

# U.S. Energy Flow Trends—2001

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**September 2003**

*U.S. Department of Energy*

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## Notes on the U.S. Energy Flow Chart for 2001

### Background

Figure 1 shows U.S. energy flow trends for 2001, with about 97 quads of net primary resource consumption. Lawrence Livermore National Laboratory (LLNL) has prepared similar flow charts of U.S. energy consumption since 1972. The chart traces the flow of individual fuels and compares these on the basis of a common energy unit of quadrillion British thermal units (Btu). A quadrillion, or “quad,” is  $10^{15}$ . One Btu is the quantity of heat needed to raise the temperature of 1 pound of water by 1°F at or near 39.2°F.

The width of each colored line across this chart is in proportion to the number of quads conveyed. (Exception: lines showing extremely small amounts have been made wide enough to be clearly visible.)

In most cases, the numbers used in this chart have been rounded to the nearest tenth of a quad, although the original data was published in hundredths or thousandths of a quad. As a consequence of independent rounding, some of the summary numbers may not appear to be a precise total of their various components.

Figure 1 shows U.S. energy consumption in quads to conform with data from the U.S. Department of Energy’s Energy Information Administration (EIA), and Figure 2 expresses U.S. energy consumption in exajoules. A joule is the metric unit for heat. One Btu equals 1,055.06 joules; and one quadrillion Btu’s equals 1.055 exajoules (an exajoule is  $10^{18}$  joules).

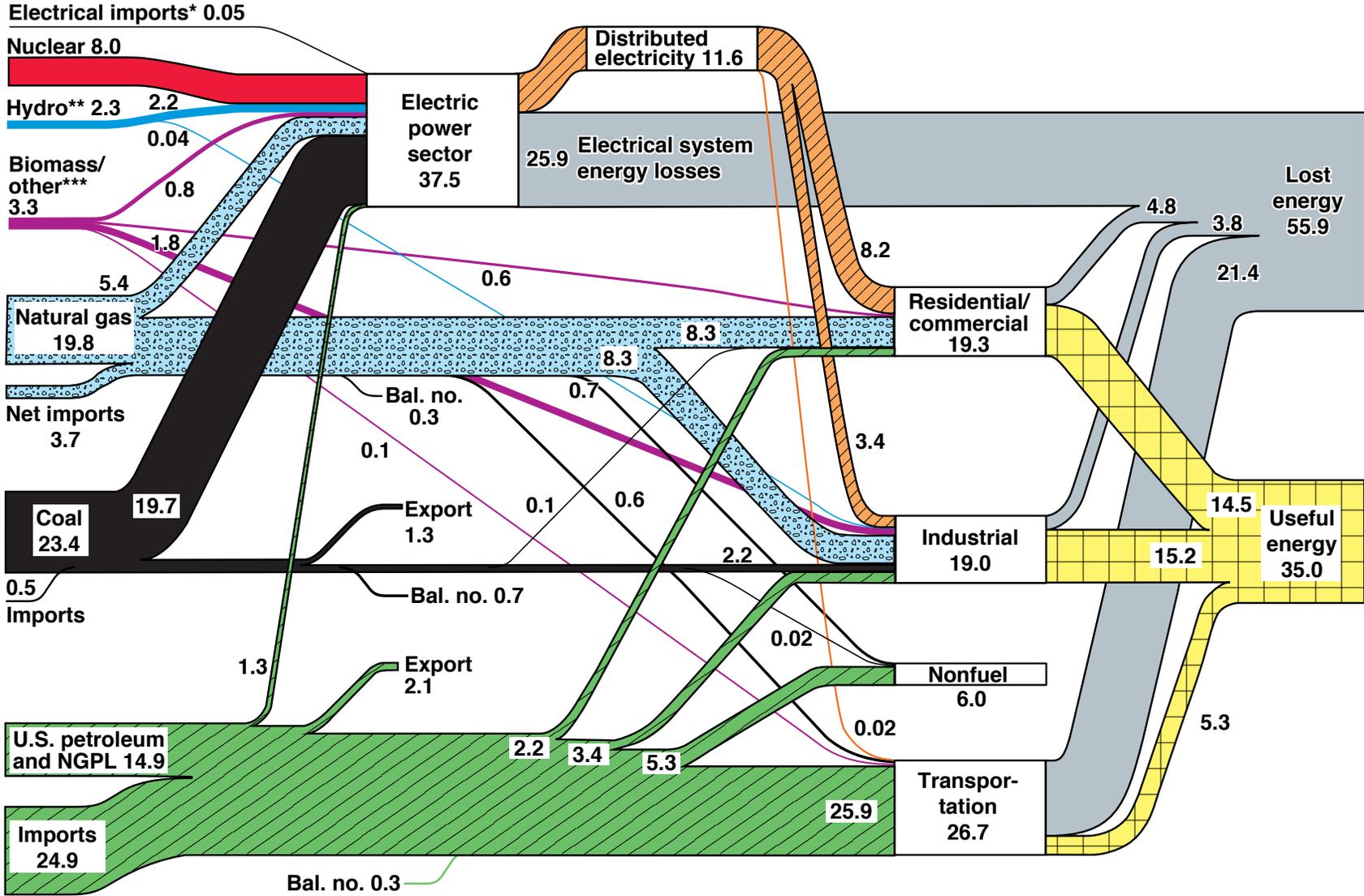
### Data Sources

The chart incorporates production and end-use data compiled by the Energy Information Administration, as published in the EIA’s *Annual Energy Review 2001* [DOE/EIA-0384(2001), Washington, D.C., November 2002]. EIA’s report is available on the Web at <http://www.eia.doe.gov/aer>. For ease of reference, some of the key tables from the EIA report are included as an appendix to this document.

Most of the 2001 data in the *Annual Energy Review 2001* (AER2001) is marked as preliminary, and these data are used in LLNL’s energy flow chart for 2001. However, EIA continually clarifies and revises its data and publishes updates in its *Monthly Energy Review* and in subsequent editions of the *Annual Energy Review*. Thus LLNL’s U.S. Energy Flow chart for 2000 (which was prepared in December 2001 and is included at the end of this document) does not entirely correspond to the revised 2000 data given in AER2001. For example, LLNL’s 2000 chart shows 98.5 quads of primary resource consumption, but AER2001 lists 99.3 quads as the 2000 total.

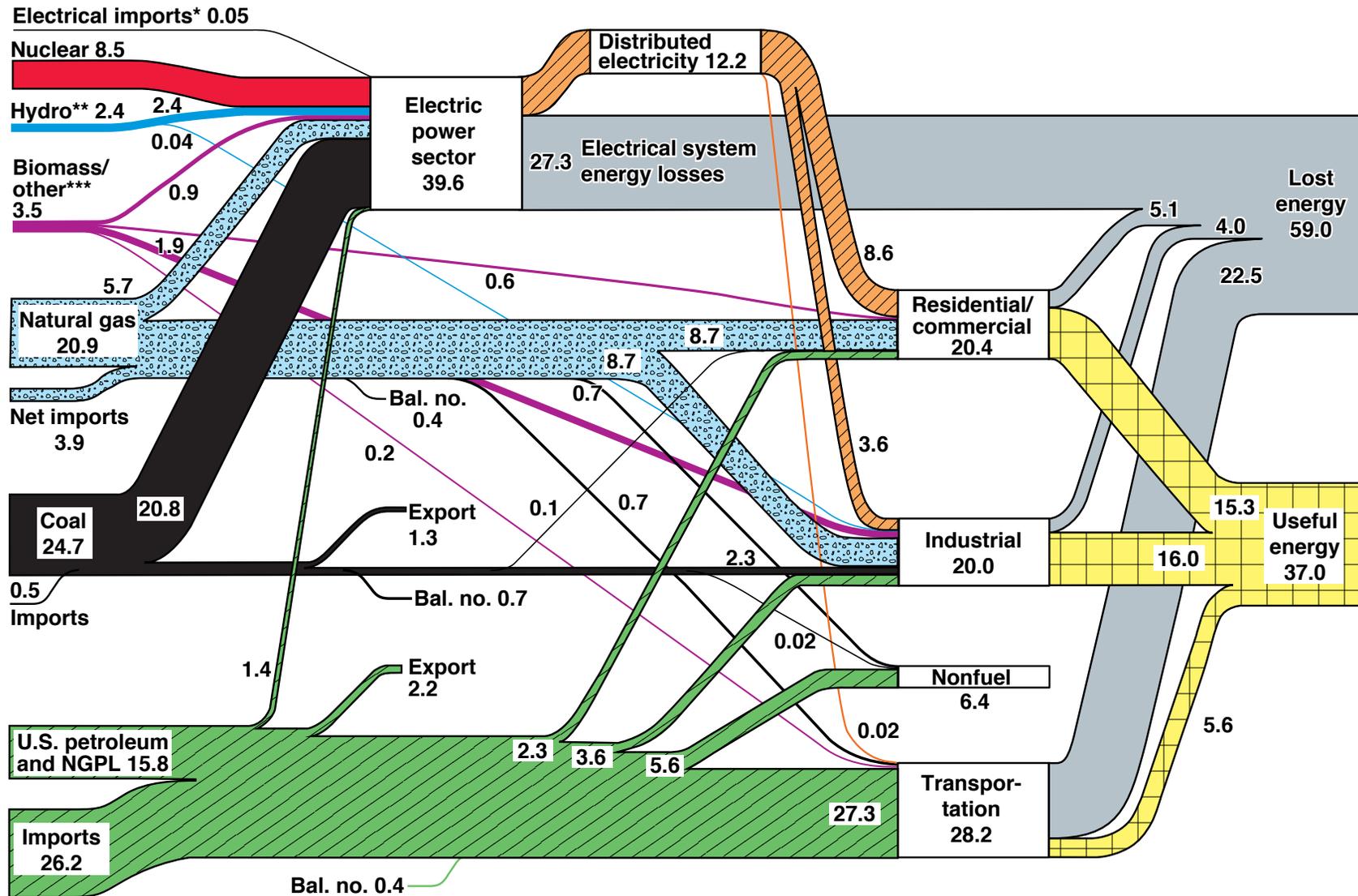
In AER2001, summary data on energy production, imports, exports, and consumption are provided in Table 1.1, “Energy Overview, 1949–2001” (p. 5). This table shows that 96.95 quads of energy were consumed in the United States in 2001.

# Figure 1. U.S. Energy Flow Trends – 2001 Net Primary Resource Consumption ~97 Quads



Source: Production and end-use data from Energy Information Administration, *Annual Energy Review 2001*  
 \*Net fossil-fuel electrical imports  
 \*\*Includes 0.2 quads of imported hydro  
 \*\*\*Biomass/other includes wood, waste, alcohol, geothermal, solar, and wind.

# Figure 2. U.S. Energy Flow Trends – 2001 Net Primary Resource Consumption ~102 Exajoules



Source: Production and end-use data from Energy Information Administration, *Annual Energy Review 2001*

\*Net fossil-fuel electrical imports

\*\*Includes 0.2 quads of imported hydro

\*\*\*Biomass/other includes wood, waste, alcohol, geothermal, solar, and wind.

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AER2001's Table 1.2, "Energy Production by Source, 1949–2001" (p. 7), gives additional details about the 71.673 quads of energy produced within the United States in 2001. Table 1.3, "Energy Consumption by Source, 1949–2001" (p. 9), indicates the amounts of various fossil fuels and renewable energy sources consumed, as well as nuclear energy. Table 1.4, "Energy Imports, Exports, and Net Imports, 1949–2001" (p. 11), shows that the United States had net energy imports of 26.03 quads in 2001. This represents 26.8% of total energy consumed, compared to 25.4% in 2000. Petroleum accounted for 87.7% of net U.S. energy imports in 2001.

AER2001's Table 2.1.a, "Energy Consumption by Sector, 1949–2001" (p. 38), gives the amounts and types of energy consumed by four end-use sectors—residential, commercial, industrial, and transportation—and by the electric power sector. Tables 2.1.b–f (pp. 39–43) give the consumption of resources for each individual sector. LLNL's chart combines the residential and the commercial sectors into a single unit: residential/commercial.

### Definition of End-Use Sectors

The **Residential/Commercial** sector includes private and institutional residences; business establishments not engaged in transportation or manufacturing; commercial establishments; religious and nonprofit organizations; health, social, and educational institutions; and federal, state, and local governments. Electricity used for public street and highway lighting is also included.

The **Industrial** sector includes manufacturing industries (the largest part of the sector), mining, construction, agriculture, fisheries, and forestry. Establishments range from large steel mills to small farms. In LLNL's energy flow chart, fossil fuels used by industry in a nonfuel capacity are treated as a separate data stream; however, most

of the AER2001 tables incorporate nonfuel consumption in the data for the industrial sector.

The **Transportation** sector includes all types of public and private vehicles that transport people and commodities. This sector also includes the energy used to transport natural gas in pipelines. In fact, about 97% of the natural gas consumed by the transportation sector is for the operation of pipelines, primarily in compressors (AER2001, Table 6.5, p. 189).

### Energy Content

The energy flow chart shows all energy streams in terms of a common energy unit: quadrillion Btu. The EIA typically uses conversion factors that represent the gross heat content of the fuel, which is the total amount of heat released when fuel is burned if the water in the combustion products is condensed (i.e., the "higher heating value"). Higher heating value is the fuel value basis on which fuel is priced. It is achieved in many power plants but not in transportation.

Appendix A of AER2001 (pp. 333–343) gives the thermal conversion factors used in that report. These factors are computed annually from the best available data, weighted as appropriate. EIA's estimate of heat content for a fuel depends on the source, type, year of production, and the sector using the fuel. For example, in 2001 the relatively small amount of coal consumed by the residential/commercial sector had an average heat content of approximately 25.000 million Btu per short ton of coal, but the coal used to generate electricity had an average heat content of approximately 20.366 million Btu per short ton. (AER2001, Table A5, p. 337).

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Some conversion factors, useful for estimation, include:

<i>Fuel</i>	<i>Energy content (Btu)</i>
Short ton of coal	21,400,000
Barrel (42 gallons) of crude oil	5,800,000
Cubic foot of natural gas (at standard conditions)	1,027
Kilowatt-hour of electricity	3,412

## Conversion Efficiency Factors

For the sake of consistency with LLNL's previous energy flow charts, the U.S. chart for 2001 assumes the same conversion efficiencies for the residential/commercial, industrial, and transportation sectors as in previous years. The conversion efficiencies are used to determine the proportion of "useful" to "lost" (or "rejected") energy. The uncertainties in these conversion estimates are large.

For electricity generation, the electrical system energy losses are assumed by the EIA to be about two-thirds of the energy consumed. LLNL's energy flow chart for 2001 shows electrical system energy losses of 25.9 quads, which is the sum of the amounts shown for the individual sectors in AER2001's Tables 2.1.b–e, pages 39–42 (i.e., 9.161 quads for residential, 9.122 quads for commercial, 7.583 quads for industrial, and 0.044 quads for transportation).

According to AER2001 (p. 248, Note 1), "Electrical system energy losses are estimated as the difference between total energy consumed to generate electricity and the total energy content of electricity consumed by end users. Most of these losses occur at steam-electric power plants (conventional and nuclear) in the conversion of heat energy into mechanical energy to turn electric generators. This loss is a thermodynamically necessary feature of the steam-electric cycle." This loss occurs in both the Rankine (steam) or Brayton (turbine)

cycles. Transmission and distribution losses, which are not spelled out separately on this chart, are estimated to be about 9% of the gross generation of electricity.

The conversion efficiency factors for the residential/commercial and the industrial sectors are based on engineering estimates for the conversion efficiency of devices such as process heaters and boilers.

For the residential/commercial sector, we again assume an efficiency of 75%. This is a weighted average between space heating at approximately 60% efficiency and motors and other electrical uses at about 90% efficiency.

For the industrial sector, we continue to assume a conversion efficiency of 80%.

For transportation, we continue to assume a generous 20% efficiency, which corresponds to the approximate average efficiency of internal combustion engines as measured on Federal Driving Schedules (i.e., the amount of energy that actually reaches the drive train of a vehicle, compared to the amount of energy consumed). Note that the peak efficiencies of 33–35% for spark-ignited engines and 41–45% for diesel engines are not representative of conversion efficiencies over the Federal Driving Schedules.

## Balancing Numbers

Three "balancing numbers" are indicated on the chart:  $-0.336$  for natural gas,  $-0.689$  for coal, and  $0.335$  for petroleum. When these three balancing numbers are added together, there is a  $-0.69$  quad difference between the left-hand (or "production") side of the chart and the right-hand (or "consumption") side. This  $-0.69$  quad difference corresponds approximately to the "adjustments" of  $-0.75$  quad shown in AER2001 on Table 1.1.

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## Electricity Generation

LLNL's 1999 and 2000 energy flow charts lumped together the electricity generated by "utility" and "nonutility" generators, although the EIA produced separate estimates for each category.

For 2001, however, the EIA has changed how it estimates and groups data on the fuel consumed in electricity generation, and AER2001 is the first EIA publication to incorporate those changes. EIA now organizes electric power and fuel use data into two new categories: electricity-only plants and combined-heat-and-power (CHP) plants, which were formerly known as cogeneration facilities.

EIA now assigns CHP plants to the end-use sector that they report as their major line of business. Thus, a CHP plant that primarily operates to sell electricity is in the electric power sector; a CHP plant that is part of a hospital is in the commercial sector; and a CHP plant that is part of a paper mill is assigned to the industrial sector. The fuels consumed by these CHP plants are assigned to the corresponding sectors.

This does not affect the basic appearance of LLNL's flow chart, although there is a slight shift in the proportion of resources consumed by the various sectors between the 2000 and 2001 charts. On the 2001 chart, the thermal energy (i.e., useful heat) produced by the CHP plants in the electric power sector is not separated from the electric power generated. (More extensive details about electricity generation are given in AER2001, Section 8, pp. 217–249.)

In 2001, net electricity generation dropped about 2.2% from the previous year, to 3,719 billion kilowatt-hours in 2001 from 3,802 billion kilowatt-hours in 2000. Since 1949, such a generating decrease had occurred only once before—in 1982 (AER2001, Table 8.1, p. 221).

## Nonfuel Use

The data on fossil fuel consumption for nonfuel use is from AER2001, Table 1.15, "Fossil Fuel Consumption for Nonfuel Use, 1980–2001" (p. 33). Petroleum products account for 5.3 quads of nonfuel use and include asphalt and road oil, liquefied petroleum gases, pentanes plus, lubricants, petrochemical feedstocks, special naphthas, and other products.

Nonfuel consumption in 2001 accounted for 6.2% of the primary energy resources consumed in the United States; however, because these resources were not used for energy purposes, LLNL's energy flow chart does not assign "lost" and "useful" designations.

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## Notes on Primary Resources

### **Biomass/Other**

By far the largest portion in this category comes from “wood, waste, and alcohol,” which accounted for 2.869 quads of energy produced in 2001. Geothermal energy accounted for 0.313 quads; solar for 0.064 quads; and wind for 0.059 quads. (AER2001, Table 1.2).

### **Coal**

In 2001, the 23.441 quads of coal produced domestically represented 31.5% of all the energy produced within the United States (AER2001, Table 1.2). The electric power sector used 89.8% of the coal consumed in the United States in 2001 (AER2001, Tables 1.3 and 2.1f), with coal fueling 51.5% of the United States’ generation of electricity (AER2001, Table 2.2a, p. 45).

In 2001, 53.1% of U.S. coal production occurred west of the Mississippi, and 46.9% occurred east of the Mississippi. Surface mining accounted for 66.3% of the coal produced, with underground mines accounting for 33.7%. (AER2001, Table 7.2, p. 203)

The approximate heat content of coal consumed by the different end-use sectors is given in Table A5 (p. 337).

### **Hydroelectric Power**

This involves the production of power from falling water, a renewable resource; almost all of this energy goes for the generation of electricity. The amount of hydroelectric power produced varies from year to year, depending on precipitation. Because of drought, the amount of hydroelectric power produced in the United States in 2001 was the lowest since 1966 (AER2001, Table 1.2).

### **Natural Gas**

In AER2001, details about natural gas production and consumption are included in Diagram 3, “Natural Gas Flow, 2001” (p. 175), and Table 6.1, “Natural Gas Overview, 1949–2001” (p. 177). The approximate heat content of natural gas is given in Table A4 (p. 336).

Net imports of natural gas in 2001 amounted to 3.64 quads. This accounted for about 16.1% of the natural gas consumed in the United States (AER2001, Table 6.3, p. 185), which is higher than the 2000 proportion of 15.1%. About 94% of the gross natural gas imports came from Canada.

Of the natural gas withdrawn from U.S. wells in 2001, about 21% came from offshore locations (AER2001, Table 6.4, p. 187).

### **Nuclear Energy**

This is generated by the 104 operable nuclear generating units in the United States. Nuclear energy accounted for 20.7% of electricity net generation in the United States in 2001—the highest share ever (AER2001, Table 9.2, p. 255).

In 2001, the nuclear power industry operated with a capacity factor of 89.4%. (Capacity factors measure actual power generation as a share of maximum possible output.) For comparison, the capacity factor was 88.1% in 2000 and 70.2% in 1990 (AER2001, Table 9.2, p. 255).

Although EIA counts nuclear electric power as U.S. production, a significant proportion of the uranium used in fuel assemblies for U.S.

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civilian nuclear power reactors is now of foreign origin. During 2001, owners and operators of U.S. civilian nuclear power reactors purchased 55,426 thousand pounds of  $U_3O_8$  equivalent, with 76.2% of that uranium being of foreign origin. Also in 2001, the uranium in fuel assemblies loaded into U.S. civilian nuclear power reactors was 74.9% of foreign origins. In 2001, Canada was the top supplier of uranium to the United States (17,120 thousand pounds of  $U_3O_8$  equivalent), followed by the United States (13,187 thousand pounds), Australia (10,314 thousand pounds), Russia (5,042 thousand pounds), Kazakhstan (3,149 thousand pounds), Uzbekistan (2,643 thousand pounds), and South Africa (2,022 thousand pounds). This information on uranium is from EIA's *Uranium Industry Annual 2002* [DOE/EIA-0478(2002), Washington, D.C., May 2003, Tables 11, 12, and 27.]

### **Petroleum and Natural Gas Plant Liquids (NGPL)**

This category includes both crude oil and natural gas plant liquids (i.e., hydrocarbons in natural gas that have been separated as liquids). In AER2001, details about petroleum are found in Diagram 2 (p. 125) and Table 5.1 (p. 127). The approximate heat content of various petroleum products and of crude oil and NGPL can be found in AER2001, Tables A1, A2, and A3 (pp. 333–335).

Petroleum, at 38.232 quads, accounted for 39.4% of the United States' 2001 energy consumption, a higher proportion than 2000's 38.7%. Motor gasoline was 44% of the total petroleum products supplied in 2001 (AER2001, Figure 5.11, p. 146).

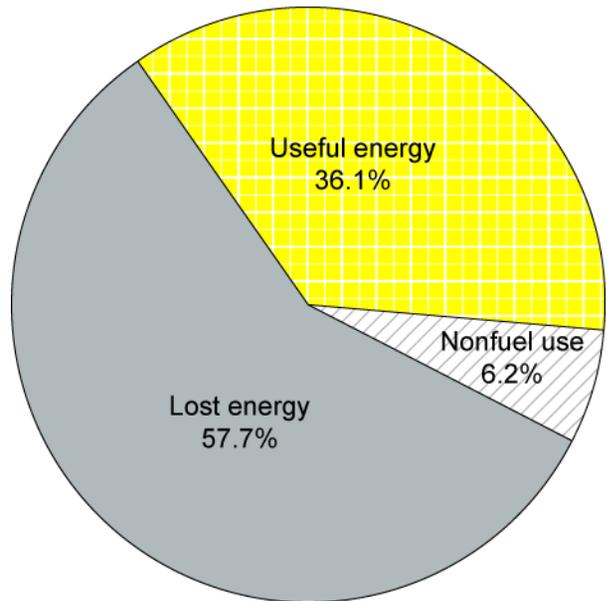
The net petroleum imports of 22.82 quads accounted for 59.7% of U.S. petroleum consumption in 2001; by comparison, in 1990 the net petroleum imports of 15.29 quads accounted for only about 45.6% of consumption (AER2001, Table 1.4, p. 11). During that same interval (1990 to 2001), total U.S. energy consumption increased 14.5% (84.567 quads to 96.950 quads), and petroleum consumption increased 13.9% (33.553 quads to 38.232 quads). (AER2001, Tables 1.3 and 1.4, pp. 9 and 11)

In 2001, Persian Gulf nations accounted for 23.5% of U.S. petroleum imports. These nations include Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and United Arab Emirates. The largest single supplier of U.S. petroleum imports was Canada (1,786 thousand barrels/day or 15.4% of total petroleum imports); second was Saudi Arabia (1,657 thousand barrels/day or 14.3%); third was Venezuela (1,538 thousand barrels/day or 13.2%); and fourth was Mexico (1,423 thousand barrels/day or 12.2%). (AER01, Table 5.4, p. 133)

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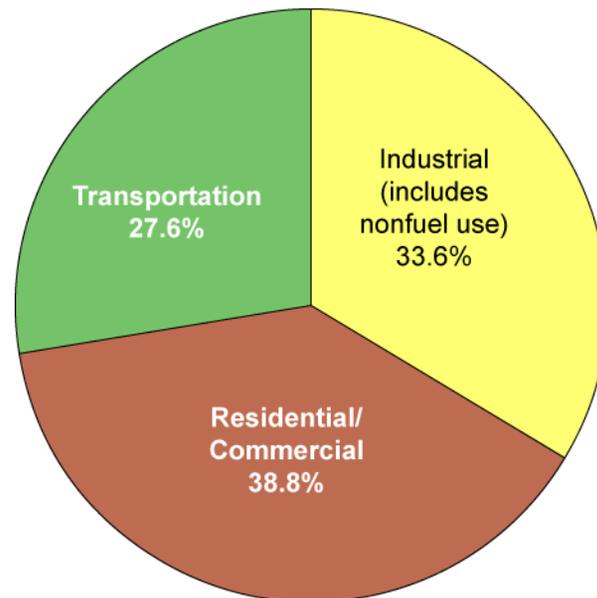
## Other Ways to View This Data

**The U.S. Consumed ~97 Quads of Energy in 2001**



**Figure 3.** In 2001 the United States consumed about 97 quads of energy. As shown in the U.S. energy flow chart (Figure 1), about 36% of that energy total was “useful,” while almost 58% of energy content was lost in the conversion process.

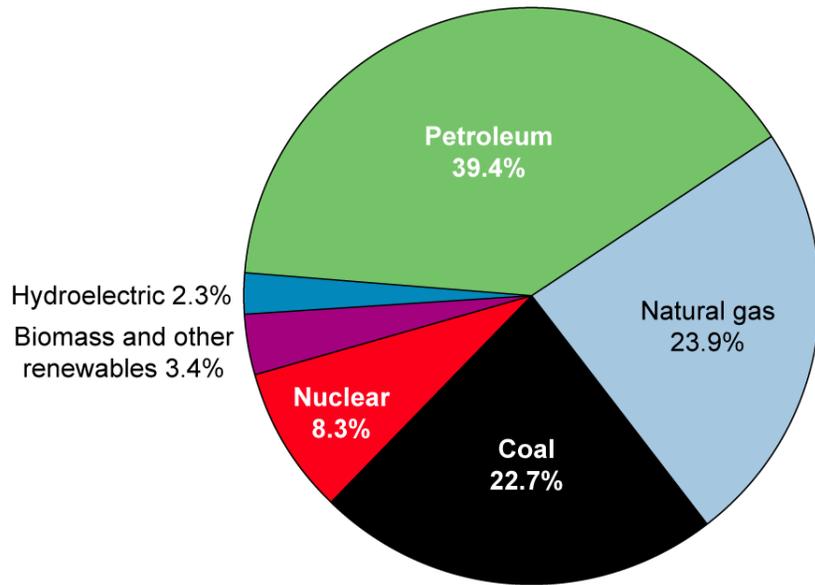
**2001 Energy Consumption by End-Use Sector**  
(Includes electrical system energy losses)



Source: AER2001

**Figure 4.** U.S. energy consumption by end-use sector. Distributed electricity and related electrical system energy losses are included in each sector.

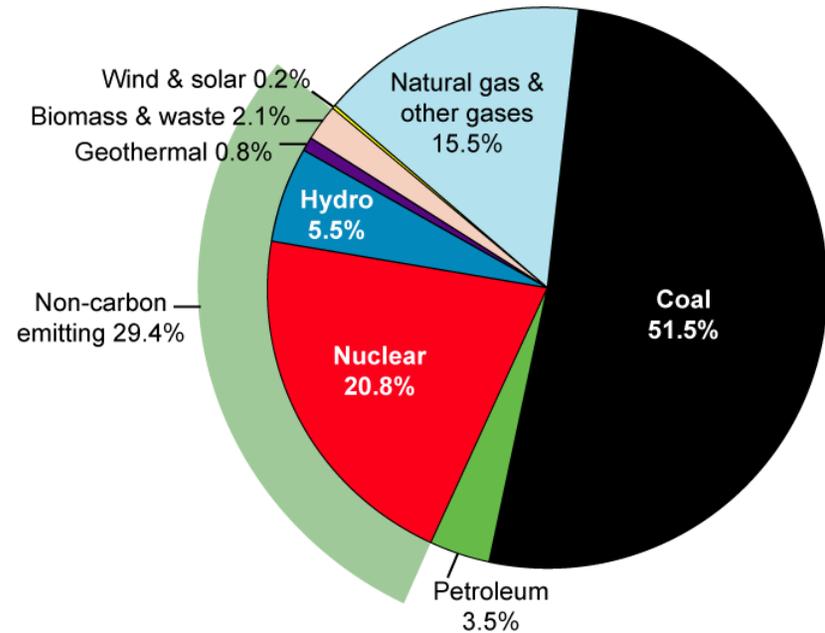
**2001 Energy Consumption by Resource**



Source: AER2001, Table 1.3

**Figure 5.** In 2001, petroleum supplied more than 39% of U.S. energy consumption, followed by natural gas (23.9%) and coal (22.7%). Together, these three fossil fuels supplied 86% of the United States' energy.

**Total U.S. Electricity Generation by Resource, 2001**

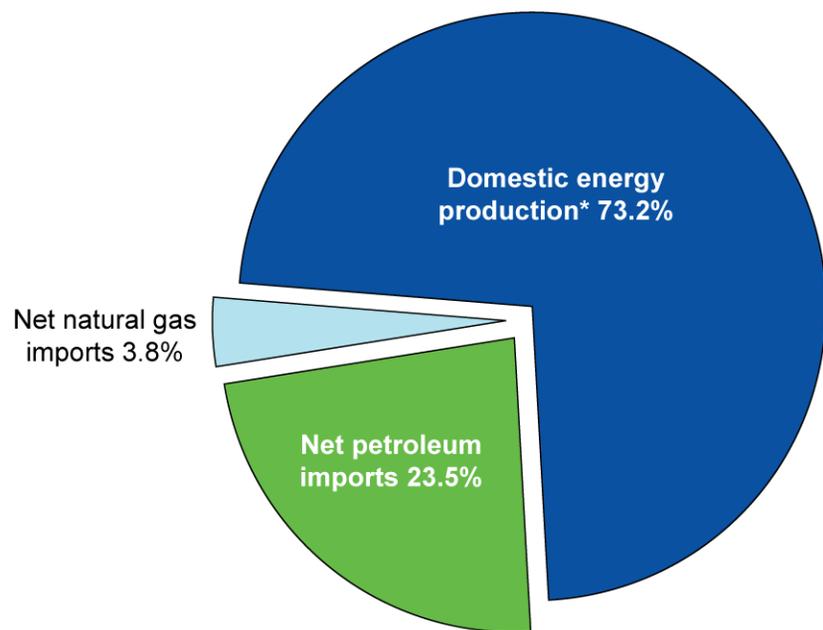


Source: AER2001, Table 2.2a

**Figure 6.** Coal supplied more than half (51.5%) of the energy used to generate electricity in the United States in 2001. Nuclear energy accounted for 20.8%. Non-carbon-emitting sources (i.e., nuclear and renewable energy, including hydroelectricity) together accounted for 29.4% of the electricity generated.

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**Total Domestic and Imported Energy  
Consumed in U.S., 2001**



Source: AER2001, Tables 1.2 and 1.4  
\* Less net coal exports of 0.77 quads

**Figure 7. In 2001, the United States produced only 73.2% of the energy that the nation consumed. The remaining 26.8% came from imports, with net petroleum imports accounting for almost one fourth of total U.S. energy consumption. Note that the EIA included the 8.028 quads of nuclear power with domestic energy production, and this chart corresponds to the EIA interpretation. However, about three-quarters of the uranium in fuel assemblies loaded into U.S. civilian nuclear power reactors in 2001 was of foreign origin (*Uranium Industry Annual 2002*, Table 27, p. 25).**

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## U.S. Carbon Emissions from Energy Consumption, 2001

Paralleling the U.S. Energy flow chart, LLNL also produces a chart showing U.S. carbon (i.e., carbon dioxide) emissions from energy consumption. Figure 8, the 2001 chart, depicts these emissions by type of fossil fuel and by the same end-use sectors as shown on the energy flow chart.

The numbers for this chart are from EIA's publication, *Emissions of Greenhouse Gases in the United States 2001* [DOE/EIA-0573(2001), Washington, D.C., published December 2002 and available on the Web at [http://www.eia.doe.gov/env/env\\_pub.html](http://www.eia.doe.gov/env/env_pub.html) .]

Carbon dioxide (CO<sub>2</sub>) is one of the “greenhouse gases” that trap absorbed radiation in the Earth's atmosphere. Other greenhouse gases include nitrous oxide, methane, and various engineered gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. EIA's report (GHG2001) quantifies all the U.S. emissions of greenhouse gases caused by human activity. The numbers on this chart are from Chapter 3, pages 19–36, of GHG2001.

Carbon dioxide is a colorless, nonpoisonous gas that is a normal part of the Earth's atmosphere. However, carbon dioxide is also a product of the combustion of fossil fuels (coal, petroleum, and natural gas), and thus U.S. carbon dioxide emissions correlate to the amount of fossil fuels used for energy consumption. In 2001, energy-related carbon dioxide accounted for 82.1% of all the anthropogenic U.S. greenhouse gas emissions, based on global warming potential (GHG2001, Figure ES1, p. x).

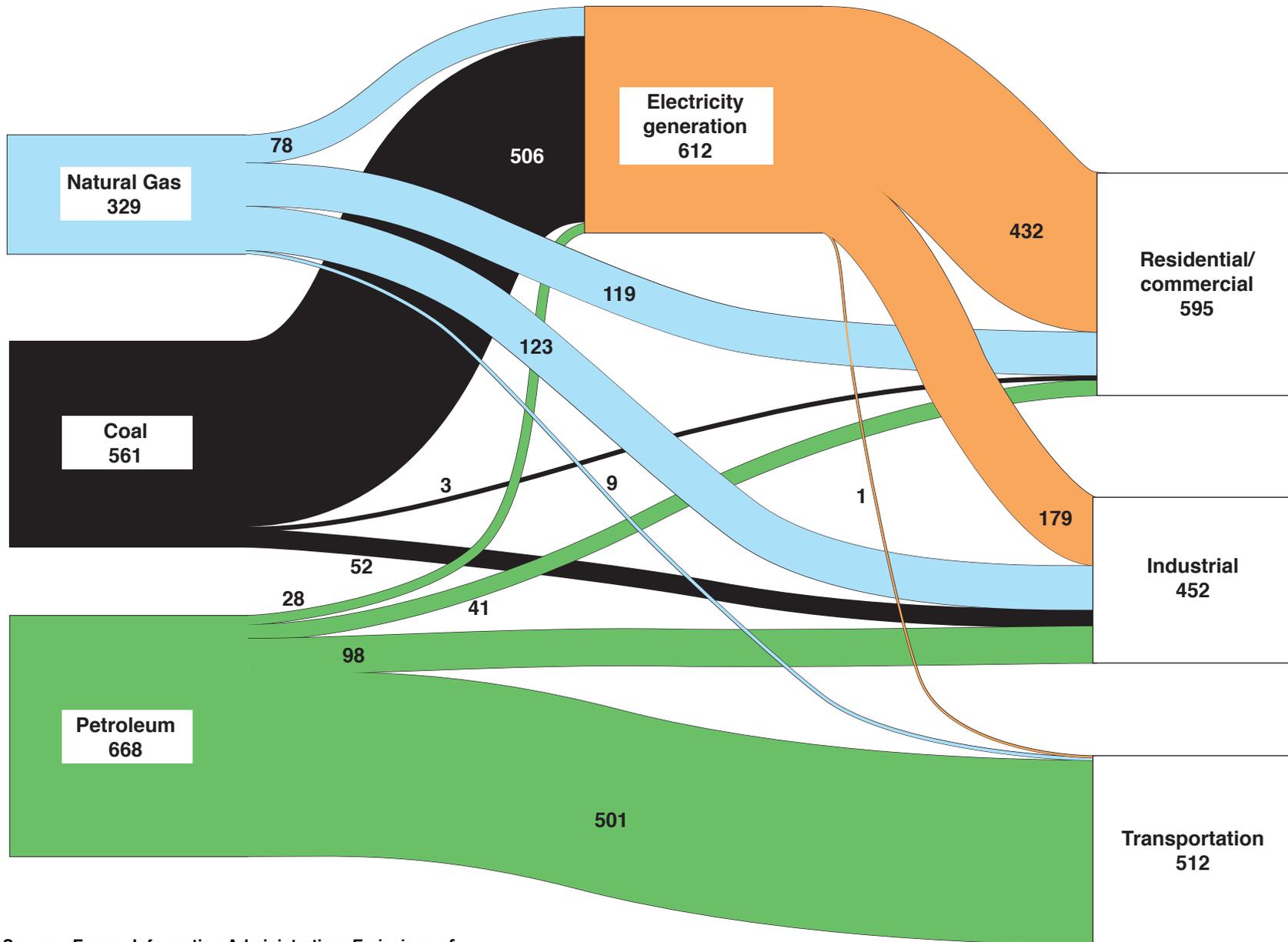
Following EIA's conventions, this chart shows these emissions in terms of million metric tons of carbon (MtC), based on the molecular weight of the gas. Carbon dioxide mass is converted to carbon mass by multiplying by 12/44. Thus the 5,788.5 million metric tons of *carbon dioxide* emissions in 2001 is equivalent to 1579 million metric tons of *carbon*, of which 1547 MtC derived from energy consumption (the amount shown on the chart). The non-energy-related carbon dioxide emissions came from cement production, industrial processes, and other sources.

In 2001, the United States carbon emissions were down about 1.1% from the previous year—1547 MtC in 2001, down from 1564.9 MtC in 2000, according to EIA's most recent estimates. This decrease corresponds to the 2.4% drop in U.S. energy consumption for 2001—96.95 quads in 2001, down from 99.3 quads in 2000. EIA attributes this decrease for 2001 to a number of factors:

- A reduction in overall economic growth in the United States.
- A 4.4% reduction in manufacturing output.
- Warmer winter weather that decreased demand on heating fuels.
- A drop in electricity demand.

Note that the drop in carbon emissions (1.1%) is not as steep as the drop in overall energy consumption (2.4%), in part because drought caused a decrease in (carbon-free) hydroelectricity production and because carbon emissions from petroleum (the transportation sector) and from U.S. territories increased.

# Figure 8. U.S. 2001 Carbon Emissions from Energy Consumption – 1547\* MtC



Source: Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2001*

\*Includes adjustments of 14.8 million metric tons of carbon (MtC) from U.S. territories, less 26.4 MtC from bunker fuels

Note: Numbers may not equal sum of components because of independent rounding

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## Comparison of 1990, 2000, and 2001 Energy Consumption

For comparison, LLNL's U.S. energy flow chart for 2000 (in quads) is included as Figure 9 at the end of this section. Since LLNL prepared the 2000 chart (which was based on *Annual Energy Review 2000*), EIA has revised some of its estimates. For example, EIA now lists total U.S. energy consumption for 2000 as 99.32 quads, instead of the 98.5 quads shown in Figure 9. Also, EIA has readjusted the end-sector allocation for fuel consumed in combined-heat-and-power (CHP) plants.

Note that the numbers in the tables below are from AER2001. The tables include data for 1990, 2000, and 2001. The tables also show the percentage change from 1990 to 2001.

### Primary Resource Consumption by End-Use Sector

As Table 1 shows, from 1990 to 2001 U.S. energy consumption increased 14.6%. During that period, energy consumption by the electric power sector increased 22.6% and by the transportation sector increased 18.7%. Table 1 does not allocate electric power to the other end-use sectors, as does LLNL's energy flow chart (Figure 1.)

### Energy Production and Imports

From 1990 to 2001, as Table 2 indicates, the amount of energy produced in the United States has remained almost constant, while the net imports of energy have increased 84.7%. In 2001, net imports provided 26.8% of the energy that the United States consumed; in 1990 imports were only 16.7% of the total consumption.

Petroleum accounts for the majority of U.S. energy imports and is of special concern because much of that petroleum comes from volatile regions of the world. However, natural gas imports are actually increasing more than three times as fast as petroleum imports. Most of that natural gas comes from Canada.

### Resource Consumption

Variations in resource consumption can be caused by differences in supply, cost, and weather. For example, the amount of rainfall in certain regions of the United States affects the amount of hydroelectricity that can be produced. Colder winters increase the demand on fuels for space heating, while hotter summers lead to greater consumption of electricity for air conditioning and thus of the resources used in electricity generation. As Table 3 indicates, from 1990 to 2001 the consumption of nuclear energy grew at a faster rate (31.5%) than any other resource, followed by natural gas (17.8%).

### Factors Affecting Consumption

As Table 4 shows, per-capita energy use in 2001 was exactly the same as in 1990—that is, 340 million Btu per person. Between 1990 and 2001, however, the U.S. population increased 14.5%—and, in parallel, total energy consumption increased 14.6%.

Although the U.S. Gross Domestic Product (GDP) increased 39.1% from 1990 to 2001 (in chained 1996 dollars), the amount of energy consumed per dollar of GDP dropped 17.6%. Economic fluctuations particularly impact energy use in the industrial sector and also in the transportation sector.

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**Table 1. Primary resource consumption by sector\*,  
1990, 2000, and 2001**

	<b>1990 (quads)</b>	<b>2000 (quads)</b>	<b>2001 (quads)</b>	<b>% change 1990–2001</b>
Residential/ Commercial	10.27	11.35	11.139	8.5
Industrial (incl. non-fuel)	21.240	22.907	21.630	1.8
Transportation	22.472	26.643	26.682	18.7
Electric power industry*	30.594	38.412	37.499	22.6
Total consumption	84.567	99.315	96.950	14.6

*Source:* AER2001, T. 2.1.a

\*Electric power generation and electrical system energy losses are grouped under Electric Power Industry and not assigned to the other sectors.

**Table 2. U.S. energy production and net imports,  
1990, 2000, and 2001**

	<b>1990 (quads)</b>	<b>2000 (quads)</b>	<b>2001 (quads)</b>	<b>% change 1990–2001</b>
U.S. production	70.732	71.059	71.673	1.3
Net energy imports	14.09	25.21	26.03	84.7
Net petroleum imports	15.29	22.38	22.82	49.2
Net natural gas imports	1.46	3.62	3.72	154.8

*Source:* AER2001, T. 1.2 and 1.4

**Table 3. U.S. energy consumption by resource, 1990, 2000, and 2001**

	1990 (quads)	2000 (quads)	2001 (quads)	% change 1990–2001
Biomass/other	3.081	3.388	3.307	7.3
Hydro	3.128	3.077	2.376	(24.0)
Nuclear	6.104	7.862	8.028	31.5
Natural gas	19.718	24.042	23.224	17.8
Coal*	19.161	22.657	21.971	14.7
Petroleum & NGPL	33.553	38.404	38.232	13.9

Source: AER2001, T. 1.3 \*Includes coal coke net imports

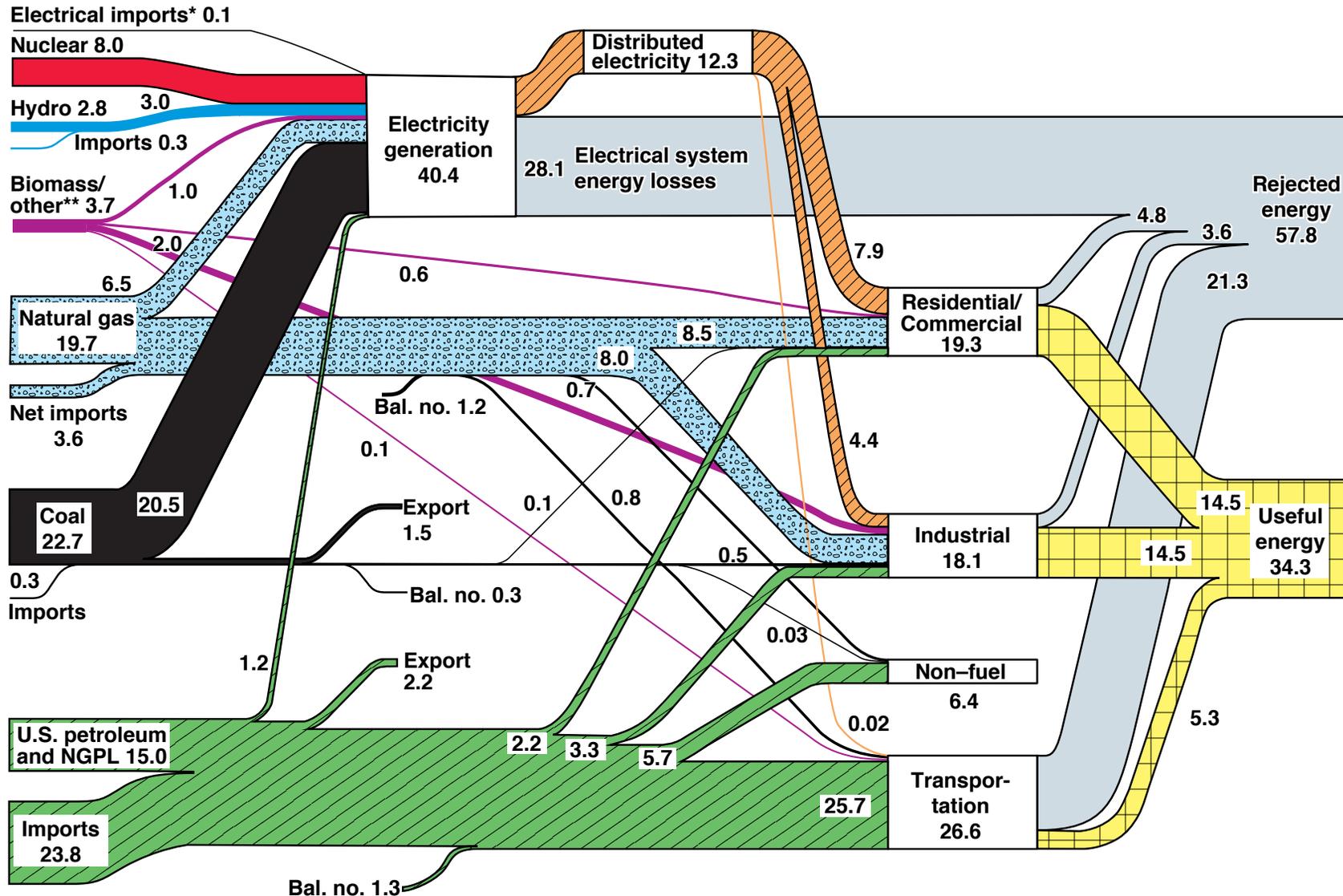
**Table 4. Factors affecting total U.S. energy consumption, 1990, 2000, and 2001**

	1990	2000	2001	% change 1990–2001
Total U.S. energy consumption (quads)	84.567	99.315	96.950	14.6
U.S. population (million people)	248.8	281.4	284.8	14.5
Energy consumption per person (million Btu)	340	353	340	0
GDP (billion chained 1996 dollars)	6,707.9	9,224.0	9,333.8	39.1
Energy consumption per \$ of GDP (1000 Btu per chained 1996 dollar)	12.61	10.77	10.39	-17.6

Source: AER2001, Tables 1.5 and E1

# Figure 9. U.S. Energy Flow Trends – 2000

## Net Primary Resource Consumption 98.5 Quads



Source: Production and end-use data from Energy Information Administration, Annual Energy Review 2000

\*Net fossil-fuel electrical imports

\*\*Biomass/other includes wood and waste, geothermal, solar, and wind.

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**Appendix**  
**Selected Tables from**  
**Energy Information Administration's**  
***Annual Energy Review 2001***

- Table 1.1. Energy Overview, 1949–2001
- Table 1.2. Energy Production by Source, 1949–2001
- Table 1.3. Energy Consumption by Source, 1949–2001
- Table 1.4. Energy Imports, Exports, and Net Imports, 1949–2001
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**Table 1.1 Energy Overview, 1949-2001**  
(Quadrillion Btu)

Year	Production				Imports		Exports		Adjustments <sup>8</sup>	Consumption			
	Fossil Fuels <sup>1</sup>	Nuclear Electric Power <sup>2</sup>	Renewable Energy <sup>3</sup>	Total <sup>4</sup>	Petroleum <sup>5</sup>	Total <sup>6</sup>	Coal	Total <sup>7</sup>		Fossil Fuels <sup>9</sup>	Nuclear Electric Power <sup>2</sup>	Renewable Energy <sup>10</sup>	Total <sup>4,11</sup>
1949	28.75	0	2.97	31.72	1.43	1.47	0.88	1.59	0.40	29.00	0	3.00	32.00
1950	32.56	0	2.98	35.54	1.89	1.93	0.79	1.47	-1.37	31.63	0	3.00	34.63
1951	35.79	0	2.96	38.75	1.87	1.92	1.68	2.62	-1.05	34.01	0	2.99	37.00
1952	34.98	0	2.94	37.92	2.11	2.17	1.40	2.37	-0.95	33.80	0	2.97	36.77
1953	35.35	0	2.83	38.18	2.28	2.34	0.98	1.87	-0.96	34.83	0	2.86	37.68
1954	33.76	0	2.75	36.52	2.32	2.37	0.91	1.70	-0.53	33.88	0	2.78	36.66
1955	37.36	0	2.78	40.15	2.75	2.83	1.46	2.29	-0.44	37.41	0	2.83	40.24
1956	39.77	0	2.85	42.62	3.17	3.25	1.98	2.95	-1.13	38.89	0	2.90	41.79
1957	40.13	(s)	2.85	42.98	3.46	3.57	2.17	3.45	-1.29	38.93	(s)	2.89	41.82
1958	37.22	(s)	2.92	40.13	3.72	3.92	1.42	2.06	-0.32	38.72	(s)	2.95	41.67
1959	39.05	(s)	2.90	41.95	3.91	4.11	1.05	1.54	-1.03	40.55	(s)	2.94	43.49
1960	39.87	0.01	2.93	42.80	4.00	4.23	1.02	1.48	-0.43	42.14	0.01	2.98	45.12
1961	40.31	0.02	2.95	43.28	4.19	4.46	0.98	1.38	-0.60	42.76	0.02	2.98	45.76
1962	41.73	0.03	3.12	44.88	4.56	5.01	1.08	1.48	-0.57	44.68	0.03	3.12	47.83
1963	44.04	0.04	3.10	47.17	4.65	5.10	1.36	1.85	-0.78	46.51	0.04	3.10	49.65
1964	45.79	0.04	3.23	49.06	4.96	5.49	1.34	1.84	-0.87	48.54	0.04	3.25	51.83
1965	47.23	0.04	3.40	50.68	5.40	5.92	1.38	1.85	-0.72	50.58	0.04	3.40	54.02
1966	50.04	0.06	3.43	53.53	5.63	6.18	1.35	1.85	-0.83	53.51	0.06	3.45	57.02
1967	52.60	0.09	3.69	56.38	5.56	6.19	1.35	2.15	-1.52	55.13	0.09	3.69	58.91
1968	54.31	0.14	3.78	58.23	6.21	6.93	1.38	2.03	-0.71	58.50	0.14	3.77	62.41
1969	56.29	0.15	4.10	60.54	6.90	7.71	1.53	2.15	-0.47	61.36	0.15	4.11	65.63
1970	59.19	0.24	4.08	63.50	7.47	8.39	1.94	2.66	-1.37	63.52	0.24	4.10	67.86
1971	58.04	0.41	4.27	62.72	8.54	9.58	1.55	2.18	-0.82	64.60	0.41	4.31	69.31
1972	58.94	0.58	4.40	63.92	10.30	11.46	1.53	2.14	-0.48	67.70	0.58	4.48	72.76
1973	58.24	0.91	4.43	63.58	13.47	14.73	1.43	2.05	-0.46	70.32	0.91	4.58	75.81
1974	56.33	1.27	4.77	62.37	13.13	14.41	1.62	2.22	-0.48	67.91	1.27	4.90	74.08
1975	54.73	1.90	4.72	61.36	12.95	14.11	1.76	2.36	-1.07	65.35	1.90	4.79	72.04
1976	54.72	2.11	4.77	61.60	15.67	16.84	1.60	2.19	-0.18	69.10	2.11	4.86	76.07
1977	55.10	2.70	4.25	62.05	18.76	20.09	1.44	2.07	-1.95	70.99	2.70	4.43	78.12
1978	55.07	3.02	5.04	63.14	17.82	19.25	1.08	1.93	-0.34	71.86	3.02	5.24	80.12
1979	58.01	2.78	5.17	65.95	17.93	19.62	1.75	2.87	-1.65	72.89	2.78	5.38	81.04
1980	59.01	2.74	5.49	67.24	14.66	15.97	2.42	3.72	-1.05	69.98	2.74	5.71	78.44
1981	58.53	3.01	5.47	67.01	12.64	13.97	2.94	4.33	-0.08	67.75	3.01	5.82	76.57
1982	57.46	3.13	5.99	66.57	10.78	12.09	2.79	4.63	-0.59	64.04	3.13	6.29	73.44
1983	54.42	3.20	6.49	64.11	10.65	12.03	2.04	3.72	0.90	63.29	3.20	6.86	73.32
1984	58.85	3.55	6.43	68.83	11.43	12.77	2.15	3.80	-0.82	66.62	3.55	6.84	76.97
1985	57.54	R4.08	6.03	R67.65	10.61	12.10	2.44	4.23	1.19	66.22	R4.08	6.46	R76.70
1986	56.58	R4.38	6.13	R67.09	13.20	14.44	2.25	4.06	-0.50	66.15	R4.38	6.51	R76.97
1987	57.17	R4.75	5.69	R67.61	14.16	15.76	2.09	3.85	-0.04	68.63	R4.75	6.17	R79.48
1988	57.87	R5.59	5.49	R68.95	15.75	17.56	2.50	4.42	0.89	71.66	R5.59	5.82	R82.99
1989	57.47	R5.60	R6.27	R69.34	17.16	18.96	2.64	4.77	R1.40	R72.95	R5.60	R6.44	R84.93
1990	58.56	R6.10	R6.10	R70.73	17.12	18.95	2.77	4.87	R-0.25	R72.35	R6.10	R6.21	R84.57
1991	57.83	R6.42	R6.13	R70.33	16.35	18.50	2.85	5.16	R0.97	R72.05	R6.42	R6.28	R84.64
1992	57.59	R6.48	5.91	R69.93	16.97	19.58	2.68	4.96	R1.50	R73.57	R6.48	6.13	R86.05
1993	55.74	R6.41	6.16	R68.26	18.51	21.50	1.96	4.28	R2.30	R75.10	R6.41	R6.40	R87.78
1994	57.95	R6.69	R6.06	R70.68	19.24	22.73	1.88	4.08	R0.24	R76.62	R6.69	R6.40	R89.57
1995	57.46	R7.08	R6.67	R71.17	18.88	22.57	2.32	4.54	R2.30	R77.61	R7.08	R6.96	R91.50
1996	58.30	R7.09	R7.14	R72.49	20.29	24.01	2.37	R4.64	R2.66	R80.10	R7.09	R7.45	R94.52
1997	58.76	R6.60	R7.08	R72.39	21.74	25.51	2.19	R4.56	R1.64	R81.20	R6.60	R7.32	R94.97
1998	R59.20	R7.07	R6.56	R72.79	22.91	R26.85	2.09	R4.37	R0.08	R81.65	R7.07	R6.78	R95.34
1999	R57.51	R7.61	R6.58	R71.64	23.13	R27.54	1.53	R3.80	R1.58	R82.75	R7.61	R6.79	R96.97
2000	R57.05	R7.86	R6.20	R71.06	R24.53	R29.31	1.53	R4.09	R3.05	R85.18	R7.86	R6.46	R99.32
2001P	58.21	8.03	5.52	71.67	24.88	29.95	1.27	3.92	-0.75	83.48	8.03	5.68	96.95

<sup>1</sup> Coal, natural gas (dry), crude oil, and natural gas plant liquids.

<sup>2</sup> See Note 1 at end of section.

<sup>3</sup> End-use consumption and electricity net generation.

<sup>4</sup> Also includes hydroelectric pumped storage.

<sup>5</sup> Crude oil and petroleum products. Includes imports into the Strategic Petroleum Reserve.

<sup>6</sup> Also includes natural gas, coal, coal coke, and electricity.

<sup>7</sup> Also includes natural gas, petroleum, coal coke, and electricity.

<sup>8</sup> A balancing item. Includes stock changes, losses, gains, miscellaneous blending components, and unaccounted-for supply.

<sup>9</sup> Coal, coal coke net imports, natural gas, petroleum, and electricity net imports derived from fossil fuels.

<sup>10</sup> End-use consumption, electricity net generation, and electricity net imports derived from renewable energy.

<sup>11</sup> Alcohol (ethanol blended into motor gasoline) is included in consumption values for both "Fossil Fuels" and "Renewable Energy," but is counted only once in total energy consumption.

R=Revised. P=Preliminary. (s)=Less than 0.005 quadrillion Btu.

Note: Totals may not equal sum of components due to independent rounding.

Sources: Tables 1.2, 1.3, and 1.4.

**Table 1.2 Energy Production by Source, 1949-2001**  
(Quadrillion Btu)

Year	Fossil Fuels					Nuclear Electric Power <sup>3</sup>	Hydro-electric Pumped Storage <sup>4</sup>	Renewable Energy <sup>1</sup>						Total
	Coal	Natural Gas (Dry)	Crude Oil <sup>2</sup>	Natural Gas Plant Liquids	Total			Conventional Hydroelectric Power	Wood, Waste, Alcohol <sup>5</sup>	Geothermal	Solar	Wind	Total	
1949	11.974	5.377	10.683	0.714	28.748	0	(6)	1.425	1.549	0	NA	NA	2.974	31.722
1950	14.060	6.233	11.447	0.823	32.563	0	(6)	1.415	1.562	0	NA	NA	2.978	35.540
1951	14.419	7.416	13.037	0.920	35.792	0	(6)	1.424	1.535	0	NA	NA	2.958	38.751
1952	12.734	7.964	13.281	0.998	34.977	0	(6)	1.466	1.474	0	NA	NA	2.940	37.917
1953	12.278	8.339	13.671	1.062	35.349	0	(6)	1.413	1.419	0	NA	NA	2.831	38.181
1954	10.542	8.682	13.427	1.113	33.764	0	(6)	1.360	1.394	0	NA	NA	2.754	36.518
1955	12.370	9.345	14.410	1.240	37.364	0	(6)	1.360	1.424	0	NA	NA	2.784	40.148
1956	13.306	10.002	15.180	1.283	39.771	0	(6)	1.435	1.416	0	NA	NA	2.851	42.622
1957	13.061	10.605	15.178	1.289	40.133	(s)	(6)	1.516	1.334	0	NA	NA	2.849	42.983
1958	10.783	10.942	14.204	1.287	37.216	0.002	(6)	1.592	1.323	0	NA	NA	2.915	40.133
1959	10.778	11.952	14.933	1.383	39.045	0.002	(6)	1.548	1.353	0	NA	NA	2.901	41.949
1960	10.817	12.656	14.935	1.461	39.869	0.006	(6)	1.608	1.320	0.001	NA	NA	2.929	42.804
1961	10.447	13.105	15.206	1.549	40.307	0.020	(6)	1.656	1.295	0.002	NA	NA	2.953	43.280
1962	10.901	13.717	15.522	1.593	41.732	0.026	(6)	1.816	1.300	0.002	NA	NA	3.119	44.877
1963	11.849	14.513	15.966	1.709	44.037	0.038	(6)	1.771	1.323	0.004	NA	NA	3.098	47.174
1964	12.524	15.298	16.164	1.803	45.789	0.040	(6)	1.886	1.337	0.005	NA	NA	3.228	49.056
1965	13.055	15.775	16.521	1.883	47.235	0.043	(6)	2.059	1.335	0.004	NA	NA	3.398	50.676
1966	13.468	17.011	17.561	1.996	50.035	0.064	(6)	2.062	1.369	0.004	NA	NA	3.435	53.534
1967	13.825	17.943	18.651	2.177	52.597	0.088	(6)	2.347	1.340	0.007	NA	NA	3.694	56.379
1968	13.609	19.068	19.308	2.321	54.306	0.142	(6)	2.349	1.419	0.009	NA	NA	3.778	58.225
1969	13.863	20.446	19.556	2.420	56.286	0.154	(6)	2.648	1.440	0.013	NA	NA	4.102	60.541
1970	14.607	21.666	20.401	2.512	59.186	0.239	(6)	2.634	1.431	0.011	NA	NA	4.076	63.501
1971	13.186	22.280	20.033	2.544	58.042	0.413	(6)	2.824	1.432	0.012	NA	NA	4.268	62.723
1972	14.092	22.208	20.041	2.598	58.938	0.584	(6)	2.864	1.503	0.031	NA	NA	4.398	63.920
1973	13.992	22.187	19.493	2.569	58.241	0.910	(6)	2.861	1.529	0.043	NA	NA	4.433	63.585
1974	14.074	21.210	18.575	2.471	56.331	1.272	(6)	3.177	1.540	0.053	NA	NA	4.769	62.372
1975	14.989	19.640	17.729	2.374	54.733	1.900	(6)	3.155	1.499	0.070	NA	NA	4.723	61.357
1976	15.654	19.480	17.262	2.327	54.723	2.111	(6)	2.976	1.713	0.078	NA	NA	4.768	61.602
1977	15.755	19.565	17.454	2.327	55.101	2.702	(6)	2.333	1.838	0.077	NA	NA	4.249	62.052
1978	14.910	19.485	18.434	2.245	55.074	3.024	(6)	2.937	2.038	0.064	NA	NA	5.039	63.137
1979	17.540	20.076	18.104	2.286	58.006	2.776	(6)	2.931	2.152	0.084	NA	NA	5.166	65.948
1980	18.598	19.908	18.249	2.254	59.008	2.739	(6)	2.900	2.485	0.110	NA	NA	5.494	67.241
1981	18.377	19.699	18.146	2.307	58.529	3.008	(6)	2.758	2.590	0.123	NA	NA	5.471	67.007
1982	18.639	18.319	18.309	2.191	57.458	3.131	(6)	3.266	2.615	0.105	NA	NA	5.985	66.574
1983	17.247	16.593	18.392	2.184	54.416	3.203	(6)	3.527	2.831	0.129	NA	(s)	6.488	64.106
1984	19.719	18.008	18.848	2.274	58.849	3.553	(6)	3.386	2.880	0.165	(s)	(s)	6.431	68.832
1985	19.325	16.980	18.992	2.241	57.539	R4.076	(6)	2.970	2.864	0.198	(s)	(s)	6.033	R67.647
1986	19.509	16.541	18.376	2.149	56.575	R4.380	(6)	3.071	2.841	0.219	(s)	(s)	6.132	R67.087
1987	20.141	17.136	17.675	2.215	57.167	R4.754	(6)	2.635	2.823	0.229	(s)	(s)	5.687	R67.608
1988	20.738	17.599	17.279	2.260	57.875	R5.587	(6)	2.334	2.937	0.217	(s)	(s)	5.489	R68.951
1989	21.346	17.847	16.117	2.158	57.468	R5.602	(6)	R2.828	R3.062	R0.306	R0.055	R0.019	R6.271	R69.341
1990	22.456	18.362	15.571	2.175	58.564	R6.104	-0.036	R3.030	R2.661	R0.325	R0.060	R0.024	R6.100	R70.732
1991	21.594	18.229	15.701	2.306	57.829	R6.422	-0.047	R3.001	R2.702	R0.336	R0.063	R0.027	R6.130	R70.334
1992	21.629	18.375	15.223	2.363	57.590	R6.479	-0.043	2.617	R2.847	R0.349	R0.064	0.030	R5.907	R69.933
1993	20.249	18.584	14.494	2.408	55.736	R6.410	-0.042	2.892	R2.804	R0.364	R0.066	0.031	R6.157	R68.262
1994	22.111	19.348	14.103	2.391	57.952	R6.694	-0.035	R2.683	R2.939	R0.338	R0.069	0.036	R6.065	R70.676
1995	22.029	19.101	13.887	2.442	57.458	R7.075	-0.028	R3.205	R3.068	R0.294	R0.070	0.033	R6.669	R71.175
1996	22.684	19.363	13.723	2.530	58.299	R7.087	-0.032	R3.590	R3.127	R0.316	R0.071	R0.033	R7.137	R72.491
1997	23.211	19.394	13.658	2.495	58.758	R6.597	R-0.041	R3.640	R3.006	R0.325	R0.070	R0.034	R7.075	R72.389
1998	23.935	R19.613	13.235	2.420	R59.204	R7.068	-0.046	R3.297	R2.835	R0.328	R0.070	0.031	R6.561	R72.787
1999	23.186	R19.341	12.451	2.528	R57.505	R7.610	R-0.062	R3.268	R2.872	R0.331	R0.069	0.046	R6.585	R71.638
2000	R22.623	R19.461	R12.358	R2.611	R57.054	R7.862	R-0.057	R2.811	R2.948	R0.317	R0.066	R0.057	R6.199	R71.059
2001 <sup>P</sup>	23.441	19.839	12.390	2.541	58.211	8.028	-0.090	2.219	2.869	0.313	0.064	0.059	5.524	71.673

<sup>1</sup> End-use consumption and electricity net generation.

<sup>2</sup> Includes lease condensate.

<sup>3</sup> See Note 1 at end of section.

<sup>4</sup> Pumped storage facility production minus energy used for pumping.

<sup>5</sup> Alcohol is ethanol blended into motor gasoline.

<sup>6</sup> Included in conventional hydroelectric power.

R=Revised. P=Preliminary. NA=Not available. (s)=Less than 0.0005 quadrillion Btu.

Note: Totals may not equal sum of components due to independent rounding.

Sources: Tables 5.1, 6.1, 7.1, 8.2a, 10.2a, 10.2b, and A2-A6.

**Table 1.3 Energy Consumption by Source, 1949-2001**  
(Quadrillion Btu)

Year	Fossil Fuels					Total	Nuclear Electric Power	Hydro-electric Pumped Storage <sup>5</sup>	Renewable Energy <sup>1</sup>					Total <sup>7</sup>	
	Coal	Coal Coke Net Imports	Natural Gas <sup>2</sup>	Petroleum <sup>3</sup>	Electricity Net Imports <sup>4</sup>				Conventional Hydroelectric Power <sup>6</sup>	Wood, Waste, Alcohol <sup>7</sup>	Geothermal <sup>8</sup>	Solar	Wind		Total
1949	11.981	-0.007	5.145	11.883	( <sup>9</sup> )	29.002	0	( <sup>9</sup> )	1.449	1.549	NA	NA	NA	2.998	32.000
1950	12.347	0.001	5.968	13.315	( <sup>9</sup> )	31.632	0	( <sup>9</sup> )	1.440	1.562	NA	NA	NA	3.003	34.635
1951	12.553	-0.021	7.049	14.428	( <sup>9</sup> )	34.008	0	( <sup>9</sup> )	1.454	1.535	NA	NA	NA	2.988	36.996
1952	11.306	-0.012	7.550	14.956	( <sup>9</sup> )	33.800	0	( <sup>9</sup> )	1.496	1.474	NA	NA	NA	2.970	36.770
1953	11.373	-0.009	7.907	15.556	( <sup>9</sup> )	34.826	0	( <sup>9</sup> )	1.439	1.419	NA	NA	NA	2.857	37.684
1954	9.715	-0.007	8.330	15.839	( <sup>9</sup> )	33.877	0	( <sup>9</sup> )	1.388	1.394	NA	NA	NA	2.783	36.660
1955	11.167	-0.010	8.998	17.255	( <sup>9</sup> )	37.410	0	( <sup>9</sup> )	1.407	1.424	NA	NA	NA	2.832	40.242
1956	11.350	-0.013	9.614	17.937	( <sup>9</sup> )	38.888	0	( <sup>9</sup> )	1.487	1.416	NA	NA	NA	2.903	41.791
1957	10.821	-0.017	10.191	17.932	( <sup>9</sup> )	38.926	(s)	( <sup>9</sup> )	1.557	1.334	NA	NA	NA	2.890	41.816
1958	9.533	-0.007	10.663	18.527	( <sup>9</sup> )	38.717	0.002	( <sup>9</sup> )	1.629	1.323	NA	NA	NA	2.952	41.670
1959	9.518	-0.008	11.717	19.323	( <sup>9</sup> )	40.550	0.002	( <sup>9</sup> )	1.587	1.353	NA	NA	NA	2.940	43.493
1960	9.838	-0.006	12.385	19.919	( <sup>9</sup> )	42.137	0.006	( <sup>9</sup> )	1.657	1.320	0.001	NA	NA	2.977	45.120
1961	9.623	-0.008	12.926	20.216	( <sup>9</sup> )	42.758	0.020	( <sup>9</sup> )	1.680	1.295	0.002	NA	NA	2.977	45.755
1962	9.906	-0.006	13.731	21.049	( <sup>9</sup> )	44.681	0.026	( <sup>9</sup> )	1.822	1.300	0.002	NA	NA	3.124	47.832
1963	10.413	-0.007	14.403	21.701	( <sup>9</sup> )	46.509	0.038	( <sup>9</sup> )	1.772	1.323	0.004	NA	NA	3.099	49.647
1964	10.964	-0.010	15.288	22.301	( <sup>9</sup> )	48.543	0.040	( <sup>9</sup> )	1.907	1.337	0.005	NA	NA	3.248	51.831
1965	11.581	-0.018	15.769	23.246	( <sup>9</sup> )	50.577	0.043	( <sup>9</sup> )	2.058	1.335	0.004	NA	NA	3.397	54.016
1966	12.143	-0.025	16.995	24.401	( <sup>9</sup> )	53.514	0.064	( <sup>9</sup> )	2.073	1.369	0.004	NA	NA	3.446	57.024
1967	11.914	-0.015	17.945	25.284	( <sup>9</sup> )	55.127	0.088	( <sup>9</sup> )	2.344	1.340	0.007	NA	NA	3.691	58.906
1968	12.331	-0.017	19.210	26.979	( <sup>9</sup> )	58.502	0.142	( <sup>9</sup> )	2.342	1.419	0.009	NA	NA	3.771	62.415
1969	12.382	-0.036	20.678	28.338	( <sup>9</sup> )	61.362	0.154	( <sup>9</sup> )	2.659	1.440	0.013	NA	NA	4.113	65.628
1970	12.265	-0.058	21.795	29.521	( <sup>9</sup> )	63.522	0.239	( <sup>9</sup> )	2.654	1.431	0.011	NA	NA	4.096	67.858
1971	11.598	-0.033	22.469	30.561	( <sup>9</sup> )	64.596	0.413	( <sup>9</sup> )	2.861	1.432	0.012	NA	NA	4.305	69.314
1972	12.077	-0.026	22.698	32.947	( <sup>9</sup> )	67.696	0.584	( <sup>9</sup> )	2.944	1.503	0.031	NA	NA	4.478	72.758
1973	12.971	-0.007	22.512	34.840	( <sup>9</sup> )	70.316	0.910	( <sup>9</sup> )	3.010	1.529	0.043	NA	NA	4.581	75.808
1974	12.663	0.056	21.732	33.455	( <sup>9</sup> )	67.906	1.272	( <sup>9</sup> )	3.309	1.540	0.053	NA	NA	4.902	74.080
1975	12.663	0.014	19.948	32.731	( <sup>9</sup> )	65.355	1.900	( <sup>9</sup> )	3.219	1.499	0.070	NA	NA	4.788	72.042
1976	13.584	(s)	20.345	35.175	( <sup>9</sup> )	69.104	2.111	( <sup>9</sup> )	3.066	1.713	0.078	NA	NA	4.857	76.072
1977	13.922	0.015	19.931	37.122	( <sup>9</sup> )	70.989	2.702	( <sup>9</sup> )	2.515	1.838	0.077	NA	NA	4.431	78.122
1978	13.766	0.125	20.000	37.965	( <sup>9</sup> )	71.856	3.024	( <sup>9</sup> )	3.141	2.038	0.064	NA	NA	5.243	80.123
1979	15.040	0.063	20.666	37.123	( <sup>9</sup> )	72.892	2.776	( <sup>9</sup> )	3.141	2.152	0.084	NA	NA	5.377	81.044
1980	15.423	-0.035	20.394	34.202	( <sup>9</sup> )	69.984	2.739	( <sup>9</sup> )	3.118	2.485	0.110	NA	NA	5.712	78.435
1981	15.908	-0.016	19.928	31.931	( <sup>9</sup> )	67.750	3.008	( <sup>9</sup> )	3.105	2.590	0.123	NA	NA	5.818	76.569
1982	15.322	-0.022	18.505	30.232	( <sup>9</sup> )	64.037	3.131	( <sup>9</sup> )	3.572	2.615	0.105	NA	NA	6.292	73.441
1983	15.894	-0.016	17.357	30.054	( <sup>9</sup> )	63.290	3.203	( <sup>9</sup> )	3.899	2.831	0.129	NA	(s)	6.860	73.317
1984	17.071	-0.011	18.507	31.051	( <sup>9</sup> )	66.617	3.553	( <sup>9</sup> )	3.800	2.880	0.165	(s)	(s)	6.845	76.972
1985	17.478	-0.013	17.834	30.922	( <sup>9</sup> )	66.221	R4.076	( <sup>9</sup> )	3.398	2.864	0.198	(s)	(s)	6.460	R76.705
1986	17.260	-0.017	16.708	32.196	( <sup>9</sup> )	66.148	R4.380	( <sup>9</sup> )	3.446	2.841	0.219	(s)	(s)	6.507	R76.974
1987	18.008	0.009	17.744	32.865	( <sup>9</sup> )	68.626	R4.754	( <sup>9</sup> )	3.117	2.823	0.229	(s)	(s)	6.170	R79.481
1988	18.846	0.040	18.552	34.222	( <sup>9</sup> )	71.660	R5.587	( <sup>9</sup> )	2.662	2.937	0.217	(s)	(s)	5.817	R82.994
1989	R19.051	0.030	R19.712	34.211	-0.050	R72.954	R5.602	( <sup>9</sup> )	R2.987	R3.062	R0.317	R0.055	R0.019	R6.441	R84.926
1990	R19.156	0.005	R19.718	33.553	-0.080	R72.352	R6.104	-0.036	R3.128	R2.661	R0.337	R0.060	R0.024	R6.209	R84.567
1991	R18.992	0.010	R20.149	32.845	0.059	R72.055	R6.422	-0.047	R3.139	R2.702	R0.351	R0.063	R0.027	R6.283	R84.640
1992	R19.122	0.035	R20.835	33.527	0.053	R73.572	R6.479	-0.043	2.818	R2.847	R0.368	R0.064	0.030	R6.127	R86.051
1993	R19.835	0.027	R21.351	33.841	0.050	R75.105	R6.410	-0.042	3.119	R2.804	R0.382	R0.066	0.031	R6.403	R87.780
1994	R19.909	0.058	R21.842	34.670	0.140	R76.619	R6.694	-0.035	2.993	R2.939	R0.366	R0.069	0.036	R6.401	R89.571
1995	R20.089	0.061	R22.784	34.553	0.121	R77.608	R7.075	-0.028	R3.480	R3.068	R0.312	R0.070	0.033	R6.962	R91.501
1996	R21.002	R0.035	R23.196	35.757	0.109	R80.100	R7.087	-0.032	R3.889	R3.127	R0.329	R0.071	R0.033	R7.450	R94.521
1997	R21.445	R0.057	R23.327	36.266	R0.107	R81.203	R6.597	R-0.041	R3.881	R3.006	R0.325	R0.070	R0.034	R7.316	R94.969
1998	R21.656	R0.080	R22.934	36.934	R0.047	R81.650	R7.068	-0.046	R3.518	R2.835	R0.329	R0.070	0.031	R6.782	R95.338
1999	R21.623	R0.070	R23.008	37.960	R0.091	R82.751	R7.610	R-0.062	R3.472	R2.872	R0.332	R0.069	0.046	R6.790	R96.968
2000	R22.580	R0.077	R24.042	R38.404	R0.082	R85.184	R7.862	R-0.057	R3.077	R2.948	R0.317	R0.066	R0.057	R6.465	R99.315
2001P	21.928	0.043	23.224	38.232	0.049	83.476	8.028	-0.090	2.376	2.869	0.315	0.064	0.059	5.683	96.950

<sup>1</sup> End-use consumption, electricity net generation, and net imports of electricity from renewable energy.

<sup>2</sup> Includes supplemental gaseous fuels.

<sup>3</sup> Petroleum products supplied, including natural gas plant liquids and crude oil burned as fuel.

<sup>4</sup> Electricity net imports from fossil fuels. May include some nuclear-generated electricity.

<sup>5</sup> Pumped storage facility production minus energy used for pumping.

<sup>6</sup> Through 1988, includes all electricity net imports. From 1989, includes only electricity net imports derived from hydroelectric power.

<sup>7</sup> Alcohol (ethanol blended into motor gasoline) is included in both "Petroleum" and "Alcohol," but is

counted only once in total energy consumption.

<sup>8</sup> From 1989, includes electricity imports from Mexico that are derived from geothermal energy.

<sup>9</sup> Included in conventional hydroelectric power.

R=Revised. P=Preliminary. NA=Not available. (s)=Less than 0.0005 and greater than -0.0005 quadrillion Btu.

Note: Totals may not equal sum of components due to independent rounding.

Sources: Tables 5.1, 6.1, 7.1, 7.7, 8.1, 8.2a, 10.1, and A2-A6.

**Table 1.4 Energy Imports, Exports, and Net Imports, 1949-2001**  
(Quadrillion Btu)

Year	Imports					Exports					Net Imports				
	Coal	Natural Gas	Petroleum <sup>1</sup>	Other <sup>2</sup>	Total	Coal	Natural Gas	Petroleum	Other <sup>2</sup>	Total	Coal	Natural Gas	Petroleum <sup>1</sup>	Other <sup>2</sup>	Total
1949	0.01	0.00	1.43	0.03	1.47	0.88	0.02	0.68	0.02	1.59	-0.87	-0.02	0.75	0.02	-0.13
1950	0.01	0.00	1.89	0.04	1.93	0.79	0.03	0.64	0.01	1.47	-0.78	-0.03	1.24	0.03	0.47
1951	0.01	0.00	1.87	0.04	1.92	1.68	0.03	0.89	0.03	2.62	-1.67	-0.03	0.98	0.01	-0.71
1952	0.01	0.01	2.11	0.04	2.17	1.40	0.03	0.91	0.02	2.37	-1.40	-0.02	1.20	0.02	-0.20
1953	0.01	0.01	2.28	0.04	2.34	0.98	0.03	0.84	0.02	1.87	-0.97	-0.02	1.44	0.02	0.47
1954	0.01	0.01	2.32	0.04	2.37	0.91	0.03	0.75	0.01	1.70	-0.91	-0.02	1.58	0.02	0.67
1955	0.01	0.01	2.75	0.06	2.83	1.46	0.03	0.77	0.02	2.29	-1.46	-0.02	1.98	0.04	0.54
1956	0.01	0.01	3.17	0.06	3.25	1.98	0.04	0.91	0.02	2.95	-1.98	-0.03	2.26	0.04	0.30
1957	0.01	0.04	3.46	0.06	3.57	2.17	0.04	1.20	0.03	3.45	-2.16	(s)	2.26	0.02	0.12
1958	0.01	0.14	3.72	0.05	3.92	1.42	0.04	0.58	0.02	2.06	-1.41	0.10	3.14	0.03	1.86
1959	0.01	0.14	3.91	0.05	4.11	1.05	0.02	0.45	0.02	1.54	-1.04	0.12	3.46	0.03	2.57
1960	0.01	0.16	4.00	0.06	4.23	1.02	0.01	0.43	0.02	1.48	-1.02	0.15	3.57	0.04	2.74
1961	(s)	0.23	4.19	0.04	4.46	0.98	0.01	0.37	0.02	1.38	-0.98	0.22	3.82	0.02	3.08
1962	0.01	0.42	4.56	0.03	5.01	1.08	0.02	0.36	0.03	1.48	-1.08	0.40	4.20	(s)	3.53
1963	0.01	0.42	4.65	0.03	5.10	1.36	0.02	0.44	0.03	1.85	-1.35	0.40	4.21	-0.01	3.25
1964	0.01	0.46	4.96	0.07	5.49	1.34	0.02	0.43	0.06	1.84	-1.33	0.44	4.53	0.01	3.65
1965	(s)	0.47	5.40	0.04	5.92	1.38	0.03	0.39	0.06	1.85	-1.37	0.44	5.01	-0.02	4.06
1966	(s)	0.50	5.63	0.05	6.18	1.35	0.03	0.41	0.06	1.85	-1.35	0.47	5.21	-0.01	4.32
1967	0.01	0.58	5.56	0.04	6.19	1.35	0.08	0.65	0.06	2.15	-1.35	0.50	4.91	-0.02	4.04
1968	0.01	0.67	6.21	0.04	6.93	1.38	0.10	0.49	0.06	2.03	-1.37	0.58	5.73	-0.02	4.90
1969	(s)	0.75	6.90	0.06	7.71	1.53	0.05	0.49	0.08	2.15	-1.53	0.70	6.42	-0.02	5.56
1970	(s)	0.85	7.47	0.07	8.39	1.94	0.07	0.55	0.11	2.66	-1.93	0.77	6.92	-0.04	5.72
1971	(s)	0.96	8.54	0.08	9.58	1.55	0.08	0.47	0.07	2.18	-1.54	0.88	8.07	(s)	7.41
1972	(s)	1.05	10.30	0.11	11.46	1.53	0.08	0.47	0.06	2.14	-1.53	0.97	9.83	0.05	9.32
1973	(s)	1.06	13.47	0.20	14.73	1.43	0.08	0.49	0.06	2.05	-1.42	0.98	12.98	0.14	12.68
1974	0.05	0.99	13.13	0.25	14.41	1.62	0.08	0.46	0.06	2.22	-1.57	0.91	12.66	0.19	12.19
1975	0.02	0.98	12.95	0.16	14.11	1.76	0.07	0.44	0.08	2.36	-1.74	0.90	12.51	0.08	11.75
1976	0.03	0.99	15.67	0.15	16.84	1.60	0.07	0.47	0.06	2.19	-1.57	0.92	15.20	0.09	14.65
1977	0.04	1.04	18.76	0.26	20.09	1.44	0.06	0.51	0.06	2.07	-1.40	0.98	18.24	0.20	18.02
1978	0.07	0.99	17.82	0.36	19.25	1.08	0.05	0.77	0.03	1.93	-1.00	0.94	17.06	0.33	17.32
1979	0.05	1.30	17.93	0.33	19.62	1.75	0.06	1.00	0.06	2.87	-1.70	1.24	16.93	0.27	16.75
1980	0.03	1.01	14.66	0.28	15.97	2.42	0.05	1.16	0.09	3.72	-2.39	0.96	13.50	0.18	12.25
1981	0.03	0.92	12.64	0.39	13.97	2.94	0.06	1.26	0.06	4.33	-2.92	0.86	11.38	0.33	9.65
1982	0.02	0.95	10.78	0.35	12.09	2.79	0.05	1.73	0.06	4.63	-2.77	0.90	9.05	0.28	7.46
1983	0.03	0.94	10.65	0.41	12.03	2.04	0.06	1.57	0.05	3.72	-2.01	0.89	9.08	0.36	8.31
1984	0.03	0.85	11.43	0.46	12.77	2.15	0.06	1.54	0.05	3.80	-2.12	0.79	9.89	0.40	8.96
1985	0.05	0.95	10.61	0.49	12.10	2.44	0.06	1.66	0.08	4.23	-2.39	0.90	8.95	0.41	7.87
1986	0.06	0.75	13.20	0.43	14.44	2.25	0.06	1.67	0.08	4.06	-2.19	0.69	11.53	0.36	10.38
1987	0.04	0.99	14.16	0.57	15.76	2.09	0.05	1.63	0.08	3.85	-2.05	0.94	12.53	0.49	11.91
1988	0.05	1.30	15.75	0.47	17.56	2.50	0.07	1.74	0.10	4.42	-2.45	1.22	14.01	0.37	13.15
1989	0.07	1.39	17.16	0.34	18.96	2.64	0.11	1.84	0.18	4.77	-2.57	1.28	15.33	0.15	14.19
1990	0.07	1.55	17.12	0.22	18.95	2.77	0.09	1.82	0.18	4.87	-2.70	1.46	15.29	0.03	14.09
1991	0.08	1.80	16.35	0.27	18.50	2.85	0.13	2.13	0.04	5.16	-2.77	1.67	14.22	0.22	13.34
1992	0.10	2.16	16.97	0.35	19.58	2.68	0.22	2.01	0.05	4.96	-2.59	1.94	14.96	0.31	14.62
1993	0.20	2.40	18.51	0.39	21.50	1.96	0.14	2.12	0.06	4.28	-1.76	2.25	16.40	0.32	17.22
1994	0.22	2.68	19.24	0.58	22.73	1.88	0.16	1.99	0.05	4.08	-1.66	2.52	17.26	0.53	18.65
1995	0.24	2.90	18.88	0.55	22.57	2.32	0.16	1.99	0.07	4.54	-2.08	2.74	16.89	0.47	18.03
1996	0.20	3.00	20.29	0.52	24.01	2.37	0.16	2.06	R0.06	R4.64	-2.17	2.85	18.23	R0.46	R19.37
1997	0.19	3.06	21.74	0.52	25.51	2.19	0.16	2.10	R0.11	R4.56	-2.01	2.90	19.64	R0.41	20.94
1998	0.22	3.22	22.91	0.50	R26.85	2.09	0.16	1.97	R0.15	R4.37	-1.87	3.06	20.94	R0.35	22.47
1999	0.23	3.66	23.13	0.52	R27.54	1.53	0.16	1.95	R0.15	R3.80	-1.30	3.50	21.18	R0.37	R23.75
2000	0.31	R3.87	R24.53	R0.59	R29.31	1.53	R0.25	2.15	R0.17	R4.09	-1.21	R3.62	R22.38	R0.42	R25.21
2001 <sup>P</sup>	0.49	4.12	24.88	0.45	29.95	1.27	0.40	2.06	0.20	3.92	-0.77	3.72	22.82	0.25	26.03

<sup>1</sup> Includes imports into the Strategic Petroleum Reserve, which began in 1977.

<sup>2</sup> Coal coke and small amounts of electricity transmitted across U.S. borders with Canada and Mexico.

R=Revised. P=Preliminary. (s)=Less than 0.005 quadrillion Btu and greater than -0.005 quadrillion Btu.

Notes: Includes trade between the United States (50 States and the District of Columbia) and its

territories and possessions. Totals or net import items may not equal sum of components due to independent rounding.

Sources: Tables 5.1, 6.1, 7.1, 7.7, 8.1, 10.2b, and A2-A6.

**Table 1.15 Fossil Fuel Consumption for Nonfuel Use, 1980-2001**

Year	Petroleum Products									Natural Gas	Coal	Total	Percent of Total Energy Consumption
	Asphalt and Road Oil	Liquefied Petroleum Gases	Pentanes Plus	Lubricants	Petro-chemical Feedstocks	Petroleum Coke	Special Naphthas	Other <sup>1</sup>	Total				
Physical Units <sup>2</sup>													
1980	145	230	( <sup>3</sup> )	58	253	24	37	58	805	639	2.4	—	—
1981	125	229	( <sup>3</sup> )	56	216	29	27	54	736	507	2.1	—	—
1982	125	256	( <sup>3</sup> )	51	157	23	25	48	686	438	1.4	—	—
1983	136	264	( <sup>3</sup> )	53	151	10	30	45	689	441	1.2	—	—
1984	150	247	10	57	145	16	40	41	705	495	1.5	—	—
1985	156	265	13	53	144	15	30	41	718	500	1.1	—	—
1986	164	248	17	52	169	14	25	38	727	496	0.7	—	—
1987	170	303	12	59	170	24	28	36	802	578	0.8	—	—
1988	171	319	21	57	173	25	22	40	827	554	0.7	—	—
1989	165	332	17	58	172	23	20	39	827	563	0.6	—	—
1990	176	344	18	60	199	30	20	39	887	572	0.6	—	—
1991	162	394	10	53	200	27	17	44	907	573	0.6	—	—
1992	166	397	13	54	214	41	20	35	940	594	1.2	—	—
1993	174	389	60	55	216	27	20	33	976	596	0.9	—	—
1994	176	437	56	58	222	30	15	35	1,029	673	0.9	—	—
1995	178	450	66	57	215	32	13	26	1,037	647	0.9	—	—
1996	177	470	69	55	217	34	14	27	1,063	656	0.9	—	—
1997	184	473	65	58	250	29	14	27	1,102	<sup>R</sup> 678	0.9	—	—
1998	190	454	58	61	252	51	20	31	1,117	<sup>R</sup> 685	0.8	—	—
1999	200	512	72	62	<sup>R</sup> 238	62	28	28	<sup>R</sup> 1,201	<sup>R</sup> 666	0.8	—	—
2000	192	<sup>R</sup> 527	<sup>R</sup> 68	61	<sup>R</sup> 243	<sup>R</sup> 38	<sup>R</sup> 19	29	<sup>R</sup> 1,177	<sup>R</sup> 684	0.8	—	—
2001 <sup>P</sup>	190	479	66	56	211	45	16	31	1,093	645	0.8	—	—
Quadrillion Btu													
1980	0.96	0.78	( <sup>3</sup> )	0.35	1.43	0.14	0.19	0.34	4.19	0.65	0.08	4.92	6.3
1981	0.83	0.77	( <sup>3</sup> )	0.34	1.21	0.17	0.14	0.31	3.78	0.52	0.07	4.37	5.7
1982	0.83	0.87	( <sup>3</sup> )	0.31	0.88	0.14	0.13	0.28	3.44	0.45	0.04	3.93	5.4
1983	0.90	0.89	( <sup>3</sup> )	0.32	0.85	0.06	0.16	0.26	3.45	0.45	0.04	3.94	5.4
1984	0.99	0.84	0.05	0.35	0.82	0.09	0.21	0.24	3.58	0.51	0.05	4.14	5.4
1985	1.03	0.90	0.06	0.32	0.82	0.09	0.16	0.24	3.63	0.52	0.03	4.18	5.4
1986	1.09	0.85	0.08	0.31	0.95	0.08	0.13	0.22	3.72	0.51	0.02	4.25	5.5
1987	1.13	1.06	0.06	0.36	0.96	0.14	0.14	0.21	4.06	0.60	0.03	4.69	5.9
1988	1.14	1.11	0.10	0.34	0.97	0.15	0.11	0.23	4.16	0.57	0.02	4.75	5.7
1989	1.10	1.18	0.08	0.35	0.96	0.14	0.11	0.23	4.14	0.58	0.02	4.74	5.6
1990	1.17	1.20	0.08	0.36	1.12	0.18	0.11	0.23	4.46	0.59	0.02	5.07	6.0
1991	1.08	1.38	0.04	0.32	1.15	0.16	0.09	0.26	4.48	0.59	0.02	5.09	6.0
1992	1.10	1.39	0.06	0.33	1.20	0.25	0.10	0.20	4.64	0.61	0.04	5.29	<sup>R</sup> 6.1
1993	1.15	1.35	0.28	0.34	1.22	0.17	0.10	0.20	4.80	0.61	0.03	5.44	6.2
1994	1.17	1.55	0.26	0.35	1.26	0.18	0.08	0.20	5.05	0.69	0.03	5.77	<sup>R</sup> 6.4
1995	1.18	1.59	0.30	0.35	1.21	0.19	0.07	0.20	5.08	0.66	0.03	5.77	6.3
1996	1.18	1.65	0.32	0.34	1.21	0.21	0.07	0.19	5.17	0.67	0.03	5.87	6.2
1997	1.22	1.67	0.30	0.35	1.40	0.18	0.07	0.20	5.40	<sup>R</sup> 0.70	0.03	<sup>R</sup> 6.13	6.5
1998	1.26	1.60	0.27	0.37	1.40	0.31	0.11	0.22	5.54	0.71	0.03	6.28	6.6
1999	1.32	1.81	0.33	0.37	1.33	0.37	0.15	0.21	5.89	<sup>R</sup> 0.68	0.03	<sup>R</sup> 6.60	6.8
2000	<sup>R</sup> 1.28	<sup>R</sup> 1.86	0.31	0.37	<sup>R</sup> 1.35	0.23	<sup>R</sup> 0.10	0.21	<sup>R</sup> 5.70	<sup>R</sup> 0.70	0.03	<sup>R</sup> 6.43	6.5
2001 <sup>P</sup>	1.26	1.69	0.31	0.34	1.17	0.27	0.08	0.22	5.34	0.66	0.02	6.02	6.2

<sup>1</sup> Distillate fuel oil, residual fuel oil, waxes, and miscellaneous products.

<sup>2</sup> Petroleum - million barrels; natural gas - billion cubic feet; and coal - million short tons.

<sup>3</sup> Included in liquefied petroleum gases.

R=Revised. P=Preliminary. — = Not applicable.

Notes: See Note 2 at end of section for a discussion of "Nonfuel Use." Because of changes in methodology, data series may be revised annually. See Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2000* (November 2001), Appendix A, on the Web Page, for a discussion of the estimates in the table. Totals may not equal sum of components due to independent rounding.

Web Page: <http://www.eia.doe.gov/environment.html>.

Sources: **Petroleum Products:** 1980—EIA, Energy Data Reports, *Petroleum Statement, Annual and Sales of Liquefied Petroleum Gases and Ethane in 1980*. 1981-2000—EIA, *Petroleum Supply Annual*, annual reports, and unpublished data. 2001—EIA, *Petroleum Supply Monthly* (February 2002), and EIA estimates. **Natural Gas:** 1980—Bureau of the Census, 1980 Survey of Manufactures, *Hydrocarbon, Coal, and Coke Materials Consumed*. 1981 forward—U.S. Department of Commerce. **Coal:** 1960-1995—U.S. International Trade Commission, *Synthetic Organic Chemicals, United States Production and Sales, 1995* (January 1997). 1996 forward—Estimated because the data series has been discontinued. **Percent of Total Energy Consumption:** Derived by dividing total by total consumption on Table 1.3.

**Table 2.1a Energy Consumption by Sector, 1949-2001**  
(Trillion Btu)

Year	End-Use Sectors								Electric Power Sector <sup>3,4</sup>	Adjustments <sup>5</sup>	Total
	Residential		Commercial <sup>1</sup>		Industrial <sup>2</sup>		Transportation				
	Primary	Total	Primary	Total	Primary	Total	Primary	Total			
1949	4,475	R5,619	2,661	R3,665	R12,627	R14,726	7,880	R7,991	4,358	(s)	32,000
1950	4,848	R6,012	2,824	R3,888	R13,881	R16,242	8,384	R9,493	4,698	(s)	34,635
1951	5,099	R6,381	R2,752	R3,892	R15,118	R17,680	8,934	R9,043	5,093	(s)	36,996
1952	5,179	R6,587	2,662	R3,867	R14,662	R17,313	8,907	R9,004	5,361	(s)	36,770
1953	5,056	R6,567	2,520	R3,782	R15,328	R18,211	9,031	R9,124	5,749	(s)	37,684
1954	5,286	R6,875	2,445	R3,725	R14,306	R17,156	8,823	R8,903	5,800	(s)	36,660
1955	5,633	R7,312	2,548	R3,888	R16,091	R19,490	R9,475	R9,551	6,495	(s)	40,242
1956	5,851	R7,684	2,608	R4,031	R16,562	R20,215	R9,791	R9,860	6,979	(s)	41,791
1957	5,772	R7,747	2,434	R3,952	R16,513	R20,219	9,837	9,897	7,260	(s)	41,816
1958	6,143	R8,226	2,553	R4,120	R15,798	R19,319	R9,953	10,005	7,223	(s)	41,670
1959	6,224	R8,455	2,630	R4,359	R16,519	R20,329	R10,298	R10,350	7,821	(s)	43,493
1960	6,689	R9,087	2,702	R4,597	R16,977	R20,839	R10,560	R10,597	8,192	(s)	45,120
1961	6,815	R9,330	2,744	R4,711	R16,993	R20,944	R10,735	R10,770	8,469	(s)	45,755
1962	7,113	R9,818	2,910	R5,024	R17,590	R21,770	R11,186	11,221	9,033	(s)	47,832
1963	7,135	R10,035	2,897	R5,227	R18,366	R22,730	R11,621	11,655	9,628	(s)	49,647
1964	7,161	R10,295	2,949	R5,442	R19,427	R24,096	R11,965	11,998	10,330	(s)	51,831
1965	7,334	R10,695	3,144	R5,813	R20,124	R25,074	12,400	12,434	11,013	(s)	54,016
1966	7,549	R11,221	3,384	R6,301	R21,030	R26,401	13,069	13,102	11,993	(s)	57,024
1967	7,741	R11,669	3,738	R6,870	R21,013	R26,615	R13,718	R13,752	12,696	(s)	58,906
1968	7,968	R12,372	3,861	R7,291	R21,872	R27,886	R14,831	R14,866	13,882	(s)	62,415
1969	8,277	R13,208	4,046	R7,797	R22,654	R29,118	R15,471	R15,506	15,182	(s)	65,628
1970	8,353	R13,803	4,196	R8,311	R22,975	R29,647	R16,061	R16,098	16,273	(s)	67,858
1971	8,460	R14,290	4,279	R8,684	R22,732	R29,611	16,693	16,729	17,149	(s)	69,314
1972	8,655	R14,909	4,369	R9,159	R23,532	R30,974	R17,681	R17,716	18,520	(s)	72,758
1973	8,250	R14,963	4,381	R9,533	R24,741	R32,693	R18,576	R18,612	19,852	R7	75,808
1974	7,928	R14,714	4,221	R9,386	R23,816	R31,855	R18,086	R18,119	20,022	R7	74,080
1975	8,006	R14,856	4,023	R9,477	R21,454	R29,464	R18,209	R18,244	20,350	R1	72,042
1976	8,408	R15,460	4,333	R10,051	R22,685	R31,454	19,065	19,099	21,573	R8	76,072
1977	8,207	R15,729	4,217	R10,210	R23,193	R32,356	R19,784	R19,820	22,713	7	78,122
1978	8,272	R16,202	4,269	R10,517	R23,276	R32,788	R20,580	R20,615	23,724	R2	80,123
1979	7,934	R15,888	4,333	R10,664	R24,211	R34,019	R20,436	R20,471	24,128	R2	81,044
1980	7,504	R15,898	4,097	R10,633	R22,673	R32,209	R19,658	R19,696	24,505	R-1	78,435
1981	7,103	R15,431	3,831	R10,703	R21,404	R30,926	R19,469	R19,506	24,760	3	76,569
1982	7,163	R15,649	3,859	R10,940	R19,113	R27,778	R19,032	R19,069	24,270	R4	73,441
1983	6,834	R15,547	3,827	R11,024	R18,598	R27,602	R19,098	R19,141	24,956	R3	73,317
1984	6,990	R15,870	3,991	R11,546	R20,208	R29,745	R19,761	R19,809	26,020	R3	76,972
1985	6,988	R16,023	3,712	R11,554	R19,540	R29,062	R20,023	20,071	26,446	R-4	R76,705
1986	6,807	R16,009	3,652	R11,681	R19,133	R28,463	20,768	R20,817	26,611	R3	R76,974
1987	6,841	R16,341	3,743	R12,054	R20,046	R29,633	21,405	21,456	27,448	R-3	R79,481
1988	7,244	R17,140	3,953	R12,643	R20,958	R30,895	22,261	22,313	28,574	R3	R82,994
1989	7,492	R17,785	R3,954	R13,172	R20,886	R31,408	R22,497	R22,552	4P30,087	R10	R84,926
1990	R6,457	R16,878	R3,813	R13,267	R21,240	R31,904	R22,472	R22,526	P30,594	R-9	R84,567
1991	6,689	R17,453	R3,862	R13,498	R20,901	R31,566	R22,069	R22,122	P31,118	R1	R84,640
1992	R6,882	R17,401	R3,899	R13,453	R21,806	R32,738	R22,406	R22,459	P31,058	(s)	R86,051
1993	R7,121	R18,318	R3,894	R13,852	R21,740	R32,738	R22,829	R22,883	P32,207	R-10	R87,780
1994	R6,949	R18,246	R3,930	R14,159	R22,376	R33,668	R23,448	R23,503	P32,875	R-6	R89,571
1995	R7,022	R18,749	R4,032	R14,753	R22,643	R34,035	R23,904	R23,960	P33,896	R3	R91,501
1996	R7,556	R19,742	R4,218	R15,251	R23,376	R35,012	R24,456	R24,511	P34,912	R4	R94,521
1997	R7,088	R19,146	R4,248	R15,754	R23,619	R35,255	R24,752	R24,807	P35,256	R6	R94,969
1998	R6,462	R19,114	R3,961	R16,029	R23,080	R34,848	R25,295	R25,351	P36,543	R-3	R95,338
1999	R6,810	R19,702	R4,001	R16,430	R22,825	R34,740	R26,031	R26,089	P37,294	R6	R96,968
2000	R7,129	R20,517	R4,221	R17,237	R22,907	R34,855	R26,643	R26,704	P38,412	R2	R99,315
2001 <sup>P</sup>	6,899	20,157	4,240	17,443	21,630	32,604	26,682	26,746	37,499	(s)	96,950

<sup>1</sup> Commercial sector fuel use, including that at commercial combined-heat-and-power (CHP) and commercial electricity-only plants. See Appendix G for commercial sector NAICS codes.

<sup>2</sup> Industrial sector fuel use, including that at industrial combined-heat-and-power (CHP) and industrial electricity-only plants. See Appendix G for industrial sector NAICS codes.

<sup>3</sup> The electric power sector (electric utilities and independent power producers) comprises electricity-only and combined-heat-and-power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public—i.e., NAICS 22 plants.

<sup>4</sup> Through 1988, data are for consumption at electric utilities only. Beginning in 1989, data also include consumption at independent power producers.

<sup>5</sup> A balancing item. The sum of primary consumption in the five energy-use sectors equals the sum of total consumption in the four end-use sectors. However, total energy consumption does not equal the sum of the sectoral components due to the use of sector-specific conversion factors for natural gas and coal.

R=Revised. P=Preliminary. (s)=Less than 0.5 trillion Btu.

Notes: Primary consumption includes coal, natural gas, petroleum, nuclear electric power, hydroelectric power, wood, waste, alcohol fuels, geothermal, solar, wind, net imports of coal coke, and net imports of electricity. Total consumption includes primary consumption, electricity retail sales, and electrical system energy losses. Totals may not equal sum of components due to independent rounding.

Sources: Tables 2.1b-2.1f.

**Table 2.1b Residential Sector Energy Consumption, 1949-2001**  
(Trillion Btu)

Year	Primary Consumption									Electricity Retail Sales <sup>4</sup>	Electrical System Losses <sup>5</sup>	Total
	Fossil Fuels				Renewable Energy				Total Primary			
	Coal	Natural Gas <sup>1</sup>	Petroleum	Total	Wood	Geothermal <sup>2</sup>	Solar <sup>3</sup>	Total				
1949	1,272	1,027	1,121	3,420	1,055	NA	NA	1,055	4,475	228	R916	R5,619
1950	1,261	1,240	1,340	3,842	1,006	NA	NA	1,006	4,848	246	R918	R6,012
1951	1,134	1,526	1,481	4,141	958	NA	NA	958	5,099	284	R998	R6,381
1952	1,079	1,679	1,522	4,279	899	NA	NA	899	5,179	319	R1,089	R6,587
1953	946	1,744	1,533	4,224	832	NA	NA	832	5,056	355	R1,156	R6,567
1954	858	1,961	1,667	4,486	800	NA	NA	800	5,286	397	R1,193	R6,875
1955	867	2,198	1,792	4,858	775	NA	NA	775	5,633	438	R1,241	R7,312
1956	823	2,409	1,880	5,112	739	NA	NA	739	5,851	490	R1,343	R7,684
1957	654	2,588	1,828	5,070	702	NA	NA	702	5,772	535	R1,441	R7,747
1958	652	2,809	1,994	5,455	688	NA	NA	688	6,143	578	R1,504	R8,226
1959	573	3,015	1,989	5,577	647	NA	NA	647	6,224	630	R1,602	R8,455
1960	585	3,212	2,265	6,062	627	NA	NA	627	6,689	687	R1,711	R9,087
1961	534	3,362	2,332	6,228	627	NA	NA	587	6,815	732	R1,784	R9,330
1962	512	3,600	2,441	6,553	560	NA	NA	560	7,113	794	R1,910	R9,818
1963	438	3,700	2,459	6,598	537	NA	NA	537	7,135	856	R2,044	R10,035
1964	379	3,908	2,375	6,662	499	NA	NA	499	7,161	928	R2,206	R10,295
1965	358	4,028	2,481	6,866	468	NA	NA	468	7,334	993	R2,367	R10,695
1966	349	4,275	2,471	7,094	455	NA	NA	455	7,549	1,081	R2,590	R11,221
1967	299	4,451	2,557	7,307	434	NA	NA	434	7,741	1,160	R2,768	R11,669
1968	269	4,588	2,685	7,543	426	NA	NA	426	7,968	1,302	R3,102	R12,372
1969	248	4,875	2,739	7,862	415	NA	NA	415	8,277	1,456	R3,475	R13,208
1970	209	4,987	2,755	7,952	401	NA	NA	401	8,353	1,591	R3,859	R13,803
1971	175	5,126	2,777	8,078	382	NA	NA	382	8,460	1,704	R4,125	R14,290
1972	116	5,264	2,895	8,276	380	NA	NA	380	8,655	1,838	R4,416	R14,909
1973	94	4,977	2,825	7,896	354	NA	NA	354	8,250	1,976	R4,737	R14,963
1974	82	4,901	2,573	7,557	371	NA	NA	371	7,928	1,973	R4,813	R14,714
1975	63	5,023	2,495	7,580	425	NA	NA	425	8,006	2,007	R4,844	R14,856
1976	59	5,147	2,720	7,927	482	NA	NA	482	8,408	2,069	R4,983	R15,460
1977	57	4,913	2,695	7,666	542	NA	NA	542	8,207	2,202	R5,320	R15,729
1978	49	4,981	2,620	7,651	622	NA	NA	622	8,272	2,301	R5,628	R16,202
1979	37	5,055	2,114	7,206	728	NA	NA	728	7,934	2,330	R5,625	R15,888
1980	31	4,866	1,748	6,645	859	NA	NA	859	7,504	2,448	R5,947	R15,898
1981	30	4,660	1,543	6,234	869	NA	NA	869	7,103	2,464	R5,864	R15,431
1982	32	4,753	1,441	6,226	937	NA	NA	937	7,163	2,489	R5,997	R15,649
1983	31	4,516	1,362	5,909	925	NA	NA	925	6,834	2,562	R6,150	R15,547
1984	38	4,692	1,337	6,067	923	NA	NA	923	6,990	2,662	R6,218	R15,870
1985	35	4,571	1,483	6,089	899	NA	NA	899	6,988	2,709	R6,326	R16,023
1986	35	4,439	1,457	5,931	876	NA	NA	876	6,807	2,795	R6,407	R16,009
1987	32	4,449	1,508	5,989	852	NA	NA	852	6,841	2,902	R6,598	R16,341
1988	32	4,765	1,563	6,359	885	NA	NA	885	7,244	3,046	R6,850	R17,140
1989	28	4,929	1,560	R6,517	918	5	53	976	7,492	3,090	R7,204	R17,785
1990	R28	4,523	R1,263	R5,814	581	6	56	642	R6,457	3,153	R7,269	R16,878
1991	23	4,697	1,293	R6,012	613	6	58	677	6,689	3,260	R7,504	R17,453
1992	24	4,835	R1,311	R6,170	645	6	60	711	R6,882	3,193	R7,326	R17,401
1993	24	5,095	R1,385	R6,504	548	7	62	616	R7,121	3,394	R7,802	R18,318
1994	21	4,988	R1,333	R6,342	537	6	64	607	R6,949	3,441	R7,857	R18,246
1995	17	4,981	R1,356	R6,355	596	7	65	667	R7,022	3,557	R8,170	R18,749
1996	17	5,383	R1,489	R6,888	595	7	R65	R667	R7,556	3,694	R8,493	R19,742
1997	16	5,118	R1,448	R6,582	433	R8	65	506	R7,088	3,671	R8,387	R19,146
1998	R12	4,669	R1,322	R6,003	387	8	65	459	R6,462	3,856	R8,796	R19,114
1999	14	4,858	R1,452	R6,324	414	R9	64	486	R6,810	3,906	R8,985	R19,702
2000	R11	R5,121	R1,493	R6,626	433	9	R61	503	R7,129	R4,069	R9,319	R20,517
2001P	11	4,940	1,473	6,424	407	9	59	475	6,899	4,098	9,161	20,157

<sup>1</sup> Includes supplemental gaseous fuels.

<sup>2</sup> Geothermal heat pump and direct use energy.

<sup>3</sup> Solar thermal direct use and photovoltaic electricity generation. Includes small amounts of commercial sector use.

<sup>4</sup> Electricity retail sales to ultimate customers reported by electric utilities and other energy service providers.

<sup>5</sup> Total losses are calculated as the primary energy consumed by the electric power sector minus the energy content of electricity retail sales. Total losses are allocated to the end-use sectors in proportion to each sector's share of total electricity retail sales.

R=Revised, P=Preliminary, NA=Not available.

Note: Totals may not equal sum of components due to independent rounding.

Sources: Tables 2.1f, 5.12a, 6.5, 7.3, 8.5, 10.2a, A1, and A3-A6.

**Table 2.1c Commercial Sector Energy Consumption, 1949-2001**  
(Trillion Btu)

Year	Primary Consumption									Total Primary	Electricity Retail Sales <sup>4</sup>	Electrical System Energy Losses <sup>5</sup>	Total
	Fossil Fuels				Renewable Energy								
	Coal	Natural Gas <sup>1</sup>	Petroleum	Total	Hydropower <sup>2</sup>	Wood	Waste	Geothermal <sup>3</sup>	Total				
1949	1,554	360	727	2,641	NA	20	NA	NA	20	2,661	200	R804	R3,665
1950	1,542	401	862	2,805	NA	19	NA	NA	19	2,824	225	R838	R3,888
1951	1,331	481	R922	R2,734	NA	18	NA	NA	18	R2,752	252	R888	R3,892
1952	1,169	534	942	2,645	NA	17	NA	NA	17	2,662	273	R932	R3,867
1953	985	549	970	2,504	NA	16	NA	NA	16	2,520	297	R966	R3,782
1954	825	605	1,000	2,430	NA	15	NA	NA	15	2,445	319	R961	R3,725
1955	801	651	1,081	2,533	NA	15	NA	NA	15	2,548	350	R991	R3,888
1956	730	742	1,122	2,594	NA	14	NA	NA	14	2,608	380	R1,043	R4,031
1957	535	803	1,083	2,421	NA	13	NA	NA	13	2,434	411	R1,107	R3,952
1958	512	902	1,125	2,540	NA	13	NA	NA	13	2,553	435	R1,132	R4,120
1959	415	1,009	1,194	2,618	NA	12	NA	NA	12	2,630	488	R1,241	R4,359
1960	407	1,056	1,228	2,690	NA	12	NA	NA	12	2,702	543	R1,352	R4,597
1961	371	1,115	1,247	2,733	NA	11	NA	NA	11	2,744	572	R1,395	R4,711
1962	371	1,249	1,280	2,899	NA	11	NA	NA	11	2,910	621	R1,493	R5,024
1963	317	1,307	1,262	2,887	NA	10	NA	NA	10	2,897	688	R1,643	R5,227
1964	274	1,419	1,247	2,940	NA	9	NA	NA	9	2,949	738	R1,755	R5,442
1965	259	1,490	1,386	3,135	NA	9	NA	NA	9	3,144	789	R1,880	R5,813
1966	263	1,676	1,436	3,375	NA	9	NA	NA	9	3,384	859	R2,058	R6,301
1967	225	2,022	1,483	3,730	NA	8	NA	NA	8	3,738	925	R2,207	R6,870
1968	203	2,140	1,510	3,853	NA	8	NA	NA	8	3,861	1,014	R2,416	R7,291
1969	195	2,323	1,520	4,038	NA	8	NA	NA	8	4,046	1,108	R2,644	R7,797
1970	165	2,473	1,551	4,189	NA	8	NA	NA	8	4,196	1,201	R2,913	R8,311
1971	175	2,587	1,510	4,272	NA	7	NA	NA	7	4,279	1,288	R3,117	R8,684
1972	153	2,678	1,530	4,362	NA	7	NA	NA	7	4,369	1,408	R3,382	R9,159
1973	160	2,649	1,565	4,374	NA	7	NA	NA	7	4,381	1,517	R3,635	R9,533
1974	175	2,617	1,423	4,214	NA	7	NA	NA	7	4,221	1,501	R3,663	R9,386
1975	147	2,558	1,310	4,015	NA	8	NA	NA	8	4,023	1,598	R3,857	R9,477
1976	144	2,718	1,461	4,323	NA	9	NA	NA	9	4,333	1,678	R4,041	R10,051
1977	148	2,548	1,511	4,207	NA	10	NA	NA	10	4,217	1,754	R4,238	R10,210
1978	165	2,643	1,450	4,257	NA	12	NA	NA	12	4,269	1,813	R4,435	R10,517
1979	149	2,836	1,334	4,319	NA	14	NA	NA	14	4,333	1,854	R4,477	R10,664
1980	115	2,674	1,287	4,076	NA	21	NA	NA	21	4,097	1,906	R4,630	R10,633
1981	137	2,583	1,090	3,810	NA	21	NA	NA	21	3,831	2,033	R4,839	R10,703
1982	155	2,673	1,008	3,837	NA	22	NA	NA	22	3,859	2,077	R5,004	R10,940
1983	162	2,508	1,136	3,805	NA	22	NA	NA	22	3,827	2,116	R5,080	R11,024
1984	171	2,600	1,198	3,969	NA	22	NA	NA	22	3,991	2,264	R5,290	R11,546
1985	141	2,508	1,039	3,688	NA	24	NA	NA	24	3,712	2,351	R5,491	R11,554
1986	141	2,386	1,099	3,625	NA	27	NA	NA	27	3,652	2,439	R5,591	R11,681
1987	129	2,505	1,079	3,714	NA	29	NA	NA	29	3,743	2,539	R5,773	R12,054
1988	136	2,748	1,037	3,921	NA	32	NA	NA	32	3,953	2,675	R6,015	R12,643
1989	118	2,802	R973	R3,893	1	R36	22	3	R61	R3,954	2,767	R6,450	R13,172
1990	R128	2,701	R913	R3,742	1	R39	28	3	R71	R3,813	2,860	R6,594	R13,267
1991	118	2,813	R859	R3,791	1	R41	26	3	R72	R3,862	2,918	R6,717	R13,498
1992	118	2,890	R811	R3,818	1	R44	32	3	R81	R3,899	2,900	R6,653	R13,453
1993	119	2,942	R749	R3,810	1	R46	33	3	R84	R3,894	3,019	R6,939	R13,852
1994	118	2,979	R747	R3,844	1	R46	35	4	R86	R3,930	3,116	R7,114	R14,159
1995	117	3,113	R710	R3,940	1	R46	40	5	R92	R4,032	3,252	R7,470	R14,753
1996	122	3,244	R742	R4,108	1	R50	53	5	R110	R4,218	3,344	R7,689	R15,251
1997	129	3,302	R703	R4,135	1	R49	58	6	R113	R4,248	3,503	R8,004	R15,754
1998	R93	3,098	R658	R3,850	1	R48	54	7	R111	R3,961	3,678	R8,390	R16,029
1999	103	3,130	R655	R3,887	1	R52	54	7	R114	R4,001	3,766	R8,663	R16,430
2000	R92	R3,301	R719	R4,112	1	R53	47	8	R109	R4,221	R3,956	R9,060	R17,237
2001 <sup>P</sup>	92	3,331	718	4,141	1	43	46	8	98	4,240	4,081	9,122	17,443

<sup>1</sup> Includes supplemental gaseous fuels.

<sup>2</sup> Conventional hydroelectric power.

<sup>3</sup> Geothermal heat pump and direct use energy.

<sup>4</sup> Electricity retail sales to ultimate customers reported by electric utilities and other energy service providers.

<sup>5</sup> Total losses are calculated as the primary energy consumed by the electric power sector minus the energy content of electricity retail sales. Total losses are allocated to the end-use sectors in proportion to

each sector's share of total electricity retail sales.

R=Revised. P=Preliminary. NA=Not available.

Notes: The commercial sector includes commercial combined-heat-and-power (CHP) and commercial electricity-only plants. See Appendix G for commercial sector NAICS codes. Totals may not equal sum of components due to independent rounding.

Sources: Tables 2.1f, 5.12a, 6.5, 7.3, 8.5, 10.2a, A1, and A3-A6.

**Table 2.1d Industrial Sector Energy Consumption, 1949-2001**

(Trillion Btu)

Year	Primary Consumption										Total Primary	Electricity Retail Sales <sup>4</sup>	Electrical System Energy Losses <sup>5</sup>	Total
	Fossil Fuels					Renewable Energy								
	Coal	Coal Coke Net Imports	Natural Gas <sup>1</sup>	Petroleum	Total	Hydropower <sup>2</sup>	Wood	Waste	Geothermal <sup>3</sup>	Total				
1949	5,433	-7	3,188	R3,468	R12,083	76	468	NA	NA	R544	R12,627	418	R1,681	R14,726
1950	5,781	1	3,546	3,951	13,279	69	532	NA	NA	R602	R13,881	500	R1,862	R16,242
1951	6,202	-21	4,052	4,270	R14,502	63	553	NA	NA	R616	R15,118	567	R1,995	R17,680
1952	5,517	-12	4,181	R4,363	R14,049	62	552	NA	NA	R613	R14,662	601	R2,050	R17,313
1953	5,931	-9	4,304	R4,480	R14,706	57	566	NA	NA	R622	R15,328	678	R2,204	R18,211
1954	4,730	-7	4,319	4,632	13,674	56	576	NA	NA	R632	R14,306	711	R2,139	R17,156
1955	5,620	-10	4,701	R5,111	15,421	38	631	NA	NA	R669	R16,091	887	R2,512	R19,490
1956	5,667	-13	4,874	R5,336	R15,864	37	661	NA	NA	R698	R16,562	976	R2,677	R20,215
1957	5,536	-17	5,107	R5,235	R15,861	36	616	NA	NA	R652	R16,513	1,003	R2,703	R20,219
1958	4,533	-7	5,208	5,408	R15,141	37	620	NA	NA	R657	R15,798	978	R2,543	R19,319
1959	4,413	-8	5,647	R5,739	R15,790	37	692	NA	NA	R729	R16,519	1,075	R2,735	R20,329
1960	4,543	-6	5,973	R5,747	R16,258	39	680	NA	NA	R719	R16,977	1,107	R2,755	R20,839
1961	4,345	-8	6,170	R5,755	R16,262	36	695	NA	NA	R731	R16,993	1,149	R2,802	R20,944
1962	4,385	-6	6,451	5,996	16,826	36	728	NA	NA	R764	R17,590	1,228	R2,952	R21,770
1963	4,590	-7	6,748	R6,227	17,557	34	775	NA	NA	R809	R18,366	1,288	R3,076	R22,730
1964	4,915	-10	7,114	R6,548	R18,566	34	827	NA	NA	R861	R19,427	1,382	R3,287	R24,096
1965	5,127	-18	7,339	6,789	19,236	33	855	NA	NA	R888	R20,124	1,463	R3,488	R25,074
1966	5,215	-25	7,795	R7,110	R20,095	33	902	NA	NA	R935	R21,030	1,582	R3,789	R26,401
1967	4,934	-15	8,043	R7,120	R20,082	36	895	NA	NA	R930	R21,013	1,655	R3,947	R26,615
1968	4,855	-17	8,626	R7,391	R20,855	35	982	NA	NA	R1,017	R21,872	1,778	R4,236	R27,886
1969	4,712	-36	9,234	R7,696	R21,605	34	1,014	NA	NA	R1,048	R22,654	1,909	R4,555	R29,118
1970	4,656	-58	9,536	R7,787	R21,922	34	1,019	NA	NA	R1,053	R22,975	1,948	R4,724	R29,647
1971	3,944	-33	9,892	R7,856	R21,659	34	1,040	NA	NA	R1,074	R22,732	2,011	R4,867	R29,611
1972	3,993	-26	9,884	8,534	R22,385	34	1,113	NA	NA	R1,147	R23,532	2,187	R5,255	R30,974
1973	4,057	-7	10,388	R9,104	R23,541	35	1,165	NA	NA	R1,200	R24,741	2,341	R5,611	R32,693
1974	3,870	56	10,004	8,694	22,624	33	1,159	NA	NA	R1,192	R23,816	2,337	R5,701	R31,855
1975	3,667	14	8,532	R8,146	R20,359	32	1,063	NA	NA	R1,096	R21,454	2,346	R5,664	R29,464
1976	3,661	(s)	8,762	R9,010	R21,432	33	1,220	NA	NA	R1,253	R22,685	2,573	R6,196	R31,454
1977	3,454	15	8,635	R9,774	R21,879	33	1,281	NA	NA	R1,314	R23,193	2,682	R6,481	R32,356
1978	3,314	125	8,539	R9,867	R21,845	32	1,400	NA	NA	R1,432	R23,276	2,761	R6,751	R32,788
1979	3,593	63	8,549	R10,568	R22,773	34	1,405	NA	NA	R1,439	R24,211	2,873	R6,935	R34,019
1980	3,155	-35	8,395	R9,525	R21,040	33	1,600	NA	NA	R1,633	R22,673	2,781	R6,755	R32,209
1981	3,157	-16	8,257	R8,285	R19,682	33	1,602	87	NA	R1,722	R21,404	2,817	R6,705	R30,926
1982	2,552	-22	7,121	7,795	17,446	33	1,516	118	NA	R1,667	R19,113	2,542	R6,124	R27,778
1983	2,490	-11	6,826	R7,420	R16,720	33	1,690	155	NA	R1,879	R18,598	2,648	R6,356	R27,602
1984	2,842	-16	7,448	R8,014	R18,292	33	1,679	204	NA	R1,916	R20,208	2,859	R6,678	R29,745
1985	2,760	-13	7,080	R7,805	R17,632	33	1,645	230	NA	R1,908	R19,540	2,855	R6,667	R29,062
1986	2,641	-17	6,690	R7,920	R17,234	33	1,610	256	NA	R1,899	R19,133	2,834	R6,497	R28,463
1987	2,673	9	7,323	R8,151	R18,155	33	1,576	282	NA	R1,891	R20,046	2,928	R6,658	R29,633
1988	2,828	40	7,696	R8,430	R18,993	33	1,625	308	NA	R1,965	R20,958	3,059	R6,878	R30,895
1989	2,787	30	8,131	R8,126	R19,074	P26	R1,584	R200	2	R1,812	R20,886	3,158	R7,364	R31,408
1990	2,756	5	8,502	R8,306	R19,569	P28	R1,447	R194	2	R1,671	R21,240	3,226	R7,438	R31,904
1991	2,601	10	8,619	R8,047	R19,277	P28	R1,410	R185	2	R1,625	R20,901	3,230	R7,435	R31,566
1992	2,515	35	8,967	R8,617	R20,133	P31	R1,461	R179	2	R1,672	R21,806	3,319	R7,614	R32,738
1993	2,496	27	R9,120	R8,399	R20,042	P30	R1,484	R181	2	R1,697	R21,740	3,334	R7,664	R32,738
1994	2,510	58	R9,172	R8,792	R20,532	P62	R1,580	R199	3	R1,844	R22,376	3,439	R7,853	R33,668
1995	2,488	61	R9,637	R8,552	R20,739	P55	R1,652	R195	3	R1,905	R22,643	3,455	R7,936	R34,035
1996	2,434	R35	R9,947	R8,989	R21,405	P61	R1,683	R224	3	R1,971	R23,376	3,527	R8,110	R35,012
1997	2,395	R57	R9,976	R9,215	R21,643	P58	R1,731	R184	3	R1,976	R23,619	3,542	R8,094	R35,255
1998	2,335	R80	R9,806	R9,017	R21,238	P55	R1,603	R180	3	R1,841	R23,080	3,587	R8,182	R34,848
1999	R2,227	R70	R9,415	R9,284	R20,995	P49	R1,606	R171	4	R1,830	R22,825	3,611	R8,305	R34,740
2000	R2,256	R77	R9,628	R9,076	R21,038	P42	R1,636	R186	4	R1,869	R22,907	R3,631	R8,317	R34,855
2001 <sup>P</sup>	2,137	43	8,913	8,722	19,814	37	1,580	194	5	1,816	21,630	3,392	7,583	32,604

<sup>1</sup> Includes supplemental gaseous fuels.

<sup>2</sup> Conventional hydroelectric power.

<sup>3</sup> Geothermal heat pump and direct use energy.

<sup>4</sup> Electricity retail sales to ultimate customers reported by electric utilities and other energy service providers.

<sup>5</sup> Total losses are calculated as the primary energy consumed by the electric power sector minus the energy content of electricity retail sales. Total losses are allocated to the end-use sectors in proportion to

each sector's share of total electricity retail sales.

R=Revised. P=Preliminary. NA=Not available. (s)=Less than +0.5 trillion Btu and greater than -0.5 trillion Btu.

Notes: The industrial sector includes industrial combined-heat-and-power (CHP) and industrial electricity-only plants. See Appendix G for industrial sector NAICS codes. Totals may not equal sum of components due to independent rounding.

Sources: Tables 2.1f, 5.12b, 6.5, 7.3, 8.5, 10.2a, A1, and A3-A6.

**Table 2.1e Transportation Sector Energy Consumption, 1949-2001**  
(Trillion Btu)

Year	Primary Consumption					Total Primary <sup>2</sup>	Electricity Retail Sales <sup>3</sup>	Electrical System Energy Losses <sup>4</sup>	Total <sup>2</sup>
	Fossil Fuels				Renewable Energy				
	Coal	Natural Gas <sup>1</sup>	Petroleum	Total	Alcohol Fuels <sup>2</sup>				
1949	1,727	NA	6,152	7,880	NA	7,880	22	R89	R7,991
1950	1,564	130	6,690	8,384	NA	8,384	23	R86	R8,493
1951	1,379	199	7,356	8,934	NA	8,934	24	R85	R9,043
1952	984	214	7,709	8,907	NA	8,907	22	R74	R9,004
1953	733	238	R8,059	9,031	NA	9,031	22	R71	R9,124
1954	461	239	8,123	8,823	NA	8,823	20	R60	R8,903
1955	421	254	R8,800	R9,475	NA	R9,475	20	R56	R9,551
1956	340	306	9,145	9,791	NA	9,791	19	51	R9,860
1957	241	310	9,286	9,837	NA	9,837	16	44	9,897
1958	115	323	9,514	R9,953	NA	R9,953	15	38	10,005
1959	88	362	9,849	R10,298	NA	R10,298	14	37	10,350
1960	75	359	R10,126	R10,560	NA	R10,560	10	26	R10,597
1961	19	391	R10,325	R10,735	NA	R10,735	10	25	10,770
1962	17	396	R10,773	R11,186	NA	R11,186	10	R24	11,221
1963	16	437	R11,168	11,621	NA	11,621	10	24	11,655
1964	17	450	R11,498	R11,965	NA	R11,965	10	24	11,998
1965	16	517	R11,868	12,400	NA	12,400	10	24	12,434
1966	15	553	12,501	13,069	NA	13,069	10	23	13,102
1967	11	594	R13,113	R13,718	NA	R13,718	10	24	R13,752
1968	10	609	R14,212	R14,831	NA	R14,831	10	24	R14,866
1969	7	651	R14,813	R15,471	NA	R15,471	10	25	R15,506
1970	7	745	R15,310	R16,061	NA	R16,061	11	26	R16,098
1971	5	766	15,923	16,693	NA	16,693	10	25	16,729
1972	4	787	R16,891	R17,681	NA	R17,681	10	25	R17,716
1973	3	743	R17,831	R18,576	NA	R18,576	11	25	R18,612
1974	2	685	R17,399	R18,086	NA	R18,086	10	24	R18,119
1975	1	595	R17,614	R18,209	NA	R18,209	10	R24	R18,244
1976	(s)	559	18,506	19,065	NA	19,065	10	24	19,099
1977	(s)	543	R19,241	R19,784	NA	R19,784	10	25	R19,820
1978	(s)	539	R20,041	R20,580	NA	R20,580	10	25	R20,615
1979	(s)	612	R19,825	R20,436	NA	R20,436	10	24	R20,471
1980	(s)	650	R19,008	R19,658	NA	R19,658	11	27	R19,696
1981	(s)	658	R18,811	R19,469	7	R19,469	11	26	R19,506
1982	(s)	612	R18,420	R19,032	19	R19,032	11	27	R19,069
1983	(s)	505	R18,593	R19,098	35	R19,098	13	30	R19,141
1984	(s)	545	R19,216	R19,761	43	R19,761	14	33	R19,809
1985	(s)	519	R19,504	R20,023	52	R20,023	14	33	20,071
1986	(s)	499	20,269	20,768	60	20,768	15	35	R20,817
1987	(s)	535	20,870	21,405	69	21,405	16	R35	21,456
1988	(s)	632	21,629	22,261	70	22,261	16	36	22,313
1989	(s)	649	R21,849	R22,497	71	R22,497	16	R38	R22,552
1990	(s)	680	R21,792	R22,472	63	R22,472	16	R37	R22,526
1991	(s)	620	R21,448	R22,069	73	R22,069	16	R37	R22,122
1992	(s)	R608	R21,798	R22,406	83	R22,406	16	R37	R22,459
1993	(s)	R644	R22,185	R22,829	97	R22,829	16	R37	R22,883
1994	(s)	R708	R22,739	R23,448	109	R23,448	17	R39	R23,503
1995	(s)	R723	R23,181	R23,904	117	R23,904	17	R39	R23,960
1996	(s)	R736	R23,719	R24,456	84	R24,456	17	R39	R24,511
1997	(s)	R779	R23,973	R24,752	106	R24,752	17	R38	R24,807
1998	(s)	R665	R24,630	R25,295	117	R25,295	17	R39	R25,351
1999	(s)	R674	R25,358	R26,031	122	R26,031	17	40	R26,089
2000	(s)	R672	R25,971	R26,643	139	R26,643	18	R42	R26,704
2001 <sup>P</sup>	(s)	642	26,040	26,682	147	26,682	20	44	26,746

<sup>1</sup> Natural gas consumed in the operation of pipelines (primarily in compressors) and small amounts consumed as vehicle fuel. See Table 6.5.

<sup>2</sup> Alcohol (ethanol blended into motor gasoline) is included in both "Petroleum" and "Alcohol Fuels," but is counted only once in both total primary consumption and total consumption.

<sup>3</sup> Electricity retail sales to ultimate customers reported by electric utilities and other energy service providers.

<sup>4</sup> Total losses are calculated as the primary energy consumed by the electric power sector minus the

energy content of electricity retail sales. Total losses are allocated to the end-use sectors in proportion to each sector's share of total electricity retail sales.

<sup>5</sup> Since 1978, the small amounts of coal consumed for transportation are reported as industrial sector consumption.

R=Revised. P=Preliminary. NA=Not available. (s)=Less than 0.5 trillion Btu.

Note: Totals may not equal sum of components due to independent rounding.

Sources: Tables 2.1f, 5.12c, 6.5, 7.3, 8.5, 10.2a, A1, and A3-A6.

**Table 2.1f Electric Power Sector Energy Consumption, 1949-2001**  
(Trillion Btu)

Year	Primary Consumption														Total Primary
	Fossil Fuels					Nuclear Electric Power	Hydro-electric Pumped Storage <sup>3</sup>	Renewable Energy							
	Coal	Natural Gas <sup>1</sup>	Petroleum	Other <sup>2</sup>	Total			Conventional Hydroelectric Power <sup>4</sup>	Wood	Waste	Geothermal <sup>5</sup>	Solar	Wind	Total	
1949	1,995	569	415	(6)	2,979	0	(6)	1,373	6	NA	NA	NA	NA	R1,379	4,358
1950	2,199	651	472	(6)	3,322	0	(6)	1,371	5	NA	NA	NA	NA	R1,377	4,698
1951	2,507	791	400	(6)	3,697	0	(6)	1,391	5	NA	NA	NA	NA	R1,396	5,093
1952	2,557	942	420	(6)	3,920	0	(6)	1,435	6	NA	NA	NA	NA	R1,441	5,361
1953	2,777	1,070	514	(6)	4,362	0	(6)	1,382	5	NA	NA	NA	NA	R1,387	5,749
1954	2,841	1,206	417	(6)	4,464	0	(6)	1,333	3	NA	NA	NA	NA	R1,336	5,800
1955	3,458	1,194	471	(6)	5,123	0	(6)	1,369	3	NA	NA	NA	NA	R1,373	6,495
1956	3,790	1,283	455	(6)	5,527	0	(6)	1,450	2	NA	NA	NA	NA	R1,452	6,979
1957	3,855	1,383	498	(6)	5,737	(s)	(6)	1,521	2	NA	NA	NA	NA	R1,523	7,260
1958	3,721	1,421	486	(6)	5,628	2	(6)	1,592	2	NA	NA	NA	NA	R1,594	7,223
1959	4,029	1,686	552	(6)	6,267	2	(6)	1,550	2	NA	NA	NA	NA	R1,552	7,821
1960	4,228	1,785	553	(6)	6,565	6	(6)	1,618	2	NA	1	NA	NA	R1,620	8,192
1961	4,355	1,889	557	(6)	6,801	20	(6)	1,645	1	NA	2	NA	NA	R1,648	8,469
1962	4,622	2,035	560	(6)	7,217	26	(6)	1,786	1	NA	2	NA	NA	R1,789	9,033
1963	5,050	2,211	585	(6)	7,846	38	(6)	1,738	1	NA	4	NA	NA	R1,744	9,628
1964	5,380	2,397	634	(6)	8,411	40	(6)	1,873	2	NA	5	NA	NA	R1,879	10,330
1965	5,821	2,395	722	(6)	8,938	43	(6)	2,025	3	NA	4	NA	NA	R2,032	11,013
1966	6,302	2,696	883	(6)	9,881	64	(6)	2,040	3	NA	4	NA	NA	R2,047	11,993
1967	6,445	2,834	1,011	(6)	10,290	88	(6)	2,308	3	NA	7	NA	NA	R2,318	12,696
1968	6,994	3,245	1,181	(6)	11,421	142	(6)	2,307	4	NA	9	NA	NA	R2,320	13,882
1969	7,219	3,596	1,571	(6)	12,386	154	(6)	2,625	3	NA	13	NA	NA	R2,642	15,182
1970	7,227	4,054	2,117	(6)	13,399	239	(6)	2,620	1	2	11	NA	NA	R2,635	16,273
1971	7,299	4,099	2,495	(6)	13,893	413	(6)	2,827	1	2	12	NA	NA	R2,843	17,149
1972	7,811	4,084	3,097	(6)	14,992	584	(6)	2,909	1	2	31	NA	NA	R2,944	18,520
1973	8,658	3,748	3,515	(6)	15,921	910	(6)	2,975	1	2	43	NA	NA	R3,021	19,852
1974	8,534	3,519	3,365	(6)	15,418	1,272	(6)	3,276	1	2	53	NA	NA	R3,332	20,022
1975	8,786	3,240	3,166	(6)	15,191	1,900	(6)	3,187	(s)	2	70	NA	NA	R3,259	20,350
1976	9,720	3,152	3,477	(6)	16,349	2,111	(6)	3,032	1	2	78	NA	NA	R3,113	21,573
1977	10,262	3,284	3,901	(6)	17,446	2,702	(6)	2,482	3	2	77	NA	NA	R2,565	22,713
1978	10,238	3,297	3,987	(6)	17,522	3,024	(6)	3,110	2	1	64	NA	NA	R3,178	23,724
1979	11,260	3,613	3,283	(6)	18,156	2,776	(6)	3,107	3	2	84	NA	NA	R3,196	24,128
1980	12,123	3,810	2,634	(6)	18,567	2,739	(6)	3,085	3	2	110	NA	NA	R3,199	24,505
1981	12,583	3,768	2,202	(6)	18,553	3,008	(6)	3,072	3	1	123	NA	NA	R3,199	24,760
1982	12,582	3,342	1,568	(6)	17,491	3,131	(6)	3,539	2	1	105	NA	NA	R3,647	24,270
1983	13,213	2,998	1,544	(6)	17,754	3,203	(6)	3,866	2	2	129	NA	(s)	R3,999	24,956
1984	14,019	3,220	1,286	(6)	18,526	3,553	(6)	3,767	5	4	165	(s)	(s)	R3,941	26,020
1985	14,542	3,160	1,090	(6)	18,792	4,076	(6)	3,365	8	7	198	(s)	(s)	R3,578	26,446
1986	14,444	2,691	1,452	(6)	18,586	4,380	(6)	3,413	5	7	219	(s)	(s)	R3,645	26,611
1987	15,173	2,935	1,257	(6)	19,365	4,754	(6)	3,084	8	7	229	(s)	(s)	R3,329	27,448
1988	15,850	2,709	1,563	(6)	20,123	5,587	(6)	2,630	10	8	217	(s)	(s)	R2,864	28,574
1989 <sup>P,7</sup>	R16,118	3,192	1,703	-50	20,963	5,602	(6)	R2,961	100	132	R308	3	19	R3,522	30,087
1990 <sup>P</sup>	R16,245	3,321	1,278	-80	20,764	6,104	-36	R3,098	124	187	R327	4	24	R3,763	30,594
1991 <sup>P</sup>	R16,250	3,399	1,198	59	20,906	6,422	-47	R3,110	126	229	R340	5	27	R3,837	31,118
1992 <sup>P</sup>	R16,466	3,534	991	53	21,043	6,479	-43	R2,786	140	262	R356	4	30	R3,579	31,058
1993 <sup>P</sup>	R17,196	3,560	1,124	50	21,930	6,410	-42	R3,088	150	265	R369	5	31	R3,908	32,207
1994 <sup>P</sup>	R17,261	4,000	1,059	140	22,460	6,694	-35	R2,929	152	282	R352	5	36	R3,756	32,875
1995 <sup>P</sup>	R17,466	4,325	755	121	22,667	7,075	-28	R3,424	125	296	R298	5	33	R4,182	33,896
1996 <sup>P</sup>	R18,429	3,883	817	109	23,239	7,087	-32	R3,827	138	300	R314	5	33	R4,618	34,912
1997 <sup>P</sup>	R18,905	4,146	927	R107	24,085	6,597	-41	R3,821	137	309	R309	5	34	R4,615	35,256
1998 <sup>P</sup>	R19,216	4,698	1,306	R47	25,267	7,068	-46	R3,462	137	308	R311	5	31	R4,254	36,543
1999 <sup>P</sup>	R19,279	4,926	1,211	R91	25,507	7,610	-62	R3,422	138	315	R312	5	46	R4,239	37,294
2000 <sup>P</sup>	R20,220	5,316	1,144	R82	26,762	7,862	-57	R3,033	134	318	R296	5	57	R3,845	38,412
2001 <sup>P</sup>	19,689	5,397	1,280	49	26,415	8,028	-90	2,338	140	311	292	5	59	3,146	37,499

<sup>1</sup> Includes supplemental gaseous fuels.

<sup>2</sup> Electricity net imports from fossil fuels; may include some nuclear-generated electricity.

<sup>3</sup> Pumped storage facility production minus energy used for pumping.

<sup>4</sup> Through 1988, includes all electricity net imports. Beginning in 1989, includes electricity net imports derived from hydroelectric power only.

<sup>5</sup> Beginning in 1989, includes electricity imports from Mexico that are derived from geothermal energy.

<sup>6</sup> Included in "Conventional Hydroelectric Power."

<sup>7</sup> Through 1988, data are for consumption at electric utilities only. Beginning in 1989, data also include

consumption at independent power producers.

R=Revised. P=Preliminary. NA=Not available. (s)=Less than 0.5 trillion Btu.

Notes: Data are for fuels consumed to produce electricity and useful thermal output. The electric power sector (electric utilities and independent power producers) comprises electricity-only and combined-heat-and-power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public—i.e., NAICS 22 plants. Totals may not equal sum of components due to independent rounding.

Sources: Tables 5.12d, 6.5, 7.3, 10.2b, A1, and A4-A6.

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## References and Web Locations

The energy production and end-use data in the U.S. energy flow chart were derived from: U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 2001*, DOE/EIA-0384(2000), Washington, D.C., November 2002. The report is available on the Web at <http://www.eia.doe.gov/aer> .

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The carbon emissions data are from U.S. Department of Energy, Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2001*, DOE/EIA-0573(2001), Washington, D.C., December 2002. This report is available on the Web at [http://www.eia.doe.gov/env/env\\_pub.html](http://www.eia.doe.gov/env/env_pub.html) .

The energy flow charts and reports and the carbon emissions charts prepared by Lawrence Livermore National Laboratory are available on the Web at <http://eed.llnl.gov/flow/> .

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