i>	leaded regular	no	AR, DE, ME, MS, MT, ND, NH, OK, RI, SC, SD, VT, WV, WY
		leaded premium	no	
		unleaded regular	no	
		unleaded premium	no	
	<i>CPI</i>	leaded regular	yes	
		leaded premium	yes	
		unleaded regular	yes	
		unleaded premium	yes	
1978	<i>Platt's</i>	leaded regular	no	none
		leaded premium	yes	
	<i>CPI</i>	leaded regular	yes	
		unleaded regular	yes	
1976, 1977	<i>Platt's</i> <i>CPI</i>	leaded regular	no	AK
		leaded regular	no	
		leaded premium	no	
		unleaded regular	no	
1974, 1975	<i>Platt's</i> <i>CPI</i>	leaded regular	no	AK
		leaded regular	no	
		leaded premium	no	
1970-1973	<i>Platt's</i>	leaded regular	no	AK, HI

missing price for OR is assumed to be equal to the average of the April and August prices.

For States with data from *Platt's* only, prices by product type (leaded and unleaded) are first calculated as the simple average of full-service and self-service prices for that product for each month and State. The resulting prices are then weighted into monthly composite prices by using U.S. leaded and unleaded shares of motor gasoline product supplied from the *MER*. The following 26 States have data only from *Platt's*: AL,

**Table TN34. Motor Gasoline Price Assignments from Consumer Prices: Energy, 1978-1982**

State	City Price Assignments
AK	Anchorage
CA	Los Angeles-Long Beach-Anaheim, San Diego, San Francisco, Oakland
CO	Denver-Boulder
DC	Washington
FL	Miami
GA	Atlanta
HI	Honolulu
IL	Chicago-Northwestern Indiana, St. Louis
IN	Chicago-Northwestern Indiana, Cincinnati
KS	Kansas City
KY	Cincinnati
MA	Boston
MD	Baltimore, Washington
MI	Detroit
MN	Minneapolis-St. Paul
MO	St. Louis, Kansas City
NJ	New York-Northeastern NJ, Philadelphia
NY	New York-Northeastern NJ, Buffalo
OH	Cincinnati, Cleveland
OR	Portland
PA	Philadelphia, Northeastern PA, Pittsburgh
TX	Dallas-Ft. Worth, Houston
VA	Washington
WA	Seattle-Everett, Portland
WI	Milwaukee, Minneapolis-St. Paul

Note: All types of motor gasoline are included.

AR, AZ, CT, DE, IA, ID, LA, ME, MS, MT, NC, ND, NE, NH, NM, NV, OK, RI, SC, SD, TN, UT, VT, WV, and WY.

*Platt's* reports two prices for each motor gasoline product for each year: one full-service price and one self-service price. These two prices are combined by using a simple average into a single product price for each State for each month.

The unleaded U.S. share of total motor gasoline consumption is reported in the *MER* as 52.1 percent in 1982. Assuming that the remaining motor gasoline consumption is leaded, the leaded portion of

total consumption is 47.9 percent. These shares are used for all States and months to calculate the composite prices from the leaded and unleaded prices.

For AK and HI, the only States with data only from the *CPI*, the "all types" monthly prices reported are used directly as monthly composite prices.

For States with price data from both *Platt's* and the *CPI*, the *Platt's* data are first combined into product type prices and weighted with the *MER* shares. The resulting combined prices for all motor gasoline types are averaged together, with the combined *CPI* city prices assigned to the respective month and State. The following 23 States have monthly composite prices computed in this way: CA, CO, DC, FL, GA, IL, IN, KS, KY, MA, MD, MI, MN, MO, NJ, NY, OH, OR, PA, TX, VA, WA, and WI.

1. Leaded and unleaded gasoline prices are calculated as simple averages of full-service and self-service prices from *Platt's* and are then weighted into a composite price by use of *MER* shares of leaded and unleaded motor gasoline consumption.
2. Monthly "all types" motor gasoline prices covering leaded regular, leaded premium, and unleaded regular are taken directly from the *CPI*. If there is more than one *CPI* price observation for a month and State, the *CPI* prices are simple averages.
3. Using a simple average, the composite *Platt's* prices are combined with the "all types" *CPI* prices for each State. The resulting prices are the monthly composite prices for 1982.

Annual physical unit prices for all States are calculated from the monthly motor gasoline prices calculated above and weighted by the monthly motor gasoline consumption volumes for States from *Highway Statistics*.

#### **Physical Unit Prices: 1979 Through 1981**

For 1979 through 1981, *Platt's* monthly motor gasoline prices are taken from a table titled "Platt's/Lundberg Summary." Prices are available for cities by product-type, by grade, and by type of service (full service,

self service). Four products and grades of motor gasoline are covered: leaded regular, unleaded regular, leaded premium, and unleaded premium. These data cover 37 States and taxes are included. The *CPI* reports “all types” prices, including taxes, for the cities listed in Table TN34. *Platt’s* city price assignments to States for 1979 through 1981 are shown in Table TN35.

**Table TN35. Motor Gasoline Price Assignments from *Platt’s*, 1979-1981**

State	City Price Assignments
AL	Birmingham
AZ	Phoenix, Tucson
CA	Bakersfield, Fresno, Los Angeles, Sacramento, San Diego, San Francisco, Stockton
CO	Denver
CT	New Haven
DC	Washington
FL	Miami, Tampa-St. Petersburg
GA	Atlanta
IA	Des Moines
ID	Boise
IL	Chicago
IN	Indianapolis
KY	Louisville
LA	New Orleans
MA	Boston
MD	Baltimore
MI	Detroit
MN	Minneapolis
MO	Kansas City, St. Louis
NC	Charlotte
NE	Omaha
NJ	Newark
NM	Albuquerque
NV	Las Vegas, Reno
NY	Long Island, Rochester
OH	Cincinnati
OR	Portland
PA	Philadelphia, Pittsburgh
TN	Memphis
TX	El Paso, Houston
UT	Salt Lake City
VA	Norfolk
WA	Seattle, Spokane
WI	Milwaukee

The computation of monthly composite prices for 1979 through 1981 varies, depending on the available data sources for each State. Monthly composite prices are estimated for the 14 States which do not have reported price data from either data source. If both *Platt’s* and the *CPI* report prices for a city, the *CPI* price is used.

- For States with city price observations only from *Platt’s*, prices for leaded and unleaded motor gasoline are combined by use of simple averaging, regardless of the type of service, and are converted to dollars per gallon. The leaded and unleaded prices are then weighted together into a monthly composite price. The following 12 States have prices only from *Platt’s* for 1979 through 1981: AL, AZ, CT, IA, ID, LA, NC, NE, NM, NV, TN, and UT.
  - The *Platt’s* prices for 1981 end in September of that year; monthly prices by grade and service type for October, November, and December are assumed to be equal to the corresponding September prices.
  - Leaded and unleaded prices are calculated for each State by simple averaging of all prices available for each product (leaded, unleaded), regardless of service type or grade of motor gasoline (regular, premium). All city prices for each State are averaged together.
  - Leaded and unleaded shares of total motor gasoline consumption for the United States are calculated from the *MER* for each year 1979 through 1981. The monthly product type prices are weighted into composite prices by using the national leaded and unleaded shares as weights.
- For States with city price observations only from the *CPI*, the monthly “all types” prices are used directly for States with only one price observation per month. For States with multiple observations, monthly prices are combined by simple averaging. States with *CPI* data only are: AK, CO, DC, GA, HI, IL, KS, MA, MD, MI, MN, MO, NJ, OH, OR, PA, and WI.
- For the eight States with price observations from both *Platt’s* and the *CPI* (CA, FL, IN, KY, NY, TX, VA, and WA), monthly composite prices for 1979 through 1981 are calculated by using three steps:

- a. The *Platt's* prices are combined into single "all types" prices as described above by using leaded and unleaded grades of motor gasoline shares as weights.
  - b. The *CPI* prices are combined by State.
  - c. Using simple averaging, the composite *Platt's* price for each State is combined with the "all types" *CPI* price for that State. The resulting prices are the monthly composite prices for 1979 through 1981.
4. Fourteen States are not covered by price data from either *Platt's* or the *CPI* in 1979 through 1981. These States are AR, DE, ME, MS, MT, ND, NH, OK, RI, SC, SD, VT, WV, and WY. Monthly composite prices for these States are estimated by using the monthly State-level composite prices for 1982 and Census region monthly prices from the *CPI* for 1979 through 1982.
- a. The ratio between the 1982 State prices and the 1982 *CPI* Census region prices corresponding to each State is calculated for use as an adjustment factor in 1979, 1980, and 1981.
  - b. The monthly price for each of the 14 missing States is assumed to be the product of the 1982 Census region adjustment factor for that State times the monthly motor gasoline price for that Census region from the *CPI*.

Annual physical unit prices for all States are calculated from the monthly motor gasoline prices calculated above and weighted by the monthly motor gasoline consumption volumes for States from *Highway Statistics*.

**Physical Unit Prices: 1978**

The *Platt's* monthly leaded regular motor gasoline prices cover all States except AK and HI. The *Platt's* city assignments to States are shown in Table TN36. In 1978, the *CPI* motor gasoline coverage was expanded from 21 States to 25 States (28 SMSAs) and an "all types" price was published that covers leaded regular, leaded premium, and unleaded regular. The *CPI* SMSA assignments to States for 1978 through 1982

**Table TN36. Motor Gasoline Price Assignments from *Platt's*, 1970-1978**

State	City Price Assignments
AL	Birmingham
AR	Little Rock
AZ	Phoenix
CA	Los Angeles, San Francisco
CO	Denver
CT	Hartford
DC	Washington
DE	Wilmington
FL	Miami
GA	Atlanta
IA	Des Moines
ID	Boise
IL	Chicago
IN	Indianapolis
KS	Wichita
KY	Louisville
LA	New Orleans
MA	Boston
MD	Baltimore
ME	Portland
MI	Detroit
MN	Twin Cities
MO	St. Louis
MS	Jackson
MT	Great Falls
NC	Charlotte
ND	Fargo
NE	Omaha
NH	Manchester
NJ	Newark
NM	Albuquerque
NV	Reno
NY	Buffalo, New York
OH	Cincinnati, Cleveland
OK	Tulsa
OR	Portland
PA	Philadelphia
RI	Providence
SC	Charleston
SD	Huron
TN	Memphis
TX	Dallas, El Paso, Houston
UT	Salt Lake City
VA	Norfolk
VT	Burlington
WA	Seattle, Spokane
WI	Milwaukee
WV	Charleston
WY	Cheyenne

are shown in Table TN34 on page 69. Both the *CPI* and the *Platt's* prices include taxes.

Since both sources report a single price for each city or SMSA, product weights are not needed to compute monthly composite prices. Instead, city price observations are assigned to States, as shown in Table TN34 and Table TN36. Price observations are combined by using simple averaging by State and month. If both *Platt's* and the *CPI* cover a city/SMSA, the *CPI* price is used. *Platt's* prices are converted to dollars per gallon; the *CPI* prices are already expressed in dollars. All States are covered by the data sources, so no imputation is required for 1978. The following 26 States have prices only from *Platt's*: AL, AR, AZ, CT, DE, IA, ID, LA, ME, MS, MT, NC, ND, NE, NH, NM, NV, OK, RI, SC, SD, TN, UT, VT, WV, and WY. The following 19 States are covered only by the *CPI*: AK, CA, CO, DC, FL, GA, HI, IL, MA, MD, MI, MN, MO, NJ, NY, OH, OR, PA, and WI. Six States have price data from both sources: IN, KS, KY, TX, VA, and WA.

Annual physical unit prices for all States are calculated from the monthly motor gasoline prices calculated above and weighted by the monthly motor gasoline consumption volumes for States from *Highway Statistics*.

**Physical Unit Prices: 1976, 1977**

The calculation of monthly composite State prices for 1976 and 1977 depends upon the source of data. Different procedures are used for States with only *Platt's* data, States with only *CPI* data, and States with both *Platt's* and *CPI* data. If both data sources cover a city, only the *CPI* price is used for that city. City price assignments to States are given in Table TN36 for *Platt's* and in Table TN37 for the *CPI*. Prices from both sources include taxes. AK is the only State for which prices need to be estimated.

For States with data from *Platt's* only, the monthly prices reported in *Platt's* are used either directly or combined by simple averaging if there is more than one price observation for a State in a given month. The reported prices in cents per gallon are converted to dollars per gallon. Prices for the following 29 States are calculated by using this procedure and cover only leaded regular motor gasoline: AL, AR, AZ, CO, CT,

**Table TN37. Motor Gasoline Price Assignments from Consumer Prices: Energy, 1974-1977**

State	City Price Assignments
CA	Los Angeles-Long Beach, San Diego, San Francisco-Oakland
DC	Washington
GA	Atlanta
HI	Honolulu
IL	Chicago, St. Louis
IN	Cincinnati, Chicago
KS	Kansas City
KY	Cincinnati
MA	Boston
MD	Baltimore, Washington
MI	Detroit
MN	Minneapolis-St. Paul
MO	St. Louis, Kansas City
NJ	New York-Northeastern NJ, Philadelphia
NY	Buffalo, New York-Northeastern NJ
OH	Cincinnati, Cleveland
PA	Philadelphia, Pittsburgh
TX	Dallas, Houston
VA	Washington
WA	Seattle
WI	Milwaukee, Minneapolis-St. Paul

Note: Prices are available separately for leaded regular, leaded premium, and unleaded regular (1976, 1977); "all types" prices are not available.

DE, FL, IA, ID, LA, ME, MS, MT, NC, ND, NE, NH, NM, NV, OK, OR, RI, SC, SD, TN, UT, VT, WV, and WY.

If State-level motor gasoline prices for 1976 and 1977 are available only from the *CPI*, monthly composite prices are calculated as weighted averages of leaded and unleaded prices. Prices for 15 States are calculated by using data only from the *CPI*: CA, DC, GA, HI, IL, MA, MD, MI, MN, MO, NJ, NY, OH, PA, and WI.

1. The weights used in this process are national-level shares of leaded and unleaded motor gasoline product supplied. For 1977, the leaded and unleaded share of 0.725 and 0.275, respectively, are taken from the *MER*. For 1976, *MER* data for 1977 through 1984 are used to estimate the unleaded share by using simple regression.

The unleaded percentages for 1977 through 1984 are converted to shares and used to estimate leaded and unleaded shares of motor gasoline. The resulting 1976 leaded share is 0.744 and the unleaded share is 0.256.

2. The next step is to calculate monthly composite leaded and unleaded prices for each State. If more than one *CPI* price observation is available for a particular grade of motor gasoline (leaded or unleaded) for a State in a given month, the *CPI* observations are combined by grade by using simple averaging. Regular and premium prices are averaged for an estimate of State-level leaded prices.
3. Final monthly composite prices for 1976 and 1977 are calculated by using the leaded and unleaded composite prices calculated above and the *MER*-based leaded and unleaded shares as volume weights.

For States with price data from both *Platt's* and the *CPI*, all price observations are averaged together by product type. If both sources report prices for a city, the *CPI* price is used. Once composite leaded and unleaded prices have been calculated separately for each State, the leaded and unleaded consumption shares are used to weight the product-type prices into the final monthly composite motor gasoline prices. Six States are calculated with data from both *Platt's* and the *CPI*: IN, KS, KY, TX, VA, and WA.

1. Monthly leaded composite prices are calculated by combining *Platt's* prices with the *CPI* prices for leaded regular and premium motor gasoline by month, since the *Platt's* prices cover only regular leaded fuel. If both data sources cover a city, the *CPI* prices are used.
2. Since the *CPI* is the only source of unleaded gasoline price data for 1976 through 1977, monthly unleaded composite prices are calculated from *CPI* data only.
3. Final monthly composite prices for the six States with price data from both *Platt's* and the *CPI* are calculated by using annual U.S. leaded and unleaded shares and leaded and unleaded monthly composite prices.

Prices for 1976 and 1977 for AK, the only State not covered by price data from either data source, are estimated on the basis of the average relationship between the State and the national average price for years in which data are available. The national average price used for these estimations is a simple average of the prices of the 49 States for which data are available in all years (i.e., excluding AK and HI for all years). Annual prices for AK are estimated on the basis of the average AK-to-U.S. price relationship for 1978 and 1979.

Annual physical unit prices (excluding AK) are calculated from the monthly motor gasoline prices calculated above and weighted by the monthly motor gasoline consumption volumes for States from *Highway Statistics*.

### **Physical Unit Prices: 1974, 1975**

The *Platt's* price data for 1974 through 1975 cover only leaded regular motor gasoline. Beginning in 1974, motor gasoline price data are also available from the *CPI* for selected SMSAs. An SMSA price is assigned to each State with counties included in the definition of that SMSA; for the years 1974 through 1977, prices for 23 SMSAs cover 21 States. The State assignments of SMSA prices for 1974 through 1977 are given in Table TN37 on page 72. For 1974 and 1975, *CPI* prices are reported separately for leaded regular and leaded premium motor gasoline. According to the April 1986 *CPI Detailed Report*, these prices include taxes; the *Platt's* prices also include taxes. AK is the only State not covered by either of these two data sources; prices for AK are imputed for 1974 and 1975.

The *Platt's* regular leaded prices and the *CPI* regular and premium leaded motor gasoline prices, including taxes, are assigned to their respective States, as shown in Table TN36 and Table TN37. If both sources cover a city, the *CPI* price is used. The following 29 States are covered only by *Platt's*: AL, AR, AZ, CO, CT, DE, FL, IA, ID, LA, ME, MS, MT, NC, ND, NE, NH, NM, NV, OK, OR, RI, SC, SD, TN, UT, VT, WV, and WY. The following 15 States are covered only by *CPI*: CA, DC, GA, HI, IL, MA, MD, MI, MN, MO, NJ, NY, OH, PA, and WI. The following six States have both *Platt's* and *CPI* data for a particular city: IN, KS, KY, TX, VA, and WA.

All price observations assigned to a State, regardless of grade or data source, are added together and divided by the number of observations. As part of this calculation, *Platt's* prices are converted from cents per gallon to dollars per gallon.

Neither *Platt's* nor the *CPI* reports price data for AK. The methodology of the estimation of annual AK prices is the same as used in 1976 and 1977.

Annual physical unit prices for the remaining 50 States (excluding AK) are calculated from the monthly motor gasoline prices calculated above and weighted by the monthly motor gasoline consumption volumes for States from *Highway Statistics*.

### **Physical Unit Prices: 1970 Through 1973**

Monthly motor gasoline physical unit prices for 1970 through 1973 are available only from *Platt's*, where city prices covering 49 States are reported in a table titled "Service Station Prices: Gasoline (Including Taxes)." These prices, as shown in Table TN33, are for leaded regular gasoline only and include taxes.

Monthly average city prices from *Platt's* are assigned to the State in which the city is located. *Platt's* city price assignments to States are given in Table TN36.

Monthly composite prices for 1970 through 1973 are equal to the reported monthly *Platt's* prices or, if more than one city is available for a given State in a certain month, are a simple average of the assigned city prices. The reported prices are converted from cents to dollars per gallon.

*Platt's* does not report data for either AK or HI for 1970 through 1973. The methodology of the estimation of AK and HI prices is the same as that used for 1976 and 1977.

Annual physical unit prices (excluding AK and HI) are calculated from the monthly motor gasoline prices weighted by the monthly motor gasoline consumption volumes for States from *Highway Statistics*.

### **Btu Prices: All Years**

Btu prices for States are computed by converting the physical unit prices in dollars per gallon to dollars per barrel (42 gallons per barrel). The prices are then converted to dollars per million Btu by using the factor 5.253 million Btu per barrel from 1970 through 1993 and a variable annual factor from 1994 forward. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

### **Data Sources**

#### **Prices**

1986 forward: EIA, *Petroleum Marketing Annual*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_marketing\\_annual/pma\\_historical.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html), Table 29 (1986-1988) and Table 30 (1989-1993), columns titled "All Refiners, Sales to End Users, Through Company Outlets" and "All Refiners, Sales for Resale;" and Table 35 (1994 forward), columns titled "All Grades, Sales to End Users, Through Retail Outlets" and "All Grades, Sales for Resale."

1983 through 1985: EIA, *Petroleum Marketing Annual 1985*, Volume 1, Table 16, columns titled "All Refiners and Gas Plant Operators, Sales to End-users, Through Company Outlets" and "All Refiners and Gas Plant Operators, Sales for Resale."

1974 through 1986: Bureau of Labor Statistics, U.S. Department of Labor, *Consumer Prices: Energy*, computer printouts of monthly gasoline prices.

1983 through 1986: Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics*, Tables MF-26 (1983-1993) and MF-33GA (1994 and 1995).

1970 through 1982: McGraw-Hill, Inc., *Platt's Oil Price Handbook and Oilmanac*, table titled "AAA 'Fuel-gauge' Report" (1982); table titled "Platt's/Lundberg Summary," (1979-1981); and table titled "Service Station Prices: Gasoline (Including Taxes)," (1970-1978).

1974 through 1982: Bureau of Labor Statistics, *CPI Detailed Report*, April 1986, Technical Notes, page 110.

1982: EIA, Form EIA-25, “Prime Supplier Monthly Report,” computer tape, unpublished data.

1976 through 1984: EIA, *Monthly Energy Review*, January 1985, table titled “Petroleum: Finished Motor Gasoline Supply and Disposition.”

### Taxes

1983 forward (State Taxes): Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics*, <http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.htm>, Table MF-121T.

1991 forward (Federal Taxes): EIA, *Petroleum Marketing Annual*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_marketing\\_annual/pma\\_historical.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html), Table EN1.

1983 through 1990 (Federal Taxes): EIA, *Petroleum Marketing Annual, 1990*, Table EN1.

### Consumption

1970 forward: EIA, State Energy Data System, transportation sector, motor gasoline consumption.

### Conversion Factor: All Years

1994 forward: EIA, *Annual Energy Review 2005*, Appendix A, Table A3. [http://www.eia.doe.gov/emeu/aer/pdf/pages/sec13\\_3.pdf](http://www.eia.doe.gov/emeu/aer/pdf/pages/sec13_3.pdf).

1970–1993: 5.253 million Btu per barrel.

## Petroleum Coke

Petroleum coke is consumed in the commercial, industrial, and electric power sectors. Petroleum refineries used 48 percent of the petroleum

coke consumed in 2005. Refinery use is removed from expenditure calculations for all years based on the assumption that the costs are passed on in the prices of the refined petroleum products. (See the discussion in Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).)

### Commercial Sector

Since 1992, small quantities of petroleum coke have been used for combined-heat-and-power generation in the commercial sector by the University of Northern Iowa. Prices in dollars per million Btu are calculated from data provided by the university and include taxes.

### Price Data Source

1992 forward: University of Northern Iowa, <http://www.vpaf.uni.edu/fs/serviceunits/power.shtml>.

### Industrial Sector

Petroleum coke is used for combined-heat-and-power (CHP) generation and in manufacturing processes in the industrial sector. The quantities used for CHP are assigned the electric power sector petroleum coke prices in each State. When a State has no electric power petroleum coke consumption, the Census division price or a neighboring State’s price is assigned as shown in Table TN38.

Petroleum coke used in manufacturing (about 36 percent of the total consumed in 2005) is marketed to industrial consumers in two forms, calcined and uncalcined. Calcined coke is about three times as expensive as uncalcined. A quantity-weighted U.S. average price is calculated by using U.S. Department of Commerce exports data and is assigned to all States with industrial petroleum coke consumption. The weighted average price is calculated by dividing the sum of the values of calcined and uncalcined petroleum coke exports by the sum of the two quantities exported. The exports, reported in metric tons, are converted to short tons by dividing by 0.9071847; are converted from short tons to barrels by multiplying by 5; and are converted from barrels to Btu by multiplying by 6.024. The prices do not include taxes.

**Table TN38. Industrial Sector Petroleum Coke for CHP Price Assignments, 1989 Forward**

State	Years	State or Census Division Prices Assigned
AR	2005	West South Central
CA	1989	West North Central
DE	1993–2003	PA
GA	1990	AL
	1991	East North Central
	1992	West North Central
	1993	KY
	1994–2002	South Atlantic
	2003–2005	FL
IL	1990	IN
	2000, 2001	East North Central
MI	1989, 1990	IN
	1991–1993	East North Central
MT	1990	West North Central
OH	1989, 1990	IN
	1998, 1999	East North Central
TX	1990–1992	West North Central
WI	1990	IN

**Price Data Sources**

1989 forward: Bureau of the Census, U.S. Department of Commerce, December issues of EM-545, *Foreign and Domestic Exports*, for Petroleum Coke, Not Calcined, Commodity 2713110000 and Petroleum Coke, Calcined, Commodity 2713120000.

1988: Bureau of the Census, U.S. Department of Commerce, December issue of EM-522, *U.S. Exports, Schedule B, Community by Country*, Petroleum Coke, Except Calcined, Commodity 5213150, and Petroleum Coke, Calcined, Commodity 5175120.

1987: Bureau of the Census, U.S. Department of Commerce, December issue of EM-622, *U.S. Exports, Schedule B, Commodity by Country*, Petroleum Coke, Except Calcined, Commodity 5213150, and Petroleum Coke, Calcined, Commodity 5175120.

1986: Bureau of the Census, U.S. Department of Commerce, December issue of EM-546, *U.S. Exports, Schedule B, Commodity by Country*, Petroleum Coke, Except Calcined, Commodity 5213150, and Petroleum Coke, Calcined, Commodity 5175120.

1978–1985: Bureau of the Census, U.S. Department of Commerce, FT-446, *U.S. Exports, Schedule B, Commodity by Country*, Petroleum Coke, Except Calcined, Commodity 5213150, and Petroleum Coke, Calcined, Commodity 5175120.

1970-1977: Bureau of the Census, U.S. Department of Commerce, December issues of FT-410, *U.S. Exports, Schedule B, Commodity by Country*, Petroleum Coke, Except Calcined, Commodity 3329420, and Petroleum Coke, Calcined, Commodity 3329410.

**Electric Power Sector**

The remaining petroleum coke (about 17 percent of total petroleum coke consumption in 2005) is used for electricity generation in the electric power sector. Estimates of the annual consumption of petroleum coke by the electric power sector are taken from the State Energy Data System (SEDS). The electric power prices for petroleum coke are the average delivered cost of petroleum coke receipts at electric plants. These data are available from the Energy Information Administration (EIA) *Cost and Quality of Fuels for Electric Plants (C&Q)*. The prices include all taxes, transportation, and other charges paid by the electric plants.

**Btu Prices: 2002 Forward**

Electric power sector petroleum coke prices are taken from the EIA *C&Q*. The data are compiled from the Federal Energy Regulatory Commission (FERC) Form 423, “Cost and Quality of Fuels for Electric Plants,” a survey of electric utilities and the EIA Form-423 “Cost and Quality of Fuels for Electric Plants,” a survey of non-utility power producers. The combined information from the Form EIA-423 and FERC Form 423 is used to calculate average delivered costs of petroleum coke used by the entire electric power industry.

Some States have petroleum coke consumption in the electric power sector in SEDS, but no deliveries or price data in the *C&Q*. Those States are assigned Census division average prices from the *C&Q*, or, if the Census division average is not available, they are assigned prices from neighboring States. Beginning with 2003 data, an additional method of estimating prices is used. Plant-level data from the FERC Form 423 data files are used to calculate prices for a State. If there are no plant data for the State, the plant-level data are used to calculate a price for the Census division. All these price assignments are shown in Table TN39.

**Btu Prices: 1972 Through 2001**

Estimates of the average delivered cost of petroleum coke are based on delivery and cost data from FERC Form 423 data files. From 1972 through 1982, steam plants with a maximum capacity of 25 megawatts were included in the survey. For 1983 and subsequent years, the reporting threshold was raised to 50 megawatts capacity. The FERC Form 423 data files show quantity in short tons, estimated Btu per pound, and price in cents per million Btu. The data are presented by plant, by State, and by month. The Btu price by State is calculated as the annual sum of the unit prices, weighted by the total Btu in each reported delivery, divided by the annual sum of the Btu delivered to all electric plants within the State.

In addition to the computer data files, the data also are published for some years in the EIA *C&Q*. From 1978 through 1982, *C&Q* was published monthly and annually; data for calculating petroleum coke prices are in only the monthly reports. For 1983 through 2001, *C&Q* was published annually and includes petroleum coke prices for individual States and for the Nation (the 1994 edition is the last hard copy; all later years are available electronically only).

Some States have petroleum coke consumption in the electric power sector in SEDS but no deliveries or price data in the *C&Q*. Those States are assigned Census division average prices from the *C&Q* or, if the Census division average is not available, they are assigned prices from neighboring States, as shown in Table TN39. The high DE prices prior to 1981 are actual reported prices.

**Table TN39. Petroleum Coke Electric Power Sector Price Assignments or Calculations, 1972 Forward**

State	Years	State or Census Division Prices Assigned
CA	1990–2005	West North Central
DE	1981–1992	PA
KY	2003	FERC plant data for KY
	2005	FERC plant data for East North Central
KS	1975	MO
LA	1990	AL
	1992	West North Central
	1996	FL
	1993–1995, 1997–2002	TX
	2004	FERC plant data for LA
	2005	West South Central
	ME	1994, 1995 1996–2000
MI	2004, 2005	FERC plant data for MI
MO	1983, 1985	MN
	2005	West North Central
MT	1995–1998, 2000, 2003–2005	West North Central
	1999	UT
	2001	AZ
NC	1997, 1998	FL
NY	1974, 1996, 1998–2000	PA
	2001, 2002	East North Central
	2003, 2005	Mid Atlantic
OH	2004, 2005	FERC plant data for East North Central
PA	2001–2003	East North Central
	2005	Mid Atlantic
TX	2004	FERC plant data for TX
	2005	West South Central
WA	2000	West North Central
WI	1985	MN
	2003–2005	FERC plant data for WI

**Btu Prices: 1970, 1971**

For the years 1970 and 1971, prices are estimated by using the gross domestic product implicit price deflator. The deflator for 1970 or 1971 is divided by the 1972 deflator and the quotient is multiplied by the 1972 price for each State to develop the price estimates for 1970 and 1971. The deflators are 35.1 in 1970, 37.1 in 1971, and 38.8 in 1972.

Although SEDS has a consumption estimate for New Jersey in 1971, there are no NJ price data for any year in the FERC Form 423 data files. Form 423 data for Pennsylvania in 1972 are used to estimate a PA price for 1971, which is assigned to NJ. The Form 423 PA prices for 1972 and 1971 are not used in SEDS because the consumption data source has no petroleum coke consumption in PA for those years.

**U.S. Btu Prices: All Years**

U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

**Data Sources****Prices**

2002 forward: EIA, *Cost and Quality of Fuels for Electric Plants*, Table 9, and FERC Form 423, “Cost and Quality of Fuels for Electric Plants,” <http://www.eia.doe.gov/cneaf/electricity/page/ferc423.html>.

1972–2001: EIA, computer data files from FERC Form 423, “Cost and Quality of Fuels for Electric Plants,” <http://www.eia.doe.gov/cneaf/electricity/page/ferc423.html>, as published compiled by plant in the following reports:

- 1983–2001: EIA, *Cost and Quality of Fuels for Electric Plants*, Table 20 (1983, 1984), Table 12 (1985–1989), Table 40 (1990, 1991), and Table 28 (1992–2001).
- 1978–1982: EIA, *Cost and Quality of Fuels for Electric Plants*, table titled “Wood Chips, Refuse, and Petroleum Coke Used as Fuel by Steam-Electric Units.”

1970–1972: EIA, *Annual Energy Review 1992*, Appendix C. Gross Domestic Product and Implicit Price Deflator.

**Consumption**

1970 forward: EIA, State Energy Data System, electric power sector petroleum coke consumption.

**Conversion Factors: All Years**

No conversion factors are required; Btu prices are calculated directly from data sources.

**Residual Fuel**

Residual fuel prices are developed for the industrial, commercial, transportation and electric power sectors. Estimates of the amount of residual fuel consumed by sector are taken from State Energy Data System (SEDS) and are adjusted for process fuel consumption in the industrial sector. (See Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).)

**Electric Power Sector**

The electric power price for residual fuel (heavy oil) is the average delivered cost of No. 6 fuel oil receipts at electric plants. For 1973 forward, Btu prices are developed directly from the data sources. For 1970 through 1972, prices are estimated by using simple regression analysis. All taxes, transportation, and other charges paid by the power plants are included in the prices for all years.

**Btu Prices: 1973 Forward**

Electric power sector residual fuel prices for 1973 forward are taken from the Energy Information Administration (EIA) *Cost and Quality of Fuels for Electric Plants (C&Q)*. For 1973 through 1979, British therm unit (Btu) prices are calculated as the weighted average of contract and spot prices for No. 6 fuel oil. For 1980 through 1982, C&Q prices cover all

reporting plants of 25 megawatts capacity or greater. For 1983 forward, *C&Q* reports prices for steam electric plants of 50 megawatts capacity or greater.

Table TN40 lists the States and years for which consumption is indicated by SEDS but no price is shown in *C&Q*. For these States, the Census division price, as shown in *C&Q*, is assigned as the State price. For 1996 through 2002, no power plants in the Mountain Census division reported receipts of residual fuel in the *C&Q*, therefore there were no Census division prices to assign to States with SEDS consumption. Mountain division prices were estimated for 1996 through 2002 by averaging the percentage difference between Mountain and Pacific Noncontiguous Census division prices for the years 1991 through 1995 and then applying this average ratio to the Pacific Noncontiguous prices in 1996 through 2002. The *C&Q* does not have a price for the Pacific Noncontiguous division in 2002 forward. In 2002 and 2003, the ratio of the previous year Pacific Noncontiguous price to the previous year Pacific Contiguous price is applied to the current year Pacific Contiguous price to estimate the current year Pacific Noncontiguous price. In 2004 and 2005, the Pacific Contiguous price is estimated by applying the ratio of the previous year's Mountain price to the previous year's Pacific Contiguous price to the current Mountain price. In 2004 and 2005, the Pacific Noncontiguous price is missing and also is estimated by applying the ratio of its previous year's price to the previous year's Mountain price to the current Mountain price.

The *C&Q* does not have prices for the Pacific Contiguous division for 1995 through 2000. The only State in this region that showed consumption in those years was California, which was missing price data for 1995 through 2000. It was determined that the one power plant in California that consumed residual fuel in 1995 and 1996 had purchased the fuel in 1994 and the 1994 price was assigned. For 1997 through 2000, residual fuel prices for California were calculated from data reported by electric power plants on the FERC Form 1.

The *C&Q* does not have prices for AK in 1973 forward or HI in 1973 through 1982. For 1973 through 1993, prices are estimated by calculating the ratio of the AK or HI prices from the *Statistical Yearbook* to the *Statistical Yearbook* U.S. price and multiplying the ratio by the *C&Q* U.S. price for each year. AK prices for 1973, 1975, and 1978 are not published in the *Statistical Yearbook* and are estimated by calculating an average of the ratios of the AK to U.S. *Statistical Yearbook* prices in

**Table TN40. Residual Fuel Electric Power Census Division Price Assignments, 1970 Forward**

State	Years of Assigned Prices	Census Division
AL	1975–1979	East South Central
AR	1987, 1992, 1993, 1996–2003, 2005	West South Central
AZ	1984, 1985, 1991–1997, 1999–2001	Mountain
CO	1982, 1987, 1989–1992, 1994, 1995–2001	Mountain
CT	2001–2005	New England
DC	1982–2001	South Atlantic
GA	1991, 1998–2002	South Atlantic
HI	2002–2005	Pacific Non-Contiguous
IA	1970–1985	West North Central
IL	2000, 2003–2005	East North Central
IN	1970–1979, 1995, 2001–2002	East North Central
KS	1980, 1981, 1985–1987, 1989–1992, 1995	West North Central
KY	1970–1979	East South Central
MD	2001–2005	South Atlantic
ME	2001–2005	New England
MN	1984, 1985, 1987–1990, 1992, 1993, 1996–2002	West North Central
MO	1999, 2001, 2002, 2004	West North Central
MT	1970–1979	Mountain
NC	1976, 1977, 1979, 1980, 1982, 1984	South Atlantic
ND	1970–1979, 2002	West North Central
NE	1981–1983, 1990, 1991, 1994, 1998–2005	West North Central
NM	1979–1982, 1989–1997, 2001, 2004	Mountain
NV	1983, 1985, 1996–2002	Mountain
OH	1992–1994, 2001, 2002, 2004	East North Central
OK	1977, 1978, 1980, 1982–1987, 1989, 1991–1997, 1999, 2001, 2002	West South Central
OR	1970, 1973, 1974	Pacific
PA	2002–2005	Mid-Atlantic
RI	1995	New England
SC	1983, 1985–2002	South Atlantic
SD	1981–1988	West North Central
TN	1979	East South Central
TX	1992–1997, 1999–2002	West South Central
UT	1982, 1983, 1986	Mountain
VT	1970–1979	New England
WA	1970, 1971, 1975–1978, 1981–1983, 1986–1988	Pacific
WA	1992, 1993	Pacific Contiguous
WI	2001	East North Central
WV	1970–1977, 1979	South Atlantic
WY	1970–1979	Mountain

adjacent years. The 1973 estimated price is based on the average ratio for 1972 and 1974, the 1975 price is based on the average ratio for 1974 and 1976, and the 1978 price is based on the average ratio for 1977 and 1979. The average ratio is then applied to the U.S. C&Q price for the missing year. Beginning with 1994 data, the *Statistical Yearbook* table was discontinued. Alaska prices for 1994 forward are obtained from direct contact with the only Alaskan power plant reporting use of residual fuel.

### **Btu Prices: 1970 Through 1972**

State-level Btu prices for 1970 through 1972 are estimated by using regression techniques and price data from the *Statistical Yearbook*. The regression equations use *Statistical Yearbook* State-level prices for 1973 through 1980 as the independent variable and the State-level prices calculated above (including the estimations for AK and HI) as the dependent variable. Pacific regional price averages are assigned for the missing WA prices in 1970 and 1971. The average of 1970 and 1972 AK *Statistical Yearbook* prices is substituted for the missing 1971 AK price.

### **U.S. Btu Prices: All Years**

U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

### **Data Sources**

#### **Prices**

1973 forward: EIA, *Cost and Quality of Fuels for Electric Plants*, [http://www.eia.doe.gov/cneaf/electricity/cq/cq\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/cq/cq_sum.html), Table 6 (1973–1979), Table 45 (1980–1982), Table 51 (1983, 1984), Table 41 (1985–1989), Table 14 (1990, 1991), and Table 8 (1992–2001), Table 7.D (2002, 2003), and Table 7.C (2004, 2005).

1994 forward: Alaska prices are obtained from the Golden Valley Electric Association.

1970–1993: Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry*, Table 43 (1970–1979), Table 26 (1980–1983), Table 28 (1984–1986), and Table 29 (1987–1993).

### **Consumption**

1970 forward: EIA, State Energy Data System, electric power sector residual fuel consumption.

### **Conversion Factors: All Years**

Because Btu prices are available directly from the data sources, no conversion factors are used, with the exception of Alaskan prices for 1994 forward, which use 6.287 million Btu per barrel.

## **Industrial Sector**

The industrial sector residual fuel prices for 1984 forward are developed from refiner/reseller prices of residual fuel as published in the *Petroleum Marketing Annual (PMA)*. Residual fuel prices for 1970 through 1983 are calculated or estimated by using average costs of residual fuel to manufacturing firms published in two Bureau of the Census reports and *Platt's Oil Price Handbook and Oilmanac*. Price data in these sources are available for the years 1971 and 1974 through 1981; prices for 1970, 1972, 1973, 1982, and 1983 are estimated. Prices for all years include taxes.

### **Physical Unit Prices: 1984 Forward**

Residual fuel industrial sector physical unit prices are calculated by using refiner/reseller prices to end users from the *PMA*. The States that do not have *PMA* prices are assigned their PAD district or subdistrict price as shown in Table TN41, with the exception of Alaska. Alaska industrial residual fuel prices for 1984 forward are based on the Washington industrial residual fuel prices and the ratio of the AK-to-WA industrial distillate fuel prices for each year where there is consumption. State general sales taxes are added.

**Table TN41. Residual Fuel Industrial Sector PAD District and Sub-district Price Assignments, 1984 Forward**

State	Years	Assignments
AL	1995, 1997, 1998, 2005	District III
AR	1985, 1996, 1997–2005	District III
AZ	1984–1993, 1995–2002, 2005	District V
CO	1986, 1988, 1990–1995, 1997–1999, 2001–2002	District IV
DC	1994, 1995, 2000, 2002, 2004	Subdistrict IB
GA	2001–2004	Subdistrict IC
HI	2002–2005	District V
IA	1995–1999, 2005	District II
ID	1985, 1986, 1989–1992, 1994, 1995–2003, 2005	District IV
IL	2003–2004	District II
KY	1998–2005	District II
MN	1995–1997, 2002–2005	District II
MO	1995	District II
MS	1988, 1991, 1992, 1995, 1998, 2001–2004	District III
MT	1992, 1994, 1995, 1997–1999, 2001–2005	District IV
ND	1988–1992, 1995–2002, 2005	District II
NE	1995, 1996, 1998–2000, 2002, 2005	District II
NM	1984–1986, 1990–2005	District III
NV	1986, 1988, 1991–1999, 2002–2005	District V
OK	1992–2005	District II
OR	1989	District V
SC	1993–1995, 1998–2002, 2005	Subdistrict IC
SD	1990–2005	District II
TN	1995, 2000, 2002	District II
UT	1989–1992, 1998–2000, 2002, 2005	District IV
WA	2002	District V
WI	1994, 1995, 1998	District II
WV	1984, 1998, 2002–2005	Subdistrict IC
WY	1989–1999, 2001–2005	PAD District IV

**Physical Unit Prices: 1982, 1983**

After 1981, the U.S. Department of Commerce's *Annual Survey of Manufacturers* and the *Census of Manufactures (ASM/CM)* ceased publication of fuel-specific State-level residual fuel data from which prices can be calculated. Prices for 1982 and 1983 are estimated from the average

relationship between the *ASM/CM*-based prices generated for 1978 through 1981 and the assigned *Platt's* No. 6 fuel oil prices for 1978 through 1981 (Table TN42). These average ratios are calculated at the State-level for all States except AK, which shows no industrial sector residual fuel use reported in SEDS for 1982 and 1983. Physical unit residual fuel industrial prices for 1982 and 1983 are calculated by using the assigned *Platt's* prices for 1982 and 1983 (Table TN42) and the State-level average ratios. The resulting estimates implicitly include taxes that reflect individual State differences.

**Physical Unit Prices: 1971, 1974 Through 1981**

For the years 1971 and 1974 through 1981, industrial sector residual prices are calculated directly from cost and quantity data reported by the *ASM/CM*. For all States with available cost and quantity data, prices are equal to the average cost of residual fuel to manufacturers. Taxes are included in the published cost data. Missing data for these years are assigned from the average prices of adjacent States, as shown in Table TN43.

**Physical Unit Prices: 1970, 1972, 1973**

Since *ASM/CM* data are not available for 1970, 1972, or 1973, prices for these years must be estimated. Physical unit prices are based on the ratio of the 1971 *CM* prices to the 1971 assigned No. 6 fuel oil prices from *Platt's Oil Price Handbook and Oilmanac* (Table TN42). The estimated 1971 *CM* prices for NM and WY are used in the calculations. The resulting ratios for each State are used with the *Platt's* assigned prices for 1970, 1972, and 1973 to estimate prices. The final estimates implicitly include State-specific taxes.

**Btu Prices: All Years**

Btu prices for States are calculated from the physical unit prices and the conversion factor of 6.287 million Btu per barrel. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS, which are adjusted for process fuel consumption.

Table TN42. No. 6 Fuel Oil Price Assignments from Platt's, 1970–1983

State	Years	City or State Prices Assigned	State	Years	City or State Prices Assigned
AK	1970–1972, 1975, 1977–1980	Los Angeles, CA	MT	1970–1983	Minneapolis/St. Paul, MN
	1973–1974, 1976	Los Angeles/San Francisco, CA	NC	1970–1983	Wilmington
	1981–1983	Los Angeles, CA; San Francisco, CA	ND <sup>1</sup>	1970–1983	Minneapolis/St. Paul, MN
AL	1970–1983	Savannah, GA	NE	1970–1972, 1975, 1977–1980	Los Angeles, CA
AR	1970–1983	Arkansas		1973, 1974, 1976	Los Angeles/San Francisco, CA
AZ	1970–1972, 1975, 1977–1980	Los Angeles, CA		1981–1983	Los Angeles, CA; San Francisco, CA
	1973–1974, 1976	Los Angeles/San Francisco	NH	1970–1983	Portland, ME
	1981–1983	Los Angeles, CA; San Francisco, CA	NJ	1970–1972	New Jersey
CA	1970–1972, 1975, 1977–1980	Los Angeles		1974, 1975	New York, NY; Albany, NY; Buffalo, NY
	1973–1974, 1976	Los Angeles/San Francisco		1976–1983	New York, NY; Albany, NY
	1981–1983	Los Angeles; San Francisco	NM	1970–1972, 1975, 1977–1980	Los Angeles, CA
CO <sup>1</sup>	1970–1983	Minneapolis/St. Paul, MN		1973, 1974, 1976	Los Angeles/San Francisco, CA
CT	1970–1983	New Haven		1981–1983	Los Angeles, CA; San Francisco, CA
DC	1970–1983	Baltimore, MD	NV	1970–1972, 1975, 1977–1980	Los Angeles, CA
DE	1970–1983	Baltimore, MD		1973, 1974, 1976	Los Angeles/San Francisco, CA
FL	1970–1972	Jacksonville; Miami; Tampa; Port Everglades		1981–1983	Los Angeles, CA; San Francisco, CA
	1973–1975	Jacksonville; Miami; Tampa	NY	1970–1975	New York; Albany; Buffalo
	1976–1983	Jacksonville/Miami		1976–1983	New York; Albany
GA	1970–1983	Savannah	OH <sup>1</sup>	1970	Toledo
HI	1970–1972, 1975, 1977–1980	Los Angeles, CA		1971–1983	Detroit, MI
	1973, 1974, 1976	Los Angeles/San Francisco, CA	OK <sup>2</sup>	1970–1977, 1979	Group 3 (Oklahoma)
	1981–1983	Los Angeles, CA; San Francisco, CA		1978, 1980–1983	New Orleans, LA
IA <sup>1</sup>	1970–1983	Chicago, IL	OR	1970–1972, 1975, 1977–1980	Los Angeles, CA
ID	1970–1972, 1975, 1977–1980	Los Angeles, CA		1973, 1974, 1976	Los Angeles/San Francisco, CA
	1973, 1974, 1976	Los Angeles/San Francisco, CA		1981–1983	Los Angeles, CA; San Francisco, CA
	1981–1983	Los Angeles, CA; San Francisco, CA	PA	1970–1983	Philadelphia
IL <sup>1</sup>	1970–1983	Chicago	RI	1970–1975	Providence
IN <sup>1</sup>	1970–1983	Chicago, IL		1976–1983	New Haven, CT
KS	1970	Baton Rouge, LA; New Orleans, LA	SC	1970–1983	Charleston
	1971–1983	New Orleans, LA	SD <sup>1</sup>	1970–1983	Minneapolis/St. Paul, MN
	1970	Baton Rouge, LA; New Orleans, LA	TN	1970	Baton Rouge, LA; New Orleans, LA
	1971–1983	New Orleans, LA		1971–1983	New Orleans, LA
LA	1970	Baton Rouge; New Orleans	TX	1970–1972	New Mexico/West Texas
	1971–1983	New Orleans		1973–1983	New Orleans, LA
MA	1970–1983	Boston	UT <sup>1</sup>	1970–1983	Minneapolis/St. Paul, MN
MD	1970–1983	Baltimore	VA	1970–1983	Norfolk
ME	1970–1983	Portland	VT	1970–1983	Portland, ME
MI <sup>1</sup>	1970–1983	Detroit	WA	1970–1972, 1975, 1978, 1979	Los Angeles, CA
MN <sup>1</sup>	1970–1983	Minneapolis/St. Paul		1973, 1974, 1976	Los Angeles/San Francisco, CA
MO <sup>1</sup>	1970–1973	Chicago, IL		1980–1983	Seattle/Tacoma
	1974–1983	St. Louis	WI <sup>1</sup>	1970–1983	Chicago, IL
MS	1970	Baton Rouge, LA; New Orleans, LA	WV	1970–1983	Norfolk, VA
	1971–1983	New Orleans, LA	WY <sup>1</sup>	1970–1983	Minneapolis/St. Paul, MN

<sup>1</sup>Data from Platt's are converted from cents per gallon to dollars per barrel.

<sup>2</sup>As shown in Platt's.

**Table TN43. Residual Fuel Industrial Sector Price Assignments, 1971, 1974 Through 1981**

State	Years	State Prices Used
AK	1980, 1981	HI, WA
DC	1979–1981	MD, VA
MT	1974–1979	ID, ND, SD
ND	1980	MN, MT, SD
NM	1971, 1974–1981	AZ, CO, TX
NV	1974–1978	AZ, CA, ID, OR, UT
OK	1974–1978, 1980	AR, CO, KS, MO, TX
SD	1981	IA, MN, MT, ND, NE
WY	1971, 1974–1981	CO, NE, UT

**Data Sources****Prices**

1984 forward: EIA, *Petroleum Marketing Annual*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_marketing\\_annual/pma\\_historical.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html), Table A3, column titled “Sales to End Users.”

1984 forward: Industrial sector distillate fuel price estimates from *SEDS* (AK and WA only).

1970-1983: McGraw-Hill, Inc., *Platt's Oil Price Handbook and Oilmanac*, refinery and terminal prices for No. 6 fuel oil, average of highs and lows.

1971, 1977, 1981: Bureau of the Census, U.S. Department of Commerce, *Census of Manufactures, Fuels and Electric Energy Consumed*, Part 2, Table 3. (Dates shown on the report covers are, respectively, 1972, 1977, and 1982.)

1974-1976 and 1978-1980: Bureau of the Census, U.S. Department of Commerce, *Annual Survey of Manufacturers, Fuels and Electric Energy Consumed, States by Industry Group*, Table 3.

**Taxes**

For 1992 forward, an annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the State general sales tax as of September 1 of each year is used.

1996 forward: Federation of Tax Administrators, <http://www.taxadmin.org/fta/rate/sales.html>.

1995: The Council of State Governments, *The Book of the States 1994–95* and *1996–97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

1993: Bureau of the Census, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled “State Gasoline, Sales, and Cigarette Tax Rates as of July 1, 1993,” sales tax rates.

1987–1992: Bureau of the Census, U.S. Department of Commerce, *State Government Tax Collections*, Table 8, column titled “Percentage rate, September 1.”

1984–1986: Bureau of the Census, U.S. Department of Commerce, *Statistical Abstract of the United States*, table titled “State Government Tax Collections and Excise Taxes,” column titled “Excise Taxes, General sales and gross receipts.”

**Consumption**

1970 forward: EIA, State Energy Data System, industrial sector residual fuel consumption.

**Conversion Factor: All Years**

6.287 million Btu per barrel.

## Commercial Sector

For 1984 forward, State-level commercial sector residual fuel prices are developed from refiner/reseller prices of residual fuel to end users published in the *PMA*. For 1970 through 1983, commercial sector residual fuel prices are estimated for all States from national-level residual fuel prices and the State-level electric power sector residual fuel prices. State and Federal taxes are included in the final prices for all years.

### Physical Unit Prices: 1984 Forward

Commercial sector residual fuel physical unit prices are based on refiner/reseller prices to end users from the *PMA*. States that do not have *PMA* prices are assigned their PAD district or subdistrict price (Table TN44), with the exception of AK. The AK commercial residual fuel prices, for years where there is consumption, are based on the WA commercial residual fuel price and the ratio of the AK-to-WA commercial distillate fuel prices for each year. Tax data are added to develop final prices.

### Physical Unit Prices: 1976 Through 1983

The commercial sector residual fuel physical unit prices for 1976 through 1983 are estimated from the electric power sector residual fuel prices and the U.S. average retail residual fuel prices (with taxes added) for each year. The resulting price estimates implicitly include taxes that reflect individual State differences.

1. The first step in the estimation of the commercial residual fuel physical unit State prices is to convert the State-level tax rates reported in the Bureau of the Census publications into the volume-weighted average U.S. sales tax rate by using commercial residual consumption data from SEDS.
2. A preliminary U.S. residual fuel oil price, including taxes, is computed by using the average U.S. tax rate estimated above and the annual average U.S. residual fuel price to end users (average retail price excluding taxes) from the *Monthly Energy Review (MER)*.

Table TN44. Residual Fuel Commercial Sector PAD District and Subdistrict Price Assignments, 1984 Forward

State	Years	Assignments
AL	1995	District III
AR	1996, 2004, 2005	District III
AZ	1984, 1985, 1988, 1991, 1996	District V
CO	1986, 1992, 1993, 1998, 1999	District IV
DC	1998-2001	Subdistrict IB
GA	2001, 2003	Subdistrict IC
HI	2002, 2004, 2005	District V
IA	1996, 1998, 2005	District II
ID	1985, 1986, 1989-1992, 1994, 1995-1998	District IV
IL	2003	District II
KY	1999-2001, 2005	District II
MN	1995-1997, 2002-2005	District II
MO	1995	District II
MS	1988, 1991, 1992, 2001, 2003	District III
MT	1992, 1994, 1995, 1997-2000, 2003	District IV
ND	1988, 1989-1992, 1995-2002, 2005	District II
NE	1995, 1998-2000, 2004, 2005	District II
NM	1984, 1985, 1996	District III
NV	1986, 1988, 1991, 1992, 1997-2000	District V
OK	1992, 1995, 2002, 2004	District II
OR	1989	District V
SC	1993-1995, 1998-2002, 2005	Subdistrict IC
SD	1990-1995, 1997-2002, 2004, 2005	District II
TN	1995	District II
UT	1989-1992, 1998-2001, 2004, 2005	District IV
VT	2004	Subdistrict IA
WA	2002	District V
WI	1994, 1995, 1998	District II
WV	1984	Subdistrict IC
WY	1989-1991, 1994-1998	District IV

3. Commercial sector physical unit residual fuel prices for States are computed by using the electric power sector residual fuel prices. To do this calculation, the ratio of the State-level and U.S. prices in the commercial sector is assumed to be the same as the ratio of State and U.S. prices in the electric power sector. Some States are missing electric power sector prices for 1976 through 1983; these are estimated by using adjacent States' average prices (Table TN45).

### Physical Unit Prices: 1970 Through 1975

Because no national or State-level retail residual prices are available from published data sources, commercial sector residual prices for 1970 through 1975 are estimated. The estimation method is based on the assumption that the average ratio of State-to-U.S. prices is the same in the commercial and electric power sectors. The average ratio for 1976 through 1979 of the *MER* U.S. tax-adjusted prices to the electric power sector U.S. prices is calculated and used as an adjustment factor with State-level electric power sector prices for 1970 through 1975. The resulting price estimates implicitly include taxes that reflect individual State differences.

1. The average ratio of the *MER* tax-adjusted U.S. prices and the electric power sector U.S. prices is calculated for 1976 through 1979.
2. State-level commercial sector residual fuel prices are calculated by using the electric power sector physical unit price series for 1970 through 1975 and the average ratio computed above. Price assignments for States missing electric power sector data are shown in Table TN45.

### Btu Prices: All Years

Btu prices for States are calculated from the physical unit prices and the conversion factor. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

### Data Sources

#### Prices

1984 forward: EIA, *Petroleum Marketing Annual*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_marketing\\_annual/pma\\_historical.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html), Table A3, column titled "Sales to End Users."

1984 through 1988: Commercial sector distillate fuel price estimates from SEDS (AK and WA only).

**Table TN45. Residual Fuel Commercial Sector Price Assignments, 1970 Through 1983**

State	Years	State Prices Used in the Estimation
AL	1970–1974, 1980, 1982, 1983	FL, GA, MS
ID	1980, 1981, 1983	CA, CO
	1982	CA
IN	1980–1983	IL, MI, OH
KY	1980–1983	IL, MO, OH, VA
MT	1980, 1983	CO, MN
	1982	MN
NC	1981, 1983	GA, VA
ND	1980, 1983	MN, SD
	1981, 1982	MN
OR	1975–1983	CA
TN	1970–1978, 1980–1983	AR, GA, MO, MS, VA
VT	1980–1983	ME, NH, NY
WI	1982, 1983	IL, MI, MN
WV	1980–1983	MD, OH, PA, VA
WY	1980	CO, NE, SD, UT
	1981, 1983	CO
	1982	MN

1978-1983: EIA, *Monthly Energy Review, December 1988*, table titled "Refiner Sales Prices of Residual Fuel Oil," column titled "Average Sales to End Users."

1976, 1977: EIA, *Monthly Energy Review, December 1983*, table titled "Average No. 6 Residual Fuel Oil Prices," column titled "Average, Retail."

1970-1983: Electric power sector residual fuel price estimates (in physical units) from SEDS.

#### Taxes

For 1992 forward, an annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the State general sales tax as of September 1 of each year is used.

1996 forward: Federation of Tax Administrators, <http://www.taxadmin.org/fta/rate/sales.html>.

1995: The Council of State Governments, *The Book of the States 1994–95* and *1996–97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

1993: Bureau of the Census, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled “State Gasoline, Sales, and Cigarette Tax Rates as of July 1, 1993,” sales tax rates.

1987-1992: Bureau of the Census, U.S. Department of Commerce, *State Government Tax Collections*, Table 8, column titled “Percentage rate, September 1.”

1976-1986: Bureau of the Census, U.S. Department of Commerce, *Statistical Abstract of the United States*, table titled “State Government Tax Collections and Excise Taxes,” column titled “Excise Taxes, General sales and gross receipts.”

### Consumption

1970 forward: EIA, State Energy Data System (SEDS), commercial sector residual fuel consumption.

### Conversion Factor: All Years

6.287 million Btu per barrel

## Transportation Sector

Residual fuel is consumed in the transportation sector for vessel bunkering, military use, and railroads. In 1970, vessels consumed 74 percent of the transportation use of residual fuel, and the military and railroads accounted for 24 percent and 2 percent, respectively. By 2004, vessel use had grown to 99.4 percent, military use had dropped to 0.6 percent, and the railroads’ consumption was zero. Prices are developed for vessel bunkering, and electric power sector prices are assigned to the military

and railroad uses for all years. Tax adjustments are made as described below. The transportation sector average price for each State and year is the consumption-weighted average of the prices of the three uses.

### Physical Unit Prices: All Years

**Vessel Bunkering.** Physical unit prices are calculated from actual or estimated U.S. average bunker C prices and electric power sector State and U.S. residual fuel prices for each year. The ratio of U.S. bunker C price to U.S. residual fuel electric power price is multiplied by the State electric power residual fuel price to obtain the estimated State bunker C price. Taxes are calculated for all years, as described for the commercial sector in 1976 through 1983, and added to the U.S. bunker C price, so that final State vessel bunkering price estimates implicitly taxes. Other procedures are described separately by groups of years:

1. For 1982 forward, national average prices for residual fuel with sulfur content greater than 1 percent are taken from the *Annual Energy Review* and are used as proxies for bunker C prices.
2. For 1975 through 1981, national average bunker C prices are available from the *Monthly Petroleum Product Price Report (MPPPR)*. Annual average U.S. prices for 1975 and 1976 are calculated as the simple average of the monthly prices for each respective year because annual average prices are not shown in the *MPPPR*.
3. For 1970 through 1974, no U.S. bunker C prices are available. To estimate State-level prices for these years, the average ratio of published bunker C prices and electric power sector prices for 1975 through 1979 is calculated and multiplied by the State-level electric power prices for 1970 through 1974.

Missing State prices are assigned adjacent States’ average prices from 1970-1986, as shown in Table TN46.

**Military and Railroad Use.** For all years, electric power sector residual fuel prices are assigned to military and railroad uses. The electric power prices include taxes. Since the military does not pay State taxes, the electric power prices are adjusted to remove taxes.

**Table TN46. Residual Fuel Transportation Sector Price Assignments, 1970–1986**

State	Years	State Prices Used in the Estimation
AL	1970–1974, 1980–1986	FL, GA, MS
CO	1986	KS, NM, UT
CT	1978	NH, VT
DC	1975	MD
	1978	PA
GA	1978	KY, MS
ID	1970, 1979	CA, CO
IL	1975	IA, IN, WI
IN	1980–1986	IL, MI, OH
KS	1975	MO, NE
KY	1980–1984	IL, MO, OH, VA
MD	1978	DE, PA
ME	1975	VT
MN	1986	IL, MI
MT	1983–1985	CO, MN, SD
NC	1975	GA
	1978	KY
	1981, 1983, 1985, 1986	GA, VA
ND	1982–1984	MN, SD
	1986	SD
NH	1975	VT
NM	1983, 1984	CO
NV	1975, 1978	CA
OH	1975	IN, MI
OK	1975	MO, TX
OR	1972	CA, WA
	1975–1986	CA
SC	1975, 1984	GA
	1978	AL, FL
SD	1975, 1978	MN, ND
TN	1970, 1971, 1973, 1974, 1976, 1977, 1980–1982	AR, GA, MO, MS, VA
	1975	AR, GA, MO, MS
	1978	AR, MO, MS
UT	1984	AZ, CO, NV
	1975	CO
VA	1975	GA
	1978	KY
WA	1984, 1985	CA
WI	1978, 1982–1985	IL, MI, MN
	1986	IL, MI
WV	1985	MD, OH, PA, VA
WY	1981, 1982, 1985	CO, MN, SD

In some cases, States have no residual fuel oil price reported for the electric power sector. Electric power Census division prices are assigned to those States that need prices for use in the transportation sector for 1987 forward and for OR in 1971.

**Average Prices.** Transportation sector prices are the average of bunker fuel, military, and railroad prices, weighted by each category's share of total transportation consumption from SEDS.

#### **Btu Prices: All Years**

Btu prices for States are calculated from the physical unit prices and the residual fuel conversion factor. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS.

#### **Data Sources**

##### **Prices**

1982 forward: EIA, *Annual Energy Review*, <http://www.eia.doe.gov/emeu/aer/contents.html>, Table 5.22, row titled "Sales Prices to End Users, Residual Fuel Oil, Greater Than 1 Percent Sulfur Content."

1970 forward: Electric power sector residual fuel price estimates (in physical units) from SEDS.

1976-1981: EIA, *Monthly Petroleum Product Price Report*, Table 3.

1975: Federal Energy Administration, *Monthly Petroleum Product Price Report*, Table 3.

##### **Taxes**

For 1992 forward, an annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the State general sales tax as of September 1 of each year is used.

1996 forward: Federation of Tax Administrators, <http://www.taxadmin.org/fta/rate/sales.html>.

1995: The Council of State Governments, *The Book of the States 1994–95* and *1996–97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

1993: Bureau of the Census, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled “State Gasoline, Sales, and Cigarette Tax Rates as of July 1, 1993,” sales tax rates.

1987–1992: Bureau of the Census, U.S. Department of Commerce, *State Government Tax Collections*, Table 8, column titled “Percentage rate, September 1.”

1976–1986: Bureau of the Census, U.S. Department of Commerce, *Statistical Abstract of the United States*, table titled “State Government Tax Collections and Excise Taxes,” column titled “Excise Taxes, General sales and gross receipts.”

### Consumption

1970 forward: EIA, State Energy Data System, transportation sector residual fuel consumption, including the subcategories for vessel bunkering, military, and railroad uses.

### Conversion Factor: All Years

6.287 million Btu per barrel.

## Other Petroleum Products

Sixteen separate products are included in the category called “other petroleum products.” Of the 16 products, prices are developed for the 7 noted with asterisks (\*) below and described in the following paragraphs. All of these products are used in the industrial sector:

1. Aviation gasoline blending components
2. Crude oil
3. Miscellaneous products (\*)
4. Motor gasoline blending components
5. Natural gasoline, including isopentane (1970–1983)
6. Pentanes plus (1984 forward)
7. Petrochemical feedstocks, naphtha (\*)
8. Petrochemical feedstocks, other oils (\*)
9. Petrochemical feedstocks, still gas (1970–1985) (\*)
10. Petroleum coke (\*)
11. Plant condensate (1970–1983)
12. Special naphthas (\*)
13. Still gas
14. Unfinished oils
15. Unfractionated stream (1970–1983)
16. Waxes (\*).

### Physical Unit Prices: All Years

Only national-level prices are developed for the seven other petroleum products because State-level price information is not available, and taxes are not included in any of the estimates. Consumption for the other nine products are completely removed as process fuel or intermediate products. (See Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).)

Starting in 1984, three products—natural gasoline, plant condensate, and unfractionated stream—are dropped, and pentanes plus is added in the Energy Information Administration (EIA) reporting system that is the basis of the consumption estimates. Natural gasoline (including isopentane) and plant condensate are reported together as the new product, pentanes plus. Unfractionated stream is dropped because its components are reported separately as liquefied petroleum gases.

### Miscellaneous Products

The products in this category vary from inexpensive (absorption oils similar to kerosene) to very expensive (hydraulic fluids). The price estimates are based on the evidence presented in the Bureau of Mines

*Minerals Yearbooks* of the 1970's indicating that the greater part of the miscellaneous product line consists of finished petrochemicals, especially the aromatic hydrocarbons: benzene, toluene, and the xylenes.

Price estimates for 1972, 1977, 1982, 1987, and 1992 are taken from *Census of Manufactures (CM)* data on quantity and value of "aromatics" and "other finished petroleum products" shipped by petroleum refining industries, i.e., Standard Industrial Code (SIC) 2911. The ratio of miscellaneous-products-to-crude-oil price for these 5 years varies widely. The following ratios, shown rounded, are used to estimate miscellaneous products prices for the years indicated:

1970 – 1974:	1.91 times the crude oil price
1975 – 1979:	2.42 times the crude oil price
1980 – 1984:	1.56 times the crude oil price
1985 – 1989:	1.99 times the crude oil price
1990 – forward:	1.86 times the crude oil price.

Quantity data for 1992 are published in pounds and are converted to barrels by use of the conversion factors of 7.282 pounds per gallon and 42 gallons per barrel.

Data from the U.S. Census Bureau *Economic Census 1997* are not used in SEDS estimates because only the value of shipments are published. The quantity data are not published because they are reported in a various units (pounds, barrels, etc.) and cannot be summed.

#### Price Data Sources

1970 forward: EIA, *Annual Energy Review*, <http://www.eia.doe.gov/emeu/aer/contents.html>, Table 5.21, column titled "Composite, Nominal."

1972, 1977, 1982, 1987, 1992: Bureau of the Census, U.S. Department of Commerce, *Census of Manufactures*, data for Standard Industrial Code (SIC) 2911 on "Quantity and Value of Shipments by All Producers" as shown in Table 6a from MC77-I-29A, Product Codes 2911054, 2911056 (1972 and 1977); Table 6a-1 from MC87-I-29A, Product Codes 2911D55 and 2911D57 (1982 and 1987); and Table 6a-1 from MC92-I-29A, Product Codes 2911D 55 and 2911D 57 (1992) .

#### Physical Unit Conversion Factors

1992: Gas Processors Suppliers Association in cooperation with the Gas Processors Association, *Engineering Data Book*, 9th Edition, 4th Revision, 1979, pages 16-2 and 16-3, lines 42-47.

#### Petrochemical Feedstocks, Naphtha

Naphthas for petrochemical feedstock use are those oils with boiling points less than 401° F. Consumer prices for 1978 through 1980 are derived from the special *Annual Survey of Manufacturers (ASM)* series on "Hydrocarbon, Coal, and Coke Materials Consumed" by using data for industries in SIC 2869 (industrial organic chemicals) and SIC 2821 (plastics materials, synthetic resins, and nonvulcanizable elastomers). A price estimate for 1982 is obtained from the *CM* and is based on data for SIC 2869 only. Since the ratio of petrochemical-naphtha-to-crude-oil price is reasonably constant in 1978, 1979, 1980, and 1982, the simple average of the four ratios, 1.23, is used to estimate prices for petrochemical feedstocks, naphthas, for all other years.

#### Price Data Sources

1970-1977, 1981, 1983 forward: EIA, *Annual Energy Review*, <http://www.eia.doe.gov/emeu/aer/contents.html>, Table 5.21, column titled "Composite, Nominal."

1982: Bureau of the Census, U.S. Department of Commerce, *1982 Census of Manufactures*, M82-I-28F-3(P), page 6, SIC 2869.

1980: Bureau of the Census, U.S. Department of Commerce, *1980 Annual Survey of Manufacturers*, M80(AS)-4.3, page 9, SIC 2821.

1978, 1979: Bureau of the Census, U.S. Department of Commerce, *1979 Annual Survey of Manufacturers*, M79(AS)-4.3, page 8, SIC 2821 and 2869.

#### Petrochemical Feedstocks, Other Oils

Petrochemical feedstocks referred to as "other oils" or "gas oils" are those oils with boiling points equal to or greater than 401° F. Consumer

prices for 3 years are obtained from the data on gas oils presented in the special *ASM* series on hydrocarbons consumed by using data for industries in SIC 2865 (cyclic crudes and intermediates). The other-oils-to-crude-oil price ratio is quite stable, and the average ratio for the 3-year period, 1.607, is used to estimate prices for petrochemical feedstocks, other oils, for all other years.

#### Price Data Sources

1970–1977, 1981 forward: EIA, *Annual Energy Review*, <http://www.eia.doe.gov/emeu/aer/contents.html>, Table 5.21, column titled “Composite, Nominal.”

1979, 1980: Bureau of the Census, U.S. Department of Commerce, *1980 Annual Survey of Manufacturers*, M80(AS)-4.3, page 9, SIC 2865.

1978: Bureau of the Census, U.S. Department of Commerce, *1979 Annual Survey of Manufacturers*, M79(AS)-4.3, page 8, SIC 2865.

#### **Petrochemical Feedstocks, Still Gas (1970 Through 1985)**

The source data for still gas is a mixture of consumer prices and producer prices for industries in SIC 2869 and SIC 2911 (petroleum refining). The still-gas-to-crude-oil price ratio is somewhat variable because still gas is a highly variable gaseous mixture. Value and quantity are available for 1972, 1977 through 1980, and 1982. In imputing prices for years when data from the *CM* or *ASM* are not available, the average still-gas-to-crude-oil price ratio, 0.759, is used. After 1985, EIA data series no longer report feedstock and refinery use of still gas separately and all SEDS industrial consumption is removed from the price and expenditure tables. (See Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).)

#### Price Data Sources

1970, 1971, 1981, 1983–1985: EIA, *Annual Energy Review*, Table 5.21, “Composite, Nominal.”

1982: Bureau of the Census, U.S. Department of Commerce, *1987 Census of Manufactures*, MC87-I-29A, Table 6a, SIC 2911.

1979, 1980: Bureau of the Census, U.S. Department of Commerce, *1980 Annual Survey of Manufacturers*, M80(AS)-4.3, page 9, SIC 2869.

1978: Bureau of the Census, U.S. Department of Commerce, *1979 Annual Survey of Manufacturers*, M79(AS)-4.3, page 28, SIC 2869.

1972, 1977: Bureau of the Census, U.S. Department of Commerce, *1977 Census of Manufactures*, MC77-1-29A, page 29A-20, SIC 2911.

#### **Petroleum Coke**

Petroleum coke is consumed in the commercial, industrial, and electric power sectors. See the **Petroleum Coke** section on page 75.

#### **Special Naphthas**

Prices for special naphthas are developed as the simple averages of the city prices for “varnish makers and painters naphtha” and two types of “solvent naphtha” that are published in the *Chemical Marketing Reporter*. For 1984 through 2000, the prices are averaged from the first issue of each month; for 1974, 1979, and 1980, when petroleum prices were increasing rapidly, prices are averaged from 10 randomly selected issues; and for all other years, prices are averaged from at least 5 randomly selected issues.

#### Price Data Sources

2001 forward: Prices no longer available; prices for 2000 are repeated.

1970 through 2000: Schnell Publishing Co., Inc., *Chemical Marketing Reporter*, selected monthly issues.

#### **Waxes**

Waxes data include fully refined crystalline wax, other refined crystalline wax, and microcrystalline wax. Price estimates for 1970 through 1973 and 1986 forward are calculated using the U.S. Department of Commerce, Bureau of the Census, data and dividing the value of exports by the quantity exported. For 1974 through 1985, prices are estimated by applying price indices to a representative base price.

Producer prices for 1967 for the three waxes are available from data in the 1967 *Census of Manufactures*. A weighted-average price for 1967 of \$15.75 per barrel is obtained by summing the values of shipments of the three waxes and dividing the sum by the total quantity shipped. An annual composite price index for these three waxes is listed in the Bureau of Labor Statistics publication *Producer Prices and Producer Price Indexes* for April 1974 through June 1985. Price estimates for 1975 through 1984 are derived by multiplying the published price indices by the estimated 1967 base price. The indices for 1974 and 1985 are estimated as the simple average of monthly price indices that are available for that year. The physical unit conversion factors for wax are 280 pounds per barrel; and 1 pound equals 0.45359237 kilograms.

### Price Data Sources

1989 forward: Bureau of the Census, U.S. Department of Commerce, December issues of Report No. EM-545, titled *Foreign and Domestic Exports* for Paraffin Wax Less Than 0.75 Percent Oil (Commodity 2712200000) and Other Mineral Waxes NESOI (Commodity 2712900000).

1987, 1988: Bureau of the Census, U.S. Department of Commerce, December issues of Report No. EM-546 (1987) and EM-522 (1988), titled *U.S. Exports, Schedule B, Commodity by Country* for “Paraffin Wax and Other Petroleum Waxes Unblended incl Microcrystalline Wax (Commodity 4925200)”.

1986: Bureau of the Census, U.S. Department of Commerce, December issue of EM-546, *U.S. Exports, Schedule B, Commodity by Country* for “Paraffin Wax, Crystalline, Fully Refined (Commodity 4925210),” “Paraffin Wax, Crystalline, Except Fully Refined (Commodity 4925220),” and “Petroleum Waxes, NSPF incl Microcrystalline Wax (Commodity 4925240)”.

1974–1985: Bureau of Labor Statistics, U.S. Department of Labor, *Producer Prices and Producer Price Indexes, Annual Supplement*, Commodity Code 0577.

1974–1985: Bureau of the Census, U.S. Department of Commerce, *Census of Manufactures*, 1967, page 29 A-15, quantity and value of shipments of waxes in 1967.

1970–1973: Bureau of the Census, U.S. Department of Commerce, December issues of FT-410, *U.S. Exports, Schedule B, Commodity by Country* for Paraffin Wax, Crystalline, Fully Refined (Commodity 3326220), Paraffin Wax, Crystalline, Except Fully Refined (Commodity 3326230), and Microcrystalline Wax (Commodity 3326210).

### Btu Prices: All Years

Btu prices for the seven petroleum products are calculated by converting physical unit prices from dollars per barrel to dollars per million Btu by using the conversion factors shown in Table TN47. The U.S. average price that is developed for each product is assigned to the industrial sector of States in years where there is consumption. The State-level and U.S. “other petroleum” average prices are the average of the seven petroleum products, weighted by SEDS consumption data. The variable State average prices reflect the different mix of products consumed.

**Table TN47. Other Petroleum Products Btu Conversion Factors**

Petroleum Product	Million Btu per barrel
Miscellaneous Products	5.796
Petrochemical Feedstocks	
Naphtha	5.248
Other Oils	5.825
Still Gas	6.000
Petroleum Coke	6.024
Special Naphthas	5.248
Waxes	5.537

Table TN48 shows national-level estimated prices and expenditures for the other petroleum product components for selected years from 1970 forward.

**Table TN48. Other Petroleum Price and Expenditure Estimates for the Industrial Sector, United States, Selected Years, 1970 Through 2005**

Year	Price (per barrel)			Price (per gallon)	Price (per barrel)					
	Crude oil	Gasoline	Distillate							
1970	0.80	0.94	0.43	0.53	1.96	4.14	1.12	1.07	--	--
1975	2.43	2.86	1.31	1.42	3.12	4.95	3.85	2.70	--	--
1980	6.68	7.64	4.04	2.19	10.48	12.01	7.57	7.32	--	--
1981	8.26	9.72	4.46	2.75	10.72	13.85	9.51	8.58	--	--
1982	7.26	8.79	2.72	2.15	10.72	15.76	8.60	7.74	--	--
1983	6.80	8.00	3.67	1.55	10.72	14.29	7.82	7.55	--	--
1984	6.71	7.90	3.62	1.66	11.13	13.48	7.72	7.43	--	--
1985	6.27	7.38	3.39	1.86	10.87	13.38	9.17	7.16	--	--
1986	3.41	4.01	(a)	1.53	10.73	14.70	4.99	4.61	--	--
1987	4.20	4.94	(a)	1.50	10.73	13.85	6.14	5.22	--	--
1988	3.44	4.05	(a)	1.45	10.84	11.89	5.03	4.38	--	--
1989	4.21	4.96	(a)	1.68	10.00	18.19	6.16	5.15	--	--
1990	5.21	6.13	(a)	1.73	9.71	14.74	7.13	5.80	--	--
1991	4.47	5.26	(a)	1.50	9.71	16.33	6.12	5.20	--	--
1992	4.32	5.08	(a)	1.18	9.71	24.75	5.91	5.02	--	--
1993	3.85	4.53	(a)	0.97	9.71	19.10	5.27	4.69	--	--
1994	3.65	4.30	(a)	1.02	9.71	24.75	5.00	4.52	--	--
1995	4.04	4.75	(a)	1.15	9.71	23.89	5.53	4.86	--	--
1996	4.85	5.71	(a)	1.51	9.71	22.95	6.65	5.62	--	--
1997	4.46	5.25	(a)	1.37	9.71	24.62	6.11	5.27	--	--
1998	2.93	3.45	(a)	1.27	9.71	20.11	4.02	3.67	--	--
1999	4.10	4.83	(a)	1.31	9.71	20.54	5.62	4.64	--	--
2000	6.62	7.80	(a)	1.39	9.71	21.33	9.07	6.94	--	--
2001	5.38	6.33	(a)	1.55	9.71	19.26	R 7.36	R 5.66	--	--
2002	5.65	6.65	(a)	1.28	9.71	16.53	7.73	5.83	--	--
2003	6.69	7.87	(a)	1.29	9.71	15.76	9.16	6.76	--	--
2004	8.67	10.20	(a)	1.39	9.71	17.35	11.87	8.22	--	--
2005	11.78	13.86	(a)	1.73	9.71	18.25	16.12	11.03	--	--

Year	Expenditure (in billions of dollars)			Expenditure (in billions of dollars)						
	Crude oil	Gasoline	Distillate							
1970	239	171	32	70	323	106	96	--	--	1,038
1975	683	793	124	213	450	166	729	--	--	3,159
1980	3,173	6,564	371	215	2,022	395	1,799	--	--	14,539
1981	3,639	7,074	191	571	1,521	504	1,995	--	--	15,495
1982	2,294	4,588	121	365	1,416	449	1,582	--	--	10,816
1983	1,928	4,093	202	142	1,664	443	1,290	--	--	9,760
1984	1,853	3,712	251	217	2,308	414	1,094	--	--	9,849
1985	1,478	3,729	256	241	1,733	420	1,308	--	--	9,166
1986	1,164	2,449	(a)	190	1,394	450	682	--	--	6,329
1987	1,459	2,742	(a)	283	1,554	453	843	--	--	7,335
1988	1,223	2,360	(a)	283	1,237	404	838	--	--	6,344
1989	1,637	2,704	(a)	313	1,073	609	944	--	--	7,279
1990	1,811	4,622	(a)	400	1,040	491	983	--	--	9,347
1991	1,335	4,350	(a)	311	855	574	933	--	--	8,359
1992	1,629	4,141	(a)	341	1,016	922	592	--	--	8,641
1993	1,348	3,821	(a)	189	1,016	764	499	--	--	7,638
1994	1,455	3,607	(a)	221	787	1,004	530	--	--	7,605
1995	1,506	3,808	(a)	245	688	970	537	--	--	7,753
1996	2,327	4,169	(a)	347	724	1,117	592	--	--	9,275
1997	2,394	4,524	(a)	279	702	1,077	597	--	--	9,572
1998	1,714	2,828	(a)	413	1,042	852	478	--	--	7,326
1999	2,060	3,918	(a)	521	1,412	769	629	--	--	9,310
2000	4,064	5,630	(a)	357	946	706	1,081	--	--	12,783
2001	2,656	4,194	(a)	502	763	700	R 920	--	--	R 9,734
2002	3,291	4,202	(a)	396	995	532	1,038	--	--	10,454
2003	4,099	5,505	(a)	367	782	489	1,153	--	--	12,395
2004	6,495	7,952	(a)	538	496	534	1,346	--	--	17,362
2005	8,227	9,813	(a)	603	607	572	1,818	--	--	21,641

a Consumption data for this series are not available after 1985.  
 -- = Not applicable.  
 R = Revised data.

Note: Expenditure totals may not equal sum of components due to independent rounding.  
 Source: State Energy Data System.

## Section 5. Renewable Energy Sources

Prices and expenditures for renewable energy sources are based on consumption estimates from the State Energy Data System (SEDS). Renewable energy sources reported in SEDS for 1960 forward include estimates of wood and waste in all sectors, hydroelectric power in the industrial sector, and the electric power sector's use of hydropower and geothermal, wind, wood, waste, photovoltaic and solar thermal energy. SEDS also includes, for 1989 forward, the residential and commercial sectors' use of geothermal and solar energy and industrial sector's use of geothermal energy.

### Ethanol

Ethanol, blended into motor gasoline, is included in SEDS motor gasoline consumption volumes. Therefore, the prices associated with SEDS ethanol quantities are the motor gasoline prices. Prior to 1993, ethanol and motor gasoline volumes are reported separately and are summed in SEDS. The appropriate motor gasoline price is applied to both volumes to calculate expenditures for motor gasoline.

### Hydroelectric, Geothermal, Wind, Photovoltaic, and Solar Thermal Energy

In SEDS, it is assumed that there are no direct fuel costs for hydroelectric, geothermal, wind, photovoltaic, or solar thermal energy. SEDS consumption values are adjusted by removing these fuels before calculating energy expenditures, as described in Section 7, "Consumption

Adjustments for Calculating Expenditures," at [http://www.eia.doe.gov/emeu/states/\\_seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/_seds_tech_notes.html).

### Wood and Waste

Prices are estimated for wood and waste in SEDS. It is assumed that taxes are included in the prices reported on the Energy Information Administration "Residential Energy Consumption Survey," the "Manufacturing Energy Consumption Survey," and the various electric power survey forms that are used as the basis for the SEDS price estimates.

### Residential Sector

#### *Physical Unit Prices, All Years*

Prices paid for wood by the residential sector for 1970 forward are based on unpublished data from the Form EIA-457, "Residential Energy Consumption Survey, Fall-Winter 1980-1981" (RECS 1980), and the "1993 Residential Energy Consumption Survey" (RECS 1993). The reported prices include taxes. The nine Census division average prices for residential wood from RECS 1980 are used to estimate prices for 1970 through 1989. The 1980 Census division residential wood prices are adjusted in proportion to the changes in U.S. average residential fuel oil prices each year compared to the 1980 fuel oil price. The Census division estimated prices are assigned to the States within each Census division for 1970 through 1989. The four Census region average prices

for residential wood from RECS 1993 are used to estimate prices for 1990 forward. The 1993 Census division wood prices are adjusted in proportion to the changes in U.S. average residential fuel oil prices each year compared to the 1990 fuel oil price. The estimated Census region wood prices are assigned to the States within each Census region for 1990 forward.

### ***Btu Prices, All Years***

Prices in dollars per cord are converted to dollars per million Btu using the conversion factor of 20 million Btu per cord.

### ***Data Sources***

#### **Prices**

1990 forward: EIA, unpublished data from Form EIA-457, “1993 Residential Energy Consumption Survey,” <http://www.eia.doe.gov/emeu/recs/contents.html>, Census region compilation of the answers to questions J-28 and J-33 through J-36.

1970–1989: EIA, unpublished data from Form EIA-457, “Residential Energy Consumption Survey, Fall-Winter 1980–1981” Census division compilation of data on average prices paid for wood.

1970 forward: EIA, U.S. average residential distillate fuel prices (DFRCDUS) from SEDS.

#### **Consumption**

1970 forward: EIA, State Energy Data System, residential wood consumption adjusted as described in Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).

### ***Conversion Factor***

20 million Btu per cord.

## **Commercial Sector**

### ***Btu Prices, 1989 Forward***

Wood consumption in the commercial sector is estimated for two groups—commercial combined heat and power (CHP) facilities and other commercial entities. State-level wood prices are not available for either of these two groups. The SEDS electric power sector annual average U.S. price for wood is calculated and assigned to the CHP facilities’ consumption each year. The State-level residential wood prices are used for the remaining commercial sector.

Waste is consumed in the commercial sector by commercial combined heat and power facilities only. States with commercial waste consumption are assigned the electric power sector annual average U.S. price for waste.

The State-level commercial sector wood and waste prices are consumption-weighted averages of the consumption and prices of the individual components. The consumption data are adjusted to account for quantities obtained at no cost. (See the discussion in Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).)

### ***Btu Prices, 1970 through 1988***

Wood and waste consumption and prices are not available for commercial combined heat and power facilities prior to 1989. States with commercial wood consumption are assigned the State-level residential wood price.

### ***Data Sources***

#### **Prices**

1989 forward: EIA, U.S. average consumption-weighted electric power wood and waste prices (WDEIDUS and WSEIDUS) from SEDS.

1970 forward: EIA, State-level residential wood prices (WDRCD) from SEDS.

## Consumption

1970 forward: EIA, State Energy Data System, commercial wood and waste consumption adjusted as described in Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).

## Industrial Sector

The industrial sector price estimates for wood and waste combined in SEDS are developed by dividing industrial sector consumers into two groups—manufacturing industries and combined heat and power (CHP) facilities. For the manufacturing industries, wood and waste consumption is estimated separately by the types of wood and waste within the NAICS categories based on data from the EIA “Manufacturing Energy Consumption Survey” and the U.S. Bureau of the Census, economic surveys by industry. The State-level industrial sector wood and waste prices are consumption-weighted averages of the consumption and prices of the individual wood and waste components of each of the NAICS categories. The consumption data used to calculate expenditures in SEDS are adjusted to account for estimated quantities of wood and waste obtained at no cost. (See the discussion in Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).)

### *Btu Prices, 1998 Forward*

#### Manufacturing Industries

For 1998 forward, industrial sector wood and waste prices are consumption-weighted averages based on unpublished data from the Form EIA-846, “Manufacturing Energy Consumption Survey” (MECS). Data from the 1998 MECS were used for 1998 through 2001 and data from the 2002 MECS were used for 2002 forward. MECS collects data on quantities consumed and quantities purchased in million Btu and expenditures in dollars for five types of wood and waste—pulping liquor, agricultural waste, wood harvested from trees, wood refuse and byproducts from mills, and wood and paper refuse. The quantities purchased

and the expenditures are used to calculate average prices for each type of wood and waste. MECS also identifies consumption of the different types of wood and waste by North American Industry Classification System (NAICS). For each of the NAICS codes, an average wood and waste price is calculated by using the consumption of each of the five types of wood and waste to weight the average of their respective NAICS categories prices. These average prices by NAICS code are applied to the SEDS estimates of wood and waste consumption by NAICS code in each State to calculate State-level weighted average prices for 1998 forward.

#### Industrial Combined Heat and Power Facilities

No prices are available for quantities of wood and waste used by industrial combined heat and power (CHP) facilities. The SEDS electric power sector annual average prices for wood and for waste are calculated and assigned to the industrial CHP facilities’ consumption each year.

### *Btu Prices, 1994 through 1997*

#### Manufacturing Industries

For 1994 through 1997, industrial sector wood and waste prices are consumption-weighted averages based on unpublished data from the Form EIA-846, “1994 Manufacturing Energy Consumption Survey” (MECS 1994). MECS 1994 collects data on quantities consumed and quantities purchased in million Btu and expenditures in dollars for five types of wood and waste—pulping liquor, agricultural waste, wood harvested from trees, wood refuse and byproducts from mills, and wood and paper refuse. The quantities purchased and the expenditures are used to calculate average prices for each type of wood and waste. MECS 1994 also identifies consumption of the different types of wood and waste by SIC categories 20, 24, 25, 26, and other (a subtotal of SIC codes 21 through 23 and 27 through 30). For each of the SIC codes, an average wood and waste price is calculated by using the consumption of each of the five types of wood and waste to weight the average of their respective prices. These average prices by SIC code for 1994 are applied to the SEDS estimates of wood and waste consumption by SIC code in each State to calculate State-level weighted average prices for 1994 forward. For 1996 and 1997, SEDS consumption and price estimates are developed using

the 1997 Economic Census, which uses the North American Industry Classification System (NAICS). Data for the NAICS groups that most closely correlate to the SIC groups in MECS are used.

#### **Industrial Combined Heat and Power Facilities**

No prices are available for quantities of wood and waste used by industrial combined heat and power (CHP) facilities. The SEDS electric power sector annual average prices for wood and for waste are calculated and assigned to the industrial CHP facilities' consumption each year.

#### ***Btu Prices, 1990 through 1993***

##### **Manufacturing Industries**

For 1990 through 1993, industrial sector wood and waste prices are consumption-weighted averages based on unpublished data from the Form EIA-846, "1991 Manufacturing Energy Consumption Survey" (MECS 1991). MECS 1991 collects data on quantities consumed and quantities purchased in million Btu and expenditures in dollars for five types of wood and waste—waste materials, pulping liquor, round wood, wood chips, and biomass. The quantities purchased and the expenditures are used to calculate average prices for each type of wood and waste. MECS 1991 also identifies consumption of the different types of wood and waste by SIC categories 20, 24, 26, and other (a subtotal of SIC industries 21 through 25 and 27 through 30). For each of the SIC categories, an average wood and waste price is calculated by using the consumption of each of the five types of wood and waste to weight the average of their respective prices. These average prices by SIC code for 1991 are applied to the SEDS estimates of wood and waste consumption by SIC code in each State to calculate State-level weighted average prices for 1990 through 1993.

##### **Industrial Combined Heat and Power Facilities**

No prices are available for quantities of wood and waste used by industrial combined heat and power (CHP) facilities. The SEDS electric power sector annual average prices for wood and for waste are calculated and assigned to the industrial CHP facilities consumption each year.

#### ***Btu Prices, 1986 through 1989***

##### **Manufacturing Industries**

For 1986 through 1989, industrial sector wood and waste prices are consumption-weighted averages based on data from the Form EIA-846, "1988 Manufacturing Energy Consumption Survey" (MECS 1988). MECS 1988 collects data on inputs of energy for heat, power, and electricity generation and quantities purchased in billion Btu and expenditures in dollars for five types of wood and waste—waste materials, pulping liquor, round wood, wood chips, and biomass. The quantities consumed and the expenditures are used to calculate average prices for each type of wood and waste. MECS 1988 also identifies consumption of the different types of wood and waste by SIC categories 20, 24, 26, and other (mainly SIC 25). For each of the SIC codes, an average wood and waste price is calculated by using the consumption of each of the five types of wood and waste to weight the average of the respective prices. These average prices by SIC code for 1988 are applied to the SEDS estimates of wood and waste consumption by SIC code in each State to calculate State-level weighted average prices for 1986 through 1989.

##### **Industrial Combined Heat and Power Facilities**

Information on industrial CHP facilities' use of wood and waste became available beginning with 1989 data. Although quantities of wood and waste used by industrial CHP facilities are available for 1989, prices are not available. The SEDS electric power sector annual average prices for wood and for waste are calculated and are assigned to the industrial CHP facilities' consumption in 1989.

#### ***Btu Prices, 1980 through 1985***

For 1980 through 1985, industrial sector wood and waste prices are consumption-weighted averages based on data published in the *Manufacturing Energy Consumption Survey: Consumption of Energy, 1985* (MECS 1985), Table 2. MECS 1985 contains data on inputs of energy for heat, power, and electricity generation in trillion Btu for two types of wood and waste—major byproducts and other. MECS 1985 also identifies consumption of the two types of wood and waste by the SIC categories 20, 24, 26, and other (mainly SIC 25). Since no price data

were collected on MECS 1985, the average prices for each of the SIC categories developed from MECS 1988 are applied to the MECS 1985 estimates of wood and waste consumption by SIC code in each State to calculate State-level weighted average prices for 1980 through 1985.

### **Btu Prices, 1970 through 1979**

There are no data available for estimating industrial prices for wood and waste in 1970 through 1979. Therefore, the 1980 State-level average industrial sector wood and waste prices are used for all States in 1970 through 1979.

### **Data Sources**

#### **Prices**

1989 forward: EIA, U.S. average consumption-weighted electric power wood and waste prices (WDEIDUS and WSEIDUS) from SEDS.

2001 forward: EIA, SEDS wood and waste consumption by NAICS categories 311221, 311311, 321113, 321912, 322121, 322130, and 337122, developed from the U.S. Department of Commerce, Bureau of the Census, *2002 Economic Census, Industry Series*, [http://factfinder.census.gov/servlet/FindEconDatasetsServlet?ds\\_name=EC0200A1&lang=en&ts=164989593511](http://factfinder.census.gov/servlet/FindEconDatasetsServlet?ds_name=EC0200A1&lang=en&ts=164989593511), Table 2, data on value added in manufacture. The number of employees from the *2002 Economic Census* are also used.

2002 forward: EIA unpublished data from Form EIA-846, “2002 Manufacturing Energy Consumption Survey,” national data on quantities purchased, quantities consumed as fuel, and expenditures for pulping liquor, agricultural waste, wood harvested from trees, wood refuse and byproducts from mills, and wood and paper refuse, by North American Industry Classifications (NAICS) categories.

1996 through 2000: EIA, SEDS wood and waste consumption by NAICS categories 311221, 311311, 321113, 321912, 322121, 322130, and 337122, developed from the U.S. Department of Commerce, Bureau of the Census, *1997 Economic Census, Industry Series*, <http://factfinder.census.gov/servlet/FindEcon>

[DatasetsServlet?ds\\_name=E9700A1&\\_lang=en&\\_ts=164989057292](http://factfinder.census.gov/servlet/FindEconDatasetsServlet?ds_name=E9700A1&_lang=en&_ts=164989057292), Table 2, data on value added in manufacture. The number of employees from the *1997 Economic Census* is also used.

1998 through 2001: EIA, unpublished data from Form EIA-846, “1998 Manufacturing Energy Consumption Survey,” national data on quantities purchased, quantities consumed as fuel, and expenditures for pulping liquor, agricultural waste, wood harvested from trees, wood refuse and byproducts from mills, and wood and paper refuse, by NAICS categories.

1994 through 1997: EIA, unpublished data from Form EIA-846, “1994 Manufacturing Energy Consumption Survey,” national data on quantities purchased, quantities consumed as fuel, and expenditures for pulping liquor, agricultural waste, wood harvested from trees, wood refuse and byproducts from mills, and wood and paper refuse, by Standard Industrial Classifications (SIC) categories.

1990 through 1995: EIA, SEDS wood and waste consumption by SIC categories 20, 24, 25, 26, and other (SIC 21–23 and 27–30) developed from the U.S. Department of Commerce, Bureau of the Census, *1992 Census of Manufactures, Industry Series*, Table 2, data on value added in manufacture and number of employees.

1990 through 1993: EIA, unpublished data from Form EIA-846, “1991 Manufacturing Energy Consumption Survey,” national data on quantities purchased, quantities consumed as fuel, and expenditures for waste materials, pulping liquor, round wood, wood chips, and biomass.

1986 through 1989: EIA, unpublished data from Form EIA-846, “1988 Manufacturing Energy Consumption Survey,” national data on inputs of energy for heat, power, and electricity generation, quantities purchased, and expenditures for waste materials, pulping liquor, round wood, wood chips, and biomass by SIC categories.

1986 through 1989: EIA, SEDS wood and waste consumption by Standard Industrial Code for 1987 developed from the U.S. Department of Commerce, Bureau of the Census, *1992 Census of Manufactures, Industry Series*, Table 2, revised 1987 data on value added in manufacturing and number of employees.

1980 through 1985: EIA, DOE/EIA-0512(85) *Manufacturing Energy Consumption Survey: Consumption of Energy, 1985*, Table 2. National data on inputs of energy for heat, power, and electricity generation for “Major Byproducts” and “Other” by SIC categories.

1980 through 1985: EIA, SEDS wood and waste consumption by Standard Industrial Code for 1982 developed from the U.S. Department of Commerce, Bureau of the Census, *1982 Census of Manufacturers, Industry Series*, Table 2, data on value added in manufacturing and number of employees.

1970 through 1979: EIA, SEDS 1980 State-level prices for industrial wood and waste.

### Consumption

1970 forward: EIA, State Energy Data System, industrial wood and waste consumption adjusted as described in Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).

## Electric Power Sector

State-level data on the electric power sector wood and waste consumption are taken from SEDS and are collected on Form EIA-906, “Power Plant Report,” and predecessor forms. All electric generation facilities (utilities and nonutility power producers) are required to report consumption on Form EIA-906, but no price data are collected. State and national wood and waste prices in dollars per million Btu are developed for electric utilities from data reported on other EIA and Federal Energy Regulatory Commission (FERC) forms and from telephone surveys. Taxes are included in the prices for all years. Prices are not available for nonutility power producers.

### Prices: All Years

**1989 Forward.** State-level prices for wood and waste used by electric power plants, in dollars per million Btu, are calculated from data obtained from FERC Form 1, FERC-423, and Form EIA-412 (through 2000) and by follow-up telephone calls to the electric companies that are

not required to submit those forms. For States with more than one utility using wood and waste, a consumption-weighted average price is calculated. There are anomalies that are unique to waste used for electric power generation. In some cases of municipal and industrial waste, there is no charge; and in other cases the electric power facilities charge a “tipping fee” for accepting the waste. That is, instead of paying for the fuel, the power plants are paid to take the fuel. For States where all electric power facilities pay nothing for the fuel or charge a fee for receiving it (see Table TN49), a price of zero is assigned. Although the corresponding consumption is included in calculating the average price for all fuels consumed by electric utilities in the State and the United States, the expenditure included is zero.

Information on nonutility power producers’ use of wood and waste became available beginning with 1989 data. Although quantities of wood and waste used by nonutility power producers are available for 1989, prices are not available. The SEDS electric power sector annual average prices for wood and for waste are calculated and are assigned to the nonutility power producers’ consumption for 1989 forward.

**1983 Through 1988.** A U.S. average price in dollars per million Btu is calculated and assigned to all States. The national price is a consumption-weighted average price based on data obtained from FERC Form 1 and Form EIA-412 and by follow-up telephone surveys of the electric utilities that report use of wood and waste for generating electricity.

Prices are erratic for wood and waste used at electric utilities. In addition to the anomalies of no charge for the fuel and the “tipping fee” mentioned above, handling refuse-derived fuel is more labor intensive than handling conventional fossil fuels. The labor expenses are included in the plant’s operating costs, not the fuel costs. Wood and waste prices are also erratic because the demand is relatively small and the pricing mechanism, even for a single facility, may change from year to year. A price or quantity change by a single major user affects the national price more significantly than for any other fuel.

**1978 Through 1982.** National average prices are derived from data collected on FPC Form 423 and published monthly by EIA in *Cost and Quality of Fuels for Electric Utility Plants (C&Q)*. For these years, fossil-fueled plants with a combined capacity of 25 megawatts or greater were required to report on FPC Form 423. Annual prices of wood and waste

**Table TN49. Wood and Waste Used by the Electric Power Sector at No Cost or Charged a Fee, 1989 Forward**

State	Years
Arizona	2001–2005
California	1989–1993
Connecticut	1989–2001
Florida	1999, 2000
Hawaii	1989, 1990
Kentucky	2003
Montana	1989–1994
Ohio	1989–1993
Oregon	2002, 2005

sold to electric utilities are developed as quantity-weighted monthly prices for those plants where wood chips and refuse were used as fuel. Beginning in 1983, the reporting threshold was raised to 50 megawatts, and very few plants reported use of wood and waste on the Form 423 in 1983 and subsequent years.

A detailed review of data in *C&Q* showed that some entries were in error by factors of 10, 100, or 1,000. Accordingly, the following corrections were made. For 1982, the February, March, and April quantities for the Florida Power Corporation were divided by 1,000 to make them 80, 40, and 60 short tons, respectively. The March, April, and May costs for Northern States Power were multiplied by 100 to make them \$0.70 per million Btu. For the 5 months from November 1979 through March 1980, the reported quantities of wood delivered to Burlington Electric Co. were divided by 10 in order to place them in the range of 7,980 to 9,390 short tons. For the 8 months from June 1978 through January 1979, seed corn delivered to the Logansport Indiana Electric Department were included in the waste. For February 1978, the reported quantity of wood delivered to the United Power Associates was divided by 1,000 to make it 90 short tons.

**1970 Through 1977.** The annual prices for wood chips and refuse are derived by deflating the 1978 price by using the gross domestic product implicit price deflator based on 1987 dollars. The deflators are shown in Table TN50.

**Data Sources**

**Prices**

2001 forward: EIA, data reported on FERC Form 1, “Annual Report of Major Electric Utilities, Licensees and Others;” <http://www.eia.doe.gov/cneaf/electricity/page/ferc1.html>, FERC-423, “Monthly Report of Cost and Quality of Fuels for Electric Plants;” <http://www.eia.doe.gov/cneaf/electricity/page/ferc423.html>, and follow-up telephone surveys of the electric utilities that report use of wood and waste for generating electricity.

1983 through 2000: EIA, data reported on FERC Form 1, “Annual Report of Major Electric Utilities, Licensees and Others;” <http://www.eia.doe.gov/cneaf/electricity/page/ferc1.html>, Form EIA-412, “Annual Report of Public Electric Utilities;” FERC-423, “Monthly Report of Cost and Quality of Fuels for Electric Plants;” <http://www.eia.doe.gov/cneaf/electricity/page/ferc423.html>, and follow-up telephone surveys of the electric utilities that report use of wood

**Table TN50. Price Deflators Used for Wood and Waste Prices, 1970–1977**

Years	Deflator	Years	Deflator
1970	35.1	1975	49.2
1971	37.1	1976	52.3
1972	38.8	1977	55.9
1973	41.3	1978	60.3
1974	44.9		

and waste for generating electricity.

1978-1982: EIA, *Cost and Quality of Fuels for Electric Utility Plants*, table titled “Wood Chips, Refuse, and Petroleum Coke Used as Fuel by Steam-Electric Plants.”

1970-1978: EIA, *Annual Energy Review 1991*, Appendix C, Gross Domestic Product and Implicit Price Deflator.

**Consumption**

1970 forward: EIA State Energy Data System, wood and waste consumed by the electric power sector.

## Section 6. Electricity

### Electricity Consumed by End-Use Sectors

Electricity prices in the Energy Information Administration (EIA) State Energy Data System (SEDS) tables are retail prices for sales to ultimate users in nominal dollars per million Btu. Prices are developed for the residential, commercial, industrial, and transportation sectors. Taxes collected by a electricity retailer from an end user and turned over to a government authority are included in the revenues reported in the source data for the electricity prices—the EIA *Electric Sales and Revenue* and *Electric Power Annual*, or the Edison Electric Institute *Statistical Yearbook*—and, therefore, are included in the prices calculated from revenue.

Consumption is based on sales by the electric power sector to ultimate users. Electricity consumption data by State for the residential, commercial, industrial, and transportation sectors are obtained from SEDS. Consumption of electricity in the industrial sector is adjusted for estimated refinery use in each State. (See the discussion in Section 7, “Consumption Adjustments for Calculating Expenditures,” at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).)

#### Physical Unit Prices: 2003 Forward

Physical unit prices for electricity are calculated for the residential, commercial, industrial, and transportation sectors as the average revenue per kilowatthour of sales by all electric power retailers to a State, based on the EIA *Electric Sales and Revenue* database. For some States, there are transportation electricity consumption values in SEDS based on U.S. Department of Transportation data, but no comparable transportation sales and revenue in the *Electric Sales and Revenue*. Prices for each of these States are calculated by applying the percentage change in the

commercial sector prices between the previous year and the current year to the previous year's transportation sector price. In the years when Alabama, Arkansas, and Mississippi have no previous transportation sector price to use in the calculation, the commercial sector price is assigned to the transportation sector. States without transportation sector prices are shown in Table TN51.

#### Physical Unit Prices: 1990 Through 2002

For 1990 through 2002, physical unit prices for States are calculated for all four sectors as the average revenue per kilowatthour of sales by all electric power retailers reporting sales to a State. Revenue and sales data from the Form EIA-861 "Annual Electric Power Industry Report" database, as published in the EIA *Electric Sales and Revenue*, are used to calculate physical unit prices. The prices for the residential and industrial sectors are based directly on the database. Commercial sector prices are calculated as the commercial sector revenues plus the non-transportation portion of “Other” revenues divided by the

**Table TN51. Transportation Electricity Price Estimates, 2003 Forward**

State	Years	Price Estimates
AL	2003–2005	Commercial Sector
AR	2004, 2005	Commercial Sector
IA	2003–2005	Percent Change
ME	2003–2005	Percent Change
MO	2003	Percent Change
MS	2003–2005	Commercial Sector
TN	2003	Percent Change
WI	2003–2005	Percent Change

commercial sales plus the non-transportation portion of “Other” sales. The non-transportation portions of “Other” sales and revenues are estimated using SEDS transportation electricity consumption and the *Electric Sales and Revenue* “Other” sales. The transportation sector prices are based on sales and revenues reported by a non-highway-street-lighting subsector of the “Other” category from the EIA-861 database for 1990 through 2000. Transportation electricity prices for 2001 and 2002 are calculated by applying the percentage change in the commercial sector prices between the previous year and the current year to the previous year’s transportation sector price.

Transportation electricity prices for Massachusetts and New Jersey in 2000 are out of range and are replaced with prices calculated by applying the percentage change in the commercial sector 1999 and 2000 prices to the 1999 transportation sector price.

#### **Physical Unit Prices: 1987 Through 1989**

For 1987 through 1989, State physical unit prices are calculated for all four sectors as the average revenue per kilowatthour of sales by all electric power retailers reporting sales to a State. Revenue and sales data are from the EIA *Electric Power Annual* data files.

The prices for the residential and industrial sectors are based on residential revenues and sales, and industrial revenues and sales, respectively. Commercial sector prices are calculated as the commercial sector revenues plus the non-transportation portion of “Other” revenues divided by the commercial sales plus the non-transportation portion of “Other” sales. The non-transportation portions of “Other” sales and revenues are estimated using SEDS transportation electricity consumption and the *Electric Sales and Revenue* “Other” sales. The transportation sector prices are calculated by dividing the “Other” category revenues by “Other” sales.

#### **Physical Unit Prices: 1970 Through 1986**

For 1970 through 1986, preliminary physical unit prices for States are calculated for all four sectors as the average revenue per unit of sales by all electric power facilities reporting sales to a State. The calculation of physical prices is based upon the revenues and sales data from the

*Statistical Yearbook* for each year in the series. Data for the residential sector and industrial sector are drawn from their respective columns. The commercial sector is the sum of the columns titled “Commercial,” “Street and Highway Lighting,” “Other Public Authorities,” and “Interdepartmental.” The transportation sector is the column titled “Railroads and Railways.”

For 1980 through 1986, prices are based on preliminary revenues and sales data in the given year and are replaced with revised data in the following year. The only exception to this rule is the revenues data for AR in 1981; preliminary data are used in this case because of an apparent error in the revised data.

For 1970 through 1981, MD prices are assigned to DC. There are no other missing prices for the residential, commercial, and industrial sectors.

In the transportation sector, numerous price assignments are made due to the lack of sector-specific price data. Generally, electricity usage in the transportation sector is small; the sector’s electricity use ranged from 0.1 percent to 0.2 percent of total U.S. electricity consumption in 1970 through 1986. From 1970 through 1986, only 15 States used measurable amounts of electricity in the transportation sector (CA, DC, FL, GA, IL, LA, MA, MD, NJ, NY, OH, PA, TN, VA, and WA). A few individual State prices are unavailable and are assigned the commercial sector prices: LA for 1970 through 1986 and TN for 1970 through 1986. (Prices are available for LA in 1970, 1972, 1973, but those prices are replaced by commercial sector prices to maintain a consistent series for the State.) In addition, MA transportation prices for 1985 and 1986 are estimated by multiplying the MA 1985 and 1986 commercial prices by the average of the ratios of the commercial-to-transportation sector prices for 1980 through 1984. Similarly, the VA 1977 transportation price is estimated by multiplying the VA commercial price in 1977 by the average of the ratios of the commercial-to-transportation sectors prices for 1978 through 1982.

In order to reconcile national-level electricity prices based on the *Statistical Yearbook* with the EIA national-level electricity prices published in the *Annual Energy Review (AER)*, yearly adjustment factors are calculated for the residential, commercial, and industrial sectors as follows: a preliminary U.S. price for each sector is calculated as the average of the State prices, weighted by SEDS consumption. These preliminary U.S.

prices are divided by the national-level electricity prices published in the *AER*, and the quotient is used as an adjustment factor. The preliminary State prices are multiplied by the adjustment factor to produce the final physical unit State prices in those sectors. Since no transportation sector prices are published in the *AER*, no adjustments are made to that sector and the final physical unit prices are derived solely from the *Statistical Yearbook* sales and revenue data. The annual adjustment factors for the residential, commercial, and industrial sectors are shown in Table TN52.

### Btu Prices: All Years

Btu prices for States are calculated by dividing the physical unit prices by the conversion factor 3,412 Btu per kilowatthour. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from SEDS, adjusted for process fuel consumption in the industrial sector.

### Data Sources

#### Prices

1990 forward: Sales and revenue data from EIA, Form EIA-861 "Annual Electric Power Industry Report" database as shown in the historical spreadsheets of the *Electric Power Annual* (October 26, 2007), [http://www.eia.doe.gov/cneaf/electricity/epa/sales\\_state.xls](http://www.eia.doe.gov/cneaf/electricity/epa/sales_state.xls), and [http://www.eia.doe.gov/cneaf/electricity/epa/revenue\\_state.xls](http://www.eia.doe.gov/cneaf/electricity/epa/revenue_state.xls), sector category "Total Electric Industry."

Transportation sector variations:

- 2003 forward: Column labeled "Transportation" (new reporting category).
- 2001 and 2002: Prices calculated by EIA.
- 1990–2000: Data for non-highway lighting portion of "Other" from the Form EIA-861 database files at <http://www.eia.doe.gov/cneaf/electricity/page/eia861.html>

1987–1989: EIA, *Electric Power Annual 1988*, Tables 19 and 21 (1987 data); *Electric Power Annual*, Tables 27 and 29 (1988 and 1989).

**Table TN52. Annual Electricity Price Adjustment Factors, 1970 Through 1986**

Year	Residential	Commercial	Industrial
1970	1.05121	1.05712	1.06832
1971	1.05632	1.05926	1.05504
1972	1.05271	1.05514	1.05765
1973	1.06626	1.06188	1.05991
1974	1.09572	1.08098	1.08732
1975	1.09257	1.08098	1.08732
1976	1.07753	1.07755	1.06891
1977	1.06746	1.07675	1.06820
1978	1.06654	1.08273	1.06861
1979	1.06986	1.08349	1.06441
1980	1.04457	1.06109	1.06781
1981	1.05821	1.06943	1.06523
1982	1.06654	1.06351	1.05597
1983	1.05421	1.05301	1.05537
1984	0.99693	1.01924	0.99015
1985	1.00010	1.02008	0.98355
1986	0.99854	1.01518	0.98618

Source: EIA calculations based on data from the *Annual Energy Review* and the *Statistical Yearbook of the Electric Utility Industry*.

1970–1986: Edison Electric Institute (EEI), *Statistical Yearbook of the Electric Utility Industry*, tables titled "Revenues: Total Electric Utility Industry" and "Energy Sales: Total Electric Utility Industry," based on EEI surveys.

1970–1986: EIA, *Annual Energy Review 1989*, Table 95, "Retail Prices of Electricity Sold by Electric Utilities, 1960–1989."

#### Consumption

1970 forward: EIA, State Energy Data System, electricity consumption by end-use sector.

#### Conversion Factor: All Years

3,412 Btu per kilowatthour.

## Nuclear Fuel for Generation of Electricity

Nuclear fuel prices are developed by EIA for the electric power sector. State-level data on the amount of electricity generated from nuclear power are taken from the State Energy Data System (SEDS). Regulated nuclear power plants report fuel costs per kilowatthour to the Federal Energy Regulatory Commission (FERC) annually. These data include all taxes, transportation, and handling costs.

### **Physical Unit and Btu Prices: All Years**

State-level nuclear fuel prices are estimated by EIA in two steps: (1) the total cost of fuels consumed at all nuclear power plants in a State is divided by their total generation of electricity, and (2) the cost per kilowatthour created in step 1 is divided by an annual U.S. average thermal conversion factor to create the price in dollars per million Btu. Occasionally, the fuel costs at nuclear power plants include small amounts of non-nuclear fuels that are necessary to continue essential plant operations during refueling or maintenance of the reactor. When there are not enough data available to calculate average nuclear fuel prices for a State, various methods, described below, are used to estimate prices.

### **Physical Unit Prices: 2001 Forward**

For 2001 forward, in States where there are nuclear electricity generation and fuel cost data available for some plants, but not all, the plants with available data are used to calculate the State average price. Occasionally, a plant is excluded from the State price calculation because the cost data are significantly out of range with other plants in the State. When a State has nuclear electricity generation in SEDS but no fuel cost are available, the average of physical unit prices paid by the same type of nuclear reactors in other States are used in the calculation. For States that have data available for some years but not other years, the national physical unit nuclear price is used to estimate the State price. The ratio of the current year to the previous year national nuclear price is applied to the State's physical unit nuclear fuel price for the previous year. The national prices used in the estimation are the national averages before the missing State prices are assigned. The States and years with specific price assignments are shown in Table TN53.

### **Physical Unit Prices: 1992 Through 2000**

For 1992 through 2000, in States where there are nuclear electricity generation and fuel cost data for some plants, but not all, available data are used to calculate the State average price. In States where nuclear electricity generation for a specific plant is not available, the plant's fuel cost data also are excluded from the State price calculation. In addition, plants that have no fuel cost data available are excluded from the State price calculation because the cost data are significantly out of range with other plants in the State.

Remaining States with missing cost data were assigned prices using one of the following methods: directly assigning a nearby State or the U.S. price; applying the ratio of the previous year to the current year physical unit nuclear fuel prices for a nearby State to the State's physical unit nuclear fuel price for the previous year; or, assigning the State's average price of the preceding and subsequent year.

**Table TN53. Nuclear Electricity Fuel Price Estimates, 2001 Forward**

State	Years	Price Source
CT	2001–2005	PWR Reactors, C14 & W17 Assemblies
IL	2001, 2002, 2004, 2005	Quad Cities
	2003	Average of Quad Cities 2002 & 2004
MA	2001–2005	BWR Reactors, G23 Assemblies
MD	2001–2005	PWR Reactors, C14 Assemblies
MI	2002–2005	Excludes Palisades
NE	2001–2005	PWR Reactors, C14 Assemblies
NH	2003–2005	PWR Reactors, W17 Assemblies
NJ	2001, 2005	Excludes Oyster Creek
	2002–2004	National Year-to-Year Change
NY	2001	Average of Ginna & Nine Mile Point
	2002, 2003	Ginna
	2004, 2005	PWR Reactors, G23, W14 & W15 Assemblies and BWR Reactors, G46 Assemblies
OH	2003, 2004	Perry
PA	2001, 2005	Average of Beaver Valley & Peach Bottom
	2002–2004	Beaver Valley
TX	2002–2005	South Texas
VT	2003–2005	BWR Reactors, G46 Assemblies

When a State has nuclear electricity generation in SEDS, but no fuel cost data are available, the national physical unit nuclear fuel price is used to estimate the State price. The ratio of the current year to the previous year national nuclear fuel price is applied to the State's physical unit nuclear fuel price for the previous year. The national prices used in the estimation are the national averages before missing State prices are assigned.

The States and years estimated using these methodologies are shown in Table TN54.

**Physical Unit Prices: 1970 Through 1991**

For 1970 through 1991, when a State has nuclear electricity generation in SEDS, but no fuel cost data are available, the national physical unit nuclear fuel price is used to estimate the State price. The ratio of the current year to the previous year national nuclear fuel price is applied to the State's physical unit nuclear fuel price for the previous year. The national prices used in the estimation are the national averages before missing State prices are assigned. The States and years with specific price assignments are shown in Table TN54.

**Additional Notes for Nuclear**

- In 2003, the average price for the Quad Cities facility in Illinois was high; therefore, an estimate based on the average of prices for Quad Cities between 2002 and 2004 was used instead. Costs for this facility were incorporated into the prices for Illinois, New York, and Massachusetts.
- In States where nuclear electricity generation for a specific plant is not available, the plant's fuel cost data are also excluded from the State price calculation. This occurred with the Clinton plant in Illinois in 1998 and the Cook plant in Michigan in 1998 and 1999. In addition, plants that have no fuel cost data available are excluded from State price calculations. Specifically, the following plants are omitted: Crystal River (Florida) in 1997; Clinton (Illinois) in 2000; Three-Mile Island (Pennsylvania) in 1999; Palisades (Michigan) in 2000, and 2002 through 2005; and Oyster Creek (New Jersey) in 2000, 2001 and 2005.

**Table TN54. Nuclear Electricity Fuel Price Estimates, 1970 Through 2000**

State	Years	Price Source
AL	1973, 1974, 1976	National Year-to-Year Change
AR	1980	National Year-to-Year Change
AZ	1985	National Year-to-Year Change
CO	1977, 1978, 1982–1984, 1986–1989	National Year-to-Year Change
	1985	Assigned zero
CT	1997	Assigned zero
	1998	NH
FL	1997	Excludes Crystal River
GA	1974, 1978	National Year-to-Year Change
	2000	Average of 1999 & 2001
IL	1997	Excludes LaSalle, Zion, & Clinton
	1998	Excludes LaSalle & Clinton
	2000	Excludes Clinton
ME	1972	National Year-to-Year Change
	1997	Assigned zero
MA	1999–2000	VT
MI	1997	Excludes Big Rock Point
	1998, 1999	Excludes Cook
	2000	Excludes Palisades
MS	1984	National Year-to-Year Change
MO	1984, 1985	National Year-to-Year Change
NC	1982	National Year-to-Year Change
NE	1999, 2000	IA
NJ	2000	Excludes Oyster Creek
NY	1998	Excludes Indian Point 2
OH	1986	National Year-to-Year Change
OR	1975, 1993	Assigned zero
PA	1999	Excludes Three-Mile Island
	2000	Average of Beaver Valley & Peach Bottom
SC	1970	National Year-to-Year Change
	1985	Adjusted for Catawba expenses
TN	1980, 1986, 1987	Assigned zero
WA	1970–1987	U.S.
WI	1970	National Year-to-Year Change

- Occasionally, a plant is excluded from the State price calculation because the cost data are significantly out of range with other plants in the State. This occurred with LaSalle, Zion, and Clinton in Illinois in 1997, LaSalle in Illinois in 1998, Big Rock Point in Michigan in 1997, and Indian Point 2 in New York in 1998.
- There are no prices available for Washington in 1970 through 1987 and national prices are assigned. Connecticut is assigned the New Hampshire average price in 1998, and Massachusetts is assigned the Vermont average price for 1999 and 2000. Nebraska is assigned the Iowa average price for 1999 and 2000.
- In 2000, Georgia is assigned the average of the 1999 and 2001 Georgia prices. In addition, prices for Georgia in 1978, North Carolina in 1982, and Ohio in 1986, are estimated using the ratio of the previous year to the current year national prices because the prices calculated using available data are significantly different from prices for other years for these States.
- Nuclear electricity generation levels are negative for Colorado in 1985, Tennessee in 1986 and 1987, Oregon in 1993 and Connecticut and Maine in 1997, indicating that the nuclear power plants used more energy than they supplied. In these cases, the fuel prices and expenditures are set to zero.
- For Missouri in 1985, a large credit resulting from litigation is assigned to fuel costs, creating an artificially low price. The 1986 Missouri price, which is in the range of the prices of other nuclear fuel plants, is used to estimate the 1985 price by applying the ratio of the 1985-to-1986 national prices.
- The 1985 Energy Information Administration (EIA) *Historical Plant Costs and Annual Production Expenses for Selected Electric Plants* has a footnote for the Duke Power Catawba plant in South Carolina stating that the reported production expenses represent only 12.5 percent of the actual production expenses. The production expenses used in the calculation for the Catawba plant are adjusted accordingly.

## Data Sources

### Prices

2004 Forward: EIA, Office of Coal, Nuclear, and Alternate Fuels (CNEAF), from data published in *NuclearFuel*, <http://www.platts.com/Nuclear/Newsletters%20&%20Reports/Nuclear%20Fuel/>, (a division of Platts, a McGraw-Hill Company). The data are collected on FERC Form 1, “Annual Report of Major Electric Utilities, Licensees, and Others.”

2000–2003: EIA, Office of Coal, Nuclear, and Alternate Fuels (CNEAF), from data published in *Nucleonics Week*, [http://www.platts.com/Nuclear/Newsletters %20&%20Reports/Nucleonics%20Week//](http://www.platts.com/Nuclear/Newsletters%20&%20Reports/Nucleonics%20Week//), (a division of Platts, a McGraw-Hill Company). The data are collected on FERC Form 1, “Annual Report of Major Electric Utilities, Licensees, and Others.”

1997–1999: EIA, CNEAF, from data published in *Nucleonics Week*, <http://www.platts.com/Nuclear/Newsletters%20&%20Reports/Nucleonics%20Week//>, (a division of Platts, a McGraw-Hill Company). The data are collected on FERC Form 1, “Annual Report of Major Electric Utilities, Licensees, and Others,” and Form EIA-412, “Annual Report of Public Electric Utilities,” <http://www.eia.doe.gov/cneaf/electricity/page/data.html>.

1992–1996: EIA, CNEAF, from data compiled by the Utility Data Institute, (a McGraw-Hill Company). The data are collected on FERC Form 1, “Annual Report of Major Electric Utilities, Licensees, and Others,” and Form EIA-412, “Annual Report of Public Electric Utilities,” <http://www.eia.doe.gov/cneaf/electricity/page/data.html>.

1988–1991: EIA, *Electric Plant Cost and Power Production Expenses*, Table 16 (1988–1990) and Table 14 (1991).

1982–1987: EIA, *Historical Plant Costs and Annual Production Expenses for Selected Electric Plants*, Table 18 (1982-1984) and Table 20 (1985–1987).

1979–1981: EIA, *Thermal Electric Plant Construction Cost and Annual Production Expenses*, pages 267–279 (1979), Table 11 (1980 and 1981).

1975–1978: EIA, *Steam Electric Plant Construction Cost and Annual Production Expenses*, “Section II-Nuclear Plants.”

1970–1974: Federal Power Commission, *Steam Electric Plant Construction Costs and Annual Production Expenses*, data sheets for Nuclear Plants (1970–1973), and “Section II-Nuclear Plants” (1974).

### Consumption

1970 forward: EIA, State Energy Data System, electricity generated by nuclear power.

### Conversion Factors

1985 forward: EIA, annual U.S. average factors calculated using the heat rate reported on Form EIA-860, “Annual Electric Generator Report” (and predecessor forms), and the generation reported on Form EIA-906, “Power Plant Report” (and predecessor forms). The factors are published in the State Energy Data Consumption Technical Notes, Appendix Table B1, [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html).

1970 through 1984: EIA, annual U.S. average factors calculated by dividing the total heat content consumed in nuclear generating units by the total (net) electricity generated by those nuclear generating units. The heat content and electricity generation are reported on Form FERC-1 and Form EIA-412, and predecessor forms.

## Electricity Imports and Exports

Electricity transmitted across U.S. borders with Canada and Mexico are included in the State Energy Data System electric power sector.

Quantities and value of U.S. electricity imports and exports are available in the foreign trade statistics published by the U.S. Department of Commerce, Bureau of the Census. The annual U.S. total imports and exports quantities and revenues are used to calculate U.S. annual average prices that are assigned to each of the States with electricity trade. The prices in dollars per megawatthour are converted to dollars per million Btu using the factor of 3,412 Btu per kilowatthour for 1989 forward. Imports and exports quantity and revenue data are not available for calculating prices for 1970 through 1988; prices for those years are estimated by applying annual percentage changes in industrial sector electricity prices to the 1989 U.S. average electricity imports and exports prices.

### Data Sources

#### Prices

1989 forward: U.S. Department of Commerce, Bureau of the Census taken from the U.S. International Trade Commission's Interactive Tariff and Trade DataWeb database, <http://dataweb.usitc.gov>.

1970–1988: EIA, State Energy Data System, industrial sector electricity prices.

#### Consumption

1970 forward: EIA, State Energy Data System, electricity imports and electricity exports.

### Conversion Factor, All Years

3,412 Btu per kilowatthour.



## Section 7. Consumption Adjustments for Calculating Expenditures

Expenditures developed in the EIA State Energy Data System (SEDS) are calculated by multiplying the price estimates by the SEDS consumption estimates. The consumption estimates are adjusted to remove process fuel, intermediate petroleum products, electricity exports, and other consumption that has no direct fuel costs, i.e., hydroelectric, geothermal, wind, solar and photovoltaic energy sources, and some wood and waste.

Almost all aspects of energy production, processing, and distribution consume energy as an inherent part of those activities. SEDS industrial and transportation sector consumption estimates include energy consumed in the process of providing energy to the end-use consumer and are called “process fuel.” Familiar examples include energy sources used in drilling for oil and gas and transporting natural gas and petroleum by pipeline. Another “process fuel” is the energy used in generating and delivering electricity to end users. Energy products that are subsequently incorporated into another energy product for end-use consumption are called “intermediate products.” Motor gasoline blending components are familiar examples of intermediate products that are consumed as part of the finished motor gasoline sold at service stations and other outlets.

Process fuel and intermediate products are not purchased by the end user and, therefore, do not have prices. Although the end user does not consume either process fuel or intermediate products directly, he does pay for them, because the cost to the processor or distributor is passed on to the end user in the price of the final end-user product. If their use was left in the consumption estimates and was assigned prices, the expenditures would be counted twice, first as paid by the “processor” (producer, processor, or transporter) and again as included in the price to the end user.

Some renewable energy sources are not purchased. These include hydroelectric, geothermal, wind, photovoltaic, and solar thermal energy. The consumption of these sources, which are measured in SEDS as kilowatthours of electricity produced, are not included in the State energy expenditure estimates since there are no “fuel costs” involved. Wood and waste can be purchased or obtained at no cost. Wood consumption estimates in the residential sector, and wood and waste in the commercial and industrial sectors are adjusted in SEDS to remove estimated quantities that were obtained at no cost.

To estimate energy expenditures in the price and expenditure tables, the consumption of process fuel, intermediate products, and some of the renewable energy sources are subtracted from the end-use sector in which they are included in SEDS, either the residential, commercial, industrial, or transportation sector, and there are no prices associated with them.

Process fuel consumption adjustments include:

1. Fuel (petroleum, natural gas, steam coal) and electricity consumed at refineries
2. Crude oil lease, plant, and pipeline fuel
3. Natural gas lease and plant fuel
4. Natural gas pipeline fuel
5. Electrical system energy losses (i.e., energy consumed in the generation, transmission, and distribution of electricity).

Intermediate product consumption adjustments include:

1. Aviation gasoline blending components
2. Motor gasoline blending components
3. Natural gasoline (1970 through 1983)
4. Pentanes plus (1984 forward)
5. Plant condensate (1970 through 1983)

6. Unfinished oils
7. Unfractionated stream (1970 through 1983).

Starting in 1984, natural gasoline (including isopentane) and plant condensate are reported together as the new product, pentanes plus, and the components of unfractionated stream are reported separately under liquefied petroleum gases.

Renewable energy consumption adjustments include:

1. Photovoltaic and solar thermal energy in the residential (including commercial) sector and electric power sector;
2. Geothermal energy in the residential, commercial, industrial, and electric power sectors;
3. Electricity generated from hydropower in the commercial, industrial, and electric power sectors; and
4. Electricity generated from wind energy in the electric power sector; and
5. Estimated portions of wood consumed in the residential sector, and wood and waste in the commercial and industrial sectors that were obtained at no cost.

Table TN55 shows the quantities of energy, by State, removed from SEDS consumption to calculate expenditures for 2005. Table TN56 shows the adjustments made to SEDS national consumption estimates for 1970 through 2005 to derive the net consumption data used to calculate expenditures.

State adjustment estimates from 1970 forward are available in the SEDS comma-delimited file at [http://www.eia.doe.gov/emeu/states/sep\\_prices/total/csv/pr\\_adjust\\_consum.csv](http://www.eia.doe.gov/emeu/states/sep_prices/total/csv/pr_adjust_consum.csv).

### **Adjustment Procedures**

**Hydroelectricity, Geothermal, Wind, Photovoltaic, and Solar Thermal Energy.** Electricity generated from hydropower and geothermal, wind, photovoltaic, and solar thermal energy has no fuel cost. Operation and maintenance costs associated with these energy sources are included indirectly in the prices of the electricity sold by power producers. Therefore, use of these renewable sources for electricity generation is removed from the expenditure calculations. Direct use of

geothermal and solar energy also has no fuel cost and is omitted from SEDS energy expenditure calculations.

**Residential Wood.** Some residential wood is purchased and some acquired at no cost. Based on responses to the Form EIA-457, "1980 Residential Energy Consumption Survey," Census division percentages of wood purchased were developed and applied to the residential wood consumption in each State in the divisions in 1970 through 1989. Based on responses to the Form EIA-457, "1993 Residential Energy Consumption Survey," Census region percentages were developed and applied to the residential wood consumption of the States in each region in 1990 forward.

**Commercial Wood and Waste.** Some commercial wood and waste is purchased and some acquired at no cost. Conventional commercial wood acquired at no cost was estimated using the same percentages used for the residential sector. Wood and waste acquired at no cost by commercial combined heat-and-power facilities was estimated using the U.S. annual average percentages of wood and percentages of waste acquired at no cost by the electric power sector.

**Industrial Wood and Waste.** The cost of wood and waste products used for energy vary widely from more expensive woods to free industrial waste products. Industrial consumption is broken into two segments, manufacturing industries and combined heat and power (CHP) facilities in order to estimate quantities received at no cost.

Adjustments to manufacturing wood and waste consumption in 1994 forward are based on information gathered on the Form EIA-846, "1994 Manufacturing Energy Survey (MECS)." Adjustments to manufacturing consumption in 1980 through 1993 are based on information gathered on the Form EIA-846, "1991 Manufacturing Energy Survey." Adjustments to industrial wood and waste consumption in 1970 through 1979 are based on the 1980 average ratios for each State. The 1991 and 1994 MECS report the quantities consumed and quantities purchased of five types of wood and waste in each of four (MECS1991) or five (MECS 1994) SIC categories of industries. The two quantity series are used to calculate SIC category average percentages of wood and waste obtained at no cost. These percentages are applied to the estimated consumption in those SIC categories in each State to estimate the State's manufacturing uncosted wood and waste.

**Table TN55. Energy Consumption Adjustments for Calculating Expenditures by State, 2005**  
(Billion Btu)

e	e ine e							
	i i e	e id		e e a			e ii b	
AK .....	130	—	23	34,304	34,915	—	217	69,589
AL .....	73	3	2	15,402	22,598	—	10,314	48,392
AR .....	77	—	3	11,606	11,992	—	5,022	28,700
AZ .....	—	—	—	242	—	—	—	242
CA .....	897	63	6,339	264,291	81,990	—	9,448	363,029
CO .....	—	—	516	11,400	12,150	—	2,005	26,070
CT .....	—	—	—	539	—	—	—	539
DC .....	—	—	—	—	—	—	—	—
DE .....	98	1,471	113	27,157	1,759	24	533	31,156
FL .....	—	—	—	2,051	—	—	—	2,051
GA .....	—	—	—	3,955	—	—	—	3,955
HI .....	35	4,437	51	15,848	45	—	736	21,151
IA .....	—	—	—	1,405	—	—	—	1,405
ID .....	—	—	—	—	—	—	—	—
IL .....	42	48	726	114,961	15,431	22	4,512	135,742
IN .....	36	88	109	56,478	15,691	36	4,813	77,251
KS .....	25	53	7	36,727	6,968	1	1,098	44,880
KY .....	24	22	362	33,470	6,939	9	4,259	45,085
LA .....	68	9	138	354,706	126,506	—	7,685	489,113
MA .....	—	—	—	1,123	—	—	—	1,123
MD .....	—	—	—	227	—	—	—	227
ME .....	—	—	—	—	—	—	—	—
MI .....	18	144	306	16,172	13,172	13	3,417	33,242
MN .....	29	174	251	41,575	5,611	7	2,189	49,837
MO .....	—	—	—	787	—	—	—	787
MS .....	36	1	3	39,533	13,446	—	4,345	57,362
MT .....	—	245	92	21,827	1,884	—	796	24,844
NC .....	—	—	—	4,843	—	—	—	4,843
ND .....	19	33	58	7,801	1,158	27	300	9,396
NE .....	—	—	—	156	—	—	—	156
NH .....	—	—	—	—	—	—	—	—
NJ .....	334	884	222	104,840	8,668	1	1,914	116,863
NM .....	22	—	1	14,284	13,915	—	1,809	30,031
NV .....	215	1	305	184	1,421	—	2,425	4,551
NY .....	—	—	—	3,688	—	—	—	3,688
OH .....	31	209	346	67,707	17,972	14	5,836	92,116
OK .....	18	35	416	57,224	12,808	5	1,467	71,972
OR .....	—	—	—	181	—	—	—	181
PA .....	971	3,943	2,200	106,315	21,962	531	7,737	143,660
RI .....	—	—	—	—	—	—	—	—
SC .....	—	—	—	4,326	—	—	—	4,326
SD .....	—	—	—	—	—	—	—	—
TN .....	21	48	65	27,312	5,738	24	3,306	36,513
TX .....	225	12	1,153	607,050	220,943	—	27,532	856,915
UT .....	—	500	102	20,512	3,265	—	1,329	25,707
VA .....	—	—	—	6,852	—	—	—	6,852
VT .....	—	—	—	—	—	—	—	—
WA .....	197	69	859	72,710	6,757	—	4,158	84,751
WI .....	29	170	173	5,726	7,722	11	2,495	16,327
WV .....	729	906	79	8,041	4,789	224	1,825	16,593
WY .....	—	305	94	18,958	5,051	—	1,332	25,740
US .....	4,398	13,875	15,114	2,244,495	703,263	951	124,859	3,106,956

See footnotes at end of table.

**Table TN55. Energy Consumption Adjustments for Calculating Expenditures by State, 2005 (Continued)**  
(Billion Btu)

e	e i d e n i		e i		n d i					n p i n		e i e n e
	e e n d c	d	e e n d d e e i i	d n d e	d e i e e n n d i p e i n e e	e e n d n e	d e e i i	e e	d n d e	i p e i n e e		
AK	78	1,628	57	274	—	303,709	—	—	15	2,621	47,577	425,549
AL	103	3,634	—	593	—	15,560	—	37	110,403	15,471	668,503	862,696
AR	430	1,522	—	271	—	1,731	—	19	47,182	8,993	345,976	434,824
AZ	2,972	3,699	78	618	—	23	—	205	633	17,696	520,034	546,200
CA	17,160	23,093	1,080	5,235	—	41,506	—	1,258	25,185	10,978	1,905,419	2,393,942
CO	391	3,062	342	499	—	52,862	—	225	169	13,654	362,373	459,646
CT	665	2,686	—	438	—	—	—	—	2,793	3,427	248,024	258,573
DC	1	501	—	82	—	—	—	—	—	513	88,554	89,650
DE	173	635	—	104	—	—	—	—	43	42	90,957	123,109
FL	30,726	3,254	999	664	—	1,395	—	—	61,019	10,266	1,686,042	1,796,415
GA	409	6,196	11	1,011	—	—	198	19	108,554	5,874	991,235	1,117,461
HI	1,539	—	9	1,077	—	—	339	2	939	2	76,486	101,544
IA	194	3,628	390	840	—	—	—	—	18,967	11,695	320,432	357,551
ID	101	884	841	144	—	—	—	835	15,044	5,627	163,770	187,247
IL	1,589	11,887	—	1,940	—	61	—	—	12,082	11,015	1,086,568	1,260,883
IN	1,605	6,210	390	2,939	—	99	—	—	14,833	6,718	798,508	908,554
KS	83	3,338	407	544	—	20,118	—	—	2,320	29,163	292,459	393,313
KY	775	3,241	407	529	—	3,679	—	—	13,052	8,491	669,626	744,885
LA	452	2,385	407	389	—	153,732	—	37	92,719	43,818	579,977	1,363,030
MA	216	5,081	390	1,077	—	—	—	—	2,482	1,828	428,880	441,077
MD	302	3,964	—	1,635	—	—	—	—	7,796	2,277	512,350	528,551
ME	127	1,270	—	1,062	—	—	6,250	—	44,006	630	92,651	145,995
MI	2,033	10,333	401	3,742	—	10,764	290	—	23,632	28,188	827,703	940,329
MN	591	6,127	—	1,187	—	—	1,296	—	23,465	22,524	494,766	599,793
MO	178	7,210	—	1,202	—	—	—	—	3,875	2,606	606,591	622,450
MS	24	2,154	423	351	—	5,900	—	37	36,258	22,111	343,996	468,617
MT	99	679	233	111	—	5,408	—	63	6,951	8,275	101,014	147,676
NC	518	6,619	178	1,080	—	—	7,222	—	42,063	4,469	961,782	1,028,773
ND	212	851	213	139	—	7,567	—	—	1,271	13,785	81,238	114,671
NE	141	2,134	465	383	—	239	—	—	3,767	4,480	202,165	213,932
NH	59	1,069	—	174	—	—	82	—	4,448	22	84,270	90,124
NJ	1,715	3,494	—	570	—	—	17	—	1,759	1,285	613,758	739,461
NM	220	1,297	129	212	—	79,982	—	593	234	20,340	154,674	287,712
NV	1,141	1,414	845	231	—	5	—	377	355	2,347	243,569	254,835
NY	1,008	24,354	468	5,219	—	826	594	—	11,327	10,637	1,125,249	1,183,370
OH	1,207	11,638	401	1,966	—	883	—	—	14,600	13,951	1,200,407	1,337,168
OK	34	1,957	—	319	—	66,238	—	—	14,803	32,867	402,496	590,686
OR	1,300	9,138	657	1,490	—	22	—	171	16,737	7,585	348,164	385,444
PA	1,039	5,521	390	1,947	—	5,020	—	—	21,962	31,913	1,111,200	1,322,651
RI	32	851	—	139	—	—	—	—	45	732	60,322	62,121
SC	278	3,277	25	1,146	—	—	—	—	41,234	2,522	608,941	661,750
SD	139	957	578	156	—	549	—	47	85	5,791	73,527	81,828
TN	114	4,526	—	738	—	71	7,715	—	33,580	9,506	778,697	871,461
TX	1,222	8,032	431	1,414	—	298,653	—	—	35,982	83,536	2,505,027	3,791,213
UT	76	1,290	275	210	—	22,288	—	359	109	9,344	187,361	247,020
VA	646	5,396	423	3,782	—	2,872	132	—	47,236	5,176	815,750	888,264
VT	55	573	—	93	—	—	211	—	1,427	14	44,089	46,464
WA	181	15,455	1,026	2,521	—	—	24	—	37,016	8,437	625,212	774,623
WI	406	5,677	74	1,097	—	—	2,026	—	44,295	3,750	527,117	600,769
WV	56	1,551	5	253	—	7,498	5,556	—	736	21,060	225,968	279,277
WY	7	369	1,013	60	—	30,701	—	17	14,760	14,760	105,952	178,696
US	74,823	235,741	14,460	53,898	—	1,139,957	31,951	4,300	1,049,563	602,814	27,437,445	33,751,875

<sup>a</sup> In this table, "other petroleum" consists of: still gas and petroleum coke consumed as process fuel; and aviation gasoline blending components, motor gasoline blending components, pentanes plus, and unfinished oils used as intermediate products.

<sup>b</sup> Electricity is converted at the rate of 3,412 Btu per kilowatthour.

<sup>c</sup> Solar thermal and photovoltaic energy. Includes small amounts consumed by the commercial sector that cannot be separately identified.

— = No consumption.

Source: EIA, State Energy Data System.

**Table TN56. Energy Consumption Adjustments for Calculating Expenditures, 1970 Through 2005**  
(Trillion Btu)

Year	n pin	Ad en													n pin ed in xpendi e in
		e iden i		e i		nd i						np in		e i e ne e	
		e e nd a	d	e e nd d ee ii	d nd e	e ine e	de i e e n nd ipe ine e	e e nd n e	d ee ii	e e	d nd e	ipe ine e			
1970	67,747	—	298	—	6	2,714	—	1,442	34	—	788	740	11,503	17,525	50,222
1971	69,193	—	284	—	5	2,694	—	1,456	34	—	804	761	12,103	18,140	51,053
1972	72,721	—	282	—	5	2,847	—	1,497	34	—	859	786	13,056	19,366	53,355
1973	75,778	—	263	—	5	3,010	—	1,539	35	—	900	745	13,900	20,395	55,382
1974	73,975	—	275	—	5	2,983	—	1,520	33	—	896	684	14,109	20,506	53,470
1975	72,023	—	316	—	6	2,884	—	1,434	32	—	822	595	14,341	20,430	51,593
1976	76,043	—	357	—	7	2,907	—	1,679	33	—	942	559	15,195	21,679	54,364
1977	78,028	—	402	—	8	3,008	—	1,706	33	—	989	544	15,938	22,627	55,401
1978	80,055	—	462	—	9	2,939	—	1,694	32	—	1,081	541	16,713	23,471	56,584
1979	80,926	—	543	—	10	3,078	—	1,534	34	—	1,086	613	16,922	23,819	57,107
1980	78,306	—	627	—	15	3,052	—	1,058	33	—	1,283	650	17,241	23,960	54,347
1981	76,378	—	651	—	16	2,204	—	959	33	—	1,354	660	17,230	23,106	53,272
1982	73,246	—	724	—	17	2,089	—	1,144	33	—	1,310	614	16,893	22,823	50,423
1983	73,107	—	722	—	17	2,121	140	1,010	33	—	1,480	505	17,332	23,361	49,746
1984	76,734	—	733	—	16	2,254	135	1,113	33	—	1,510	545	17,879	24,218	52,516
1985	76,653	—	755	—	18	2,046	128	1,001	33	—	1,503	521	18,270	24,275	52,378
1986	76,819	—	688	—	20	2,285	103	954	33	—	1,478	501	18,249	24,313	52,506
1987	79,172	—	634	—	22	2,485	72	1,194	33	—	1,472	538	18,679	25,130	54,042
1988	82,920	—	676	—	24	2,696	85	1,134	33	—	1,531	633	19,593	26,405	56,515
1989	84,987	58	684	3	73	2,710	59	1,103	28	2	684	650	21,010	27,063	57,924
1990	84,749	61	337	4	59	2,803	51	1,269	31	2	716	682	21,427	27,443	57,306
1991	84,664	64	353	4	60	2,668	39	1,164	30	2	685	621	21,621	27,311	57,353
1992	86,017	66	371	4	66	2,954	27	1,208	31	2	689	608	21,486	27,514	58,503
1993	87,677	68	308	4	68	2,878	21	1,199	30	2	642	643	22,282	28,146	59,531
1994	89,314	70	292	5	66	2,991	19	1,153	62	3	662	706	22,571	28,602	60,712
1995	91,261	71	292	6	66	2,915	15	1,253	55	3	445	723	23,363	29,206	62,055
1996	94,294	72	303	7	77	3,203	14	1,280	61	3	495	734	24,075	30,324	63,970
1997	94,934	72	233	7	80	3,196	5	1,251	58	3	493	781	24,331	30,511	64,423
1998	95,208	72	207	8	71	3,042	—	1,212	55	3	493	657	25,270	31,091	64,117
1999	96,813	72	218	9	66	3,051	—	1,103	49	4	495	663	25,856	31,585	65,229
2000	98,857	70	235	9	67	2,941	—	1,110	42	4	459	659	26,564	32,158	66,699
2001	96,424	69	210	9	52	R 3,152	—	R 1,139	33	5	456	R 641	25,935	R 31,701	R 64,724
2002	98,143	69	213	9	55	3,060	—	1,175	39	5	574	696	26,505	R 32,399	R 65,743
2003	98,501	71	225	12	61	3,174	—	1,186	43	3	613	R 614	26,434	R 32,435	R 66,065
2004	100,236	73	230	13	53	R 3,092	—	R 1,116	33	4	774	R 582	26,904	R 32,873	R 67,364
2005	100,369	75	236	14	54	3,107	—	1,140	32	4	1,050	603	27,437	33,752	66,617

<sup>a</sup> Solar thermal and photovoltaic energy. Includes small amounts consumed by the commercial sector that cannot be separately identified. See Section 5 of the Technical Notes for explanation of estimation methodology.  
— = No consumption.  
R = Revised data.  
Note: Totals may not equal sum of components due to independent rounding.

Sources: EIA, State Energy Data System. All data are available via the full-precision data file (CSV) at [http://www.eia.doe.gov/emeu/states/sep\\_prices/total/csv/pr\\_adjst\\_consum.csv](http://www.eia.doe.gov/emeu/states/sep_prices/total/csv/pr_adjst_consum.csv). See also the following individual data series shown at [http://www.eia.doe.gov/emeu/states/sep\\_use/total/pdf/use\\_us.pdf](http://www.eia.doe.gov/emeu/states/sep_use/total/pdf/use_us.pdf):  
n pin Table 7 • eiden i e e nd Table 8 • e i  
e e nd d ee ii Table 9 • nd i d ee ii Table 10.

Estimates of wood and waste obtained at no charge by industrial CHP facilities for 1989 forward are estimated using the U.S. annual average percentages of wood and percentages of waste acquired at no cost by the electric power sector.

Each State's industrial wood and waste consumption quantities acquired at no cost are the sum of the estimated manufacturing and CHP facilities' quantities for each year.

**Refinery Fuel.** Petroleum refinery consumption of distillate fuel, residual fuel, liquefied petroleum gases, petroleum coke, still gas, natural gas, steam coal, and electricity is estimated for each State and subtracted from the State's industrial sector total of each energy source.

Refineries' consumption of each fuel is available in the data sources by State or group of States (1970 through 1980) and by Petroleum Administration for Defense (PAD) districts or subdistricts (1981 forward). Where State-level data for the individual fuels are not available, they are estimated by allocating the group or district's values to the States with operating refineries within that group or district. The refining States' industrial sector consumption of each fuel is added together for each group or district to derive that group or district's industrial sector consumption subtotal. Then each State's portion of the group or district's refinery fuel consumption is calculated in proportion to its share of the group or district's industrial sector consumption subtotal.

In some cases, the estimated State refinery fuel consumption of residual fuel or LPG exceeds the estimate of the total industrial sector consumption of that fuel for that State. When this occurs, the refinery fuel consumption for the PAD district or subdistrict, group of States, or individual State is reduced until each State has positive industrial consumption. The excess refinery fuel is reallocated to a different PAD district or subdistrict, group of States or individual State as shown in Table TN57. When this adjustment involves a PAD district or subdistrict or group value, the refineries' consumption estimates for all States within the PAD district or subdistrict or group are recalculated using these new values.

Because crude oil consumption is not an individual fuel in SEDS for 1970 through 1980, the small amounts of crude oil that were used at refineries during those years were allocated to residual and distillate fuels consumed at refineries. The allocation from crude oil refinery use to

**Table TN57. Reallocations of Excess Refinery Fuel Consumption**

Year	Fuel	Thousand Barrels	Excess in:	Reallocated to:
1971	Residual Fuel	294	Kansas	Oklahoma
1973	Residual Fuel	45	Group 4: Kentucky, Tennessee	Illinois
1979	LPG	173	Montana	Wyoming
1985	Residual Fuel	212	PAD District IV	PAD District V
1986	Residual Fuel	403	PAD District IV	PAD District V
1987	Residual Fuel	497	PAD District IV	PAD District V
1988	Residual Fuel	305	PAD District IV	PAD District V
1989	Residual Fuel	381	PAD District IV	PAD District V
1990	Residual Fuel	336	PAD District IV	PAD District V
1991	Residual Fuel	378	PAD District IV	PAD District V
1992	Residual Fuel	361	PAD District IV	PAD District V
1996	Residual Fuel	184	PAD District IV	PAD District V
1997	Residual Fuel	100	PAD District IV	PAD District V
1998	Residual Fuel	82	PAD District IV	PAD District V
1999	Residual Fuel	142	PAD District IV	PAD District V
2000	Residual Fuel	224	PAD District IV	PAD District V
2001	Residual Fuel	149	PAD District IV	PAD District II
2001	Residual Fuel	95	PAD District V	PAD District II
2001	Residual Fuel	281	PAD District V	PAD District III
2002	Residual Fuel	33	PAD District V	PAD District III
2002	Residual Fuel	67	PAD District V	PAD District IV
2003	Residual Fuel	228	PAD District V	PAD District III
2004	Residual Fuel	296	PAD District V	PAD District III
2005	LPG	198	PAD District V	PAD District IV

Source: EIA calculations based on data from the State Energy Data System and the *Petroleum Supply Annual*.

residual and distillate fuels refinery use was made according to each fuel's share of the total crude oil used directly (including losses) as residual and distillate fuels from the EIA *Petroleum Supply Annual, Volume 1*, of each year, Table 2.

Refinery consumption of still gas, excluding still gas consumed as petrochemical feedstocks, is subtracted from the SEDS industrial sector total for 1970 through 1985. Beginning in 1986, EIA data series no longer report refinery fuel and feedstock use separately, and all industrial still gas consumption is removed.

Refineries' consumption of coal is withheld in the data source for 1999 and 2000 and unpublished estimates developed by the data source office are used for 1999 and 2000. For 2001 and 2002, the U.S. values for refinery consumption of coal are published although the PAD district values are withheld. The PAD district values for 2001 and 2002 are estimated by applying the PAD districts' percentages of the U.S. total in 2000 to the U.S. totals for 2001 and 2002.

**Intermediate Products.** Aviation gasoline blending components, motor gasoline blending components, natural gasoline (1970 through 1983), pentanes plus (1984 forward), plant condensate (1970 through 1983), unfinished oils, and unfractionated stream (1970 through 1983) are used at refineries and blending plants to make end-use petroleum products, particularly motor gasoline. Accordingly, consumption of these products is completely removed.

**Crude Oil Lease, Plant, and Pipeline Fuel.** Industrial crude oil is assumed to be used as lease, plant, and pipeline fuel. Because these are process fuel uses, this crude oil is removed from SEDS industrial sector consumption.

**Natural Gas Lease and Plant Fuel.** Natural gas consumed as lease and plant fuel is process fuel and is subtracted from SEDS industrial sector natural gas totals by State and year.

**Natural Gas Pipeline Fuel.** Most of the natural gas consumed in the transportation sector of is used to power pipelines. As such, it is a process fuel and is subtracted from SEDS consumption in order to calculate expenditures.

**Electricity Exports.** Electricity exported to Canada and Mexico are excluded from the calculations of U.S. domestic energy expenditures and U.S. average energy prices.

**Electrical System Energy Losses.** The amount of energy lost during generation, transmission, and distribution of electricity (including plant use and unaccounted for electrical energy) is process fuel and is subtracted from sectoral energy consumption estimates used in the price and expenditure tables. The energy losses are "paid for" when residential, commercial, industrial, and transportation sector consumers buy the electricity produced by the electric power sector.

## Data Sources

**Capacity of Petroleum Refineries.** 1982 forward: EIA, *Petroleum Supply Annual, Volume 1*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/psa\\_volume1.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html) tables titled "Number and Capacity of Operable Petroleum Refineries," columns titled, "Crude Capacity, Barrels per Calendar Day, Operating" (1982–1985), and "Atmospheric Crude Oil Distillation Capacity, Barrels per Calendar Day, Operating" (1986 forward).

1979–1981: EIA, Energy Data Reports, *Petroleum Refineries in the United States and U.S. Territories*, table titled "Number and Capacity of Petroleum Refineries," column heading, "Crude Capacity, Barrels per Calendar Day, Operating."

1978: EIA, Energy Data Reports, *Petroleum Refineries in the United States and Puerto Rico*, table titled "Number and Capacity of Petroleum Refineries," column heading, "Crude Capacity, Barrels per Calendar Day, Operating."

1970–1977: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Surveys, *Petroleum Refineries in the United States and Puerto Rico*, table titled "Number and Capacity of Petroleum Refineries," column heading, "Crude Capacity, Barrels per Calendar Day, Operating."

**Fuel Consumed at Refineries.** 1981–1994, 1996, and 1998 forward: EIA, *Petroleum Supply Annual, Volume 1*, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/psa\\_volume1.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html) table titled "Fuels Consumed at Refineries by PAD District." Data for 1991 are from a separately published an EIA *Errata* dated November 10, 1992, GPO Stock No. 061-003-00758-9.

1995, 1997: EIA, *Petroleum Supply Annual, Volume 1*, table titled "Fuels Consumed at Refineries by PAD District." Data for coal, electricity, and natural gas are not published and values for the previous year are repeated.

1976–1980: EIA, Energy Data Reports, *Crude Petroleum, Petroleum Products, and Natural Gas Liquids*, table titled "Fuels Consumed for All Purposes at Refineries in the United States, by States."

1970–1975: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Surveys, *Crude Petroleum, Petroleum Products, and Natural Gas Liquids*, table titled “Fuels Consumed for All Purposes at Refineries in the United States, by States.”

**Intermediate Products.** 1970 forward: EIA, State Energy Data System, industrial sector consumption estimates for aviation gasoline blending components, crude oil, motor gasoline blending components, natural gasoline (1970–1983), pentanes plus (1984 forward), petroleum coke, plant condensate (1970–1983), still gas (excluding still gas consumed as petrochemical feedstocks, 1970–1985), unfinished oil, and unfractionated stream (1970–1983).

**Natural Gas Lease, Plant, and Pipeline Fuel Use.** 1997 forward: EIA, Natural Gas Navigator, [http://tonto.eia.doe.gov/dnav/ng/ng\\_cons\\_sum\\_dcunusa.htm](http://tonto.eia.doe.gov/dnav/ng/ng_cons_sum_dcunusa.htm) (use drop-down menu to select area, then click on icon that says “Download Series History”) and published in the EIA, *Natural Gas Annual*, Tables 26 through 76.

1993–1996: EIA *Historical Natural Gas Annual 1930 Through 2000*, [http://www.eia.doe.gov/oil\\_gas/natural\\_gas/data\\_publications/historical\\_natural\\_gas\\_annual/hnga.html](http://www.eia.doe.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga.html) Table 15.

1970–1992: EIA *Natural Gas Annual 1994, Volume II*, Table 14.

**Residential Wood.** 1990 forward: EIA, unpublished data from the “1993 Residential Energy Consumption Survey,” Form EIA-457 <http://www.eia.doe.gov/emeu/recs/contents.html>.

1970–1989: EIA, unpublished data from the “1980 Residential Energy Consumption Survey,” Form EIA-457.

**Commercial Wood and Waste.** 1990 forward: EIA, unpublished data from the “1993 Residential Energy Consumption Survey,” Form EIA-457 <http://www.eia.doe.gov/emeu/recs/contents.html>.

1989 forward: EIA, SEDS, U.S. annual average percentages of wood (WDEISUS) and percentages of waste (WSEISUS) acquired at no cost by the electric power sector.

1970–1989: EIA, unpublished data from the “1980 Residential Energy Consumption Survey,” Form EIA-457.

**Industrial Wood and Waste.** 1994 forward: EIA, unpublished data from the “1994 Manufacturing Energy Consumption Survey” (Form EIA-846) <http://www.eia.doe.gov/emeu/mecs/contents.html>.

1989 forward: EIA, SEDS, U.S. annual average percentages of wood (WDEISUS) and percentages of waste (WSEISUS) acquired at no cost by the electric power sector.

1970–1993: EIA, unpublished data from the “1991 Manufacturing Energy Consumption Survey” (Form EIA-846).

## Metric and Other Physical Conversion Factors

Data presented in the State Energy Data System are expressed predominately in units that historically have been used in the United States, such as British thermal units, barrels, cubic feet, and short tons. However, because U.S. commerce involves other nations, most of which use metric units of measure, the U.S. Government is committed to the transition to the metric system, as stated in the Metric Conversion Act of 1975 (Public Law 94-168), amended by the Omnibus Trade and Competitiveness Act of 1988 (Public Law 100-418), and Executive Order 12770 of July 25, 1991.

The metric conversion factors presented in Table A1 can be used to calculate the metric-unit equivalents of values expressed in U.S. customary units. For example, 500 short tons are the equivalent of 453.6 metric

tons (500 short tons x 0.9071847 metric tons/short ton = 453.6 metric tons).

In the metric system of weights and measures, the names of multiples and subdivisions of any unit may be derived by combining the name of the unit with prefixes, such as deka, hecto, and kilo, meaning, respectively, 10, 100, 1,000, and deci, centi, and milli, meaning, respectively, one-tenth, one-hundredth, and one-thousandth. Common metric prefixes can be found in Table A2.

The conversion factors presented in Table A3 can be used to calculate equivalents in various physical units commonly used in energy analyses. For example, 10 barrels are the equivalent of 420 U.S. gallons (10 barrels x 42 gallons/barrel = 420 gallons).

**Table A1. Metric Conversion Factors**

U.S. Unit	multiplied by	Conversion Factor	equals	Metric Unit	U.S. Unit	multiplied by	Conversion Factor	equals	Metric Unit
<b>Mass</b>					<b>Volume</b>				
short tons (2,000 lb)	x	0.907 184 7	=	metric tons (t)	barrels of oil (bbl)	x	0.158 987 3	=	cubic meters (cm <sup>3</sup> )
long tons	x	1.016 047	=	metric tons (t)	cubic yards (yd <sup>3</sup> )	x	0.764 555	=	cubic meters (cm <sup>3</sup> )
pounds (lb)	x	0.453 592 37 <sup>a</sup>	=	kilograms (kg)	cubic feet (ft <sup>3</sup> )	x	0.028 316 85	=	cubic meters (cm <sup>3</sup> )
pounds uranium oxide (lb U <sub>3</sub> O <sub>8</sub> )	x	0.384 647 <sup>b</sup>	=	kilograms uranium (kgU)	U.S. gallons (gal)	x	3.785 412	=	liters (L)
ounces, avoirdupois (avdp oz)	x	28.349 52	=	grams (g)	ounces, fluid (fl oz)	x	29.573 53	=	milliliters (mL)
					cubic inches (in <sup>3</sup> )	x	16.387 06	=	milliliters (mL)
<b>Length</b>					<b>Area</b>				
miles (mi)	x	1.609 344 <sup>a</sup>	=	kilometers (km)	acres	x	0.404 69	=	hectares (ha)
yard (yd)	x	0.914 4 <sup>a</sup>	=	meters (m)	square miles (mi <sup>2</sup> )	x	2.589 988	=	square kilometers (km <sup>2</sup> )
feet (ft)	x	0.304 8 <sup>a</sup>	=	meters (m)	square yards (yd <sup>2</sup> )	x	0.836 127 4	=	square meters (m <sup>2</sup> )
inches (in)	x	2.54 <sup>a</sup>	=	centimeters (cm)	square feet (ft <sup>2</sup> )	x	0.092 903 04 <sup>a</sup>	=	square meters (m <sup>2</sup> )
					square inches (in <sup>2</sup> )	x	6.451 6 <sup>a</sup>	=	square centimeters (cm <sup>2</sup> )
<b>Energy</b>					<b>Temperature</b>				
British Thermal Units (Btu)	x	1,055.055 852 62 <sup>a,c</sup>	=	joules (J)	degrees Fahrenheit (°F)	x	5/9 (after subtracting 32) <sup>a,d</sup>	=	degrees Celsius (°C)
calories (cal)	x	4.186 8 <sup>a</sup>	=	joules (J)					
kilowatthours (kWh)	x	3.6 <sup>a</sup>	=	megajoules (MJ)					

<sup>a</sup>Exact conversion.

<sup>c</sup>Calculated by the Energy Information Administration.

<sup>e</sup>The Btu used in this table is the International Table Btu adopted by the Fifth International Conference on Properties of Steam, London, 1956.

<sup>d</sup>To convert degrees Celsius (°C) to degrees Fahrenheit (°F) exactly, multiply by 9/5, then add 32.

Notes: • Spaces have been inserted after every third digit to the right of the decimal for ease of reading. • Most metric units shown belong to the International System of Units (SI),

and the liter, hectare, and metric ton are accepted for use with the SI units. For more information about the SI units, contact Dr. Barry Taylor at Building 221, Room B160, National Institute of Standards and Technology, Gaithersburg, MD 20899, or on telephone number 301-975-4220.

Sources: General Services Administration, Federal Standard 376B, *Preferred Metric Units for General Use by the Federal Government* (Washington, DC, January 27, 1993), pp. 9-11, 13, and 16. National Institute of Standards and Technology, Special Publications 330, 811, and 814. American National Standards Institute/Institute of Electrical and Electronic Engineers, ANSI/IEEE Std 268-1992, pp. 28 and 29.

**Table A2. Metric Prefixes**

Unit Multiple	Prefix	Symbol	Unit Subdivision	Prefix	Symbol
10 <sup>1</sup>	deka	da	10 <sup>-1</sup>	deci	d
10 <sup>2</sup>	hecto	h	10 <sup>-2</sup>	centi	c
10 <sup>3</sup>	kilo	k	10 <sup>-3</sup>	milli	m
10 <sup>6</sup>	mega	M	10 <sup>-6</sup>	micro	μ
10 <sup>9</sup>	giga	G	10 <sup>-9</sup>	nano	n
10 <sup>12</sup>	tera	T	10 <sup>-12</sup>	pico	p
10 <sup>15</sup>	peta	P	10 <sup>-15</sup>	femto	f
10 <sup>18</sup>	exa	E	10 <sup>-18</sup>	atto	a
10 <sup>21</sup>	zetta	Z	10 <sup>-21</sup>	zepto	z
10 <sup>24</sup>	yotta	Y	10 <sup>-24</sup>	yocto	Y

Source: U.S. Department of Commerce, National Institute of Standards and Technology, *The International System of Units (SI)*, NIST Special Publication 330, 1991 Edition (Washington, DC, August 1991), p. 10.

**Table A3. Other Physical Conversion Factors**

Energy Source	Original Unit		Conversion Factor		Final Unit
<b>Petroleum</b>	barrels (bbl)	x	42 <sup>a</sup>	=	U.S. gallons (gal)
<b>Coal</b>	short tons	x	2,000 <sup>a</sup>	=	pounds (lb)
	long tons	x	2,240 <sup>a</sup>	=	pounds (lb)
	metric tons (t)	x	1,000 <sup>a</sup>	=	kilograms (kg)
<b>Wood</b>	cords (cd)	x	1.25 <sup>b</sup>	=	short tons
	cords (cd)	x	128	=	cubic feet (ft <sup>3</sup> )

<sup>a</sup>Exact conversion.

<sup>b</sup>Calculated by the Energy Information Administration.

Source: U.S. Department of Commerce, National Institute of Standards and Technology, *Specifications, Tolerances and Other Technical Requirements for Weighing and Measuring Devices*, NIST Handbook 44, 1994 Edition (Washington, DC, October 1993), pp. B-10, C-17, and C-21.



## Summary of Changes Reflected in These State Energy Data System Price and Expenditure Data

Revisions to prices and expenditures contained in the State Energy Data System (SEDS) and incorporated in this 2005 data edition of the State Energy Data are summarized in this appendix. The portable document file (PDF) tables and hypertext markup language (HTML) tables contain rounded data for the most recent year. The comma-separated-value (CSV) files provide the data for all years in the full precision contained in the SEDS database. The information in this appendix covers revisions to all data, full precision and rounded, for all years 1970 through 2004.

Price revisions occur for several reasons: new price series are added; data sources for prices change; price estimation methodologies are revised or price assignment and estimation procedures are updated; data entries are corrected; or consumption estimates are revised. The first four kinds of changes affect State-level and U.S. prices directly. The fifth, a revised consumption value, affects the State prices that are estimated as consumption-weighted averages of other States' data and, similarly, affects all the consumption-weighted U.S. average prices.

Consumption estimates used to calculate expenditures in the price and expenditure tables are developed from the SEDS consumption data. Full documentation of the consumption estimation procedures can be found in the Consumption Technical Notes at [http://www.eia.doe.gov/emeu/states/seds\\_tech\\_notes.html](http://www.eia.doe.gov/emeu/states/seds_tech_notes.html). Since energy expenditure estimates depend on both the price and consumption estimates (including the consumption adjustments for process fuel and intermediate products), revision of either or both may cause revisions to the expenditures series.

### Coal

**Electric Power Sector, 2002.** A change in the methodology for estimating electric power prices described in the coal section of the SEDS Price and Expenditure Technical Notes ([http://www.eia.doe.gov/emeu/states/sep\\_prices/notes/pr\\_coal.pdf](http://www.eia.doe.gov/emeu/states/sep_prices/notes/pr_coal.pdf)) causes revisions to the estimates for 2002. Prices for 12 States are revised, ranging from a 1-percent decrease for Michigan to a 47-percent decrease for Hawaii. Proportional revisions occur in expenditure estimates for the 12 States for which prices are revised. These changes also cause small decreases in the U.S. total electric power sector price and expenditure estimates. All changes can be seen in the PDF and HTML tables and can be found in the greater-precision CSV data files.

**Residential, Commercial, Industrial and Electric Power Sectors, 2004.** Prices of coal delivered to the residential, commercial, industrial and electric power sectors in Alaska in 2004 were revised by the data source, an informal survey of the single coal supplier in the State. The revisions cause a 2-percent increase in the commercial and industrial sectors and a 3-percent increase in the residential and electric power sectors. Expenditure estimates for Alaska in these sectors increased proportionately. Changes to Alaska's price estimates cause U.S. average coal price estimates for the residential and commercial sectors to increase by 1 cent, while revisions in U.S. prices in the industrial and electric power sectors are not noticeable in the rounded data in the PDF and HTML tables. All changes, including the U.S. price and expenditure estimates, can be seen in the greater-precision CSV data files.

In addition, revisions to conversion factors for coal consumed by coke plants as described in the SEDS Consumption Technical Notes ([http://www.eia.doe.gov/emeu/states/sep\\_use/notes/use\\_coal.pdf](http://www.eia.doe.gov/emeu/states/sep_use/notes/use_coal.pdf))

cause revisions to prices in the industrial sector for 2004 for the 10 States in which coal is consumed by coke plants (Alabama, Illinois, Indiana, Kentucky, Michigan, New York, Ohio, Pennsylvania, Virginia, and West Virginia). All revisions are by 0.01 percent or less and cannot be seen in the PDF and HTML tables.

## Electricity Imports and Exports

**Electricity Imports and Exports, 1970 forward.** The implementation of a new data source for prices of electricity imports and exports, described in the electricity section of the SEDS Price and Expenditure Technical Notes ([http://www.eia.doe.gov/emeu/states/sep\\_prices/notes/pr\\_elec.pdf](http://www.eia.doe.gov/emeu/states/sep_prices/notes/pr_elec.pdf)), causes revisions to the electricity imports price estimates for 1970 forward. The new electricity imports prices cause increases ranging from \$0.61 per million Btu in 1970 to \$17.22 per million Btu in 2001. Proportional revisions occur in the expenditure estimates for electricity trade although for States with very small quantities of electricity imports the revisions are too small to be seen in the PDF and HTML tables and can only be seen in the greater-precision CSV data files.

## Electricity Retail Sales

**Residential, Commercial, Industrial, and Transportation Sectors, 2001 through 2004.** Prices for electricity in the residential, commercial, industrial, and transportation sectors of California in 2001 through 2004 are revised in the data source, EIA, Form EIA-861 "Annual Electric Power Industry Report." The California price revisions range from an 11-percent increase in the transportation sector in 2004 to a 6-percent decrease in the industrial sector in 2002. While incorporating the revised data for California, data for other States were also revised by small amounts due to rounding to a different level of precision. The revisions to other States prices are too small to be seen in the PDF and HTML tables but could be noticed in the greater precision CSV data files. The resulting revisions to the U.S. average prices are large enough to be seen in both the tables and the data files. Expenditures for electricity calculated with these revised prices and with the revised electricity sales quantities documented in the SEDS Consumption Technical Notes at

[http://www.eia.doe.gov/emeu/states/sep\\_use/notes/use\\_changes.pdf](http://www.eia.doe.gov/emeu/states/sep_use/notes/use_changes.pdf)), show proportional revisions.

## Natural Gas

**Residential, Commercial, Industrial, and Transportation Sectors, Louisiana, 2002.** Natural gas prices in the residential, commercial, industrial, and transportation sectors of Louisiana in 2002 are corrected to reflect revisions in the factor used to convert prices from dollars per cubic foot to dollars per British thermal units that were made in the last SEDS data cycle. These revisions cause expenditures in the residential, commercial, and industrial sectors to increase slightly (consumption in the transportation sector is so small that expenditures were unchanged at the level of rounding in SEDS). The increase in industrial expenditures is the only revision large enough to be seen in the rounded data in the PDF and HTML tables (all of the revisions can be seen in the higher-precision CSV files). This change also contributes to the revisions to the U.S. total expenditures for the affected sectors for 2002.

**Residential, Commercial, and Industrial Sectors, 2001, 2003, and 2004.** Revisions to the factor used to convert prices from dollars per cubic foot to dollars per British thermal units (Btu) in 2001, 2003, and 2004, described in the SEDS Consumption Technical Notes ([http://www.eia.doe.gov/emeu/states/sep\\_use/notes/use\\_changes.pdf](http://www.eia.doe.gov/emeu/states/sep_use/notes/use_changes.pdf)), cause revisions to natural gas prices in all sectors other than the electric power sector. In the cases where the conversion factor is revised downward, the consumption estimate in Btu decreases by the same proportion that the price in dollars per million Btu increases causing the resulting expenditure to remain virtually unchanged. The same compensating revisions occur when the conversion factor increases, the price decreases, and expenditure remains changed only by rounding differences caused by the recalculation. In 2001, the factors are revised for 32 States, causing small price increases, the largest being an increase of \$0.12 per million Btu (1 percent) in the residential natural gas price in Kansas. In 2003 the factors are revised for three States, New Mexico, New York, and Texas, causing price decreases by \$0.01 per million Btu or less. In 2004, the conversion factors are revised for 21 States contributing to price revisions as large as the decrease by \$0.64 per million Btu (4 percent) in the residential natural gas price in Florida. The residential natural gas expenditure estimate for Florida in 2004 remains unchanged (except for rounding differences that occur in the

recalculation) because the revised conversion factor causes the consumption estimate, expressed in Btu, to increase proportionally.

In addition, the prices for natural gas delivered to residential, commercial, and industrial sectors in 2004 were revised by the data source, the EIA Natural Gas Navigator. The impact of the revised conversion factors, described above, and the revised prices causes almost all residential, commercial, and industrial natural gas prices for all States to be revised for 2004. Expenditures for natural gas are affected by all these price revisions and revisions to the cubic feet of consumption of natural gas described in the SEDS Consumption Technical Notes ([http://www.eia.doe.gov/emeu/states/sep\\_use/notes/use\\_changes.pdf](http://www.eia.doe.gov/emeu/states/sep_use/notes/use_changes.pdf)). More than half of the revisions can be seen in the PDF and HTML tables and all can be seen in the greater-precision CSV data files. These revisions to State prices and consumption estimates in 2004 cause U.S. average prices and total expenditures for natural gas in the residential, commercial, and industrial sectors to be revised by less than one-half of a percent and most of these changes cannot be seen in the PDF and HTML tables.

**Transportation Sector, 2000 through 2004.** The prices for natural gas consumed by the transportation sector are revised for 2000 through 2004 by the data source, the EIA Natural Gas Navigator. Prices previously available for Alabama (2000 and 2001), Georgia (2000 through 2002), Michigan (2000 and 2001), West Virginia (2000 and 2001), and Iowa (2004) are no longer available in the Natural Gas Navigator. Therefore, these States are assigned estimated prices calculated as the averages of the prices of surrounding States. This causes large increases in the estimated prices for Georgia, Michigan, and West Virginia and decreases in the estimated prices for Alabama and Iowa. There is a change in which neighboring States' prices are used to calculate average prices that are assigned to Iowa in 2001 through 2003 and to Nebraska in 2002 and 2004. This change causes Iowa and Nebraska transportation natural gas prices to be revised by less than 10 percent. In addition, the price of natural gas used for transportation in Oregon for 2004 was revised in the data source, a decrease of 38 percent. This causes the Idaho price for 2004, which is estimated using Oregon price, to be decreased by 7 percent. The price of transportation natural gas for Maine was corrected to be zero for 2003 and 2004, since no consumption is reported for these years. Most of these revisions are large enough to be seen in the PDF and HTML tables and proportional revisions occur in the associated expenditure estimates. The State-level revisions cause a 2-percent increase

in the U.S. average price and total expenditures for natural gas used in the transportation sector for 2000 and 2001 and smaller decreases in the U.S. values for 2002 through 2004.

In addition to the price and resulting expenditure revisions described in the previous paragraph, revisions to the factors used for converting prices from dollars per cubic foot to dollars per British thermal units, cause small revisions to prices in the transportation sector of 31 States in 2001, 3 States in 2003, and 21 States in 2004. These revisions to natural gas prices in the transportation sector are by 1 percent or less with the exception of the 4-percent increase for Florida in 2004. Although prices are revised, estimated expenditures remain virtually unchanged because the same revised factors were used to convert consumption from cubic feet to Btu and the revisions to consumption offset the price revisions when calculating expenditures.

**Electric Power Sector, 2001.** Revisions to natural gas consumption estimates for the electric power sector in 2001 described in the SEDS Consumption Technical Notes ([http://www.eia.doe.gov/emeu/states/sep\\_use/notes/use\\_changes.pdf](http://www.eia.doe.gov/emeu/states/sep_use/notes/use_changes.pdf)) cause expenditure estimates to be revised as well. Most of the expenditure revisions were small increases and most can be seen in the PDF and HTML tables. The largest increase in electric power sector expenditures for natural gas was in California, an increase of \$18 million representing less than one-half a percent change. The \$12-million increase in Kansas and the \$10-million in Utah (both representing 16-percent increases in expenditures) were the only other revisions over \$10 million. The sum of State-level revisions caused the U.S. total expenditures for natural gas in the electric power sector to increase by \$89 million, a change of less than 1 percent. The U.S. average price is revised slightly by the recalculation, a change that can only be seen in the greater precision of the CSV data files.

**Electric Power Sector, 2002 and 2003.** Prices for natural gas delivered to the electric power sector in 2002 and 2003 are revised by the data source, the EIA Natural Gas Navigator. These revisions also affect the prices of some States for which there are no prices in the source because those States are assigned prices calculated as the average of surrounding States' prices. Prices are revised for 10 States in 2002 and 36 States in 2003. The largest revisions are the \$1.05-per-million-Btu decrease in South Carolina in 2002 and in Maryland in 2003, representing a 30-percent decrease and a 16-percent decrease, respectively. Most of the revisions are decreases in 2002 and increases in 2003 resulting a

decrease in the average U.S. price for natural gas consumed in the electric power sector of less than one-quarter of a percent in 2002 and an even smaller increase in 2003. Electric power sector expenditures for natural gas in 2002 and 2003, calculated with these revised prices, change in proportion to the price revisions.

**Electric Power Sector, 2004.** Although there are no revisions to prices for natural gas purchased by the electric power sector in 2004 in data the source, revisions to the factor used for converting prices from dollars per cubic foot to dollars per British thermal units, described in the SEDS Consumption Technical Notes ([http://www.eia.doe.gov/emeu/states/sep\\_use/notes/use\\_changes.pdf](http://www.eia.doe.gov/emeu/states/sep_use/notes/use_changes.pdf)), cause revisions to the prices expressed in dollars per Btu for 17 States in 2004. All of the revisions are increases, and all except 3 are large enough to be seen in the PDF and HTML files. Because the same revised conversion factors are used to convert consumption from cubic feet to Btu and prices from dollars per cubic feet to dollars per million Btu, the conversions compensate for each other and the resulting calculated expenditures remain unchanged except for small rounding differences. Of the 9 States with revisions to the physical quantities of electric power natural gas consumption, described in the Consumption Technical Notes, only Texas and Arizona have small expenditure increases that are visible in the PDF and HTML tables. The State-level revisions cause the U.S. average price and U.S. total expenditures for natural gas consumed in the electric power sector to increase slightly in 2004.

## Petroleum

### *Asphalt and Road Oil*

**Industrial Sector, 1999 through 2004.** The SEDS asphalt consumption data source, the Asphalt Institute, *Asphalt Usage Survey for the United States and Canada*, which is used to calculate consumption-weighted average State prices, began publishing data on modified asphalt cement from 1999 forward. In this edition of SEDS, that additional data series has been incorporated into the calculations of average prices of asphalt by State for 1999 forward. This causes the prices for most States to be reduced slightly. In addition, the consumption values published for Delaware, New Hampshire, Rhode Island, and Vermont in 1999 seem out of range and the 1998 data for those States are repeated for 1999. The

largest price revision caused by these changes in the estimation methodology is a decrease by \$0.63 per million Btu or by 15 percent for New Hampshire in 1999. The next largest revisions are decreases of \$0.08 per million Btu (2 percent) for Montana in 2001 and \$0.07 per million Btu (2 percent) in Wyoming for 2002. Proportional revisions occur in all the expenditure estimates calculated using these prices. Although many of the revisions to prices and expenditures are quite small, some can be seen in the PDF and HTML tables and all can be found in the greater-precision CSV data files.

In addition, revisions to asphalt consumption data, as described in the SEDS Consumption Technical Notes at [http://www.eia.doe.gov/emeu/states/sep\\_use/notes/use\\_changes.pdf](http://www.eia.doe.gov/emeu/states/sep_use/notes/use_changes.pdf), cause prices and expenditures to be revised for Alaska, Arkansas, and Arizona in 2001. The revisions to the prices and expenditures for Alaska and the expenditures for Arkansas are large enough to be seen in the PDF and HTML tables, but the others can only be seen in the greater-precision CSV files.

### *Aviation Gasoline*

**Transportation Sector, 2004.** Although there have been no revisions to prices for aviation gasoline in the data source, the revisions to consumption estimates in the transportation sector for all States (described in the SEDS Consumption Technical Notes at [http://www.eia.doe.gov/emeu/states/sep\\_use/notes/use\\_changes.pdf](http://www.eia.doe.gov/emeu/states/sep_use/notes/use_changes.pdf)) cause revisions to expenditures for aviation gasoline for all States in 2004. Expenditures are revised by as much as 11 percent in California, while most States' aviation gasoline expenditures are decreased by 1 percent.

### *Distillate Fuel*

**All Sectors, 2004.** Although there have been no revisions to prices for distillate fuel in the data source, the revision to consumption data for all States and all end-use sectors (described in the SEDS Consumption Technical Notes at [http://www.eia.doe.gov/emeu/states/sep\\_use/notes/use\\_changes.pdf](http://www.eia.doe.gov/emeu/states/sep_use/notes/use_changes.pdf)) cause small revisions to expenditures for distillate fuel in 2004. The recalculation of consumption-weighted U.S. average prices and the State average prices paid by all sectors causes those prices to be affected slightly by the expenditure revisions. The only revisions that are large enough to be seen in the SEDS PDF and

HTML tables are the electric power sector 2004 expenditures for distillate fuel in Arizona and the U.S. total. All other revisions can only be seen in the fuller-precision CSV data files.

### **Jet Fuel**

**Transportation Sector, 2000.** A data entry error for the price of kerosene-type jet fuel in Hawaii in 2000 has been corrected in this edition of SEDS. The price is revised from \$4.34 per million Btu to \$6.98 per million Btu and causes the U.S. average price to be revised from \$6.60 per million Btu to \$6.64 per million Btu. The jet fuel expenditures for Hawaii and the U.S. total in 2000 are increased in proportion to the price increases.

### **Liquefied Petroleum Gases**

**Residential, Commercial and Industrial Sectors, 2004.** Revisions to liquefied petroleum gases (LPG) consumption in Hawaii, as described in the SEDS Consumption Technical Notes at ([http://www.eia.doe.gov/emeu/states/sep\\_use/notes/use\\_changes.pdf](http://www.eia.doe.gov/emeu/states/sep_use/notes/use_changes.pdf)), lead to the inclusion of residential and commercial prices for Hawaii when previously there were none in SEDS. For calculating expenditures, industrial sector consumption estimates are adjusted to remove LPG consumed by petroleum refineries to avoid double-counting of the cost of those fuels. The method of estimating State refinery fuel use involves calculations done at the aggregate Petroleum Administration for Defense District (PADD) levels. Since Hawaii is in PADD 5, the revision to Hawaii's industrial sector consumption in 2004 affects the estimates of the adjusted industrial sector consumption of LPG in the other PADD 5 States (Alaska, California, Nevada, and Washington). Although industrial sector prices of LPG in the PADD 5 States have not changed, estimates of expenditures are decreased by 86 percent for Hawaii and by 2 percent for the other four States. All of these revisions cause the U.S. total residential, commercial, and industrial sectors' expenditures to be revised slightly and the U.S. average prices of LPG for the three sectors to also be revised slightly. Most of these revisions are large enough to be seen in the PDF and HTML tables as well as in the greater-precision CSV files.

**Transportation Sector, 2002 through 2004.** A review of State taxes on LPG used as a vehicle fuel in SEDS and further research resulted in a 4 or 5-percent increase in the estimated prices of LPG used in the transportation sector of New Mexico for 2002 through 2004 and proportional increases in the associated expenditures. These increases for New Mexico cause small increases in the U.S. total transportation expenditures for LPG and the U.S. average price in all 3 years. Most of these revisions can be seen in the PDF and HTML tables as well as in the greater-precision CSV files.

### **Lubricants**

**All Sectors, 2002 through 2004.** Value of shipments data used to derive prices for lubricants used in the industrial and transportation sectors are revised for the U.S. for 2002 through 2004 in the data source, the Bureau of Census, *Annual Survey of Manufactures*. All the revisions are large enough to be seen in the HTML and PDF tables. Prices are decreased by \$1.56 per million Btu in 2002 and \$2.04 per million Btu in 2003, and are increased by \$1.04 per million Btu in 2004. These changes in prices cause corresponding revisions in expenditures.

### **Motor Gasoline**

**Commercial, Industrial, and Transportation Sectors, 2003 and 2004.** A correction in the average motor gasoline tax rate for Ohio in 2003 and 2004 causes a 1-cent per million Btu price increase for motor gasoline, which in turn causes small increases in expenditures for motor gasoline in the commercial, industrial, and transportation sectors of Ohio. The revisions also cause very small increases in the U.S. average price of motor gasoline that cannot be seen in the PDF and HTML tables, only in the greater-precision CSV data files. The expenditure estimates are revised accordingly.

In addition, the revisions to motor gasoline consumption data for all States in 2004 (described in the SEDS Consumption Technical Notes at [http://www.eia.doe.gov/emeu/states/sep\\_fuel/notes/use\\_changes.pdf](http://www.eia.doe.gov/emeu/states/sep_fuel/notes/use_changes.pdf)) cause small revisions to motor gasoline expenditures for all States and sectors in 2004. Most revisions are by less than 1 million nominal dollars with the exception of expenditures for motor gasoline in the transportation sectors of Illinois, Montana, and Ohio and in the

commercial sectors of Connecticut, Indiana, Ohio, Oklahoma, and Pennsylvania. The State revisions cause total U.S. expenditures for motor gasoline to increase by less than 1 percent in the transportation sector and decrease by 8 percent in the commercial sector.

#### ***Other Petroleum Products***

#### **Miscellaneous Petroleum Products**

**Industrial Sector, 2001.** A correction was made to the 2001 nominal composite price of crude oil, which is used to estimate the price of miscellaneous petroleum products. The same U.S. average price is assigned to every State with miscellaneous petroleum products consumption,

therefore all the States' prices decreased from \$7.73 per million Btu to \$7.36 per million Btu. Proportional decreases (by 5 percent) occur in the expenditures for each State.

#### **Petroleum Coke**

**Industrial Sector, 2004.** Although there have been no revisions to prices for petroleum coke in SEDS, the revisions to consumption data in the industrial sector (described in the SEDS Consumption Technical Notes at [http://www.eia.doe.gov/emeu/states/sep\\_fuel/notes/use\\_changes.pdf](http://www.eia.doe.gov/emeu/states/sep_fuel/notes/use_changes.pdf)) cause small revisions to expenditures for petroleum coke in 2004 for 4 States: Ohio, South Carolina, Texas, and Washington. The revisions can be seen in the CSV data files.

## Glossary

**Asphalt:** A dark brown-to-black cement-like material obtained by petroleum processing and containing bitumens as the predominant component; used primarily for road construction. It includes crude asphalt as well as the following finished products: cements, fluxes, the asphalt content of emulsions (exclusive of water), and petroleum distillates blended with asphalt to make cutback asphalts.

**ASTM:** The American Society for Testing and Materials.

**Aviation Gasoline:** A complex mixture of relatively volatile hydrocarbons with or without small quantities of additives, blended to form a fuel suitable for use in aviation reciprocating engines. Fuel specifications are provided in ASTM Specification D 910 and Military Specification MIL-G-5572. *Note:* Data on blending components are not counted in data on finished aviation gasoline.

**Aviation Gasoline Blending Components:** Naphthas that are used for blending or compounding into finished aviation gasoline (e.g., straight-run gasoline, alkylate, and reformat). Excludes oxygenates (alcohols and ethers), butane, and pentanes plus.

**Barrel (petroleum):** A unit of volume equal to 42 U.S. gallons.

**British Thermal Unit (Btu):** The quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit at the temperature at which water has its greatest density (approximately 39 degrees Fahrenheit).

**Coal:** A readily combustible black or brownish-black rock whose composition, including inherent moisture, consists of more than 50 percent by weight and more than 70 percent by volume of carbonaceous material. It is formed from plant remains that have been compacted,

hardened, chemically altered, and metamorphosed by heat and pressure over geologic time. Coals are classified according to their degree of progressive alteration from lignite to anthracite. In the U.S. classification, the ranks of coal include lignite, subbituminous coal, bituminous coal, and anthracite and are based on fixed carbon, volatile matter, heating value, and agglomerating (or caking) properties.

- **Coking Coal:** Coal that meets the requirements for making coal coke. It must be low in ash and sulfur and form a coke that is capable of supporting the charge of iron ore and limestone in a blast furnace. Coking coal is usually a blend of two or more bituminous coals.
- **Steam Coal:** In this report, steam coal represents all noncoking coal.

**Coal Coke:** A solid carbonaceous residue derived from low-ash, low-sulfur bituminous coal from which the volatile constituents are driven off by baking in an oven at temperatures as high as 2,000 degrees Fahrenheit so that the fixed carbon and residual ash are fused together. Coke is used as a fuel and as a reducing agent in smelting iron ore in a blast furnace.

**Coke Plants:** Plants where coal is carbonized in slot or beehive ovens for the manufacture of coke.

**Combined-Heat-and-Power (CHP) Plant:** A plant designed to produce both heat and electricity. If one or more units of the plant is a CHP unit, then the whole plant is designated as a CHP plant. *Note:* This term is being used in place of the term “cogenerator” that was used by EIA in the past. CHP better describes the facilities because some of the plants included do not produce heat and power in a sequential fashion and, as a

result, do not meet the legal definition of cogeneration specified in the Public Utility Regulatory Policies Act (PURPA).

**Commercial Sector:** An energy-consuming sector that consists of service-providing facilities and equipment of: businesses; Federal, State, and local governments; and other private and public organizations, such as religious, social, or fraternal groups. The commercial sector includes institutional living quarters. It also includes sewage treatment facilities. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a wide variety of other equipment. *Note:* This sector includes generators that produce electricity and/or useful thermal output primarily to support the activities of the above-mentioned commercial establishments.

**Constant Dollars:** Amounts expressed in constant dollars having been adjusted to remove the effect of changes in the purchasing power of the dollar. Prices expressed in constant dollars usually reflect buying power relative to a base year. Prices in this publication are expressed in **Nominal Dollars**.

**Conversion Factor:** A number that translates units of one system into corresponding values of another system. Conversion factors can be used to translate physical units of measure for various fuels into Btu equivalents. See **British Thermal Unit**.

**Crude Oil Used Directly:** Crude oil consumed as fuel by petroleum pipelines and on crude oil leases.

**Cubic foot (cf), natural gas:** The amount of natural gas contained at standard temperature and pressure (60 degrees Fahrenheit and 14.73 pounds standard per square inch) in a cube whose edges are one foot long.

**Degree-Day Normals:** Simple arithmetic averages of monthly or annual degree-days over a long period of time. The 30-year period 1951 through 1980 is used for the estimates in this report. The averages may be simple degree-day normals or population-weighted degree-day normals. Monthly, State-level simple averages are used for this report.

**Degree-Days, Heating (HDD):** The number of degrees per day that the daily average temperature is below 65° F. The daily average temperature

is the mean of the maximum and minimum temperatures for a 24-hour period.

**Diesel Fuel:** A fuel composed of distillate fuel oils obtained in petroleum refining operation or blends of such distillate fuel oils with residual fuel oil used in motor vehicles. The boiling point and specific gravity are higher for diesel fuels than for gasoline.

**Distillate Fuel Oil:** A general classification for one of the petroleum fractions produced in conventional distillation operations. It includes diesel fuels and fuel oils. Products known as No. 1, No. 2, and No. 4 diesel fuel are used in on-highway diesel engines, such as those in trucks and automobiles, as well as off-highway engines, such as those in railroad locomotives and agricultural machinery. Products known as No. 1, No. 2, and No. 4 fuel oils are used primarily for space heating and electric power generation.

**Electrical System Energy Losses:** The amount of energy lost during generation, transmission, and distribution of electricity, including plant and unaccounted-for uses.

**Electricity Retail Sales:** The amount of electricity sold by electric utilities and other energy service providers to customers purchasing electricity for their own use and not for resale. These sales are usually grouped by classes of service, such as residential, commercial, industrial, and other. "Other" sales include sales for public street and highway lighting and other sales to public authorities and railways, and interdepartmental sales.

**Electric Power Sector:** An energy-consuming sector that consists of electricity-only and combined-heat-and-power (CHP) plants within the NAICS (North American Industry Classification System) 22 category whose primary business is to sell electricity, or electricity and heat, to the public. *Note:* This sector includes electric utilities and independent power producers

**Electric Utility:** A corporation, person, agency, authority, or other legal entity or instrumentality aligned with distribution facilities for delivery of electric energy for use primarily by the public. Included are investor-owned electric utilities, municipal and State utilities, Federal electric utilities, and rural electric cooperatives. A few entities that are tariff based and corporately aligned with companies that own

distribution facilities are also included. Electric utilities are included in the electric power sector. *Note:* Due to the issuance of FERC Order 888 that required traditional electric utilities to functionally unbundle their generation, transmission, and distribution operations, “electric utility” currently has inconsistent interpretations from State to State.

**End-Use Sectors:** The residential, commercial, industrial, and transportation sectors of the economy.

**Energy:** The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Energy has several forms, some of which are easily convertible and can be changed to another form useful for work. Most of the world’s convertible energy comes from fossil fuels that are burned to produce heat that is then used as a transfer medium to mechanical or other means in order to accomplish tasks. Electrical energy is usually measured in kilowatthours, while heat energy is usually measured in British thermal units.

**Energy Consumption:** The use of energy as a source of heat or power or as an input in the manufacturing process.

**Energy Expenditures:** In this report, the money directly spent by consumers to purchase energy. Expenditures equal the amount of energy used by the consumer times the price per unit paid by the consumer. In the calculation of the amount of energy used, process fuel and intermediate products are not included.

**Ethanol:** An anhydrous, denatured aliphatic alcohol (C<sub>2</sub>H<sub>5</sub>OH) intended for motor gasoline blending.

**Exports:** Shipments of goods from within the 50 States and the District of Columbia to U.S. possessions and territories or to foreign countries.

**f.a.s.:** See **Free Alongside Ship**.

**Federal Energy Regulatory Commission (FERC):** The Federal agency with jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, oil pipeline rates, and gas pipeline certification. FERC is an independent regulatory agency within the Department of Energy and is the successor to the Federal Power Commission.

**Federal Power Commission (FPC):** The predecessor agency of the Federal Energy Regulatory Commission. The Federal Power Commission was created by an Act of Congress under the Federal Water Power Act on June 10, 1920. It was charged originally with regulating the electric power and natural gas industries. It was abolished on September 30, 1977, when the Department of Energy was created. Its functions were divided between the Department of Energy and the Federal Energy Regulatory Commission, an independent regulatory agency.

**Fiscal Year:** The U.S. Government’s fiscal year runs from October 1 through September 30. The fiscal year is designated by the calendar year in which it ends; e.g., fiscal year 2006 begins on October 1, 2005, and ends on September 30, 2006.

**Fossil Fuel:** An energy source formed in the Earth’s crust from decayed organic material, such as petroleum, coal, and natural gas.

**Free Alongside Ship (f.a.s.):** The value of a commodity at the port of exportation, generally including the purchase price, plus all charges incurred in placing the commodity alongside the carrier at the port of exportation.

**Gasohol:** A blend of finished motor gasoline containing alcohol (generally ethanol but sometimes methanol) at a concentration between 5.7 percent and 10 percent by volume.

**Geothermal Energy:** Hot water or steam extracted from geothermal reservoirs in the Earth’s crust and used for geothermal heat pumps, water heating, or electricity generation.

**Heat Content of a Quantity of Fuel, Gross:** The total amount of heat released when a fuel is burned. Coal, crude oil, and natural gas all include chemical compounds of carbon and hydrogen. When those fuels are burned, the carbon and hydrogen combine with oxygen in the air to produce carbon dioxide and water. Some of the energy released in burning goes into transforming the water into steam and is usually lost. The amount of heat spent in transforming the water into steam is counted as part of gross heat content but is not counted as part of net content. Gross heat content is also referred to as the higher heating value. Btu conversion factors typically used by the Energy Information Administration represent gross heat content.

**Heat Content of a Quantity of Fuel, Net:** The amount of usable heat energy released when a fuel is burned under conditions similar to those in which it is normally used. Net heat content is also referred to as the lower heating value. Btu conversion factors typically used by the Energy Information Administration represent gross heat content.

**Heavy Oil:** The fuel oils remaining after the lighter oils have been distilled off during the refining process. Except for start-up and flame stabilization, virtually all petroleum used in steam plants is heavy oil. Includes fuel oil numbers 4, 5, and 6; crude; and topped crude.

**Hydroelectric Power:** The production of electricity from the kinetic energy of falling water.

**Imports:** Receipts of goods into the 50 States and the District of Columbia from U.S. possessions and territories or from foreign countries.

**Independent Power Producer:** A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for the generation of electricity for use primarily by the public, and that is not an electric utility. Independent power producers are included in the electric power sector.

**Industrial Sector:** An energy-consuming sector that consists of all facilities and equipment used for producing, processing, or assembling goods. The industrial sector encompasses the following types of activity: manufacturing (NAICS codes 31-33); agriculture, forestry, fishing and hunting (NAICS code 11); mining, including oil and gas extraction. (NAICS code 21); and construction (NAICS code 23). Overall energy use in this sector is largely for process heat and cooling and powering machinery, with lesser amounts used for facility heating, air conditioning, and lighting. Fossil fuels are also used as raw material inputs to manufactured products. *Note:* This sector includes generators that produce electricity and/or useful thermal output primarily to support the above-mentioned industrial activities.

**Jet Fuel:** A refined petroleum product used in jet aircraft engines. Kerosene-type jet fuel is a kerosene-based product used for commercial and military turbojet and turboprop aircraft engines. Naphtha-type jet fuel is a fuel in the heavy naphtha boiling range used primarily for military turbojet and turboprop aircraft engines because it has a lower freeze

point than other aviation fuels and meets engine requirements at high altitudes and speeds.

**Kerosene:** A light petroleum distillate that is used in space heaters, cook stoves, and water heaters and is suitable for use as a light source when burned in wick-fed lamps. Kerosene has a maximum distillation temperature of 400 degrees Fahrenheit at the 10-percent recovery point, a final boiling point of 572 degrees Fahrenheit, and a minimum flash point of 100 degrees Fahrenheit. Included are No. 1-K and No. 2-K, the two grades recognized by ASTM Specification D 3699 as well as all other grades of kerosene called range or stove oil, which have properties similar to those of No. 1 fuel oil.

**Kilowatthour (kWh):** A measure of electricity defined as a unit of work or energy, measured as 1 kilowatt (1,000 watts) of power expended for 1 hour. One kilowatthour is equivalent to 3,412 Btu.

**Lease and Plant Fuel:** Natural gas used in well, field, and lease operations (such as gas used in drilling operations, heaters, dehydrators, and field compressors) and used as fuel in natural gas processing plants.

**Light Oil:** Lighter fuel oils distilled off during the refining process. Virtually all petroleum used in internal combustion and gas-turbine engines is light oil. Includes fuel oil numbers 1 and 2, kerosene, and jet fuel.

**Liquefied Petroleum Gases (LPG):** A group of hydrocarbon-based gases derived from crude oil refining or natural gas fractionation. They include ethane, ethylene, propane, propylene, normal butane, butylene, isobutane, and isobutylene. For convenience of transportation, these gases are liquefied through pressurization.

**Lubricants:** Substances used to reduce friction between bearing surfaces, or incorporated into other materials used as processing aids in the manufacture of other products, or used as carriers of other materials. Petroleum lubricants may be produced either from distillates or residues. Lubricants include all grades of lubricating oils, from spindle oil to cylinder oil to those used in greases.

**Miscellaneous Petroleum Products:** All finished petroleum products not classified elsewhere—for example, petrolatum, lube refining byproducts (aromatic extracts and tars), absorption oils, ram-jet fuel, petroleum rocket fuels, synthetic natural gas feedstocks, and specialty oils.

**Motor Gasoline:** A complex mixture of relatively volatile hydrocarbons with or without small quantities of additives, blended to form a fuel suitable for use in spark-ignition engines. Motor gasoline, as defined in ASTM Specification D-4814 or Federal Specification VV-G-1690C, is characterized as having a boiling range of 122 to 158 degrees Fahrenheit at the 10-percent recovery point to 365 to 374 degrees Fahrenheit at the 90-percent recovery point. "Motor Gasoline" includes conventional gasoline; all types of oxygenated gasoline, including gasohol; and reformulated gasoline, but excludes aviation gasoline. *Note:* Volumetric data on blending components, such as oxygenates, are not counted in data on finished motor gasoline until the blending components are blended into the gasoline.

**Motor Gasoline Blending Components:** Naphthas that will be used for blending or compounding into finished motor gasoline (e.g., straight-run gasoline, alkylate, reformate, benzene, toluene, and xylene). Excluded are oxygenates (alcohols and ethers), butane, and pentanes plus.

**Natural Gas:** A gaseous mixture of hydrocarbon compounds, primarily methane.

**Natural Gas, Dry:** Natural gas which remains after: 1) the liquefiable hydrocarbon portion has been removed from the gas stream (i.e., gas after lease, field, and/or plant separation); and 2) any volumes of nonhydrocarbon gases have been removed where they occur in sufficient quantity to render the gas unmarketable. Dry natural gas is also known as consumer-grade natural gas. The parameters for measurement are cubic feet at 60 degrees Fahrenheit and 14.73 pounds per square inch absolute.

**Natural Gasoline:** A term used in the gas processing industry to refer to a mixture of liquid hydrocarbons (mostly pentanes and heavier hydrocarbons) extracted from natural gas. It includes isopentane.

**Nominal Dollars:** A measure used to express nominal price.

**Nominal Price:** The price paid for a product or service at the time of the transaction. Nominal prices are those that have not been adjusted to remove the effect of changes in the purchasing power of the dollar; they reflect buying power in the year in which the transaction occurred.

**Nonutility Power Producer:** A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for electric generation and is not an electric utility. Nonutility power producers include qualifying cogenerators, qualifying small power producers, and other nonutility generators (including independent power producers). Nonutility power producers are without a designated franchised service area and do not file forms listed in the *Code of Federal Regulations*, Title 18, Part 141.

**North American Industry Classification System (NAICS):** A system of numeric codes used to categorize businesses by the type of activity in which they are engaged. It replaces the Standard Industrial Classification (SIC). This new structure was developed jointly by the United States, Canada, and Mexico to provide consistent, comparable information on an industry-by-industry basis for all three economies.

**Nuclear Electric Power (nuclear power):** Electricity generated by the use of the thermal energy released from the fission of nuclear fuel in a reactor.

**Nuclear Fuel:** Fissionable materials that have been enriched to a composition that, when placed in a nuclear reactor, will support a self-sustaining fission chain reaction, producing heat in a controlled manner for process use.

**PAD Districts:** Petroleum Administration for Defense Districts. Geographic aggregations of the 50 States and the District of Columbia into five districts for the Petroleum Administration for Defense in 1950. The districts were originally instituted for economic and geographic reasons as Petroleum Administration for War (PAW) Districts, which were established in 1942. See map on page 9

**Pentanes Plus:** A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas. Includes isopentane, natural gasoline, and plant condensate.

**Petrochemical Feedstocks:** Chemical feedstocks derived from petroleum principally for the manufacture of chemicals, synthetic rubber, and a variety of plastics. In this report the categories reported are "Naphthas Less Than 401° F. Endpoint" and "Other Oils Equal to or Greater Than 401° F. Endpoint."

**Petroleum:** A broadly defined class of liquid hydrocarbon mixtures. Included are crude oil, lease condensate, unfinished oils, refined products obtained from the processing of crude oil, and natural gas plant liquids. *Note:* Volumes of finished petroleum products include nonhydrocarbon compounds, such as additives and detergents, after they have been blended into the products.

**Petroleum Coke:** A residue high in carbon content and low in hydrogen that is the final product of thermal decomposition in the condensation process in cracking. This product is reported as marketable coke or catalyst coke.

**Petroleum Coke, Catalyst:** The carbonaceous residue that is deposited on and deactivates the catalyst used in many catalytic operations (e.g., catalytic cracking). Carbon is deposited on the catalyst, thus deactivating the catalyst. The catalyst is reactivated by burning off the carbon, which is used as a fuel in the refining process. That carbon or coke is not recoverable in a concentrated form.

**Petroleum Coke, Marketable:** Those grades of coke produced in delayed or fluid cokers that may be recovered as relatively pure carbon. Marketable petroleum coke may be sold as is or may be further purified by calcining.

**Petroleum Products:** Products obtained from the processing of crude oil (including lease condensate), natural gas, and other hydrocarbon compounds. Petroleum products include unfinished oils, liquefied petroleum gases, pentanes plus, aviation gasoline, motor gasoline, naphtha-type jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, petrochemical feedstocks, special naphthas, lubricants, waxes, petroleum coke, asphalt, road oil, still gas, and miscellaneous products.

**Photovoltaic Energy:** Direct-current electricity generated from sunlight through solid-state semiconductor devices that have no moving parts.

**Plant Condensate:** One of the natural gas liquids, mostly pentanes and heavier hydrocarbons, recovered and separated as liquids at gas inlet separators or scrubbers in processing plants.

**Primary Energy Expenditures:** Expenditures for energy consumed in each of the four major end-use sectors, excluding energy in the form of

electricity, plus expenditures by the electric power sector for energy used to generate electricity. There are no fuel-associated expenditures for associated expenditures for hydroelectric power, geothermal energy, photovoltaic and solar energy, or wind energy. Also excluded are the quantifiable consumption expenditures that are an integral part of process fuel consumption.

**Process Fuel:** All energy consumed in the acquisition, processing, and transportation of energy. Quantifiable process fuel includes three categories: natural gas lease and plant operations, natural gas pipeline operations, and oil refinery operations.

**Propane:** A normally gaseous straight-chain hydrocarbon (C<sub>3</sub>H<sub>8</sub>). It is a colorless paraffinic gas that boils at a temperature of -43.67° F. It is extracted from natural gas or refinery gas streams. It includes all products designated in ASTM Specification D1835 and Gas Processors Association Specifications for commercial propane and HD-5 propane.

**Real Price:** A price that has been adjusted to remove the effect of changes in the purchasing power of the dollar. Real prices, expressed in constant dollars, usually reflect buying power relative to a base year. Prices shown in this publication are **Nominal Prices**.

**Refinery (petroleum):** An installation that manufactures finished petroleum products from crude oil, unfinished oils, natural gas liquids, other hydrocarbons, and alcohol.

**Renewable Energy:** Energy obtained from sources that are essentially inexhaustible (unlike, for example, fossil fuels, which are in finite supply). Renewable sources of energy include conventional hydroelectric power, wood, waste, alcohol fuels, geothermal, solar, and wind.

**Residential Sector:** An energy-consuming sector that consists of living quarters for private households. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a variety of other appliances. The residential sector excludes institutional living quarters.

**Residual Fuel Oil:** The heavier oils, known as No. 5 and No. 6 fuel oils, that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations. It conforms to ASTM Specifications D396 and D975 and Federal Specification VV-F-815C. No. 5, a

residual fuel oil of medium viscosity, is also known as Navy Special and is defined in Military Specification MIL-F-859E, including Amendment 2 (NATO Symbol F-770). It is used in steam-powered vessels in government service and inshore powerplants. No. 6 fuel oil includes Bunker C fuel oil and is used for the production of electric power, space heating, vessel bunkering, and various industrial purposes.

**Road Oil:** Any heavy petroleum oil, including residual asphaltic oil, used as a dust palliative and surface treatment on roads and highways. It is generally produced in six grades, from 0, the most liquid, to 5, the most viscous.

**Short Ton (coal):** A unit of weight equal to 2,000 pounds.

**SIC:** See **Standard Industrial Classification**.

**Solar Thermal Energy:** The radiant energy of the sun that can be converted into other forms of energy, such as heat or electricity.

**Special Naphthas:** All finished products within the naphtha boiling range that are used as paint thinners, cleaners, or solvents. Those products are refined to a specified flash point. Special naphthas include all commercial hexane and cleaning solvents conforming to ASTM Specifications D1836 and D484, respectively. Naphthas to be blended or marketed as motor gasoline or aviation gasoline or that are to be used as petrochemical and synthetic natural gas (SNG) feedstocks are excluded.

**Standard Industrial Classification (SIC):** A set of codes developed by the Office of Management and Budget which categorizes industries into groups with similar economic activities. It has been replaced by **North American Industry Classification System**.

**Steam Coal:** See **Coal**.

**Still Gas (refinery gas):** Any form or mixture of gas produced in refineries by distillation, cracking, reforming, and other processes. The principal constituents are methane, ethane, ethylene, normal butane, butylene, propane, and propylene. It is used primarily as refinery fuel and petrochemical feedstock.

**Transportation Sector:** An energy-consuming sector that consists of all vehicles whose primary purpose is transporting people and/or goods

from one physical location to another. Included are automobiles; trucks; buses; motorcycles; trains, subways, and other rail vehicles; aircraft; and ships, barges, and other waterborne vehicles. Vehicles whose primary purpose is not transportation (e.g., construction cranes and bulldozers, farming vehicles, and warehouse tractors and forklifts) are classified in the sector of their primary use. In this report, natural gas used in the operation of natural gas pipelines is included in the transportation sector.

**Unfinished Oils:** All oils requiring further processing, except those requiring only mechanical blending. Unfinished oils are produced by partial refining of crude oil and include naphthas and lighter oils, kerosene and light gas oils, heavy gas oils, and residuum.

**Unfractionated Streams:** Mixtures of unsegregated natural gas liquid components, excluding those in plant condensate. This product is extracted from natural gas.

**United States:** The 50 States and the District of Columbia.

**Value Added by Manufacture:** A measure of manufacturing activity that is derived by subtracting the cost of materials (which covers materials, supplies, containers, fuel, purchased electricity, and contract work) from the value of shipments. This difference is then adjusted by the net change in finished goods and work-in-progress between the beginning and end-of-year inventories.

**Vessel Bunkering:** Includes sales for the fueling of commercial or private boats, such as pleasure craft, fishing boats, tugboats, and ocean-going vessels, including vessels operated by oil companies. Excluded are volumes sold to the U.S. Armed Forces.

**Waste Energy:** Municipal solid waste, landfill gas, methane, digester gas, liquid acetonitrile waste, tall oil, waste alcohol, medical waste, paper pellets, sludge waste, solid byproducts, tires, agricultural byproducts, closed loop biomass, fish oil, and straw used as fuel.

**Waxes:** Solid or semi-solid materials derived from petroleum distillates or residues by such treatments as chilling, precipitating with a solvent, or de-oiling. It is a light-colored, more-or-less translucent crystalline mass, slightly greasy to the touch, consisting of a mixture of solid hydrocarbons in which the paraffin series predominates. Includes all

marketable wax, whether crude scale or fully refined. The three grades included are microcrystalline, crystalline-fully refined, and crystalline-other. The conversion factor is 280 pounds per 42 U.S. gallons per barrel.

**Wind Energy:** Energy present in wind motion that can be converted to mechanical energy for driving pumps, mills, and electric power

generators. Wind pushes against sails, vanes, or blades radiating from a central rotating shaft.

**Wood Energy:** Wood and wood products used as fuel, including round wood (cord wood), limb wood, wood chips, bark, sawdust, forest residues, charcoal, pulp waste, and spent pulping liquor.