DOE/EIA-0348(94/1)
Distribution Category
UC-950

Electric Power Annual 1994
Volume I

July 1995

Energy Information Administration
Office of Coal, Nuclear, Electric and Alternate Fuels
U.S. Department of Energy
Washington, DC 20585

Contacts

Questions regarding this report may be directed to:

Energy Information Administration, EI-52
Coal and Electric Data and Renewables Division
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Questions of a general nature should be directed to:

Dean Fennell (202/254-5660)
e-Mail DFENNELL@EIA.DOE.GOV
Program Manager

Contributions to this report were provided by:

Publication Coordinator: Sandra R. Smith (202/254-5632); *Review of U.S. Electric Utility Statistics, 1994:* Melvin Johnson (202/254-5665), Elsie Bess (202/254-5637); *Generating Capability at U.S. Electric Utilities:* Karen McDaniel (202/254-5672); *Electric Utility Net Generation:* Melvin Johnson; *U.S. Electric Utility Fossil-Fuel Statistics:* Kenneth McClevey (202/254-5655), Melvin Johnson; *U.S. Electric Utility Retail Sales and Revenue:* Stephen Calopedis (202/254-5661), Deborah Bolden (202)/254-5663); *Technical Notes:* Stephen Calopedis.

Fax phone number (202)254-5765.

Preface

Two-Volume Approach Allows Early Release of Data

To provide EIA customers with data earlier than in the past, the Office of Coal, Nuclear, Electric and Alternate Fuels has separated the *Electric Power Annual* (EPA) into two volumes.

This first volume--with a focus on U.S. electric utilities--contains final 1994 data on net generation and fossil fuel consumption, stocks, receipts, and cost. Volume 1 also contains preliminary 1994 data on generating unit capability and planned additions, as well as *estimates* of retail sales of electricity, associated revenue, and the average revenue per kilowatthour of electricity sold. These estimates are based on a **monthly sample** (Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions"). Additionally, information on net generation from renewable energy sources and on the associated generating capability is included in Volume 1 of the EPA. Estimates for national-level nonutility data are also provided.

Volume 2--expected to be available in November 1995--will present other annual data earlier than ever before. The second volume will present annual 1994 summary statistics for the electric power industry, including information on nonutility power producers. Included in the latter volume will be preliminary data for electric utility retail sales of electricity, associated revenue, and average revenue per kilowatthour of electricity sold (based on the **annual census**--Form EIA-861, "Annual Electric Utility Report") and statistics on electric utility financial and environmental aspects, power transactions, and demand-side management. Preliminary 1994 data for U.S. nonutility power producers on installed capacity and gross generation, as well as supply and disposition information, will also be provided in Volume 2 of the EPA.

The *Electric Power Annual* presents a summary of electric power industry statistics at national, regional, and State levels. The objective of the publication is to provide industry decisionmakers, government policymakers, analysts, and the general public with historical data that may be used in understanding U.S. electricity markets. The *Electric Power Annual* is prepared by the Coal and Electric Data and Renewables Division; Office of Coal, Nuclear, Electric and Alternate Fuels; Energy Information Administration (EIA); U.S. Department of Energy.

In the private sector, the majority of the users of the *Electric Power Annual* are researchers and analysts and, ultimately, individuals with policy- and decisionmaking responsibilities in electric utility companies. Financial and investment institutions, economic development organizations interested in new power plant construction, special interest groups, lobbyists, electric power associations, and the news media will find data in the *Electric Power Annual* useful.

In the public sector, users include analysts, researchers, statisticians, and other professionals with regulatory, policy, and program responsibilities for Federal, State, and local governments. The Congress and other legislative bodies may also be interested in general trends related to electricity at State and national levels. Much of the data in this report can be used in analytic studies to evaluate new legislation. Public service commissions and other special government groups share an interest in State-level statistics. These groups can also compare the statistics for their States with those of other jurisdictions.

In Volume 1, the section titled, "A Review of U.S. Electric Utilities Statistics, 1994," highlights key statistics for the year. Subsequent sections present data on generating capability, including proposed capability additions; net generation; fossil fuel statistics; and estimates of retail sales and revenue. Each section contains related text and tables and refers the reader to the appropriate publication that contains more detailed data on the subject matter. Monetary values in this publication are expressed in nominal terms.

Data published in the *Electric Power Annual Volume 1* are compiled from three statistical forms filed monthly and one form filed annually by electric utilities. These forms are described in detail in the Technical Notes.

Contents

Tables

Illustrations

A Review of U.S. Electric Utility Statistics, 1994

Generating Capability

As of year-end 1994, electric utility generating capability in the United States totaled 702,658 megawatts.[1] Based on primary energy source, coal-fired capability totaled 301,098 megawatts; gas-fired, 133,854 megwatts; nuclear, 99,148 megawatts; renewables, 77,470 megawatts; petroleum, 69,919 megawatts; and hydroelectric (pumped storage only), 21,168 megawatts. Total capability included 3,841 megawatts of newly added capability. Of this 3,841 megawatts of capability that entered service in 1994, 3,046 was gas-fired capability (79 percent); coal-fired capability additions represented 14 percent; hydroelectric capability additions represented 4 percent; and petroleum-fired capability additions represented 2 percent. No new nuclear units started operation in 1994.

Retired capability, represented by 99 generating units, totaled 2,433 megawatts during 1994. These retirements included 39 petroleum-fired units representing 317 megawatts; 38 gas-fired units representing 1,642 megawatts; and 8 coal-fired units representing 461 megawatts, with the remainder being small hydroelectric units averaging less than 1 megawatt in capability. No nuclear or renewable units (excluding hydroelectric) were retired during 1994.

At year-end 1994, U.S. electric utilities planned to add 42,936 megawatts of capability over the next 10 years. Of this, petroleum- and gas-fired capability additions represented 34,486 megawatts (80 percent); coal-fired capability additions represented 5,386 megawatts (13 percent); and hydroelectric, nuclear-powered, and renewable (excluding hydroelectric) capability represented the remaining 3,065 megawatts.

Figure 1. Generating Capability at U.S. Electric Utilities by Energy Source, 1994

[1] Data on capability and planned additions for 1994 are preliminary.

Net Generation

A record level of net generation was set during 1994, when 2,911 billion kilowatthours of electricity were produced--an increase of 1 percent from the previous year. Net generation of electricity from nuclear power also achieved a record level at 640 billion kilowatthours, an increase of 5 percent from 1993. Nuclear power supplied 22 percent of the total U.S. electricity production in 1994, compared with 21 percent in 1993. An improvement in the utilization rate of nuclear-powered units contributed to the growth in nuclear-powered generation during the year. In 1994, the average capacity factor for nuclear operating generating units was 74 percent; in 1993, it was 71 percent.

Figure 2. U.S. Electric Utility Net Generation by Energy Source, 1994

The increased production from nuclear-powered units offset, to a large extent, a 9-percent decline in petroleum-fired production and offset, to a lesser extent, coal-fired generation that was slightly below the amount reported in 1993. Generation from petroleum-fired plants represented only 3 percent of total U.S. electricity production in 1994. Coal-fired generation, however, continued to be the largest contributor to the supply of electricity, providing 56 percent of total utility generation.

The only major energy source other than nuclear power that showed an increase in electricity generation during 1994 was gas (291 billion kilowatthours, which was 12 percent above the amount reported in 1993). Gas-fired plants provided 10 percent of total U.S. electricity production in 1994, compared with 9 percent in 1993. The increased level of gas-fired generation--compared with the year before--was partially due to additional generating units coming on line during 1994 that use gas as the primary fuel source. In 1994, 46 gas-fired units with a net summer capability of 3,046 megawatts came on line.

Fossil Fuel Receipts and Costs

In 1994, electric utilities received 832 million short tons of coal, 143 million barrels of petroleum, and 2,864 billion cubic feet (Bcf) of gas. The total delivered cost[2] for these fuels was 32 billion dollars. Coal accounted for 82 percent of the total Btu content of fossil fuels delivered in 1994, while gas and petroleum accounted for 14 percent and 4 percent, respectively.

The 832 million short tons of coal received during 1994 was a record amount, eclipsing the previous high of 787 million short tons received in 1990 by 45 million short tons. Factors related to an increase in receipts of coal include a buildup in coal stockpile levels (in contrast to the large reduction in stocks that occurred during 1993) and a 4-million-short-ton increase in coal consumption. On a dollar-per-short-ton basis, the cost of coal received was $28.03, down from the $28.58 reported for 1993. The average sulfur content (measured as percent sulfur by weight) of coal delivered in 1994 was 1.17 percent, down from 1.18 in 1993.[3] On a pound-per-million-Btu basis, the average sulfur content of coal was 1.09 compared with 1.11 in 1993. The average Btu content of coal was 10,338 per pound, an increase from 10,315 per pound in 1993.

Receipts of petroleum delivered to electric utilities in 1994 totaled 143 million barrels, a decrease of 5 million barrels from 1993. The average cost of petroleum was $15.70 per barrel, up from $15.42 per barrel in 1993. Receipts of gas totaled 2,864 Bcf in 1994, up 289 Bcf from 1993. The average cost of gas fell $0.34 per thousand cubic feet (Mcf) to $2.28 per Mcf. On a dollar-per-million-Btu basis, petroleum was the most expensive fossil fuel at $2.49, gas was second at $2.23, and coal was least expensive at $1.36.

[2] The delivered cost of fossil fuels includes all costs (i.e., transportation, taxes, etc.) incurred by the electric utility for shipment of the fuel to the plant. It does not include unloading charges.

[3] Energy Information Administration, *Cost and Quality of Fuels for Electric Utility Plants 1993*, DOE/EIA-0191(94) (Washington, DC, July 1995), Table ES4.

Figure 3. Average Cost of Fossil Fuels at U.S. Electric Utilities, 1993 and 1994

Several factors affected the level of fossil fuel receipts at electric plants in 1994. Most important was the low level of stocks of coal on hand at the start of the year. Electric utilities began 1994 with a total of 99 million short tons of coal stocks (including subbituminous and bituminous coal only), the lowest beginning-of-year stock level since 1975. Events contributing to this low level of stocks included the United Mine Workers of America (UMWA) strike from May through December 1993 and severe flooding in the Midwest during the summer of 1993 that interrupted the delivery of coal to power plants. Both events pushed some deliveries scheduled for 1993 into 1994.[4]

Weather conditions notable for affecting fossil fuel requirements in 1994 included bitter-cold weather throughout the East during January and February 1994, an intense heat wave that engulfed most of the country during June, lack of precipitation in the western United States that reduced hydroelectric generation and increased electric utility reliance on fossil fuels, and unusually mild weather throughout the eastern half of the Nation from August through December that reduced demand for fossil fuels.

Notable during 1994 were the scheduling and delivery problems affecting receipts of western coal. The problems began with the extensive flooding that occurred throughout the Missouri and upper Mississippi River Basins during the summer of 1993. Shipments of western coal to midwestern electric utilities were delayed and in some cases canceled. Many shipments were rescheduled for later in the year or delayed until 1994. Demand for low-sulfur western coal[5] increased as the deadline approached for compliance with Phase I of the Clean Air Act Amendments of 1990 (CAAA90). This increase in demand, coupled with the delay and rescheduling of shipments until 1994, caused a substantial increase in rail traffic from western mines. Cycle times dramatically increased due to traffic congestion on the rail lines. Meanwhile, substantial maintenance and track expansion programs (already in progress) further led to additional delays and canceled shipments. The result was low stocks of coal at several electric utilities during the first half of 1994.[6]

Nationally, nuclear generation increased 5 percent from 1993 and accounted for 22 percent of total generation. Higher nuclear generation affected fossil fuel requirements, especially at State and utility levels. Pennsylvania, North Carolina, Tennessee, and Texas each had large increases in nuclear generation. These four States generally recorded decreases in generation from fossil fuels, with obvious implications for fossil fuel receipts.

Conventional hydroelectric generation decreased 8 percent in 1994 from 1993 with the decline occurring primarily in the western United States. The result was an increase in the use of coal and gas in the Mountain and Pacific Contiguous Census Divisions.

Petroleum receipts totaled 143 million barrels, down 5 million barrels from 1993. A shift away from petroleum as a baseload fuel and competition from low-cost natural gas resulted in lower petroleum receipts. As the cost spread between gas and petroleum widened during the second half of the year, receipts of Number 6 fuel oil plummeted to a 6-month total of only 52 million barrels.[7]

Estimated Retail Sales

Estimated total retail sales of electricity to all ultimate consumers in the United States in 1994 reached 2,921 billion kilowatthours, an increase of 56 billion kilowatthours, or 2 percent, compared with 1993 (Table 1). In 1994, sales increased in all major end-use sectors. The commercial sector led with an increase of 37 billion kilowatthours (5 percent). The residential sector followed, increasing by 11 billion kilowatthours (1 percent). Lastly, the industrial sector

[4] Energy Information Administration, *Cost and Quality of Fuels for Electric Utility Plants 1993,* DOE/EIA-0191(93) (Washington, DC, July 1994), pp. 2-3.

[5] Title IV of the CAAA90 established an Acid Rain Program designed to reduce emissions from utility boilers in a two-phase approach. Starting on January 1, 1995, Phase I sets emission restrictions on 110 mostly coal-burning plants in the eastern and midwestern United States. Phase II begins in the year 2000 and places additional emission restrictions on approximately 1,000 electric plants. To comply with Phase I, it is expected that many electric utilities will increase purchases of low-sulfur coal while reducing purchases of high-sulfur coal.

[6] McGraw-Hill, Inc., *Coal Week,* Vol. 20, No.37, September 12, 1994.

[7] Energy Information Administration, *Electric Power Monthly,* DOE/EIA-0226(95/04) (Washington, DC, April 1995), Table 34.

increased by 8 billion kilowatthours or less than 1 percent.

Figure 4. Estimated U.S. Electric Utility Retail Sales to Ultimate Consumers by Sector, 1994

Figure 5. Estimated U.S. Electric Utility Average Revenue per Kilowatthour by Sector, 1994

Estimated Revenue from the sale of electricity to all ultimate consumers in the United States in 1994 reached $202 billion, an increase of 4 billion dollars (2 percent), compared with the level in 1993. Electricity revenue in the commercial and residential sectors increased by 3 billion and 2 billion dollars (5 and 2 percent), respectively. Revenue from sales of electricity in the industrial sector decreased by 1 billion dollars (2 percent).

Estimated Average Revenue per Kilowatthour[8] of electricity sold to ultimate consumers in 1994 was 6.92 cents, the same level as in 1993. Average revenue per kilowatthour in the residential and commercial sectors increased by $0.07 cent and $0.03 cent, respectively--each by less than 1 percent. In the industrial sector, however, average revenue per kilowatthour decreased by $0.14 cents or 3 percent.

In 1994, estimated U.S. total retail sales of electricity (2,921 billion kilowatthours) exceeded total net generation by U.S. electric utilities by 10 million kilowatthours (less than 1 percent). The major factor contributing to this difference was a 49-percent increase in net imports (EIA estimate based on preliminary data from the National Energy Board of Canada and Department of Energy, Fossil Energy) of electricity to the United States. Net imports of electricity in 1994 were 42 billion kilowatthours, compared with 28 billion kilowatthours in 1993. Electric utility purchases of electricity from nonutility power producers also contributed, to a lesser extent, to this difference between generation and sales.

[8] Estimated average revenue per kilowatthour is the ratio of estimated revenue to estimated retail sales.

Table 1. U.S. Electric Utility Summary Statistics, 1993 and 1994

Item	1993	1994	Percent Change
Generating Capability (megawatts) [1]	**699,971**	**702,658**	**0.4**
Coal	300,795	301,098	.1
Petroleum	69,519	69,919	.6
Gas	132,495	133,854	1.0
Nuclear	99,041	99,148	.1
Hydroelectric Pumped Storage	21,146	21,168	.1
Renewable			
Hydroelectric (conventional)	74,763	75,196	.6
Geothermal	1,747	1,747	.0
Biomass [2]	459	515	12.2
Wind	1	8	[3] 700.0
Solar Thermal	0	0	.0
Photovoltaic	4	4	.0
Net Generation (million kilowatthours)	**2,882,525**	**2,910,712**	**1.0**
Coal	1,639,151	1,635,493	–.2
Petroleum [4]	99,539	91,039	–8.5
Gas	258,915	291,115	12.4
Nuclear	610,291	640,440	4.9
Hydroelectric Pumped Storage [5]	–4,036	–3,378	–16.3
Renewable			
Hydroelectric (conventional)	269,098	247,071	–8.2
Geothermal	7,571	6,941	–8.3
Biomass [2]	1,990	1,988	–.1
Wind	0	0	.0
Solar Thermal	0	0	.0
Photovoltaic	4	3	–25.0
Consumption			
Coal (million short tons)	814	817	.4
Petroleum (million barrels) [6]	162	151	–6.8
Gas (billion cubic feet)	2,682	2,987	11.4
Stocks (Year End)			
Coal (million short tons)	111	127	14.4
Petroleum (million barrels) [7]	62	63	1.6
Receipts			
Coal (million short tons)	769	832	8.2
Petroleum (million barrels) [8]	148	143	–3.4
Gas (billion cubic feet) [9]	2,575	2,864	11.2
Cost (cents per million Btu) [10]			
Coal	138.5	135.5	–2.2
Petroleum [11]	243.3	248.8	2.3
Gas	256.0	223.0	–12.9
Estimated Retail Sales (million kilowatthours)	**2,864,782**	**2,920,860**	**2.0**
Residential	994,380	1,005,804	1.1
Commercial	790,225	827,309	4.7
Industrial	984,111	992,422	.8
Other [12]	96,065	95,326	–.8
Estimated Revenue from Retail Sales (billion dollars)	**198**	**202**	**2.0**
Residential	83	85	2.4
Commercial	61	64	4.9
Industrial	48	47	–2.1
Other [12]	7	6	–14.3
Estimated Average Revenue per Kilowatthour (cents)	**6.92**	**6.92**	**.00**
Residential	8.34	8.41	.8
Commercial	7.72	7.75	.4
Industrial	4.86	4.72	–2.9
Other [12]	6.86	6.79	–1.0

[1] Net summer capability based on primary energy source; waste heat, waste gases, and waste steam are included in the original primary energy source (i.e., coal, petroleum, or gas); historical data have been revised to reflect this change.
[2] Includes wood, wood waste, peat, wood liquors, railroad ties, pitch, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oils, and/or other waste.
[3] Includes the addition in 1994 of a 6.8-megawatt unit at the Sacramento Municipal Utility District, Solano Plant.
[4] Includes petroleum coke.
[5] Represents total pumped storage facility production minus energy used for pumping. Negative generation denotes that electric power consumed for plant use exceeds gross generation.
[6] Does not include petroleum coke consumption of 9.999 million short tons in 1994 and 1.220 million short tons in 1993.
[7] Does not include petroleum coke stocks of .003 million short tons at year end 1994 and .089 million shorts tons at year end 1993.
[8] Does not include petroleum coke receipts of 1.263 million short tons in 1994 and 1.248 million short tons in 1993.
[9] Includes small amounts of coke-oven, refinery, and blast furnace gas.
[10] Average cost of fuel delivered to electric generating plants with a total steam-electric nameplate capacity of 50 or more megawatts; average cost values are weighted by Btu.
[11] Does not include petroleum coke cost of 68.9 cents per million Btu in 1994 and 70.3 cents per million Btu in 1993.
[12] Includes public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

Notes: •Data for net summer capability are preliminary for 1994, other data in this table are final. •See technical notes for estimation methodology. •Totals may not equal sum of components because of independent rounding. •Percent change is calculated before rounding. • * = less than 0.5 megawatts.

Sources: •Energy Information Administration, Form EIA-759, ''Monthly Power Plant Report''; Form EIA-860, ''Annual Electric Generator Report'' and

Generating Capability at U.S. Electric Utilities

More than one-third of the primary energy in the Nation is used to generate electricity.[9] Consumers expect electricity to be instantly available; that is, at the flick of a switch. In fact, electricity is so important to the functioning of our society that its unavailability is newsworthy. The U.S. electric power industry is organized to ensure that an adequate supply of electricity is available to meet all demand requirements at any given instant, both now and in the future. This chapter provides an inventory of the capability of various methods for converting energy into electricity and information regarding industry plans for building additional capability in the future.

The generating units operated by an electric utility vary by intended usage; that is, by the three major types of load (generally categorized as base, intermediate, and peak) requirements the utility must meet. A *baseload generating unit* is normally used to satisfy all or part of the minimum or base load of the system and, as a consequence, produces electricity at an essentially constant rate and runs continuously. Baseload units are generally the newest, largest, and most efficient[10] of the three types of units. A *peakload generating unit*, normally the least efficient of the three unit types, is used to meet requirements during the periods of greatest or peak load on the system. *Intermediate-load generating units* meet system requirements that are greater than base load but less than peak load. Intermediate-load units are used during the transition between baseload and peak load requirements. Utilities also have reserve or standby generating units, which are available to the system in the event of an unexpected increase in load or an unexpected outage within the system. Consequently, an inventory of net capability must account for reserve or standby capability, as well as generating units that are not available to the system for various reasons (such as routine maintenance).

Net capability in this report, unless otherwise stated, refers to that which is *operable* and includes both active and inactive capability. Once a new generator has been declared available to generate power to the electrical grid, it is considered a part of the operable capability of the utility until it is retired from service. Generating units that are used for standby service, generators that are placed in cold reserve or cold standby, and generators that are out of service for an extended period (exceeding 1 year) comprise the inactive operable capability.[11] Active operable capability includes generators that are generating or available to generate; this includes generators that may be down for scheduled maintenance, refueling, or forced outages.

An electric utility plant (station) contains generating units and auxiliary equipment that are used to convert various types of energy into electric energy. A fossil-fueled generating unit may be designed to use (burn) one or more fossil fuels to produce electricity. A generating unit capable of burning more than one fossil fuel is referred to as a dual-fired unit. Some dual-fired units can only burn one fuel at a time (that is, the fuels are fired sequentially), while others can burn more than one fuel simultaneously (concurrent firing of different fuels). A sequentially fired unit generally uses one fossil fuel as its primary energy source but can switch to a second fossil fuel as an alternate energy source. Unless stated otherwise, information regarding generating capability in this report is based on the primary energy source.

9 Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(95/04) (Washington, DC, April 1995), pp. 7 and 33.

10 The *operating efficiency* of a generating unit is a function of the amount of net heat that it can extract from the energy source for use in the production of electricity.

11 As of the year-end 1994, about 3 percent of the operable capability was inactive, based on preliminary data from the Energy Information Administration, Form EIA-860, "Annual Electric Generator Report."

Prime Movers

Electric utilities use a variety of prime movers based on the loads, availability of fuels, and energy requirements of the utility. The most common prime movers are the steam turbine, internal-combustion engine, gas combustion turbine, water turbine, and wind turbine.[12] Most prime movers used to produce electricity today are turbines. The energy sources most often used with prime movers are the fossil fuels--coal, petroleum, and natural gas.

Steam-Turbine Generating Units. Most of the electricity in the United States is produced in steam turbines. In a *fossil-fueled* steam turbine, the fuel is burned in a boiler to produce steam. The resulting steam then turns the turbine blades that turn the shaft of the generator to produce electricity. In a *nuclear-powered* steam turbine, the boiler is replaced by a reactor containing a core of nuclear fuel (primarily enriched uranium). Heat produced in the reactor by fission of the uranium is used to make steam. The steam is then passed through the turbine generator to produce electricity, as in the fossil-fueled steam turbine. Steam-turbine generating units are used primarily to serve the base load of electric utilities. Fossil-fueled steam-turbine generating units range in size (nameplate capacity) from 1 megawatt to over 1,000 megawatts. The size of nuclear-powered steam-turbine generating units in operation today ranges from 75 megawatts to more than 1,400 megawatts.

Gas Turbine Generating Units. In a gas turbine (combustion-turbine) unit, hot gases produced from the combustion of natural gas and distillate oil in a high-pressure combustion chamber are passed directly through the turbine, which spins the generator to produce electricity. Gas turbines are commonly used to serve the peak loads of the electric utility. Gas-turbine units can be installed at a variety of site locations, because their size is generally less than 100 megawatts. Gas-turbine units also have a quick startup time, compared with steam-turbine units. As a result, gas-turbine units are suitable for peaking, emergency, and reserve-power requirements.

The gas turbine, as is typical with peaking units, has a lower efficiency than the steam turbine used for baseload power. The efficiency of the gas turbine is increased when coupled with a steam turbine in a *combined-cycle* operation. In this operation, hot gases (which have already been used to spin one turbine generator) are moved to a waste-heat recovery steam boiler where the water is heated to produce steam that, in turn, produces electricity by running a second steam-turbine generator. In this way, two generators produce electricity from one initial fuel input. All or part of the heat required to produce steam may come from the exhaust of the gas turbine. Thus, the steam-turbine generator may be supplementarily fired in addition to the waste heat. Combined-cycle generating units generally serve intermediate loads.

Internal-Combustion Engines These prime movers have one or more. cylinders in which the combustion of fuel takes place. The engine, which is connected to the shaft of the generator, provides the mechanical energy to drive the generator to produce electricity. Internal-combustion (or diesel) generators can be easily transported, can be installed upon short notice, and can begin producing electricity nearly at the moment they start. Thus, like gas turbines, they are usually operated during periods of high demand for electricity. They are generally about 5 megawatts in size.

Hydroelectric Generating Units. Hydroelectric power is the result of a process in which flowing water is used to spin a turbine connected to a generator. The two basic types of hydroelectric systems are those based on *falling water* and those based on *natural river current.* In the first system, water accumulates in reservoirs created by the use of dams. This water then falls through conduits (penstocks) and applies pressure against the turbine blades to drive the generator to produce electricity. In the second system, called a *run-of-the-river* system, the force of the river current (rather than falling water) applies pressure to the turbine blades to produce electricity. Since run-of-the-river systems do not usually have reservoirs and cannot store substantial quantities of water, power production from this type of system depends on seasonal changes and stream flow. These conventional hydroelectric generating units range in size from less than 1 megawatt to 700 megawatts. Because of their ability to start quickly and make rapid changes in power output, hydroelectric generating units are suitable for serving peak loads and providing spinning reserve power, as well as serving baseload requirements.

Another kind of hydroelectric power generation is the *pumped storage* hydroelectric system. Pumped storage hydroelectric plants use the same principle for generation of power as the conventional hydroelectric operations based on falling water and river current. However, in a pumped storage operation, low-cost off-peak energy is used to pump water to an upper reservoir where it is stored as potential energy. The water is then released to flow back down through the turbine generator to produce electricity during periods of high demand for electricity.

Other Generating Units. Other methods of electric power generation, which presently contribute only small amounts to total power production, have potential for expansion. These include *geothermal, solar, wind,* and *biomass* (wood, municipal solid waste, agricultural waste, etc.). *Geothermal* power comes from heat energy buried beneath the surface of the earth. Although most of this heat is at depths beyond current drilling methods, in some areas of the country,

[12] A turbine converts the kinetic energy of a moving fluid (liquid or gas) to mechanical energy. Turbines have a series of blades mounted on a shaft against which fluids are forced, thus rotating the shaft connected to the generator. The fluids most commonly used in turbines are steam, hot air, or combustion products, and water.

magma[13] flows close enough to the surface of the earth to produce steam. That steam can then be harnessed for use in conventional steam-turbine plants. *Solar power* is derived from the energy (both light and heat) of the sun. *Photovoltaic conversion* generates electric power directly from the light of the sun; whereas, *solar-thermal* electric generators use the heat from the sun to produce steam to drive turbines. *Wind power* is derived from the conversion of the energy contained in wind into electricity. A wind turbine is similar to a typical wind mill. However, because of the intermittent nature of sunlight and wind, high capacity utilization factors cannot be achieved for these plants. Several electric utilities have incorporated *wood* and *waste* (for example, municipal waste, corn cobs, and oats) as energy sources for producing electricity at their power plants. These sources replace fossil fuels in the boiler. The combustion of wood and waste creates steam that is typically used in conventional steam-electric plants.

Generator Rating

The rating of a generator is a measure of its ability to produce electricity. Generators are rated by nameplate capacity. The *nameplate capacity* is the full-load continuous rating of the generator under specified conditions, as designated by the manufacturer, and is usually indicated on a metal plate attached to the generator. *Net capability* is the steady hourly output that the generating unit is expected to supply to the system load, as demonstrated by test procedures. The capability of the generating unit in the summer is generally less than in the winter due to high ambient-air and cooling-water temperatures, which cause generating units to be less efficient. The measure used in this publication for electric utilities is net summer capability. The nameplate capacity of a generator is generally greater than its net capability.

Planned Generating Unit Additions

Electric utilities must provide a continuous and dependable supply of electricity to their consumers. They must maintain a balance between supply and demand and, at the same time, maintain an adequate reserve margin to ensure system reliability. To accomplish this, electric utilities continually assess their need for new generating capability.

The most important factor in determining the need for new electric generating capability is growth in the demand for electricity. Growth in demand is influenced primarily by economic forces (for example, the Gross National Product) and the cost of fuels and electricity. Electric utilities constantly monitor their peak demands and energy requirements and usually update their forecasts of these annually. Electric utilities use various methodologies to forecast annual peak demand and energy requirements, from which they determine the amount of capability that is needed to meet expected demand. Two additional factors that contribute to the need for new generating capability are the retirements of older generators and the decreasing efficiency of aging generating units.

Before deciding to add new capability, electric utilities consider other options that may be more cost-effective in meeting future demand. Also, they may choose to combine the addition of new capability with other options that include repowering and/or life extension of their existing capability, load-management programs and/or purchases of power from nonutilities.

Electric utilities are considering repowering as a cost-effective means of meeting future energy requirements. Several repowering technologies have been developed. Repowering generally consists of modifying old coal-fired electric generating units by replacing the boiler with a new combustion technology, which results in better performance and an increase in capacity. Several repowering technologies were reported as part of the 10-year construction plans of utilities. In some cases, an existing steam-electric plant is reconfigured as a combined-cycle plant by adding a gas turbine. Several electric utilities have already completed this kind of repowering and more repowering is included in their 10-year construction plans. Other technologies repower with clean-coal technology. Repowering with clean-coal technology includes replacing the furnace and boiler in an old plant with new, cleaner-burning, high-efficiency coal combustion or gasification technology. Although utilities are considering their reported plans for implementing these technologies as “demonstration” projects, test programs have shown that these technologies do have dependability for future use by electric utilities in the United States.

Although life extension (plant refurbishment) adds little, if any, new capability, some utilities have chosen to refurbish their plants since refurbishment can add about 20 years of life to aged plants nearing retirement and is less expensive than repowering.

With concerns about future demand, in particular, future peak demands, utilities are studying and implementing ways to encourage customers to reduce or shift loads. These techniques include allowing customers to have more choice in setting the cost of their energy, controlling their energy use, and at the same time reducing overall demand. Reducing demand delays the need for new capability.

Once the decision has been made to add capability, either by building new power plants or adding new generating units at existing power plants, the type of capability to be added is determined by matching the load to be served with the appropriate type of generating unit. If the needs of a utility are limited to capa-

[13] Magma is the molten matter under the earth's crust from which igneous rock is formed by cooling.

bility required to meet peak demand, then gas turbine, internal-combustion, or pumped-storage hydroelectric generating units are likely to be the choice for new additions. To meet other energy requirements (intermediate and base load), the options available to the utility include the addition of steam-electric, combined-cycle, or conventional-hydroelectric generating units.

Data Sources

The following tables contain a summary of the number of electric generators and the amount of electric generating capability in the United States at national, regional, and State levels for the period 1990 through 1994, as well as capability additions planned by electric utilities for 1995 through 2004. During the past year, several updates were made for these data. These changes include the installation of new generators; the retirement of existing generators; the use of a primary energy source for dual-fired units different from that which has been reported in the past; and the modification of generators, such as the rewinding of stators or the retrofitting of associated generator equipment. Respondents that did not meet the reporting requirements of Form EIA-860 were deleted. The capacity of generators sold to nonutilities was also deleted. The inclusion of new respondents also resulted in data changes.

Estimates of net summer capability and net winter capability are made for operable nonnuclear electric generating units with no reported capability. Additionally, estimates are made for all electric generating units that are not nuclear-powered or coal-fired and are under construction or in the planning stage. These estimates are calculated using a statistical relationship that exists between the capability (summer and winter) and installed generator nameplate capacity for units that were in commercial operation as of the end of 1992. For a description of the estimation formula, see the technical notes.

Data in the tables were obtained from the Form EIA-860, "Annual Electric Generator Report." Data are reported annually on the Form EIA-860 by approximately 900 electric utilities in the United States that operate power plants or plan to operate power plants within 10 years of the reporting year. These 10-year plans include generating units that are under construction or in various stages of planning at the time data are submitted.

Data from the Form EIA-860 for 1994 are preliminary. Final data, as well as more detailed statistics on operable capacity and planned capability additions, are published in the *Inventory of Power Plants in the United States.*[14]

Table 2. Generating Capability at U.S. Electric Utilities by Prime Mover and Primary Energy Source, End of Year 1990 Through 1994
(Megawatts)

Prime Mover/Primary Energy Source	1990	1991	1992	1993	1994
Fossil Steam	**446,985**	**446,575**	**446,201**	**446,315**	**445,296**
Coal-Fired	299,876	299,611	300,547	300,795	301,098
Petroleum-Fired	49,789	45,711	44,472	41,905	41,151
Gas-Fired	97,320	101,253	101,182	103,614	103,047
Gas Turbine/Internal Combustion	**50,861**	**52,790**	**54,291**	**56,494**	**59,575**
Petroleum-Fired	27,275	27,235	27,381	27,614	28,768
Gas-Fired	23,516	25,555	26,910	28,881	30,807
Nuclear	**99,624**	**99,589**	**98,985**	**99,041**	**99,148**
Hydroelectric Pumped Storage	**19,462**	**18,414**	**21,190**	**21,146**	**21,168**
Renewable					
Hydroelectric (conventional)	71,423	73,617	72,185	74,763	75,196
Geothermal	1,614	1,563	1,739	1,747	1,747
Biomass [1]	494	464	464	459	515
Wind	*	*	*	1	[2] 8
Solar Thermal	0	0	0	0	0
Photovoltaic	3	3	3	4	4
U.S. Total	**690,465**	**693,016**	**695,059**	**699,971**	**702,658**

[1] Includes wood, wood waste, peat, wood liquors, railroad ties, pitch, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oils, and/or other waste.
[2] Includes the addition in 1994 of a 6.8-megawatt unit at the Sacramento Municipal Utility District, Solano Plant.
* =Value less than 0.5.
Notes: •Waste heat, waste gases, and waste steam are included in the original primary energy source category (i.e., coal, petroleum, or gas). •Data for 1994 are preliminary; prior-year data are final. •Totals may not equal sum of components because of independent rounding. •Generating capability is net summer capability.
Source: Energy Information Administration, Form EIA-860, ''Annual Electric Generator Report.''

[14] Energy Information Administration, *Inventory of Power Plants in the United States*, DOE/EIA-0095.

Table 3. Summary of Capability Additions, Retirements, and Total Operable Capability at U.S. Electric Utilities by Energy Source, End of Year 1994

Primary Energy Source	Added		Retired		Operable	
	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)
Coal	**1**	**540**	**8**	**461**	**1,219**	**301,098**
Petroleum	**22**	**71**	**39**	**317**	**3,357**	**69,919**
Gas	**46**	**3,046**	**38**	**1,642**	**2,150**	**133,854**
Nuclear	**0**	**0**	**0**	**0**	**109**	**99,148**
Hydroelectric Pumped Storage	**0**	**0**	**0**	**0**	**143**	**21,168**
Renewable						
Hydroelectric (conventional)	15	145	14	13	3386	75,196
Geothermal	0	0	0	0	29	1,747
Biomass [2]	1	32	0	0	25	515
Wind	1	7	0	0	21	8
Solar Thermal	0	0	0	0	0	0
Photovoltaic	1	*	0	0	9	4
U.S. Total	**87**	**3,841**	**99**	**2,433**	**10,448**	**702,658**

[1] Net summer capability.

[2] Includes wood, wood waste, peat, wood liquors, railroad ties, pitch, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oils, and/or other waste.

* =Value less than 0.5.

Notes: •Data are preliminary. •Totals may not equal sum of components because of independent rounding. •Total capability cannot be calculated from the prior year's capability by adjusting for retirements and newly added capability because capability ratings for independent generators change each year and generators are purchased from or sold to nonutilities. •Waste heat, waste gases, and waste steam are included in the original primary energy source category (i.e., coal, petroleum, or gas).

Source: Energy Information Administration, Form EIA-860, ''Annual Electric Generator Report.''

Table 4. Planned Capability Additions at U.S. Electric Utilities by Energy Source, 1995 Through 2004

Year	Total		Petroleum & Gas		Coal	
	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)
1995	99	7,037	76	3,961	3	856
1996	47	3,178	35	1,961	5	1,173
1997	34	1,543	22	1,376	1	122
1998	47	2,959	31	2,819	0	0
1999	51	4,727	38	3,892	2	660
2000	69	5,733	43	4,779	1	750
2001	40	4,341	40	4,341	0	0
2002	38	5,071	36	4,533	1	500
2003	28	3,181	27	3,081	0	0
2004	34	5,168	30	3,743	3	1,325
1995-2004	**487**	**42,936**	**378**	**34,486**	**16**	**5,386**

Year	Nuclear		Hydroelectric		Renewable [2]	
	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)
1995	1	1,170	19	1,050	0	0
1996	0	0	7	45	0	0
1997	0	0	11	44	0	0
1998	0	0	16	140	0	0
1999	0	0	10	74	1	100
2000	0	0	23	189	2	14
2001	0	0	0	0	0	0
2002	0	0	1	38	0	0
2003	0	0	0	0	1	100
2004	0	0	0	0	1	100
1995-2004	**1**	**1,170**	**87**	**1,581**	**5**	**314**

[1] Net summer capability.

[2] Includes geothermal, biomass, wind, solar thermal, and photovoltaic (excludes hydroelectric).

Notes: •Data are preliminary. •Totals may not equal sum of components because of independent rounding. •Waste heat, waste gases, and waste steam are included in the original primary energy source category (i.e., coal, petroleum, or gas).

Source: Energy Information Administration, Form EIA-860, ''Annual Electric Generator Report.''

Table 5. Generating Capability at U.S. Electric Utilities by Census Division and State, End of Year 1993 and 1994

Census Division State	1993		1994	
	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)
New England	**673**	**22,371**	**668**	**22,192**
Connecticut	83	6,754	83	6,733
Maine	188	2,402	190	2,433
Massachusetts	201	9,461	197	9,287
New Hampshire	45	2,508	44	2,500
Rhode Island	21	153	19	148
Vermont	135	1,094	135	1,093
Middle Atlantic	**954**	**80,004**	**947**	**79,866**
New Jersey	120	13,850	114	13,500
New York	598	32,731	597	32,826
Pennsylvania	236	33,423	236	33,540
East North Central	**1,685**	**114,206**	**1,685**	**114,531**
Illinois	333	32,769	330	32,952
Indiana	156	20,901	159	20,710
Michigan	564	22,412	566	22,413
Ohio	239	27,186	239	27,192
Wisconsin	393	10,938	391	11,264
West North Central	**1,882**	**54,798**	**1,872**	**55,342**
Iowa	399	8,074	399	8,217
Kansas	423	9,706	416	9,715
Minnesota	341	8,864	337	8,951
Missouri	355	15,433	354	15,488
Nebraska	251	5,512	251	5,518
North Dakota	46	4,478	46	4,488
South Dakota	67	2,733	69	2,965
South Atlantic	**1,371**	**134,916**	**1,365**	**136,604**
Delaware	30	2,269	30	2,269
District of Columbia	4	806	4	806
Florida	377	34,814	368	35,487
Georgia	206	21,504	212	22,039
Maryland	106	10,709	104	10,837
North Carolina	202	20,182	195	20,007
South Carolina	212	16,131	216	16,691
Virginia	178	14,054	180	13,958
West Virginia	56	14,448	56	14,510
East South Central	**474**	**58,538**	**477**	**59,148**
Alabama	147	19,972	147	19,878
Kentucky	110	15,297	112	15,507
Mississippi	52	7,045	53	7,114
Tennessee	165	16,224	165	16,649
West South Central	**808**	**103,284**	**806**	**103,531**
Arkansas	105	9,672	106	9,674
Louisiana	110	16,885	109	16,873
Oklahoma	153	12,859	154	12,898
Texas	440	63,868	437	64,087
Mountain	**830**	**49,837**	**827**	**50,386**
Arizona	123	15,034	123	15,058
Colorado	172	6,648	170	6,675
Idaho	116	2,304	110	2,500
Montana	95	4,871	95	4,907
Nevada	66	5,235	69	5,478
New Mexico	54	5,062	55	5,078
Utah	148	4,812	148	4,816
Wyoming	56	5,869	57	5,874
Pacific Contiguous	**1,147**	**78,704**	**1,147**	**77,718**
California	676	44,313	672	43,297
Oregon	193	10,133	194	10,166
Washington	278	24,259	281	24,255
Pacific Noncontiguous	**647**	**3,313**	**654**	**3,339**
Alaska	550	1,711	557	1,737
Hawaii	97	1,602	97	1,602
U.S. Total	**10,471**	**699,971**	**10,448**	**702,658**

[1] Net summer capability.

Notes: •Data for 1994 are preliminary; prior-year data are final. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-860, ''Annual Electric Generator Report.''

Table 6. Coal-Fired, Nuclear, Hydroelectric, and Renewable Generating Capability at U.S. Electric Utilities by Census Division and State, End of Year 1994

Census Division State	Coal		Nuclear		Hydroelectric		Renewable [1]	
	Number of Generators	Capability [2] (megawatts)	Number of Generators	Capability [2] (megawatts)	Number of Generators	Capability [2] (megawatts)	Number of Generators	Capability [2] (megawatts)
New England	**15**	**2,638**	**8**	**6,375**	**379**	**3,134**	**14**	**144**
Connecticut	1	385	4	3,194	35	137	2	64
Maine	0	0	1	870	142	422	1	32
Massachusetts	9	1,675	1	665	64	1,861	8	*
New Hampshire	5	578	1	1,150	32	283	0	0
Rhode Island	0	0	0	0	1	1	0	0
Vermont	0	0	1	496	105	430	3	47
Middle Atlantic	**98**	**23,005**	**19**	**17,481**	**374**	**9,551**	**0**	**0**
New Jersey	7	1,634	4	3,862	3	380	0	0
New York	32	3,879	6	4,831	326	7,238	0	0
Pennsylvania	59	17,492	9	8,788	45	1,932	0	0
East North Central	**382**	**76,550**	**23**	**20,112**	**483**	**2,846**	**10**	**194**
Illinois	58	15,090	13	12,609	16	12	0	0
Indiana	79	19,192	0	0	21	69	0	0
Michigan	77	11,928	5	3,967	234	2,201	0	0
Ohio	119	23,158	2	2,037	7	124	3	90
Wisconsin	49	7,182	3	1,499	205	440	7	104
West North Central	**198**	**35,214**	**8**	**5,608**	**159**	**3,909**	**13**	**85**
Iowa	51	5,975	1	515	25	125	1	*
Kansas	19	5,220	1	1,160	0	0	2	*
Minnesota	50	5,742	3	1,564	54	142	10	85
Missouri	48	10,811	1	1,115	29	1,110	0	0
Nebraska	15	3,112	2	1,254	20	167	0	0
North Dakota	12	3,867	0	0	5	545	0	0
South Dakota	3	488	0	0	26	1,820	0	0
South Atlantic	**216**	**65,163**	**27**	**23,689**	**452**	**11,931**	**3**	*****
Delaware	5	931	0	0	0	0	0	0
District of Columbia	0	0	0	0	0	0	0	0
Florida	29	10,037	5	3,822	6	47	0	0
Georgia	39	13,164	4	3,840	118	2,853	0	0
Maryland	15	4,631	2	1,675	13	530	0	0
North Carolina	45	12,438	5	4,639	99	1,840	0	0
South Carolina	25	5,352	7	6,364	125	3,448	0	0
Virginia	24	4,217	4	3,349	70	3,108	3	*
West Virginia	34	14,393	0	0	21	105	0	0
East South Central	**140**	**36,413**	**8**	**8,195**	**205**	**7,597**	**0**	**0**
Alabama	39	11,494	5	4,835	89	2,959	0	0
Kentucky	58	14,075	0	0	30	802	0	0
Mississippi	6	2,228	1	1,143	0	0	0	0
Tennessee	37	8,615	2	2,217	86	3,835	0	0
West South Central	**57**	**31,373**	**8**	**8,482**	**131**	**3,014**	**1**	*****
Arkansas	5	3,817	2	1,694	43	1,325	0	0
Louisiana	6	3,343	2	2,006	0	0	0	0
Oklahoma	10	4,868	0	0	38	1,035	0	0
Texas	36	19,345	4	4,782	50	653	1	*
Mountain	**103**	**28,790**	**3**	**3,810**	**425**	**10,449**	**9**	**48**
Arizona	14	5,119	3	3,810	41	2,793	0	0
Colorado	31	4,953	0	0	53	1,130	0	0
Idaho	0	0	0	0	106	2,358	0	0
Montana	6	2,260	0	0	84	2,514	2	13
Nevada	8	2,717	0	0	17	1,046	0	0
New Mexico	13	3,901	0	0	6	58	0	0
Utah	12	4,273	0	0	88	257	7	35
Wyoming	19	5,567	0	0	30	292	0	0
Pacific Contiguous	**5**	**1,898**	**5**	**5,396**	**864**	**43,579**	**33**	**1,868**
California	0	0	4	4,310	427	13,503	30	1,787
Oregon	1	508	0	0	177	9,021	2	35
Washington	4	1,390	1	1,086	260	21,054	1	47
Pacific Noncontiguous	**5**	**54**	**0**	**0**	**57**	**355**	**3**	*****
Alaska	5	54	0	0	53	352	3	*
Hawaii	0	0	0	0	4	3	0	0
U.S. Total	**1,219**	**301,098**	**109**	**99,148**	**3,529**	**96,364**	**86**	**2,339**

[1] Includes geothermal, biomass, wind, solar thermal, and photovoltaic (excludes hydroelectric).
[2] Net summer capability.
* =Value less than 0.5.

Notes: •Data are preliminary. •Totals may not equal sum of components because of independent rounding. •Waste heat, waste gases, and waste steam are included in the original primary energy source category (i.e., coal, petroleum, or gas).

Source: Energy Information Administration, Form EIA-860, ''Annual Electric Generator Report.''

Table 7. Petroleum-, Gas-, and Dual-Fired Steam Generating Capability at U.S. Electric Utilities by Census Division and State, End of Year 1994

Census Division State	Petroleum		Gas		Dual-Fired Petroleum/Gas		Total Petroleum and Gas	
	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)
New England	**35**	**4,993**	**6**	**1,053**	**16**	**2,243**	**57**	**8,289**
Connecticut	13	1,840	2	214	2	528	17	2,582
Maine	13	1,041	0	0	0	0	13	1,041
Massachusetts	8	2,071	4	839	11	1,225	23	4,135
New Hampshire	0	0	0	0	1	406	1	406
Rhode Island	1	41	0	0	2	84	3	125
Vermont	0	0	0	0	0	0	0	0
Middle Atlantic	**42**	**8,182**	**41**	**9,188**	**11**	**2,056**	**94**	**19,426**
New Jersey	14	1,263	11	1,591	3	117	28	2,971
New York	15	3,654	29	7,396	8	1,939	52	12,989
Pennsylvania	13	3,265	1	201	0	0	14	3,466
East North Central	**19**	**2,791**	**22**	**2,341**	**10**	**1,875**	**51**	**7,007**
Illinois	9	1,469	11	1,819	6	334	26	3,622
Indiana	5	188	2	120	0	0	7	308
Michigan	4	1,070	3	300	4	1,541	11	2,911
Ohio	1	64	1	17	0	0	2	81
Wisconsin	0	0	5	86	0	0	5	86
West North Central	**5**	**72**	**68**	**2,465**	**5**	**60**	**78**	**2,596**
Iowa	3	22	5	99	0	0	8	120
Kansas	0	0	36	1,819	3	22	39	1,841
Minnesota	2	50	10	137	0	0	12	187
Missouri	0	0	5	90	2	38	7	128
Nebraska	0	0	11	257	0	0	11	257
North Dakota	0	0	0	0	0	0	0	0
South Dakota	0	0	1	64	0	0	1	64
South Atlantic	**38**	**5,445**	**58**	**5,077**	**41**	**10,992**	**137**	**21,514**
Delaware	1	84	1	175	4	580	6	839
District of Columbia	2	550	0	0	0	0	2	550
Florida	19	2,948	45	4,266	33	8,350	97	15,563
Georgia	2	115	8	290	1	118	11	523
Maryland	7	700	2	215	2	1,224	11	2,139
North Carolina	2	28	1	68	0	0	3	96
South Carolina	2	92	0	0	0	0	2	92
Virginia	3	929	1	62	1	720	5	1,711
West Virginia	0	0	0	0	0	0	0	0
East South Central	**2**	**58**	**35**	**3,541**	**2**	**94**	**39**	**3,692**
Alabama	0	0	4	92	0	0	4	92
Kentucky	2	58	1	115	0	0	3	173
Mississippi	0	0	30	3,334	2	94	32	3,427
Tennessee	0	0	0	0	0	0	0	0
West South Central	**2**	**196**	**314**	**55,631**	**0**	**0**	**316**	**55,827**
Arkansas	0	0	16	2,515	0	0	16	2,515
Louisiana	2	196	72	11,036	0	0	74	11,232
Oklahoma	0	0	33	6,110	0	0	33	6,110
Texas	0	0	193	35,970	0	0	193	35,970
Mountain	**0**	**0**	**71**	**3,851**	**0**	**0**	**71**	**3,851**
Arizona	0	0	21	1,509	0	0	21	1,509
Colorado	0	0	12	244	0	0	12	244
Idaho	0	0	0	0	0	0	0	0
Montana	0	0	1	70	0	0	1	70
Nevada	0	0	11	904	0	0	11	904
New Mexico	0	0	24	964	0	0	24	964
Utah	0	0	2	160	0	0	2	160
Wyoming	0	0	0	0	0	0	0	0
Pacific Contiguous	**0**	**0**	**103**	**19,752**	**7**	**924**	**110**	**20,676**
California	0	0	102	19,604	7	924	109	20,528
Oregon	0	0	1	148	0	0	1	148
Washington	0	0	0	0	0	0	0	0
Pacific Noncontiguous	**26**	**1,170**	**2**	**85**	**0**	**0**	**28**	**1,255**
Alaska	0	0	2	85	0	0	2	85
Hawaii	26	1,170	0	0	0	0	26	1,170
U.S. Total	**169**	**22,908**	**720**	**102,983**	**92**	**18,243**	**981**	**144,134**

[1] Net summer capability.

Notes: •Data are preliminary. •Totals may not equal sum of components because of independent rounding. •Waste heat, waste gases, and waste steam are included in the original primary energy source category (i.e., coal, petroleum, or gas).

Source: Energy Information Administration, Form EIA-860, ''Annual Electric Generator Report.''

Table 8. Petroleum-, Gas-, and Dual-Fired Gas Turbine/Internal Combustion Generating Capability at U.S. Electric Utilities by Census Division and State, End of Year 1994

Census Division State	Petroleum		Gas		Dual-Fired Petroleum/Gas		Total Petroleum and Gas	
	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)
New England	**172**	**1,129**	**9**	**114**	**14**	**369**	**195**	**1,612**
Connecticut	24	370	0	0	0	0	24	370
Maine	33	68	0	0	0	0	33	68
Massachusetts	70	484	9	114	13	352	92	950
New Hampshire	4	66	0	0	1	17	5	83
Rhode Island	15	21	0	0	0	0	15	21
Vermont	26	120	0	0	0	0	26	120
Middle Atlantic	**226**	**5,217**	**124**	**5,110**	**12**	**76**	**362**	**10,403**
New Jersey	26	1,564	45	3,066	1	23	72	4,653
New York	104	2,037	66	1,798	11	53	181	3,888
Pennsylvania	96	1,616	13	246	0	0	109	1,862
East North Central	**395**	**2,942**	**258**	**3,962**	**83**	**919**	**736**	**7,823**
Illinois	76	482	115	974	26	164	217	1,619
Indiana	27	287	19	838	6	16	52	1,142
Michigan	149	569	69	782	21	55	239	1,406
Ohio	61	806	30	396	15	501	106	1,703
Wisconsin	82	799	25	972	15	183	122	1,954
West North Central	**616**	**3,754**	**422**	**3,308**	**378**	**867**	**1,416**	**7,929**
Iowa	161	491	55	748	97	243	313	1,482
Kansas	53	301	139	903	163	290	355	1,494
Minnesota	125	882	46	217	37	133	208	1,231
Missouri	148	1,453	70	745	51	126	269	2,324
Nebraska	79	303	100	386	24	40	203	728
North Dakota	27	67	2	10	0	0	29	77
South Dakota	23	257	10	300	6	36	39	593
South Atlantic	**273**	**6,152**	**173**	**5,929**	**84**	**2,226**	**530**	**14,307**
Delaware	15	124	3	336	1	39	19	499
District of Columbia	2	256	0	0	0	0	2	256
Florida	115	3,352	107	2,453	9	212	231	6,018
Georgia	22	942	12	550	6	167	40	1,659
Maryland	40	717	21	1,138	2	7	63	1,862
North Carolina	18	276	8	218	17	500	43	994
South Carolina	10	195	16	700	31	541	57	1,436
Virginia	50	279	6	533	18	761	74	1,573
West Virginia	1	12	0	0	0	0	1	12
East South Central	**31**	**1,221**	**23**	**725**	**31**	**1,306**	**85**	**3,251**
Alabama	1	18	1	110	8	370	10	498
Kentucky	8	76	10	330	3	50	21	456
Mississippi	2	31	12	285	0	0	14	316
Tennessee	20	1,096	0	0	20	886	40	1,982
West South Central	**54**	**281**	**205**	**4,484**	**34**	**71**	**293**	**4,835**
Arkansas	20	206	9	105	11	11	40	322
Louisiana	1	16	25	257	1	19	27	292
Oklahoma	11	30	46	827	16	28	73	885
Texas	22	29	125	3,296	6	13	153	3,337
Mountain	**96**	**356**	**100**	**2,787**	**20**	**295**	**216**	**3,438**
Arizona	3	97	37	1,727	4	3	44	1,827
Colorado	42	141	20	125	12	80	74	346
Idaho	2	6	2	136	0	0	4	142
Montana	0	0	2	50	0	0	2	50
Nevada	20	48	9	551	4	212	33	811
New Mexico	6	24	6	132	0	0	12	155
Utah	15	25	24	67	0	0	39	92
Wyoming	8	15	0	0	0	0	8	15
Pacific Contiguous	**46**	**649**	**76**	**3,248**	**6**	**404**	**128**	**4,301**
California	37	558	59	2,310	4	301	100	3,169
Oregon	1	3	10	348	2	103	13	454
Washington	8	88	7	590	0	0	15	678
Pacific Noncontiguous	**530**	**960**	**30**	**677**	**1**	**38**	**561**	**1,675**
Alaska	463	532	30	677	1	38	494	1,247
Hawaii	67	428	0	0	0	0	67	428
U.S. Total	**2,439**	**22,661**	**1,420**	**30,344**	**663**	**6,571**	**4,522**	**59,575**

[1] Net summer capability.

Notes: •Data are preliminary. •Totals may not equal sum of components because of independent rounding. •Waste heat, waste gases, and waste steam are included in the original primary energy source category (i.e., coal, petroleum, or gas).

Source: Energy Information Administration, Form EIA-860, ''Annual Electric Generator Report.''

Table 9. Planned Capability Additions at U.S. Electric Utilities by Energy Source, North American Electric Reliability Council Region, and Hawaii, 1995 Through 2004

North American Electric Reliability Council Region and Hawaii	Total		Petroleum & Gas		Coal	
	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)
ECAR	49	4,180	43	4,111	0	0
ERCOT	41	6,381	36	4,831	2	1,250
MAAC	31	3,722	30	3,422	1	300
MAIN	45	3,142	37	2,939	2	182
MAPP(U.S.)	18	377	17	374	1	4
NPCC(U.S.)	32	460	5	308	0	0
SERC	139	17,660	130	13,779	5	1,855
SPP	34	2,537	31	2,434	0	0
WSCC(U.S.)	82	4,320	35	2,131	5	1,795
Contiguous U.S.	**471**	**42,779**	**364**	**34,329**	**16**	**5,386**
ASCC	3	1	1	*	0	0
Hawaii	13	156	13	156	0	0
U.S. Total	**487**	**42,936**	**378**	**34,486**	**16**	**5,386**

	Nuclear		Hydroelectric		Renewable [2]	
	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)
ECAR	0	0	6	69	0	0
ERCOT	0	0	0	0	3	300
MAAC	0	0	0	0	0	0
MAIN	0	0	4	7	2	14
MAPP(U.S.)	0	0	0	0	0	0
NPCC(U.S.)	0	0	27	152	0	0
SERC	1	1,170	3	856	0	0
SPP	0	0	3	103	0	0
WSCC(U.S.)	0	0	42	393	0	0
Contiguous U.S.	**1**	**1,170**	**85**	**1,580**	**5**	**314**
ASCC	0	0	2	1	0	0
Hawaii	0	0	0	0	0	0
U.S. Total	**1**	**1,170**	**87**	**1,581**	**5**	**314**

[1] Net summer capability.

[2] Includes geothermal, biomass, wind, solar thermal, and photovoltaic (excludes hydroelectric).

* =Value less than 0.5.

Notes: •Data for 1994 are preliminary; prior-year data are final. •Totals may not equal sum of components because of independent rounding. •Waste heat, waste gases, and waste steam are included in the original primary energy source category (i.e., coal, petroleum, or gas).

Source: Energy Information Administration, Form EIA-860, ''Annual Electric Generator Report.''

Table 10. Planned Capability Additions at U.S. Electric Utilities by Energy Source, Census Division, and State, 1995 Through 2004

Census Division and State	Total		Petroleum & Gas		Coal	
	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)
New England	**12**	**354**	**5**	**308**	—	—
Connecticut	—	—	—	—	—	—
Maine	5	43	—	—	—	—
Massachusetts	2	5	2	5	—	—
New Hampshire	—	—	—	—	—	—
Rhode Island	3	304	3	304	—	—
Vermont	2	2	—	—	—	—
Middle Atlantic	**29**	**1,574**	**9**	**1,468**	—	—
New Jersey	8	1,328	8	1,328	—	—
New York	20	106	—	—	—	—
Pennsylvania	1	140	1	140	—	—
East North Central	**73**	**5,626**	**63**	**5,421**	**2**	**182**
Illinois	18	1,506	14	1,499	—	—
Indiana	19	2,033	19	2,033	—	—
Michigan	2	3	2	3	—	—
Ohio	11	765	9	764	—	—
Wisconsin	23	1,319	19	1,122	2	182
West North Central	**44**	**2,205**	**43**	**2,201**	**1**	**4**
Iowa	9	92	9	92	—	—
Kansas	11	267	11	267	—	—
Minnesota	4	9	3	6	1	4
Missouri	16	1,561	16	1,561	—	—
Nebraska	4	275	4	275	—	—
North Dakota	—	—	—	—	—	—
South Dakota	—	—	—	—	—	—
South Atlantic	**134**	**16,757**	**124**	**13,745**	**6**	**2,155**
Delaware	—	—	—	—	—	—
District of Columbia	—	—	—	—	—	—
Florida	24	3,140	22	2,452	2	688
Georgia	29	3,894	26	3,037	—	—
Maryland	22	2,254	21	1,954	1	300
North Carolina	31	3,701	31	3,701	—	—
South Carolina	8	1,039	7	654	1	385
Virginia	20	2,729	17	1,946	2	782
West Virginia	—	—	—	—	—	—
East South Central	**44**	**4,535**	**40**	**3,298**	—	—
Alabama	22	1,561	22	1,561	—	—
Kentucky	16	1,377	13	1,311	—	—
Mississippi	5	427	5	427	—	—
Tennessee	1	1,170	—	—	—	—
West South Central	**55**	**7,528**	**47**	**5,875**	**2**	**1,250**
Arkansas	3	103	—	—	—	—
Louisiana	1	96	1	96	—	—
Oklahoma	4	484	4	484	—	—
Texas	47	6,846	42	5,296	2	1,250
Mountain	**45**	**3,491**	**21**	**1,449**	**5**	**1,795**
Arizona	6	830	5	470	1	360
Colorado	2	539	—	—	1	515
Idaho	3	60	—	—	—	—
Montana	8	157	—	—	—	—
Nevada	14	1,812	12	972	2	840
New Mexico	—	—	—	—	—	—
Utah	11	13	4	7	—	—
Wyoming	1	80	—	—	1	80
Pacific Contiguous	**35**	**709**	**12**	**563**	—	—
California	20	340	9	277	—	—
Oregon	2	217	2	217	—	—
Washington	13	153	1	70	—	—
Pacific Noncontiguous	**16**	**157**	**14**	**156**	—	—
Alaska	3	1	1	*	—	—
Hawaii	13	156	13	156	—	—
U.S. Total	**487**	**42,936**	**378**	**34,486**	**16**	**5,386**

See notes and footnotes at end of table.

Table 10. Planned Capability Additions at U.S. Electric Utilities by Energy Source, Census Division, and State, 1995 Through 2004 (Continued)

Census Division and State	Nuclear		Hydroelectric		Renewable [2]	
	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)	Number of Generators	Capability [1] (megawatts)
New England	**0**	**0**	**7**	**45**	**0**	**0**
Connecticut	0	0	0	0	0	0
Maine	0	0	5	43	0	0
Massachusetts	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0
Rhode Island	0	0	0	0	0	0
Vermont	0	0	2	2	0	0
Middle Atlantic	**0**	**0**	**20**	**106**	**0**	**0**
New Jersey	0	0	0	0	0	0
New York	0	0	20	106	0	0
Pennsylvania	0	0	0	0	0	0
East North Central	**0**	**0**	**6**	**9**	**2**	**14**
Illinois	0	0	4	7	0	0
Indiana	0	0	0	0	0	0
Michigan	0	0	0	0	0	0
Ohio	0	0	2	2	0	0
Wisconsin	0	0	0	0	2	14
West North Central	**0**	**0**	**0**	**0**	**0**	**0**
Iowa	0	0	0	0	0	0
Kansas	0	0	0	0	0	0
Minnesota	0	0	0	0	0	0
Missouri	0	0	0	0	0	0
Nebraska	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0
South Atlantic	**0**	**0**	**4**	**857**	**0**	**0**
Delaware	0	0	0	0	0	0
District of Columbia	0	0	0	0	0	0
Florida	0	0	0	0	0	0
Georgia	0	0	3	856	0	0
Maryland	0	0	0	0	0	0
North Carolina	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0
Virginia	0	0	1	1	0	0
West Virginia	0	0	0	0	0	0
East South Central	**1**	**1,170**	**3**	**67**	**0**	**0**
Alabama	0	0	0	0	0	0
Kentucky	0	0	3	67	0	0
Mississippi	0	0	0	0	0	0
Tennessee	1	1,170	0	0	0	0
West South Central	**0**	**0**	**3**	**103**	**3**	**300**
Arkansas	0	0	3	103	0	0
Louisiana	0	0	0	0	0	0
Oklahoma	0	0	0	0	0	0
Texas	0	0	0	0	3	300
Mountain	**0**	**0**	**19**	**247**	**0**	**0**
Arizona	0	0	0	0	0	0
Colorado	0	0	1	24	0	0
Idaho	0	0	3	60	0	0
Montana	0	0	8	157	0	0
Nevada	0	0	0	0	0	0
New Mexico	0	0	0	0	0	0
Utah	0	0	7	7	0	0
Wyoming	0	0	0	0	0	0
Pacific Contiguous	**0**	**0**	**23**	**146**	**0**	**0**
California	0	0	11	63	0	0
Oregon	0	0	0	0	0	0
Washington	0	0	12	83	0	0
Pacific Noncontiguous	**0**	**0**	**2**	**1**	**0**	**0**
Alaska	0	0	2	1	0	0
Hawaii	0	0	0	0	0	0
U.S. Total	**1**	**1,170**	**87**	**1,581**	**5**	**314**

[1] Net summer capability.
[2] Includes geothermal, biomass, wind, solar thermal, and photovoltaic (excludes hydroelectric).
Notes: •Data are preliminary. •Totals may not equal sum of components because of independent rounding. •Waste heat, waste gases, and waste steam are included in the original primary energy source category (i.e., coal, petroleum, or gas).
Source: Energy Information Administration, Form EIA-860, ''Annual Electric Generator Report.''

Net Generation from U.S. Electric Utilities

This chapter provides summary statistics on the amount of electricity produced by electric utilities in the United States. The different energy sources used by electric utilities to produce electric power are also discussed in this chapter.

The production of electricity is generally referred to as generation and is measured in kilowatthours. Gross generation is the amount of power produced by an electric power plant (station), measured at the terminals of the plant (that is, prior to the point at which the power leaves the station and is available to the system). Some of the electric power generated at a power plant is used to operate equipment at the plant. Power used at the plant generally ranges between 1 percent (for hydroelectric units) and 7 percent (for steam-electric units). Net generation is the power available to the system (gross generation less use at the plant); however, it is greater than that available to consumers due to losses during transmission and distribution (approximately 8 percent to 9 percent). Net generation is the measure used for electric power production by electric utilities in this report.

Generation from Fossil Fuels

Coal. Historically, most generation of electricity in the United States has been from coal. Coal-fired generation became even more important following the Arab oil embargo of 1973 due to concerns over the availability of petroleum imports, increasing petroleum costs, and curtailments of natural gas. In 1978, the passage of the Powerplant and Industrial Fuel Use Act and the Natural Gas Policy Act encouraged further use of coal by electric utilities. Although both Federal and State environmental laws and regulations existed during the 1970's, renewed interest in environmental issues raised concerns about electric power plant emissions, particularly from those plants burning coal. The Clean Air Act Amendments of 1990 established a goal of a 10-million-ton reduction in sulfur dioxide emissions and a 2-million-ton reduction in nitrogen oxide emissions by 2000 from 1980 levels (see the chapter on Environmental Statistics). Coal-fired generation continues to provide more than one-half the total net generation of electricity by electric utilities in the Nation. Most of the electricity production from coal by electric utilities occurs in the East North Central and South Atlantic Census Divisions where substantial amounts of coal are mined.

Petroleum. During the early 1970's, electric utilities used petroleum extensively to generate electricity. However, after the 1973 embargo by the Organization of Petroleum Exporting Countries (OPEC) on petroleum exports to the United States, petroleum prices rose sharply. Further price increases occurred in 1979 and 1980 following the Iranian revolution and subsequent reductions in Iranian petroleum exports. Consequently during the past decade, utilities have not built large, petroleum-fired steam units. In addition, many utilities have either converted steam units to coal or switched fuels where dual-fired capability exists. Most of the utilities that still rely heavily on petroleum to generate electricity are located along the eastern seaboard and in California.

Gas. The demand for gas (primarily natural gas) to heat homes and serve business and industry has historically taken priority over demand from electric utilities under both Federal and State regulations. In the 1970's, many utilities were on occasion denied gas when available pipelines reached capacity in serving heating demand during the months from November to March (the peak heating season). By the middle 1970's, curtailments to electric utilities also occasionally occurred during the nonheating season as producers conserved supply in preparation for heating season demand. In the face of an attractive interstate price structure, but deprived of supplies during many months of the year, utilities in the 1970's used relatively less expensive gas when it was available, then switched to other more expensive fuels when gas supplies were curtailed. Gas became more available to utilities with the passage of the Natural Gas Policy Act of 1978 and more frequent exemptions from the gas-use restrictions of the Powerplant and Industrial Fuel Use Act (Fuel Use Act) of 1978. Amendments to the Fuel Use Act in 1987 created potential for additional use of gas. These amendments eased restrictions on the use of gas by removing a legal requirement to obtain an exemption for the construction of new gas-fired generating capability. The West South Central Census Division, where most of the gas production in the Nation occurs, supplies more than half of the gas-fired generation in the country.

Nuclear-Powered Generation

Generation from nuclear power has generally increased since the 1950's, and this trend continues. Since 1984, nuclear plants have provided the second largest share of total U.S. generation of electricity, after coal-fired plants. Although no new nuclear units have been ordered since 1978 and units ordered after 1974 were not built, many units that were under construction have either been completed and entered service or will enter service in the near future. Licensing delays, questions about radioactive waste disposal, and concern about nuclear plant safety have

slowed these units from entering service and are still major obstacles to additional growth in the use of this energy source for generating electricity. Most of the nuclear-powered generation comes from the Middle Atlantic, East North Central, and South Atlantic Census Divisions (where over 60 percent of the nuclear units in the country are located).

Generation from Renewable Fuels

Hydroelectric. Water is currently the leading renewable energy source used by electric utilities to generate electric power. Hydroelectric plants operate where suitable waterways are available; many of the best of these sites have already been developed. Generating electricity using water has several advantages. The major advantage is that water, a renewable resource, is a source of cheap power. In addition, because there is no fuel combustion, there is little air pollution in comparison with fossil fuel plants and limited thermal pollution compared with nuclear plants. Like other energy sources, the use of water for generation has limitations, including environmental impacts caused by damming rivers and streams, which affects the habitats of the local plant, fish, and animal life. Over 60 percent of the hydroelectric power in the United States is generated in the Pacific and Rocky Mountain States.

Other Sources. Other renewable resources--geothermal (heat energy beneath the surface of the earth), wood, waste, wind, and the sun (solar)--are energy sources that are constantly replenished. These energy sources have received increased attention in recent years, but a limited number of such generating facilities are in use today. Currently, renewable resources (other than water) supply less than 1 percent of the electricity generated by electric utilities. Most of the electricity produced from this category is from geothermal power. Electric utilities currently operate geothermal plants in two States (California and Utah). The Geysers, operated by the Pacific Gas and Electric Company, is the largest geothermal plant in the Nation. Only a few utilities operate units that produce electricity from wind and solar energy. Wood and waste resources can be used to replace fossil fuels in utility boilers. To date, just a few electric generating units have been built that use wood or waste products as a primary fuel.

Data Sources

The data in the following tables are aggregated at national, regional, and State levels for the period 1990 through 1994. Data in the tables were obtained from the Form EIA-759, "Monthly Power Plant Report," which is used to collect monthly data from all operators of electric utilities (approximately 715) in the United States. More detailed statistics from the Form EIA-759 are published in the *Electric Power Monthly*.[15]

Table 11. Net Generation from U.S. Electric Utilities by Energy Source, 1990 through 1994

(Million Kilowatthours)

Energy Source	1990	1991	1992	1993	1994
Coal	**1,559,606**	**1,551,167**	**1,575,895**	**1,639,151**	**1,635,493**
Petroleum [1]	**117,017**	**111,463**	**88,916**	**99,539**	**91,039**
Steam	113,402	108,176	86,046	96,070	86,469
Gas Turbine/Internal Combustion	3,615	3,287	2,871	3,469	4,570
Gas	**264,089**	**264,172**	**263,872**	**258,915**	**291,115**
Steam	245,901	245,880	245,612	237,345	259,554
Gas Turbine/Internal Combustion	18,189	18,291	18,260	21,570	31,560
Hydroelectric Pumped Storage [2]	**–3,508**	**–4,541**	**–4,177**	**–4,036**	**–3,378**
Nuclear	**576,862**	**612,565**	**618,776**	**610,291**	**640,440**
Renewable					
Hydroelectic (conventional)	283,434	280,061	243,736	269,098	247,071
Geothermal	8,581	8,087	8,104	7,571	6,941
Wind	*	*	*	*	*
Biomass [3]	2,067	2,046	2,093	1,990	1,988
Solar Thermal	—	—	—	—	—
Photovoltaic	2	3	3	4	3
U.S. Total	**2,808,151**	**2,825,023**	**2,797,219**	**2,882,525**	**2,910,712**

[1] Includes petroleum coke.

[2] Negative generation denotes that electric power consumed for plant use exceeds gross generation.

[3] Includes wood, wood waste, peat, wood liquors, railroad ties, pitch, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oils, and/or other waste.

* =Value less than 0.5.

Notes: •Data are final. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-759, ''Monthly Power Plant Report.''

[15] Energy Information Administration, *Electric Power Monthly*, DOE/EIA-0226.

Table 12. Net Generation from U.S. Electric Utilities by Selected Prime Mover, Census Division, and State, 1993 and 1994

(Million Kilowatthours)

Census Division State	Total		Fossil Steam		Gas Turbine/Internal Combustion	
	1993	1994	1993	1994	1993	1994
New England	**83,895**	**80,934**	**34,898**	**34,639**	**467**	**489**
Connecticut	28,715	27,201	6,152	6,176	10	14
Maine	8,076	9,016	759	700	2	1
Massachusetts	28,164	27,466	23,385	23,050	441	457
New Hampshire	14,586	11,888	4,537	4,648	*	1
Rhode Island	54	69	45	58	9	11
Vermont	4,301	5,294	21	6	4	5
Middle Atlantic	**306,800**	**304,724**	**166,080**	**156,831**	**1,566**	**2,769**
New Jersey	34,285	31,932	8,516	8,703	960	1,266
New York	106,315	103,763	51,943	48,069	481	1,252
Pennsylvania	166,201	169,029	105,622	100,059	124	251
East North Central	**513,781**	**503,410**	**381,023**	**389,816**	**372**	**780**
Illinois	140,081	137,746	61,630	64,932	38	114
Indiana	99,951	103,485	99,410	102,926	93	152
Michigan	92,250	83,721	62,765	68,758	94	94
Ohio	133,735	129,021	123,377	117,640	101	240
Wisconsin	47,763	49,437	33,842	35,561	46	180
West North Central	**218,360**	**230,624**	**169,309**	**176,239**	**615**	**690**
Iowa	30,992	31,964	26,899	26,665	101	110
Kansas	36,433	37,284	28,251	28,450	282	305
Minnesota	41,254	40,917	28,002	27,400	19	48
Missouri	53,202	61,519	41,559	49,521	151	141
Nebraska	22,724	21,946	14,863	14,220	49	59
North Dakota	28,500	29,004	27,084	27,146	1	1
South Dakota	5,256	7,991	2,650	2,837	14	26
South Atlantic	**575,390**	**589,168**	**395,930**	**391,402**	**6,087**	**12,895**
Delaware	8,306	8,501	7,409	6,717	898	1,784
District of Columbia	188	274	185	255	4	19
Florida	140,067	141,791	111,843	106,911	2,126	7,923
Georgia	95,738	98,753	63,628	64,881	124	88
Maryland	43,488	43,766	29,075	29,892	455	629
North Carolina	88,754	91,455	59,567	53,387	221	116
South Carolina	75,588	74,194	26,630	27,299	118	82
Virginia	52,182	52,732	26,878	24,721	2,142	2,254
West Virginia	71,078	77,703	70,716	77,340	*	*
East South Central	**273,970**	**280,344**	**223,337**	**211,112**	**1,018**	**1,364**
Alabama	94,124	95,171	67,126	63,185	140	77
Kentucky	84,998	84,097	81,838	80,055	5	29
Mississippi	23,234	26,222	14,722	15,616	609	991
Tennessee	71,614	74,854	59,651	52,256	264	267
West South Central	**394,387**	**400,239**	**337,058**	**330,628**	**6,116**	**6,402**
Arkansas	38,049	39,548	20,010	22,153	10	9
Louisiana	59,353	60,170	44,288	46,701	666	690
Oklahoma	48,811	45,381	41,702	39,946	2,812	2,970
Texas	248,174	255,141	231,058	221,828	2,628	2,733
Mountain	**254,983**	**263,866**	**199,876**	**209,720**	**1,518**	**2,436**
Arizona	68,025	71,204	37,934	39,226	1,020	1,137
Colorado	32,687	33,324	30,790	31,742	40	42
Idaho	9,023	7,303	—	—	*	*
Montana	23,447	24,705	13,808	16,556	12	11
Nevada	19,820	20,519	17,582	17,663	278	991
New Mexico	28,364	30,018	28,037	29,663	33	142
Utah	33,461	34,455	32,359	33,431	136	113
Wyoming	40,155	42,337	39,367	41,440	0	0
Pacific Contiguous	**250,296**	**246,587**	**59,331**	**75,406**	**3,656**	**4,573**
California	125,782	126,749	47,011	61,781	1,495	1,612
Oregon	40,743	37,490	3,508	3,819	1,715	2,755
Washington	83,771	82,348	8,812	9,806	446	206
Pacific Noncontiguous	**10,665**	**10,817**	**5,724**	**5,721**	**3,624**	**3,732**
Alaska	4,581	4,762	756	839	2,522	2,577
Hawaii	6,084	6,055	4,968	4,882	1,102	1,154
U.S. Total	**2,882,525**	**2,910,712**	**1,972,566**	**1,981,516**	**25,039**	**36,130**

* =Value less than 0.5 million kilowatthours.

Notes: •Data are final. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-759, ''Monthly Power Plant Report.''

Table 13. Net Generation from U.S. Electric Utilities by Energy Source, Census Division, and State, 1993 and 1994

(Million Kilowatthours)

Census Division State	Coal		Petroleum [1]		Gas	
	1993	1994	1993	1994	1993	1994
New England	**14,987**	**15,495**	**17,375**	**15,009**	**3,002**	**4,624**
Connecticut	1,908	2,104	4,206	3,354	47	732
Maine	—	—	760	702	—	—
Massachusetts	9,816	10,210	11,113	9,561	2,897	3,736
New Hampshire	3,263	3,182	1,263	1,353	12	115
Rhode Island	—	—	29	34	25	35
Vermont	—	—	5	6	21	6
Middle Atlantic	**127,676**	**119,457**	**20,027**	**17,837**	**19,943**	**22,306**
New Jersey	5,466	4,647	1,029	1,656	2,981	3,666
New York	21,820	20,859	14,439	10,998	16,166	17,464
Pennsylvania	100,390	93,952	4,559	5,182	797	1,176
East North Central	**376,682**	**383,432**	**1,918**	**2,617**	**2,794**	**4,547**
Illinois	59,765	61,214	719	1,208	1,184	2,624
Indiana	98,776	102,043	198	209	529	826
Michigan	61,559	67,539	620	656	680	657
Ohio	123,025	117,354	276	372	177	153
Wisconsin	33,558	35,283	105	172	224	287
West North Central	**165,672**	**171,915**	**1,458**	**1,575**	**2,794**	**3,439**
Iowa	26,643	26,498	50	78	308	199
Kansas	26,800	26,489	76	83	1,657	2,183
Minnesota	27,111	26,400	630	597	279	452
Missouri	40,689	48,593	634	731	386	338
Nebraska	14,740	14,002	19	18	153	259
North Dakota	27,049	27,100	36	47	*	*
South Dakota	2,642	2,833	12	21	11	8
South Atlantic	**336,390**	**335,386**	**43,381**	**42,452**	**22,246**	**26,459**
Delaware	5,185	4,754	2,094	1,620	1,027	2,127
District of Columbia	—	—	188	274	—	—
Florida	61,889	60,770	34,278	33,330	17,803	20,734
Georgia	63,296	64,728	237	161	218	80
Maryland	24,891	25,394	3,954	4,134	685	993
North Carolina	59,383	53,234	165	199	240	69
South Carolina	26,532	26,994	95	108	121	279
Virginia	24,722	22,449	2,158	2,374	2,140	2,152
West Virginia	70,492	77,063	211	251	13	25
East South Central	**216,860**	**203,688**	**3,949**	**1,678**	**3,546**	**7,111**
Alabama	66,758	62,768	72	121	436	373
Kentucky	81,722	79,897	97	155	24	31
Mississippi	8,820	8,890	3,545	1,106	2,966	6,612
Tennessee	59,560	52,132	235	296	121	95
West South Central	**194,648**	**190,028**	**2,370**	**1,097**	**146,156**	**145,906**
Arkansas	18,026	19,781	66	96	1,928	2,285
Louisiana	19,366	20,125	1,838	680	23,751	26,586
Oklahoma	28,990	27,454	14	11	15,510	15,451
Texas	128,266	122,668	453	310	104,967	101,584
Mountain	**193,607**	**202,183**	**461**	**422**	**7,327**	**9,551**
Arizona	37,021	38,072	60	128	1,872	2,162
Colorado	30,456	31,401	9	9	364	374
Idaho	—	—	*	*	—	—
Montana	13,775	16,488	21	18	24	61
Nevada	15,628	15,325	247	166	1,986	3,162
New Mexico	25,507	26,752	35	23	2,528	3,030
Utah	31,919	32,764	32	30	543	750
Wyoming	39,301	41,380	57	47	9	13
Pacific Contiguous	**12,307**	**13,614**	**2,072**	**1,874**	**48,609**	**64,491**
California	—	—	2,008	1,863	46,499	61,530
Oregon	3,503	3,814	32	5	1,687	2,755
Washington	8,804	9,800	32	6	422	206
Pacific Noncontiguous	**323**	**295**	**6,529**	**6,477**	**2,497**	**2,681**
Alaska	323	295	459	441	2,497	2,681
Hawaii	—	—	6,070	6,036	—	—
U.S. Total	**1,639,151**	**1,635,493**	**99,539**	**91,039**	**258,915**	**291,115**

See notes and footnotes at end of table.

Table 13. Net Generation from U.S. Electric Utilities by Energy Source, Census Division, and State, 1993 and 1994 (Continued)

(Million Kilowatthours)

Census Division State	Nuclear		Hydroelectric [2]		Renewable [3]	
	1993	1994	1993	1994	1993	1994
New England	**44,299**	**41,170**	**3,760**	**4,125**	**471**	**511**
Connecticut	21,802	20,160	345	412	406	439
Maine	5,740	6,632	1,576	1,682	—	—
Massachusetts	4,339	3,859	–1	100	—	—
New Hampshire	9,047	6,204	1,002	1,036	—	—
Rhode Island	—	—	0	0	—	—
Vermont	3,372	4,316	839	895	64	72
Middle Atlantic	**111,152**	**118,568**	**27,989**	**26,545**	**13**	**11**
New Jersey	24,932	22,129	–123	–167	—	—
New York	26,889	29,231	26,988	25,200	13	11
Pennsylvania	59,331	67,207	1,124	1,512	—	—
East North Central	**128,374**	**109,267**	**3,728**	**3,280**	**284**	**265**
Illinois	78,373	72,654	40	45	0	—
Indiana	—	—	448	407	—	—
Michigan	28,525	14,144	866	725	—	—
Ohio	10,011	10,952	183	189	64	—
Wisconsin	11,465	11,516	2,191	1,914	220	265
West North Central	**38,307**	**41,212**	**9,689**	**12,025**	**440**	**458**
Iowa	3,235	4,107	737	1,053	20	28
Kansas	7,900	8,529	—	—	*	*
Minnesota	11,986	12,224	834	831	414	414
Missouri	8,381	10,006	3,110	1,844	1	7
Nebraska	6,805	6,345	1,002	1,312	6	9
North Dakota	—	—	1,415	1,856	—	—
South Dakota	—	—	2,591	5,129	—	—
South Atlantic	**158,058**	**169,086**	**15,315**	**15,785**	*****	*****
Delaware	—	—	—	—	—	—
District of Columbia	—	—	—	—	—	—
Florida	25,887	26,682	211	274	—	—
Georgia	27,233	28,927	4,753	4,857	—	—
Maryland	12,301	11,235	1,658	2,010	—	—
North Carolina	23,759	32,346	5,207	5,606	—	—
South Carolina	46,189	44,466	2,651	2,347	—	—
Virginia	22,689	25,429	473	329	*	*
West Virginia	—	—	362	363	—	—
East South Central	**29,032**	**42,027**	**20,583**	**25,841**	—	—
Alabama	17,823	20,480	9,034	11,429	—	—
Kentucky	—	—	3,155	4,014	—	—
Mississippi	7,904	9,615	—	—	—	—
Tennessee	3,305	11,932	8,394	10,399	—	—
West South Central	**40,327**	**55,448**	**10,591**	**7,457**	**295**	**303**
Arkansas	13,522	13,924	4,508	3,462	—	—
Louisiana	14,398	12,779	—	—	—	—
Oklahoma	—	—	4,296	2,465	—	—
Texas	12,407	28,745	1,786	1,530	295	303
Mountain	**22,049**	**23,171**	**31,312**	**28,302**	**226**	**237**
Arizona	22,049	23,171	7,023	7,670	—	—
Colorado	—	—	1,858	1,540	0	0
Idaho	—	—	9,023	7,303	—	—
Montana	—	—	9,549	8,096	78	42
Nevada	—	—	1,960	1,866	—	—
New Mexico	—	—	294	213	—	—
Utah	—	—	818	716	148	195
Wyoming	—	—	787	897	—	—
Pacific Contiguous	**38,694**	**40,492**	**140,778**	**118,968**	**7,836**	**7,147**
California	31,581	33,752	38,264	22,852	7,430	6,752
Oregon	–21	—	35,531	30,916	11	0
Washington	7,135	6,740	66,983	65,200	395	396
Pacific Noncontiguous	—	—	**1,317**	**1,364**	**0**	**0**
Alaska	—	—	1,303	1,345	0	0
Hawaii	—	—	14	19	—	—
U.S. Total	**610,291**	**640,440**	**265,063**	**243,693**	**9,565**	**8,933**

[1] Includes petroleum coke.

[2] Station losses include energy used for pumped storage. Energy used in 1994 for pumping was 24,769 million kilowatthours and in 1993 was 23,599 million kilowatthours.

[3] Includes geothermal, biomass, wind, solar thermal, and photovoltaic (excludes hydroelectric).

* =Value less than 0.5 million kilowatthours.

Notes: •Data are final. •Negative generation denotes that electric power consumed for plant use exceeds gross generation. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-759, ''Monthly Power Plant Report.''

Table 14. Petroleum-Fired Net Generation from U.S. Electric Utilities by Selected Prime Mover, Census Division, and State, 1993 and 1994

(Million Kilowatthours)

Census Division State	Total [1]		Steam		Gas Turbine/Internal Combustion	
	1993	1994	1993	1994	1993	1994
New England	**17,375**	**15,009**	**17,179**	**14,721**	**197**	**288**
Connecticut	4,206	3,354	4,197	3,340	10	14
Maine	760	702	759	700	2	1
Massachusetts	11,113	9,561	10,941	9,305	171	256
New Hampshire	1,263	1,353	1,262	1,352	*	1
Rhode Island	29	34	20	23	9	11
Vermont	5	6	*	*	4	5
Middle Atlantic	**20,027**	**17,837**	**19,643**	**17,076**	**384**	**761**
New Jersey	1,029	1,656	906	1,431	123	225
New York	14,439	10,998	14,267	10,676	171	322
Pennsylvania	4,559	5,182	4,469	4,969	90	213
East North Central	**1,918**	**2,617**	**1,819**	**2,313**	**99**	**304**
Illinois	719	1,208	701	1,146	18	62
Indiana	198	209	177	187	20	23
Michigan	620	656	602	623	17	33
Ohio	276	372	248	239	28	133
Wisconsin	105	172	90	119	15	53
West North Central	**1,458**	**1,575**	**1,345**	**1,433**	**113**	**142**
Iowa	50	78	29	40	21	38
Kansas	76	83	53	63	24	20
Minnesota	630	597	620	581	11	16
Missouri	634	731	587	691	47	39
Nebraska	19	18	15	8	4	10
North Dakota	36	47	35	46	1	1
South Dakota	12	21	6	3	6	18
South Atlantic	**43,381**	**42,452**	**42,542**	**41,276**	**839**	**1,176**
Delaware	2,094	1,620	2,080	1,544	14	75
District of Columbia	188	274	185	255	4	19
Florida	34,278	33,330	33,770	32,885	507	445
Georgia	237	161	144	91	94	70
Maryland	3,954	4,134	3,835	3,838	119	295
North Carolina	165	199	130	139	35	60
South Carolina	95	108	73	58	23	50
Virginia	2,158	2,374	2,114	2,214	43	160
West Virginia	211	251	211	251	*	*
East South Central	**3,949**	**1,678**	**3,799**	**1,450**	**150**	**227**
Alabama	72	121	67	92	5	29
Kentucky	97	155	94	130	2	25
Mississippi	3,545	1,106	3,546	1,105	*	1
Tennessee	235	296	92	124	143	172
West South Central	**2,370**	**1,097**	**2,348**	**1,079**	**22**	**18**
Arkansas	66	96	56	88	10	9
Louisiana	1,838	680	1,837	679	1	1
Oklahoma	14	11	13	11	1	1
Texas	453	310	443	302	10	7
Mountain	**461**	**422**	**452**	**407**	**9**	**16**
Arizona	60	128	56	126	3	2
Colorado	9	9	9	9	*	*
Idaho	*	*	—	—	*	*
Montana	21	18	21	18	*	*
Nevada	247	166	244	157	2	10
New Mexico	35	23	35	22	*	1
Utah	32	30	29	27	3	3
Wyoming	57	47	57	47	0	0
Pacific Contiguous	**2,072**	**1,874**	**1,975**	**1,830**	**97**	**44**
California	2,008	1,863	1,963	1,820	44	43
Oregon	32	5	5	5	28	*
Washington	32	6	7	5	25	1
Pacific Noncontiguous	**6,529**	**6,477**	**4,969**	**4,883**	**1,560**	**1,594**
Alaska	459	441	1	1	458	440
Hawaii	6,070	6,036	4,968	4,882	1,102	1,154
U.S. Total	**99,539**	**91,039**	**96,070**	**86,469**	**3,469**	**4,570**

[1] Includes petroleum coke.

* =Value less than 0.5 million kilowatthours.

Notes: •Data are final. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-759, ''Monthly Power Plant Report.''

Table 15. Gas-Fired Net Generation from U.S. Electric Utilities by Selected Prime Mover, Census Division, and State, 1993 and 1994

(Million Kilowatthours)

Census Division State	Total		Steam		Gas Turbine/Internal Combustion	
	1993	1994	1993	1994	1993	1994
New England	**3,002**	**4,624**	**2,732**	**4,423**	**270**	**201**
Connecticut	47	732	47	732	—	—
Maine	—	—	—	—	—	—
Massachusetts	2,897	3,736	2,627	3,535	270	201
New Hampshire	12	115	12	114	0	*
Rhode Island	25	35	25	35	—	—
Vermont	21	6	21	6	—	—
Middle Atlantic	**19,943**	**22,306**	**18,762**	**20,298**	**1,182**	**2,008**
New Jersey	2,981	3,666	2,144	2,626	838	1,041
New York	16,166	17,464	15,855	16,534	310	930
Pennsylvania	797	1,176	763	1,138	34	38
East North Central	**2,794**	**4,547**	**2,522**	**4,071**	**273**	**477**
Illinois	1,184	2,624	1,164	2,573	20	52
Indiana	529	826	456	697	73	130
Michigan	680	657	603	596	77	61
Ohio	177	153	104	46	73	107
Wisconsin	224	287	194	160	30	127
West North Central	**2,794**	**3,439**	**2,291**	**2,892**	**503**	**548**
Iowa	308	199	228	127	80	72
Kansas	1,657	2,183	1,399	1,898	258	286
Minnesota	279	452	271	420	8	32
Missouri	386	338	283	237	104	101
Nebraska	153	259	108	210	45	49
North Dakota	*	*	*	*	*	*
South Dakota	11	8	2	*	8	8
South Atlantic	**22,246**	**26,459**	**16,998**	**14,740**	**5,248**	**11,719**
Delaware	1,027	2,127	143	419	883	1,708
District of Columbia	—	—	—	—	—	—
Florida	17,803	20,734	16,184	13,257	1,619	7,478
Georgia	218	80	188	62	30	18
Maryland	685	993	349	659	336	333
North Carolina	240	69	54	13	186	56
South Carolina	121	279	25	247	96	32
Virginia	2,140	2,152	41	58	2,098	2,094
West Virginia	13	25	13	25	—	—
East South Central	**3,546**	**7,111**	**2,678**	**5,974**	**868**	**1,136**
Alabama	436	373	301	325	135	48
Kentucky	24	31	21	27	2	4
Mississippi	2,966	6,612	2,357	5,622	609	990
Tennessee	121	95	0	0	121	95
West South Central	**146,156**	**145,906**	**140,062**	**139,521**	**6,094**	**6,384**
Arkansas	1,928	2,285	1,928	2,285	*	*
Louisiana	23,751	26,586	23,085	25,897	665	689
Oklahoma	15,510	15,451	12,700	12,481	2,811	2,970
Texas	104,967	101,584	102,349	98,858	2,618	2,725
Mountain	**7,327**	**9,551**	**5,817**	**7,130**	**1,510**	**2,421**
Arizona	1,872	2,162	856	1,028	1,016	1,134
Colorado	364	374	324	331	40	42
Idaho	—	—	—	—	—	—
Montana	24	61	13	50	11	11
Nevada	1,986	3,162	1,710	2,181	276	981
New Mexico	2,528	3,030	2,495	2,888	33	142
Utah	543	750	410	639	133	111
Wyoming	9	13	9	13	—	—
Pacific Contiguous	**48,609**	**64,491**	**45,049**	**59,962**	**3,559**	**4,529**
California	46,499	61,530	45,048	59,961	1,451	1,569
Oregon	1,687	2,755	0	0	1,687	2,755
Washington	422	206	1	1	421	205
Pacific Noncontiguous	**2,497**	**2,681**	**433**	**544**	**2,064**	**2,137**
Alaska	2,497	2,681	433	544	2,064	2,137
Hawaii	—	—	—	—	—	—
U.S. Total	**258,915**	**291,115**	**237,345**	**259,554**	**21,570**	**31,560**

* =Value less than 0.5 million kilowatthours.

Notes: •Data are final. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-759, ''Monthly Power Plant Report.''

U.S. Electric Utility Fossil Fuel Statistics

This chapter contains statistics on consumption of fossil fuels by U.S. electric utilities to generate electricity, and end-of-year fossil fuel stocks for all U.S. electric utility plants. Statistics are also included for receipts and costs of fossil fuels at power plants with a steam-electric and combined-cycle nameplate capacity of 50 or more megawatts, approximately 86 percent of the total capability at U.S. electric utilities. These data are aggregated to national, Census division, and State levels.

Various sources of energy are used by electric utilities to produce electricity; however, fossil fuels supply about 70 percent of the energy sources for the generation requirements of the Nation. Coal, petroleum, and gas are currently the dominant fossil fuels used by the industry.[16] Statistics on consumption, purchases (receipts), and stocks of fossil fuels at electric utilities are interdependent. That is, the stocks on site at the utility at the end of the current year result from the stocks that were available at the end of the prior year, the amount of fuel purchased during the current year, and the amount of fuel consumed during the year.

Fossil Fuel Consumption and Stocks

Coal, the energy source used by electric utilities to generate more than one-half of the electricity needed in the Nation, is consumed extensively throughout the United States (particularly in the East North Central, West North Central, West South Central, and the South Atlantic Census Divisions). The use of petroleum for generation is not as common on a national level as during the early 1970's; however, some areas of the country (such as in the New England, Middle Atlantic, and South Atlantic Census Divisions) continue to use it extensively. Consumption of gas occurs mostly in areas of the country where it is readily accessible, particularly in the West South Central Census Division, and in dual-fired generator units, which use gas and petroleum as substitute fuels.

The purposes of on-site storage are to provide an uninterrupted supply, to allow bulk shipments, and to take advantage of favorable market conditions. Electric utilities maintain stockpiles of coal and petroleum to minimize the effect of an interruption or curtailment in fuel availability (for example, railroad strikes, coal-mine strikes, or oil embargoes). Since gas is generally not stored, there are no stocks of gas.

Fossil Fuel Receipts and Costs

Statistics on electric utility receipts provide information regarding the delivery of fossil fuels to steam-electric plants. The costs include all costs incurred by an electric utility in the purchase and delivery of fuel to the plant. The type of contract under which a fuel is purchased has a significant effect on the cost of the fuel delivered and can be used as a good indicator of market conditions. Transactions where petroleum and coal are obtained by the utility under purchase orders or contracts with a duration of 1 year or more are referred to as *contract purchases.* Shipments of petroleum and coal under purchase orders or contracts of less than 1-year duration are considered *spot purchases.* Transactions that are conducted under a contract with uninterrupted delivery to secure gas are identified as *firm purchases. Interruptible purchases* are those in which the gas is received under a contract that permits curtailment of service under certain circumstances. For example, under both Federal and State regulations, requirements for gas to heat homes and serve industry have priority over requirements of the electric power industry. Consequently, a contract under which gas is purchased is most generally one that allows for an interruption in its accessibility.

Coal. Coal is obtained from three major coal-producing areas in the United States. *Appalachian coal* is mined in both surface and underground mines located in Pennsylvania, Maryland, Virginia, West Virginia, eastern Kentucky, Tennessee, Alabama, and Ohio. This coal is bituminous in rank and of low-to-medium sulfur content. Its heat content in British Thermal Units (Btu) averages over 12,000 Btu per pound. The coal is transported primarily by train, barge, and truck to electric utility plants throughout the Eastern United States. *Interior coal* is mined in both surface and underground mines located primarily in Illinois, Indiana, western Kentucky, and Missouri. It is bituminous coal with a high percentage of sulfur and contains approximately 11,000 Btu per pound. Most of this coal is delivered to plants in the Central and Southeastern United States. *Western coal* is mined in Montana, Wyoming, Colorado, Utah, North Dakota, Arizona, and New Mexico. It is delivered to plants throughout the Western and Central United States. Over one-half of the coal in this region is subbituminous coal that is low in sulfur content (less than 0.5 percent) and contains approximately 9,000 Btu per pound. Most of this coal originates in the Powder River basin of northeast Wyoming and southeast Montana. Coal from this region is delivered by unit train to plants as far east as Indiana and Georgia.

[16] Other fossil fuels include petroleum coke, refinery gas, coke oven gas, blast furnace gas, and liquified petroleum gas.

The cost of coal delivered to electric utilities can vary significantly from State to State. Coal delivered to the New England Census Division from the Appalachian coal fields may cost as much as $60 per short ton due to transportation costs and the higher cost of producing eastern coal (generally in underground mines). Environmental restrictions within a State may require electric utilities to burn only the more expensive, low-sulfur coal resulting in a higher delivered cost. In the West, especially in the Mountain Census Division, coal-burning plants are often built close to the mine thus reducing transportation costs. In addition, the cost of mining coal from large surface mines located in the Western United States is significantly less than that of underground eastern mines, resulting in a delivered cost of under $15 per short ton for States such as Montana and Wyoming. The cost of coal delivered to electric utilities in States such as North Dakota, South Dakota, and Texas is well below the national average because of the lower cost of low-grade lignite.

Petroleum. Although nationwide receipts at electric utilities are less than one-half the volume of the 1970's, several electric utilities in the New England area, New York, Florida, and Hawaii still depend on petroleum for a significant portion of their fossil fuel requirements. Receipts can vary widely from year to year at electric utilities due to changes in the cost of petroleum. Fuel oil numbers 4, 5, and 6 (heavy oil) constitute the majority of all petroleum receipts at electric utilities. Smaller amounts of fuel oil number 2 (light oil) are also used by electric utilities primarily for start-up and flame stabilization of the boilers.

The cost of petroleum delivered to electric utilities varies considerably from State to State. The most important factor in determining cost is the type of fuel oil that is being delivered. States receiving only low-grade heavy oil will show a delivered cost much lower than a State receiving only light oil. Most of the petroleum delivered to the New England, Middle Atlantic, and South Atlantic Census Divisions, California, and Hawaii for use by electric utilities is the number 6 fuel oil. The cost of fuel oil can also vary because of its sulfur content. Electric utilities that are required to meet stringent environmental standards must purchase low-sulfur fuel oil at premium prices.

Gas. Gas is used extensively as a primary fuel throughout areas of the country where it is readily accessible (for example, the West South Central Census Division and in California). Large volumes of gas are also transported by pipeline to the Middle Atlantic and South Atlantic Census Divisions. Gas receipts in these Census divisions and in California can vary considerably from year to year because some electric utilities switch between use of petroleum and gas in dual-fired generating units. The highest volume of gas receipts at electric utilities occurs during the summer months when demand for electricity peaks and when there is a greater amount available to electric utilities because of lower demands from residential and commercial consumers. In some northern parts of the United States, receipts of gas at electric utilities are limited during the winter months due to the priority for residential heating and industry needs. Many electric utilities have the capability of burning either petroleum or gas. The cost of the fuel is usually the determining factor. One major advantage of gas over all other fossil fuels is that it is a clean burning fuel. Therefore, some electric utilities use gas in order to comply with environmental regulations.

Petroleum Coke. Petroleum coke is the final product or residue produced from the process of breaking down complex petroleum hydrocarbons into lighter petroleum products, such as gasoline. This process is known as *cracking.*

Data Sources

Data in the following tables were obtained from two sources. The first is the Form EIA-759, "Monthly Power Plant Report," which is used to collect monthly data from all operators of power plants (approximately 715) in the United States. More detailed statistics on stocks and consumption are published in the *Electric Power Monthly.*[17] The second source is the Federal Energy Regulatory Commission (FERC) Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants," which is a restricted census used to collect data from approximately 230 electric utilities. More detailed statistics on receipts and costs of fossil fuels are published in the *Cost and Quality of Fuels for Electric Utility Plants.*[18]

[17] Energy Information Administration, *Electric Power Monthly,* DOE/EIA-0226.
[18] Energy Information Administration, *Cost and Quality of Fuels for Electric Utility Plants* DOE/EIA-0191.

Caution should be used in comparing stocks, receipts, and consumption data since all operators of power plants are surveyed by the Form EIA-759, while the FERC Form 423 is limited to operators of power plants with a fossil-fueled steam-electric and combined-cycle nameplate capacity of 50 or more megawatts.

Table 16. Consumption of Fossil Fuels and Year-End Stocks of Coal and Petroleum at U.S. Electric Utilities, 1990 through 1994

Item	1990	1991	1992	1993	1994
Consumption					
Coal (thousand short tons)	773,549	772,268	779,860	813,508	817,270
Petroleum (thousand barrels) [1]	196,054	184,886	147,335	162,454	151,004
Gas (million cubic feet)	2,787,332	2,789,014	2,765,608	2,682,440	2,987,146
Stocks					
Coal (thousand short tons)	156,166	157,876	154,130	111,341	126,897
Petroleum (thousand barrels) [1]	83,501	74,993	71,849	62,443	62,986

[1] Does not include petroleum coke.
Notes: •Data are final. •Totals may not equal sum of components because of independent rounding.
Source: Energy Information Administration, Form EIA-759, ''Monthly Power Plant Report.''

Table 17. Receipts and Average Delivered Cost of Fossil Fuels at U.S. Electric Utilities, 1990 Through 1994

Item	1990	1991	1992	1993	1994
Receipts					
Coal (thousand short tons)	[1] 786,627	769,923	775,963	769,152	831,929
Petroleum (thousand barrels) [2]	209,350	169,625	144,390	147,901	142,940
Gas (million cubic feet)	[3] 2,490,979	2,630,818	2,637,678	2,574,523	2,863,904
Cost (dollars)					
Coal (per short ton)	**30.45**	**30.02**	**29.36**	**28.58**	**28.03**
Contract	30.74	30.55	29.89	28.93	28.53
Spot	29.11	27.02	26.64	27.19	26.26
Petroleum (per barrel) [2]	**21.28**	**16.09**	**16.15**	**15.42**	**15.70**
Contract	21.27	16.12	16.17	15.74	15.86
Spot	21.30	16.04	16.07	14.89	15.48
Gas (per thousand cubic feet)	**2.38**	**2.20**	**2.38**	**2.62**	**2.28**
Firm	2.27	2.19	2.37	2.59	2.33
Interruptible [4]	2.48	2.22	2.40	2.66	2.25

[1] Data for 1990 do not include approximately 3 million short tons of lignite delivered each year to Unit 4 of the Sandow Plant at the Texas Utilities Electric Company.
[2] Does not include petroleum coke.
[3] Data for 1990 do not include approximately 125 billion cubic feet of gas delivered each year to combined-cycle gas turbines.
[4] Includes spot-market purchases.
Notes: •Data are final. •As of 1992, data are for electric generating plants with a total steam-electric and combined-cycle nameplate capacity of 50 or more megawatts. •Data for 1990 are for steam-electric plants with a generator nameplate capacity of 50 or more megawatts. •Totals may not equal sum of components because of independent rounding.
Source: Federal Energy Regulatory Commission, FERC Form 423, ''Monthly Report of Cost and Quality of Fuels for Electric Plants.''

Table 18. Consumption of Fossil Fuels at U.S. Electric Utilities by Census Division and State, 1993 and 1994

Census Division State	Coal (thousand short tons)		Petroleum [1] (thousand barrels)		Gas (million cubic feet)	
	1993	1994	1993	1994	1993	1994
New England	**5,736**	**5,945**	**29,119**	**25,043**	**30,141**	**48,558**
Connecticut	745	821	7,032	5,689	557	8,002
Maine	—	—	1,392	1,294	—	—
Massachusetts	3,652	3,845	18,269	15,514	28,793	38,567
New Hampshire	1,339	1,279	2,338	2,442	136	1,277
Rhode Island	0	0	72	82	387	546
Vermont	—	—	17	23	268	166
Middle Atlantic	**51,079**	**48,326**	**33,695**	**30,773**	**215,737**	**237,862**
New Jersey	2,123	1,887	2,095	3,229	35,631	42,625
New York	8,699	8,395	23,998	18,664	171,803	182,521
Pennsylvania	40,257	38,044	7,603	8,880	8,304	12,716
East North Central	**179,833**	**183,282**	**4,591**	**5,547**	**46,394**	**68,371**
Illinois	31,744	32,599	2,122	2,611	16,022	34,505
Indiana	48,836	50,554	393	412	5,667	9,009
Michigan	28,749	31,106	1,388	1,433	18,898	18,218
Ohio	51,456	49,326	565	872	2,737	2,818
Wisconsin	19,049	19,696	123	220	3,070	3,821
West North Central	**107,584**	**111,672**	**912**	**923**	**36,803**	**43,374**
Iowa	16,623	16,565	122	183	4,303	2,696
Kansas	17,226	16,989	166	142	21,636	27,279
Minnesota	16,844	17,046	91	108	3,910	5,826
Missouri	21,945	26,375	390	282	4,891	4,351
Nebraska	9,297	8,879	42	45	1,876	3,061
North Dakota	23,290	23,248	69	112	1	3
South Dakota	2,360	2,570	32	50	186	159
South Atlantic	**132,885**	**133,984**	**70,609**	**69,722**	**219,499**	**235,179**
Delaware	2,223	2,007	3,397	2,727	8,665	17,399
District of Columbia	—	—	477	664	—	—
Florida	25,108	24,758	54,351	53,369	174,361	180,697
Georgia	25,339	27,293	506	358	3,026	1,028
Maryland	9,521	9,717	7,567	7,621	8,817	12,718
North Carolina	23,055	20,624	351	447	2,911	871
South Carolina	10,410	10,597	199	277	1,851	3,005
Virginia	9,447	8,670	3,402	3,837	19,735	19,219
West Virginia	27,782	30,318	357	423	133	243
East South Central	**90,365**	**85,622**	**6,294**	**2,789**	**46,335**	**87,745**
Alabama	27,533	25,817	130	220	4,636	3,834
Kentucky	35,264	34,564	214	317	269	350
Mississippi	3,767	3,989	5,538	1,733	39,900	82,541
Tennessee	23,801	21,253	413	519	1,531	1,019
West South Central	**134,009**	**131,168**	**1,427**	**1,198**	**1,491,347**	**1,504,407**
Arkansas	11,116	12,250	131	176	21,191	24,977
Louisiana	13,089	13,479	703	434	243,983	277,116
Oklahoma	17,668	16,961	27	25	153,666	153,109
Texas	92,135	88,479	566	563	1,072,506	1,049,205
Mountain	**104,093**	**108,651**	**852**	**765**	**81,032**	**102,719**
Arizona	18,316	18,853	110	224	20,480	23,716
Colorado	16,252	16,596	28	26	4,860	4,881
Idaho	—	—	*	*	—	—
Montana	8,869	10,513	48	42	270	632
Nevada	7,608	7,772	436	287	21,305	32,246
New Mexico	14,942	15,297	72	47	27,725	32,214
Utah	13,995	14,269	55	53	6,305	8,900
Wyoming	24,111	25,350	104	86	87	129
Pacific Contiguous	**7,627**	**8,349**	**3,454**	**2,982**	**487,127**	**629,883**
California	—	—	3,336	2,959	466,061	601,290
Oregon	1,981	2,333	56	11	16,167	26,132
Washington	5,646	6,016	62	12	4,899	2,461
Pacific Noncontiguous	**298**	**271**	**11,501**	**11,263**	**28,025**	**29,048**
Alaska	298	271	845	854	28,025	29,048
Hawaii	—	—	10,656	10,409	—	—
U.S. Total	**813,508**	**817,270**	**162,454**	**151,004**	**2,682,440**	**2,987,146**

[1] Does not include petroleum coke. Petroleum coke consumption in 1994 was 9,991 thousand short tons and in 1993 was 1,220 thousand short tons.

* =Value less than 0.5 thousand barrels or 0.5 million cubic feet.

Notes: •Data are final. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-759, ''Monthly Power Plant Report.''

Table 19. Petroleum Consumption at U.S. Electric Utilities by Selected Prime Mover, Census Division, and State, 1993 and 1994

(Thousand Barrels)

Census Division State	Total		Steam		Gas Turbine/Internal Combustion	
	1993	1994	1993	1994	1993	1994
New England	**29,119**	**25,043**	**28,690**	**24,454**	**430**	**589**
Connecticut	7,032	5,689	7,003	5,651	29	38
Maine	1,392	1,294	1,385	1,287	7	6
Massachusetts	18,269	15,514	17,909	15,005	360	510
New Hampshire	2,338	2,442	2,335	2,439	2	3
Rhode Island	72	82	55	65	18	16
Vermont	17	23	3	7	14	16
Middle Atlantic	**33,695**	**30,773**	**32,641**	**28,803**	**1,055**	**1,970**
New Jersey	2,095	3,229	1,766	2,656	329	573
New York	23,998	18,664	23,532	17,837	465	828
Pennsylvania	7,603	8,880	7,343	8,311	260	569
East North Central	**4,591**	**5,547**	**4,278**	**4,673**	**312**	**874**
Illinois	2,122	2,611	2,069	2,418	53	193
Indiana	393	412	342	349	51	63
Michigan	1,388	1,433	1,327	1,335	61	98
Ohio	565	872	471	506	94	366
Wisconsin	123	220	70	65	53	155
West North Central	**912**	**923**	**552**	**513**	**360**	**410**
Iowa	122	183	59	77	63	106
Kansas	166	142	111	94	55	48
Minnesota	91	108	43	49	48	59
Missouri	390	282	234	162	156	121
Nebraska	42	45	28	16	14	29
North Dakota	69	112	66	109	3	3
South Dakota	32	50	11	7	21	44
South Atlantic	**70,609**	**69,722**	**68,647**	**66,968**	**1,962**	**2,754**
Delaware	3,397	2,727	3,362	2,562	35	164
District of Columbia	477	664	460	603	18	62
Florida	54,351	53,369	53,234	52,366	1,117	1,003
Georgia	506	358	286	187	220	170
Maryland	7,567	7,621	7,289	6,962	279	659
North Carolina	351	447	219	241	132	206
South Carolina	199	277	125	107	75	170
Virginia	3,402	3,837	3,316	3,518	86	320
West Virginia	357	423	356	423	*	*
East South Central	**6,294**	**2,789**	**6,012**	**2,352**	**282**	**437**
Alabama	130	220	116	161	14	59
Kentucky	214	317	208	258	6	59
Mississippi	5,538	1,733	5,536	1,724	1	9
Tennessee	413	519	152	209	261	311
West South Central	**1,427**	**1,198**	**1,371**	**1,152**	**56**	**46**
Arkansas	131	176	107	153	24	23
Louisiana	703	434	699	429	4	4
Oklahoma	27	25	23	23	3	2
Texas	566	563	541	547	25	16
Mountain	**852**	**765**	**818**	**723**	**34**	**42**
Arizona	110	224	100	218	10	6
Colorado	28	26	23	22	5	4
Idaho	*	*	—	—	*	*
Montana	48	42	47	41	1	1
Nevada	436	287	424	265	12	22
New Mexico	72	47	71	45	1	2
Utah	55	53	48	47	6	6
Wyoming	104	86	104	86	0	0
Pacific Contiguous	**3,454**	**2,982**	**3,252**	**2,874**	**202**	**107**
California	3,336	2,959	3,227	2,855	109	104
Oregon	56	11	10	10	46	1
Washington	62	12	15	9	47	2
Pacific Noncontiguous	**11,501**	**11,263**	**8,644**	**8,394**	**2,857**	**2,869**
Alaska	845	854	2	3	843	851
Hawaii	10,656	10,409	8,642	8,391	2,014	2,018
U.S. Total	**162,454**	**151,004**	**154,905**	**140,907**	**7,549**	**10,097**

* =Value less than 0.5.

Notes: •Data are final. •Totals may not equal sum of components because of independent rounding. •Does not include petroleum coke. Petroleum coke consumption in 1994 was 9,991 thousand short tons and in 1993 was 1,220 thousand short tons.

Source: Energy Information Administration, Form EIA-759, ''Monthly Power Plant Report.''

Table 20. Gas Consumption at U.S. Electric Utilities by Selected Prime Mover, Census Division, and State, 1993 and 1994

(Million Cubic Feet)

Census Division State	Total		Steam		Gas Turbine/Internal Combustion	
	1993	1994	1993	1994	1993	1994
New England	**30,141**	**48,558**	**27,551**	**46,547**	**2,590**	**2,011**
Connecticut	557	8,002	557	8,002	—	—
Maine	—	—	—	—	—	—
Massachusetts	28,793	38,567	26,202	36,557	2,590	2,010
New Hampshire	136	1,277	136	1,275	0	1
Rhode Island	387	546	387	546	—	—
Vermont	268	166	268	166	—	—
Middle Atlantic	**215,737**	**237,862**	**199,931**	**215,485**	**15,806**	**22,377**
New Jersey	35,631	42,625	25,153	30,213	10,478	12,413
New York	171,803	182,521	166,947	173,043	4,855	9,477
Pennsylvania	8,304	12,716	7,831	12,229	473	487
East North Central	**46,394**	**68,371**	**42,299**	**61,150**	**4,095**	**7,221**
Illinois	16,022	34,505	15,690	33,595	332	910
Indiana	5,667	9,009	4,703	7,349	964	1,661
Michigan	18,898	18,218	17,934	17,430	964	788
Ohio	2,737	2,818	1,363	592	1,374	2,226
Wisconsin	3,070	3,821	2,609	2,185	461	1,636
West North Central	**36,803**	**43,374**	**29,553**	**35,552**	**7,251**	**7,822**
Iowa	4,303	2,696	2,996	1,580	1,307	1,116
Kansas	21,636	27,279	18,197	23,328	3,438	3,951
Minnesota	3,910	5,826	3,655	5,322	255	504
Missouri	4,891	4,351	3,365	2,850	1,527	1,501
Nebraska	1,876	3,061	1,281	2,441	596	620
North Dakota	1	3	*	1	1	2
South Dakota	186	159	59	31	127	127
South Atlantic	**219,499**	**235,179**	**164,737**	**138,511**	**54,762**	**96,668**
Delaware	8,665	17,399	1,208	4,581	7,457	12,818
District of Columbia	—	—	—	—	—	—
Florida	174,361	180,697	155,347	121,272	19,013	59,425
Georgia	3,026	1,028	2,623	779	403	249
Maryland	8,817	12,718	4,762	8,591	4,055	4,127
North Carolina	2,911	871	0	0	2,911	871
South Carolina	1,851	3,005	261	2,470	1,590	535
Virginia	19,735	19,219	403	575	19,332	18,644
West Virginia	133	243	133	243	—	—
East South Central	**46,335**	**87,745**	**28,792**	**62,643**	**17,543**	**25,101**
Alabama	4,636	3,834	3,219	3,385	1,417	450
Kentucky	269	350	221	285	48	66
Mississippi	39,900	82,541	25,352	58,974	14,547	23,567
Tennessee	1,531	1,019	0	0	1,531	1,019
West South Central	**1,491,347**	**1,504,407**	**1,419,710**	**1,434,782**	**71,637**	**69,625**
Arkansas	21,191	24,977	21,190	24,975	1	2
Louisiana	243,983	277,116	236,259	268,956	7,724	8,160
Oklahoma	153,666	153,109	123,397	123,928	30,269	29,181
Texas	1,072,506	1,049,205	1,038,864	1,016,922	33,643	32,283
Mountain	**81,032**	**102,719**	**64,196**	**77,264**	**16,835**	**25,455**
Arizona	20,480	23,716	9,833	11,929	10,647	11,788
Colorado	4,860	4,881	4,264	4,325	597	557
Idaho	—	—	—	—	—	—
Montana	270	632	114	488	156	145
Nevada	21,305	32,246	18,135	22,385	3,171	9,861
New Mexico	27,725	32,214	27,285	30,536	440	1,677
Utah	6,305	8,900	4,479	7,473	1,825	1,427
Wyoming	87	129	87	129	—	—
Pacific Contiguous	**487,127**	**629,883**	**453,212**	**585,132**	**33,914**	**44,751**
California	466,061	601,290	453,192	585,116	12,869	16,173
Oregon	16,167	26,132	0	2	16,167	26,130
Washington	4,899	2,461	20	14	4,879	2,447
Pacific Noncontiguous	**28,025**	**29,048**	**0**	**0**	**28,025**	**29,048**
Alaska	28,025	29,048	0	0	28,025	29,048
Hawaii	—	—	—	—	—	—
U.S. Total	**2,682,440**	**2,987,146**	**2,429,981**	**2,657,068**	**252,459**	**330,078**

* =Value less than 0.5.

Notes: •Data are final. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-759, ''Monthly Power Plant Report.''

Table 21. Coal and Petroleum Stocks at U.S. Electric Utilities by Census Division and State, as of December 31, 1993 and 1994

Census Division State	Coal (thousand short tons)		Petroleum [1] (thousand barrels)	
	1993	1994	1993	1994
New England	**967**	**1,079**	**4,565**	**4,706**
Connecticut	160	202	1,435	1,777
Maine	—	—	685	382
Massachusetts	449	629	2,090	2,213
New Hampshire	358	248	323	267
Rhode Island	0	0	4	36
Vermont	—	—	29	31
Middle Atlantic	**12,564**	**12,687**	**10,080**	**12,974**
New Jersey	501	688	1,268	2,180
New York	953	999	7,532	8,038
Pennsylvania	11,110	11,000	1,280	2,756
East North Central	**27,296**	**32,088**	**2,498**	**2,871**
Illinois	4,019	4,526	995	1,193
Indiana	6,935	10,449	177	138
Michigan	6,206	6,505	657	884
Ohio	7,249	7,499	477	424
Wisconsin	2,887	3,109	191	232
West North Central	**14,123**	**16,739**	**1,666**	**1,640**
Iowa	3,401	3,642	206	185
Kansas	2,008	2,610	602	582
Minnesota	1,182	2,134	154	133
Missouri	3,555	4,410	386	383
Nebraska	1,272	1,276	206	218
North Dakota	2,417	2,406	48	49
South Dakota	287	259	64	91
South Atlantic	**17,877**	**23,226**	**14,892**	**15,981**
Delaware	192	470	510	860
District of Columbia	—	—	67	90
Florida	3,451	3,813	8,928	9,177
Georgia	2,825	4,699	526	556
Maryland	1,455	1,306	1,261	2,138
North Carolina	2,887	4,139	208	278
South Carolina	1,648	2,255	298	304
Virginia	1,418	2,064	2,875	2,407
West Virginia	4,001	4,479	219	172
East South Central	**8,370**	**10,317**	**2,042**	**2,083**
Alabama	2,331	3,652	210	175
Kentucky	3,990	4,466	128	171
Mississippi	417	690	1,030	1,025
Tennessee	1,632	1,509	675	712
West South Central	**13,867**	**15,520**	**8,220**	**7,624**
Arkansas	1,866	1,751	276	266
Louisiana	1,932	1,872	1,774	1,384
Oklahoma	1,944	2,319	612	609
Texas	8,125	9,578	5,557	5,365
Mountain	**15,529**	**14,559**	**1,459**	**1,267**
Arizona	3,687	3,197	647	502
Colorado	3,428	3,118	181	180
Idaho	—	—	*	*
Montana	721	517	15	18
Nevada	1,195	1,034	433	395
New Mexico	1,506	1,462	99	107
Utah	3,264	2,753	41	30
Wyoming	1,728	2,476	43	34
Pacific Contiguous	**743**	**681**	**15,758**	**12,527**
California	—	—	15,174	11,954
Oregon	312	150	237	230
Washington	431	531	347	344
Pacific Noncontiguous	**5**	**2**	**1,264**	**1,313**
Alaska	5	2	231	230
Hawaii	—	—	1,033	1,082
U.S. Total	**111,341**	**126,897**	**62,443**	**62,986**

[1] Does not include petroleum coke. Petroleum coke stocks at the end of 1994 were 3 thousand short tons and in 1993 were 89 thousand short tons.
* =Value less than 0.5.
Notes: •Data are final. •Totals may not equal sum of components because of independent rounding.
Source: Energy Information Administration, Form EIA-759, ''Monthly Power Plant Report.''

Table 22. Fossil Fuel Receipts at U.S. Electric Utilities by Census Division and State, 1993 and 1994

Census Division State	Coal (thousand short tons)		Petroleum [1] (thousand barrels)		Gas (million cubic feet)	
	1993	1994	1993	1994	1993	1994
New England	**5,417**	**6,245**	**27,617**	**24,173**	**29,640**	**48,618**
Connecticut	740	863	6,263	6,019	554	8,009
Maine	—	—	1,317	964	—	—
Massachusetts	3,370	4,127	17,828	14,742	28,283	38,595
New Hampshire	1,306	1,255	1,964	2,319	136	1,275
Rhode Island	—	—	243	121	400	572
Vermont	—	—	2	8	267	167
Middle Atlantic	**46,511**	**49,187**	**31,339**	**34,891**	**201,570**	**225,983**
New Jersey	1,845	2,115	2,711	5,451	26,861	36,154
New York	7,448	8,244	21,766	19,732	167,703	177,846
Pennsylvania	37,219	38,828	6,861	9,709	7,005	11,983
East North Central	**165,695**	**186,864**	**3,988**	**5,192**	**43,568**	**61,161**
Illinois	28,091	32,936	1,867	2,615	17,084	34,188
Indiana	43,789	53,540	399	354	4,764	7,309
Michigan	27,865	31,435	1,162	1,587	17,754	17,203
Ohio	47,992	49,311	490	541	1,425	842
Wisconsin	17,958	19,641	70	94	2,540	1,618
West North Central	**101,896**	**114,255**	**588**	**545**	**27,469**	**33,313**
Iowa	15,767	17,005	97	108	3,131	1,582
Kansas	16,465	17,653	67	98	16,426	22,203
Minnesota	15,993	17,770	33	47	2,393	3,504
Missouri	19,217	27,250	289	196	4,241	3,517
Nebraska	8,699	8,894	31	17	1,226	2,435
North Dakota	23,603	23,366	66	79	1	46
South Dakota	2,152	2,317	6	—	52	26
South Atlantic	**121,902**	**138,382**	**67,855**	**67,855**	**201,429**	**220,663**
Delaware	2,008	2,284	3,321	2,950	7,239	17,396
District of Columbia	—	—	371	653	—	—
Florida	24,115	24,948	53,854	51,596	164,475	171,834
Georgia	23,327	28,761	326	222	2,994	1,078
Maryland	8,509	9,623	6,191	7,795	4,801	8,684
North Carolina	21,194	21,330	211	271	2,373	548
South Carolina	9,781	11,188	81	107	485	2,584
Virginia	8,937	9,270	3,098	3,314	18,947	18,200
West Virginia	24,031	30,978	402	402	116	338
East South Central	**86,677**	**89,150**	**6,033**	**2,394**	**29,020**	**64,255**
Alabama	25,897	27,160	116	155	2,696	3,235
Kentucky	34,979	36,301	209	311	220	406
Mississippi	3,310	4,299	5,557	1,733	26,104	60,614
Tennessee	22,491	21,389	151	196	—	—
West South Central	**130,971**	**131,655**	**1,357**	**499**	**1,467,748**	**1,474,719**
Arkansas	10,754	11,847	95	143	19,766	22,782
Louisiana	13,073	13,408	803	208	234,879	257,290
Oklahoma	16,433	17,191	7	10	148,893	147,382
Texas	90,710	89,210	452	139	1,064,210	1,047,265
Mountain	**103,137**	**107,799**	**882**	**466**	**73,138**	**93,950**
Arizona	18,383	18,427	36	69	19,308	21,731
Colorado	16,070	16,242	4	6	2,045	2,154
Idaho	—	—	—	—	—	—
Montana	8,849	10,310	24	18	110	518
Nevada	7,376	7,627	609	222	20,516	31,440
New Mexico	14,888	15,316	70	45	26,595	30,540
Utah	13,990	14,253	31	27	4,478	7,436
Wyoming	23,580	25,624	108	79	87	131
Pacific Contiguous	**6,946**	**8,394**	**966**	**387**	**483,761**	**621,342**
California	—	—	932	370	467,486	595,291
Oregon	1,621	2,223	11	3	16,255	26,041
Washington	5,324	6,171	23	14	20	11
Pacific Noncontiguous	—	—	**7,276**	**7,096**	**17,180**	**19,900**
Alaska	—	—	—	—	17,180	19,900
Hawaii	—	—	7,276	7,096	—	—
U. S. Total	**769,152**	**831,929**	**147,901**	**147,903**	**2,574,523**	**2,863,904**

[1] Does not include petroleum coke. Petroleum coke receipts in 1994 were 1.263 million short tons and in 1993 were 1.248 million short tons.

Notes: •Data are final. •Data are for electric generating plants with a total steam-electric and combined-cycle nameplate capacity of 50 or more megawatts. •Totals may not equal sum of components because of independent rounding.

Source: Federal Energy Regulatory Commission, FERC Form 423, ''Monthly Report of Cost and Quality of Fuels for Electric Plants.''

Table 23. Average Delivered Cost of Fossil Fuel Receipts at U.S. Electric Utilities by Census Division and State, 1993 and 1994

Census Division State	Coal			Petroleum [1]			Gas		
	1993	1994		1993	1994		1993	1994	
	(cents per 10^6 Btu)	(cents per 10^6 Btu)	($ per short ton)	(cents per 10^6 Btu)	(cents per 10^6 Btu)	($ per barrel)	(cents per 10^6 Btu)	(cents per 10^6 Btu)	($ per Mcf)
New England	**166.3**	**166.0**	**42.81**	**249.3**	**252.0**	**16.00**	**264.0**	**219.2**	**2.26**
Connecticut	170.4	177.4	46.45	239.8	253.1	16.06	377.8	196.0	1.99
Maine	—	—	—	213.7	213.8	13.49	—	—	—
Massachusetts	167.5	167.8	43.00	261.7	262.4	16.63	263.0	224.1	2.32
New Hampshire	160.8	152.2	39.66	183.7	199.5	12.86	217.2	209.7	2.13
Rhode Island	—	—	—	319.7	253.5	16.11	238.9	222.5	2.29
Vermont	—	—	—	485.1	453.5	25.87	201.6	231.5	2.31
Middle Atlantic	**146.0**	**145.2**	**36.33**	**257.7**	**262.3**	**16.46**	**259.9**	**221.6**	**2.29**
New Jersey	177.3	181.7	48.49	268.0	290.2	18.08	229.9	209.6	2.17
New York	149.6	145.2	37.63	257.0	251.7	15.83	264.8	223.6	2.30
Pennsylvania	143.6	143.1	35.39	255.8	268.3	16.82	257.6	229.1	2.36
East North Central	**142.3**	**141.0**	**30.56**	**326.4**	**307.5**	**18.93**	**251.4**	**219.8**	**1.86**
Illinois	170.4	160.6	32.69	298.0	283.0	17.82	244.4	200.0	2.04
Indiana	126.8	127.2	26.79	420.7	389.9	22.50	273.7	265.9	2.72
Michigan	152.8	150.6	32.90	305.8	295.6	18.20	241.7	240.2	.97
Ohio	141.3	143.9	34.70	407.4	403.8	23.39	285.6	374.5	3.85
Wisconsin	121.0	120.9	23.13	408.7	397.9	23.29	263.0	263.4	2.66
West North Central	**100.9**	**98.8**	**16.76**	**359.2**	**355.5**	**21.03**	**244.0**	**201.4**	**1.99**
Iowa	101.2	99.0	17.39	408.0	392.3	22.71	310.1	316.2	3.18
Kansas	102.2	102.5	17.85	402.4	396.8	23.15	232.0	192.1	1.89
Minnesota	113.4	113.9	20.09	442.0	419.8	24.42	245.0	213.1	2.14
Missouri	123.8	110.1	21.39	298.8	278.4	16.97	231.8	189.7	1.90
Nebraska	75.5	76.5	13.11	420.1	401.8	23.23	272.7	205.1	2.02
North Dakota	71.4	70.4	9.28	441.6	407.2	23.72	424.9	375.7	4.11
South Dakota	109.8	108.3	13.10	467.2	—	—	237.8	272.3	2.65
South Atlantic	**163.7**	**159.9**	**39.53**	**224.2**	**232.7**	**14.75**	**243.7**	**222.2**	**2.26**
Delaware	169.0	162.0	41.98	230.0	259.3	16.31	260.9	234.2	2.43
District of Columbia	—	—	—	303.8	326.4	19.64	—	—	—
Florida	176.7	177.8	43.71	220.1	226.2	14.38	234.1	215.5	2.18
Georgia	178.2	169.1	39.82	346.9	396.3	23.05	323.6	320.8	3.29
Maryland	159.9	155.3	39.84	228.9	244.5	15.47	288.8	246.6	2.57
North Carolina	169.9	168.2	41.77	405.0	383.8	22.28	351.6	325.7	3.38
South Carolina	156.9	156.0	39.84	425.5	409.7	23.77	291.1	167.1	1.71
Virginia	146.6	145.0	37.05	212.6	216.2	13.60	278.6	256.6	2.66
West Virginia	141.8	139.2	34.70	461.9	442.4	25.89	435.5	400.1	4.00
East South Central	**138.9**	**136.2**	**32.43**	**194.6**	**230.0**	**14.37**	**243.8**	**192.6**	**2.01**
Alabama	176.0	167.2	40.42	425.4	402.0	23.28	260.4	234.3	2.37
Kentucky	116.7	116.2	27.16	437.8	433.3	25.29	301.1	287.2	2.93
Mississippi	164.2	157.1	35.54	176.2	164.1	10.52	241.6	189.8	1.98
Tennessee	126.1	125.6	30.61	431.3	414.9	24.09	—	—	—
West South Central	**144.8**	**134.8**	**20.79**	**245.8**	**300.6**	**18.29**	**247.3**	**218.5**	**2.25**
Arkansas	170.2	160.3	27.91	457.9	358.9	21.13	220.5	182.3	1.87
Louisiana	158.5	153.9	25.04	222.7	269.3	16.73	238.5	207.4	2.17
Oklahoma	123.6	102.0	17.50	349.8	370.3	21.71	310.7	266.7	2.76
Texas	143.5	135.0	19.84	245.3	285.5	17.48	240.7	215.2	2.20
Mountain	**113.4**	**111.9**	**21.83**	**399.8**	**389.1**	**23.48**	**241.6**	**202.6**	**2.08**
Arizona	135.2	137.4	28.26	511.4	428.1	25.56	280.7	217.7	2.23
Colorado	109.2	105.6	21.01	480.6	458.1	25.90	250.1	212.5	2.21
Idaho	—	—	—	—	—	—	—	—	—
Montana	69.3	69.3	11.79	525.5	462.9	27.41	268.1	114.9	1.21
Nevada	146.8	143.3	32.37	358.3	328.7	20.46	237.7	192.4	1.99
New Mexico	136.8	140.9	25.48	505.8	464.9	26.55	219.3	194.5	1.99
Utah	119.0	113.6	26.10	539.1	467.4	27.45	217.6	231.6	2.42
Wyoming	79.9	80.3	14.09	473.0	444.5	25.95	329.7	561.4	5.80
Pacific Contiguous	**130.1**	**128.4**	**21.93**	**241.6**	**227.3**	**13.92**	**294.0**	**245.7**	**2.53**
California	—	—	—	234.7	216.3	13.27	296.3	248.4	2.56
Oregon	112.2	107.3	19.18	382.8	465.4	27.17	225.2	183.0	1.85
Washington	136.0	136.5	22.93	468.9	472.0	27.74	376.0	471.2	4.95
Pacific Noncontiguous	—	—	—	**308.5**	**271.2**	**17.05**	**125.4**	**112.9**	**1.13**
Alaska	—	—	—	—	—	—	125.4	112.9	1.13
Hawaii	—	—	—	308.5	271.2	17.05	—	—	—
U. S. Total	**138.5**	**135.5**	**28.03**	**243.3**	**248.8**	**15.70**	**256.0**	**223.0**	**2.28**

[1] Does not include petroleum coke. Petroleum coke cost in 1994 was 68.9 cents per million Btu and in 1993 was 70.3 cents per million Btu.
Mcf = thousand cubic feet.

Notes: •Data are final. •Data are for electric generating plants with a total steam-electric and combined-cycle nameplate capacity of 50 or more megawatts. •Totals may not equal sum of components because of independent rounding.

Source: Federal Energy Regulatory Commission, FERC Form 423, ''Monthly Report of Cost and Quality of Fuels for Electric Plants.''

Estimated U.S. Electric Utility Retail Sales, Revenue, and Average Revenue per Kilowatthour

This chapter provides estimates on the sale of electricity to ultimate consumers by U.S. electric utilities, its associated revenue, and the average revenue per kilowatthour sold[19] at the national, Census, and State levels.

These estimates are derived from data collected on the Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions." Respondents to the Form EIA-826 are based on a statistically chosen sample and include 246 U.S. electric utilities from a universe of approximately 3,250 utilities. The sample was designed to obtain estimates of electricity sales, average revenue, and revenue per kilowatthour for all U.S. electric utilities by end-use sector. Estimates of coefficients of variation, which indicate possible error caused by sampling, are also published at each level.

Preliminary census-based statistics on retail sales of electricity, associated revenue, and average revenue per kilowatthour based on information collected on the Form EIA-861, "Annual Electric Utility Report," will be published in the *Electric Power Annual 1994,* Volume II. **Final** census-based statistics for retail sales of electricity, associated revenue, and average revenue per kilowatthour based on information collected on the Form EIA-861 will be published in the *Electric Sales and Revenue,* DOE/EIA-0540.

Because electricity cannot be stored, it must be generated, transmitted to the consumer, and consumed instantaneously. Electric utility companies were formed to provide these services. U.S. electric utilities are high-investment businesses and historically have been treated as monopolies because duplicate facilities, particularly transmission and distribution lines, would be inefficient. Thus, franchises are granted to electric utilities for given geographical areas by regulatory officials. To obtain a franchise, electric utilities must provide service to all consumers in their territories at a reasonable cost. The service territory of an electric utility is usually composed of many combinations of consumers. Electric utilities classify their consumers within end-use sector based on factors such as demand, rate schedule, and Standard Industrial Classification (SIC) code.

Private households and apartment buildings, where energy is consumed primarily for space heating, water heating, air conditioning, lighting, refrigeration, cooking, and clothes drying are classified as residential consumers. Nonmanufacturing business establishments (including hotels, motels, restaurants, wholesale businesses, retail stores, health, social, and educational institutions) are generally classified as commercial. However, demand or annual usage may be the determining factor used by the electric utility to classify a consumer as commercial. Manufacturing, construction, mining, agriculture, fishing, and forestry establishments (SIC codes 1-39) are included as industrial consumers. Again, electric utilities may instead classify industrial service based on demand or annual usage. Public street and highway lighting, railroads and railways, municipalities, divisions or agencies of State and Federal governments under special contracts or agreements, and other utility departments as defined by the pertinent regulatory agency and/or electric utility within this report are classified as other sales.

The average revenue per kilowatthour of electricity sold by electric utilities is calculated by dividing total annual revenue by total annual retail sales for each sector and State. The resulting measurement is the cost (per kilowatthour of electricity sold) for providing service to a sector, given the rate schedule of the electric utility for that particular sector. The average revenue per kilowatthour is calculated for all consumers and for each sector (residential, commercial, industrial, and other sales). Utilities typically employ a number of rate schedules within a single sector. These alternative rate schedules reflect the varying consumption levels and patterns of these customers and their associated impact on the cost to the electric utility for providing electrical service. The average revenue per kilowatthour by sector reported in this publication represents a weighted average of revenue and sales within and across sectors for all consumers.

To derive the average revenue per kilowatthour, the operating revenue[20] reported by the electric utility is used. Utility operating revenues cover--among other costs of service--State and federal income taxes and

[19] Estimated average revenue per kilowatthour is the ratio of estimated revenue to estimated retail sales.

[20] Includes energy charges, demand charges, consumer service charges, environmental surcharges, fuel adjustments, and other miscellaneous charges.

taxes other than income taxes paid by the utility. The federal component of these taxes are, for the most part, "payroll" taxes. State and local authorities will tax the value of plant (property taxes), the amount of revenues (gross receipts taxes), purchases of materials and services (sales and use taxes), and a potentially long list of other taxes that vary extensively by taxing authority. Taxes deducted from an employee's pay, such as federal income taxes and the employee's share of social security taxes, are not a part of the utility's "tax costs," but are paid to the taxing authorities in the name of the employees. These taxes are included in the utility's cost of service (for example, revenue requirements) and are included in the amounts recovered from the customer in rates and reported in operating revenues.

Electric utilities, like many other business enterprises, are required by various taxing authorities to collect and remit taxes assessed on its customers. In this regard, the utility serves as an agent for the taxing authority. Taxes assessed on the consumer, such as a gross receipts tax or sales tax, are referred to as "pass through" taxes. These taxes do not represent a cost of the utility and are not recorded in the operating revenues of the utility. However, taxing authorities differ regarding whether a specific tax is assessed on the utility or on the consumer. That decision, in turn, determines whether or not the tax is included in the electric utility's operating revenue.

Average revenue per kilowatthour from residential consumers is generally higher than for any other sector, in part due to the higher costs associated with serving many consumers who use relatively small amounts of electricity. These higher costs include direct-load costs (such as those for distribution lines) in addition to consumer or administrative costs. The industrial sector, which generally has the highest use of electricity, has the lowest average revenue per kilowatthour.

Data Sources

Summary estimates on retail sales of electricity by electric utilities and average revenue are provided in the following tables. These data were obtained from the Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions."

Table 24. Estimated Retail Sales by U.S. Electric Utilities to Ultimate Consumers and Associated Revenue by Sector, 1990 Through 1994

Item	1990	1991	1992	1993	1994
Retail Sales (million kilowatthours)					
Residential	921,473	957,801	934,044	994,380	1,005,804
Commercial	750,835	765,476	763,664	790,225	827,309
Industrial	936,428	944,684	965,356	984,111	992,422
Other[1]	95,936	96,513	94,003	96,065	95,326
U.S. Total	**2,704,672**	**2,764,474**	**2,757,067**	**2,864,782**	**2,920,860**
Revenue (million dollars)					
Residential	72,332	77,142	76,907	82,900	84,538
Commercial	55,080	57,471	58,273	61,030	64,142
Industrial	44,453	45,803	46,770	47,828	46,825
Other	5,941	6,207	6,260	6,587	6,472
U.S. Total	**177,806**	**186,624**	**188,209**	**198,345**	**201,978**

[1] Includes public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

Notes: •See technical notes for estimation methodology. •Weather-related phenomena, reclassification of retail sales, changes in number of customers, prior period adjustments, and changes in billing procedures may contribute to substantial year-to-year changes in the data in this table. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-826, ''Monthly Electric Utility Sales and Revenue Report with State Distributions.''

Table 25. Estimated Average Revenue per Kilowatthour for U.S. Electric Utilities by Sector, (Cents)

Sector	1990	1991	1992	1993	1994
Residential	7.85	8.05	8.23	8.34	8.41
Commercial	7.34	7.51	7.63	7.72	7.75
Industrial	4.75	4.85	4.84	4.86	4.72
Other[1]	6.19	6.43	6.66	6.86	6.79
All Sectors	**6.57**	**6.75**	**6.83**	**6.92**	**6.92**

[1] Includes public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

Notes: •See technical notes for estimation methodology. •Estimates represent weighted values. •Weather-related phenomena, reclassification of retail sales, changes in number of customers, prior period adjustments, and changes in billing procedures may contribute to substantial year-to-year changes in the data in this table. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-826, ''Monthly Electric Utility Sales and Revenue Report with State Distributions.''

Table 26. Estimated Retail Sales by U.S. Electric Utilities to Ultimate Consumers by Sector, Census Division, and State, 1993 and 1994

(Million Kilowatthours)

Census Division and State	All Sectors		Residential		Commercial		Industrial		Other [1]	
	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994
New England	**104,712**	**105,934**	**37,843**	**38,525**	**38,651**	**39,840**	**26,133**	**25,790**	**2,084**	**1,780**
Connecticut	27,171	27,887	10,586	10,969	10,671	10,827	5,550	5,720	364	371
Maine	11,736	11,527	3,717	3,698	2,761	2,823	4,932	4,857	326	149
Massachusetts	45,219	45,674	15,714	15,937	19,000	19,359	9,450	9,454	1,055	924
New Hampshire	9,071	9,235	3,413	3,425	2,156	2,707	3,391	2,988	111	115
Rhode Island	6,548	6,570	2,413	2,456	2,531	2,562	1,419	1,378	185	174
Vermont	4,968	5,041	2,000	2,039	1,532	1,563	1,391	1,392	45	47
Middle Atlantic	**316,078**	**321,443**	**102,948**	**104,983**	**108,291**	**115,364**	**90,874**	**86,571**	**13,965**	**14,525**
New Jersey	65,599	66,318	22,037	22,177	28,490	29,078	14,577	14,567	494	496
New York	129,939	131,459	39,720	40,452	47,618	52,968	30,433	25,344	12,168	12,696
Pennsylvania	120,541	123,665	41,191	42,354	32,183	33,318	45,864	46,660	1,304	1,333
East North Central	**489,970**	**503,286**	**146,283**	**146,295**	**121,219**	**130,450**	**207,358**	**211,783**	**15,109**	**14,759**
Illinois	118,028	121,696	35,151	35,825	35,012	35,845	39,661	41,861	8,204	8,165
Indiana	82,562	84,814	24,904	25,019	16,932	17,267	40,246	42,027	481	502
Michigan	88,434	88,213	26,925	26,186	22,207	29,097	37,980	32,028	1,322	901
Ohio	147,900	153,349	41,942	41,601	33,352	33,892	68,117	73,292	4,489	4,564
Wisconsin	53,046	55,215	17,361	17,663	13,715	14,348	21,355	22,575	614	628
West North Central	**205,205**	**207,270**	**74,837**	**75,290**	**55,120**	**56,097**	**69,661**	**70,548**	**5,587**	**5,334**
Iowa	34,165	32,663	11,439	11,214	7,520	7,247	13,764	13,039	1,443	1,163
Kansas	30,141	29,596	10,374	10,197	10,282	10,135	9,095	8,900	390	365
Minnesota	48,550	50,981	15,362	16,109	8,560	8,961	23,977	25,262	651	650
Missouri	59,178	59,322	24,249	23,905	19,925	20,427	14,058	14,064	946	925
Nebraska	18,867	19,898	7,115	7,464	5,430	5,784	5,051	5,317	1,270	1,333
North Dakota	7,432	7,666	3,209	3,255	1,821	1,874	1,885	2,007	518	530
South Dakota	6,873	7,143	3,089	3,146	1,583	1,670	1,832	1,959	369	368
South Atlantic	**580,581**	**593,364**	**235,787**	**237,443**	**167,461**	**176,998**	**158,824**	**159,909**	**18,509**	**19,014**
Delaware	9,083	9,299	3,037	3,113	2,610	2,692	3,379	3,433	57	60
District of Columbia	10,375	10,295	1,635	1,572	5,418	8,093	2,976	267	346	363
Florida	151,969	159,698	76,660	81,133	54,971	57,843	15,610	15,729	4,727	4,993
Georgia	89,145	89,079	34,089	32,343	25,217	25,852	28,841	29,827	998	1,058
Maryland	53,802	55,030	21,484	21,618	11,306	13,376	20,180	19,223	832	813
North Carolina	100,206	101,597	37,627	37,071	26,783	27,338	33,910	35,277	1,886	1,912
South Carolina	61,024	61,291	20,506	19,712	13,161	13,323	26,526	27,444	831	813
Virginia	80,372	82,123	32,054	32,214	22,515	22,942	17,067	18,060	8,736	8,906
West Virginia	24,606	24,951	8,696	8,667	5,480	5,539	10,335	10,649	95	96
East South Central	**253,493**	**254,657**	**86,918**	**87,659**	**40,743**	**40,978**	**120,760**	**120,815**	**5,073**	**5,206**
Alabama	65,465	67,267	22,831	22,930	11,905	12,283	30,085	31,394	643	659
Kentucky	67,655	68,674	18,864	19,387	9,848	10,055	36,146	36,365	2,796	2,867
Mississippi	35,633	36,694	13,450	13,607	7,248	7,707	14,343	14,775	592	605
Tennessee	84,741	82,023	31,772	31,735	11,742	10,933	40,186	38,281	1,042	1,074
West South Central	**387,431**	**398,750**	**136,861**	**139,726**	**95,479**	**99,696**	**138,762**	**142,840**	**16,329**	**16,487**
Arkansas	30,543	31,314	11,803	11,650	6,697	6,772	11,476	12,319	567	573
Louisiana	67,554	69,919	22,383	22,715	14,244	14,911	28,492	29,867	2,434	2,427
Oklahoma	40,640	41,136	15,850	16,141	10,868	11,116	11,775	11,711	2,146	2,168
Texas	248,695	256,380	86,825	89,221	63,669	66,897	87,018	88,944	11,182	11,319
Mountain	**172,169**	**179,750**	**54,338**	**56,760**	**54,267**	**54,918**	**56,939**	**60,874**	**6,624**	**7,198**
Arizona	44,234	47,453	16,674	18,229	14,808	15,685	11,147	11,562	1,604	1,978
Colorado	33,882	33,639	11,077	10,911	14,791	12,714	7,055	9,124	958	890
Idaho	18,839	19,941	6,244	6,198	4,943	5,649	7,318	7,702	334	391
Montana	12,966	13,237	3,585	3,559	3,010	3,124	5,899	6,016	473	538
Nevada	18,506	20,067	6,283	6,830	4,285	4,590	7,198	7,829	740	819
New Mexico	14,876	15,703	3,882	4,115	4,775	5,090	4,746	4,972	1,472	1,526
Utah	16,831	17,860	4,687	5,031	5,130	5,561	6,093	6,322	921	945
Wyoming	12,036	11,850	1,906	1,887	2,523	2,504	7,484	7,348	123	111
Pacific Contiguous	**342,093**	**342,953**	**114,486**	**114,897**	**104,552**	**108,266**	**110,515**	**109,012**	**12,541**	**10,777**
California	209,971	211,531	67,347	68,718	73,047	75,845	61,569	60,721	8,009	6,247
Oregon	44,036	44,695	16,714	16,367	12,248	12,639	14,473	14,916	601	772
Washington	88,086	86,727	30,425	29,812	19,257	19,782	34,473	33,375	3,931	3,758
Pacific Noncontiguous	**13,049**	**13,453**	**4,080**	**4,227**	**4,441**	**4,702**	**4,285**	**4,278**	**244**	**246**
Alaska	4,346	4,514	1,610	1,679	2,061	2,162	487	485	188	188
Hawaii	8,704	8,939	2,469	2,548	2,381	2,540	3,798	3,794	56	58
U.S. Total	**2,864,782**	**2,920,860**	**994,380**	**1,005,804**	**790,225**	**827,309**	**984,111**	**992,422**	**96,065**	**95,326**

[1] Includes public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

Notes: •See technical notes for estimation methodology. •Weather-related phenomena, reclassification of retail sales, changes in number of customers, prior period adjustments, and changes in billing procedures may contribute to substantial year-to-year changes in the data in this table. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-826, ''Monthly Electric Utility Sales and Revenue Report with State Distributions.''

Table 27. Estimated Coefficients of Variation for U.S. Electric Utility Retail Sales of Electricity by Census Division and State, 1993 and 1994

(Percent)

Census Division and State	All Sectors		Residential		Commercial		Industrial		Other [1]	
	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994
New England	**0.1**	**0.2**	**0.1**	**0.2**	**0.1**	**0.2**	**0.1**	**0.2**	**1.2**	**2.5**
Connecticut	.1	.1	.2	.2	.1	.1	.2	.2	.4	.4
Maine	.2	.1	.1	.2	.1	.1	.1	.1	2.7	1.7
Massachusetts	.2	.4	.3	.4	.3	.3	.3	.6	2.3	4.9
New Hampshire	.3	.3	.3	.4	.2	2.0	.5	.9	.3	.2
Rhode Island	—	—	.1	.1	—	.1	—	.1	.2	.2
Vermont	.2	.2	.6	.8	.2	.3	.8	.7	5.0	.3
Middle Atlantic	**.3**	**.4**	**.7**	**.8**	**.3**	**.2**	**.6**	**.5**	**.5**	**.5**
New Jersey	.2	.2	.4	.4	.1	.2	.1	.1	.2	.2
New York	.6	.6	1.3	1.5	.7	.4	1.6	1.3	.3	.4
Pennsylvania	.6	.6	1.1	1.3	.4	.5	.6	.6	4.3	3.7
East North Central	**.2**	**.1**	**.3**	**.2**	**.3**	**.4**	**.3**	**.4**	**.6**	**.3**
Illinois	.3	.2	.6	.6	.7	1.2	.4	.6	.8	.1
Indiana	.4	.3	.7	.6	.4	.4	.4	.4	5.2	4.4
Michigan	.4	.3	.5	.1	.4	1.0	.7	2.7	1.1	1.6
Ohio	.5	.2	.7	.3	.3	.2	.9	.3	1.4	.5
Wisconsin	.3	.2	.4	.5	.2	.2	.4	.3	1.2	1.6
West North Central	**.7**	**.2**	**.9**	**.3**	**1.1**	**.2**	**1.2**	**.2**	**2.2**	**1.9**
Iowa	3.6	.3	5.3	.6	8.1	.6	5.6	.3	5.9	.6
Kansas	1.3	.2	1.4	.8	1.0	.4	2.2	.4	3.3	1.8
Minnesota	.7	.5	1.0	.8	.7	.5	.7	.4	1.2	2.6
Missouri	.3	.3	.7	.6	.2	.3	.3	.4	1.2	1.4
Nebraska	.7	.6	1.1	1.0	.5	.5	.8	.8	6.8	7.4
North Dakota	.5	.5	.9	.8	.8	.6	.5	.3	.8	1.2
South Dakota	.5	.5	.9	.8	.4	.5	.2	.4	2.4	2.6
South Atlantic	**.1**	**.2**	**.2**	**.3**	**.1**	**.1**	**.2**	**.2**	**.2**	**.3**
Delaware	.2	.2	.2	.2	.2	.2	.2	.3	.6	.6
District of Columbia	—	—	—	—	—	—	—	—	—	—
Florida	.3	.4	.4	.6	.2	.3	.8	.9	.6	.6
Georgia	.4	.4	.9	.8	.2	.2	.2	.2	.7	.7
Maryland	.2	.2	.3	.4	.3	.9	.2	.8	1.4	.7
North Carolina	.4	.4	.7	.7	.4	.4	.5	.4	1.0	1.0
South Carolina	.3	.3	.7	.7	.3	.3	.3	.4	.3	.4
Virginia	.4	.4	.7	.7	.2	.2	.2	.4	.2	.5
West Virginia	.3	.2	.4	.5	.2	.2	.5	.2	1.3	1.3
East South Central	**.4**	**.4**	**.5**	**.6**	**.5**	**.3**	**.4**	**.5**	**.7**	**.6**
Alabama	.5	.6	1.2	1.2	1.0	.5	.6	.3	1.7	.8
Kentucky	1.0	.8	1.2	1.2	.5	.4	1.0	.7	.5	.5
Mississippi	.7	.6	.8	.7	.7	.6	.9	.4	4.5	1.3
Tennessee	.7	.9	1.0	.9	1.5	.9	.7	1.3	1.1	2.4
West South Central	**.2**	**.3**	**.5**	**.5**	**.2**	**.2**	**.3**	**.4**	**.3**	**.4**
Arkansas	.3	.3	.5	.6	.4	.3	.5	.4	2.2	1.3
Louisiana	.3	.3	.6	.6	.3	.3	.2	.2	1.2	1.8
Oklahoma	.6	.5	1.3	1.0	.7	.5	.5	.5	.3	.2
Texas	.3	.5	.8	.8	.3	.3	.4	.7	.4	.3
Mountain	**.4**	**.1**	**.3**	**.2**	**.4**	**.3**	**.3**	**.2**	**3.7**	**.6**
Arizona	.2	.2	.2	.3	.2	.2	.5	.4	1.7	.9
Colorado	1.8	.3	1.5	.3	1.4	1.1	1.1	.5	5.0	3.1
Idaho	.7	.5	.4	.5	1.6	1.4	1.1	1.2	2.4	2.2
Montana	1.0	.8	.8	.7	.5	.4	.7	.5	2.8	2.0
Nevada	.5	.6	.9	1.0	.3	.3	.4	.3	.8	1.1
New Mexico	.4	.5	.8	.9	.7	.8	.7	.7	4.7	1.1
Utah	.2	.2	.3	.3	.3	.3	.7	.1	24.6	.9
Wyoming	.7	.7	.7	.7	1.5	.8	.6	.7	4.2	5.7
Pacific Contiguous	**.4**	**.4**	**.3**	**.3**	**.7**	**.6**	**1.0**	**.8**	**2.1**	**2.3**
California	.2	.3	.3	.5	1.0	.9	1.5	1.2	3.1	3.9
Oregon	.9	.8	.9	.8	.3	.4	1.6	1.8	7.5	1.1
Washington	1.5	1.2	.6	.6	.4	.3	1.8	1.4	1.1	.8
Pacific Noncontiguous	**.1**	**.1**	**.1**	**.1**	**.1**	**.1**	**.2**	**.2**	**2.6**	**2.6**
Alaska	.3	.2	.2	.2	.2	.3	1.2	.8	3.4	3.4
Hawaii	.1	.1	.1	.2	.1	.1	.2	.2	.3	.6
U.S. Total	**.1**	**.1**	**.2**	**.1**	**.1**	**.1**	**.2**	**.2**	**.4**	**.3**

[1] Includes public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

Notes: •For an explanation of coefficients of variation, see the technical notes. •See technical notes for estimation methodology. •Estimates represent weighted values. •It should be noted such things as large changes in retail sales, reclassification of retail sales, or changes in billing procedures can contribute to unusually high coefficient of variations.

Sources: Energy Information Administration, Form EIA-826, ''Monthly Electric Utility Sales and Revenue Report with State Distributions.''

Table 28. Estimated Revenue from Retail Sales by U.S. Electric Utilities to Ultimate Consumers by Sector, Census Division, and State, 1993 and 1994

(Million Dollars)

Census Division and State	All Sectors		Residential		Commercial		Industrial		Other [1]	
	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994
New England	**10,552**	**10,793**	**4,297**	**4,434**	**3,831**	**3,983**	**2,167**	**2,138**	**257**	**239**
Connecticut	2,802	2,858	1,211	1,258	1,076	1,086	463	463	52	52
Maine	1,082	1,118	434	456	266	287	347	353	35	22
Massachusetts	4,564	4,641	1,757	1,794	1,847	1,900	832	826	128	122
New Hampshire	977	1,045	427	449	242	308	292	270	16	17
Rhode Island	681	675	275	278	258	255	128	122	21	20
Vermont	446	456	193	199	143	146	104	105	6	6
Middle Atlantic	**30,000**	**30,558**	**11,695**	**12,073**	**10,989**	**11,842**	**5,946**	**5,291**	**1,368**	**1,352**
New Jersey	6,529	6,677	2,505	2,563	2,765	2,864	1,174	1,162	85	88
New York	14,016	14,218	5,271	5,476	5,561	6,234	2,052	1,396	1,131	1,112
Pennsylvania	9,455	9,663	3,919	4,033	2,664	2,744	2,720	2,733	152	153
East North Central	**31,745**	**32,192**	**12,167**	**12,262**	**8,928**	**9,545**	**9,598**	**9,414**	**1,050**	**971**
Illinois	9,129	9,001	3,614	3,554	2,780	2,743	2,164	2,162	570	542
Indiana	4,220	4,398	1,649	1,691	979	1,018	1,547	1,641	45	47
Michigan	6,291	6,250	2,188	2,183	1,833	2,315	2,156	1,708	114	45
Ohio	9,162	9,532	3,490	3,582	2,520	2,628	2,876	3,030	277	292
Wisconsin	2,942	3,012	1,226	1,253	817	841	855	872	44	46
West North Central	**12,356**	**12,427**	**5,450**	**5,540**	**3,477**	**3,515**	**3,088**	**3,083**	**341**	**288**
Iowa	2,015	1,903	921	911	481	458	534	506	79	28
Kansas	1,985	1,948	810	803	690	675	449	437	36	32
Minnesota	2,721	2,902	1,097	1,186	524	564	1,052	1,104	48	48
Missouri	3,732	3,703	1,752	1,737	1,245	1,260	669	642	66	64
Nebraska	1,043	1,081	451	473	311	322	206	208	76	79
North Dakota	435	444	203	206	120	122	93	95	20	21
South Dakota	424	446	216	225	106	115	84	90	16	17
South Atlantic	**38,406**	**38,837**	**18,602**	**18,617**	**11,182**	**11,685**	**7,448**	**7,306**	**1,174**	**1,229**
Delaware	630	630	273	277	188	189	163	157	7	7
District of Columbia	703	733	117	117	387	578	176	12	22	24
Florida	10,923	11,176	6,133	6,326	3,659	3,686	816	816	316	348
Georgia	5,976	5,874	2,651	2,509	1,876	1,905	1,362	1,368	87	93
Maryland	3,724	3,846	1,755	1,814	807	962	1,095	1,001	67	68
North Carolina	6,571	6,579	3,050	3,007	1,754	1,781	1,634	1,658	133	133
South Carolina	3,435	3,482	1,496	1,478	815	849	1,076	1,106	47	49
Virginia	5,154	5,209	2,578	2,535	1,377	1,412	713	764	486	499
West Virginia	1,289	1,309	549	553	317	324	413	423	9	9
East South Central	**13,238**	**13,058**	**5,443**	**5,452**	**2,599**	**2,567**	**4,902**	**4,734**	**294**	**305**
Alabama	3,721	3,657	1,559	1,525	820	825	1,304	1,268	38	39
Kentucky	2,914	2,955	1,068	1,108	522	529	1,194	1,183	130	136
Mississippi	2,216	2,219	965	955	538	549	661	664	53	51
Tennessee	4,386	4,227	1,851	1,864	718	664	1,743	1,620	74	79
West South Central	**24,602**	**25,293**	**10,778**	**11,069**	**6,602**	**6,950**	**6,138**	**6,156**	**1,083**	**1,118**
Arkansas	2,069	2,032	976	938	472	466	581	589	40	38
Louisiana	4,265	4,261	1,754	1,741	1,063	1,079	1,271	1,267	177	173
Oklahoma	2,460	2,410	1,138	1,134	685	679	510	484	127	113
Texas	15,808	16,591	6,909	7,255	4,383	4,726	3,776	3,816	740	794
Mountain	**10,606**	**11,172**	**4,136**	**4,397**	**3,632**	**3,720**	**2,440**	**2,650**	**399**	**404**
Arizona	3,652	3,861	1,613	1,744	1,291	1,348	641	657	107	113
Colorado	2,066	2,064	810	808	864	767	320	418	72	70
Idaho	752	793	311	313	218	245	207	217	16	18
Montana	561	591	203	208	154	161	184	199	20	23
Nevada	1,084	1,280	408	490	278	321	362	426	35	42
New Mexico	1,094	1,124	356	376	401	426	236	235	101	87
Utah	889	957	321	346	301	328	227	241	40	42
Wyoming	508	501	112	112	125	124	263	257	8	8
Pacific Contiguous	**25,477**	**26,235**	**9,848**	**10,189**	**9,318**	**9,831**	**5,719**	**5,678**	**592**	**537**
California	20,303	20,725	7,624	7,854	7,848	8,283	4,416	4,228	415	361
Oregon	1,955	2,037	836	867	600	617	481	514	39	39
Washington	3,219	3,472	1,388	1,468	871	931	822	935	138	137
Pacific Noncontiguous	**1,364**	**1,413**	**483**	**505**	**470**	**503**	**383**	**376**	**28**	**29**
Alaska	436	459	180	189	192	207	43	41	22	22
Hawaii	928	953	304	316	278	296	340	335	6	6
U.S. Total	**198,345**	**201,978**	**82,900**	**84,538**	**61,030**	**64,142**	**47,828**	**46,825**	**6,587**	**6,472**

[1] Includes public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

Notes: •See technical notes for estimation methodology. •Weather-related phenomena, reclassification of retail sales, changes in number of customers, prior period adjustments, and changes in billing procedures may contribute to substantial year-to-year changes in the data in this table. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-826, ''Monthly Electric Utility Sales and Revenue Report with State Distributions.''

Table 29. Estimated Coefficients of Variation of Revenue from Retail Sales by U.S. Electric Utilities by Census Division and State, 1993 and 1994

(Percent)

Census Division and State	All Sectors		Residential		Commercial		Industrial		Other [1]	
	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994
New England	**0.3**	**0.4**	**0.2**	**0.2**	**0.4**	**0.5**	**0.3**	**0.5**	**0.7**	**1.1**
Connecticut	.2	.2	.2	.2	.2	.1	.2	.2	.2	.3
Maine	.2	.3	.1	.2	.1	.2	.3	.4	2.1	.7
Massachusetts	.6	.8	.5	.5	.9	1.1	.8	1.1	1.2	2.2
New Hampshire	.5	.4	.7	.6	.5	1.7	.5	.7	.3	.4
Rhode Island	.1	.1	.1	.1	.1	.1	.2	.2	.1	.2
Vermont	.7	.7	.9	.7	.7	.9	.9	1.0	.5	.4
Middle Atlantic	**.5**	**.5**	**.7**	**.8**	**.5**	**.4**	**1.3**	**.5**	**.6**	**.4**
New Jersey	.2	.3	.4	.4	.2	.2	.2	.2	.1	.1
New York	.9	.9	1.1	1.2	.9	.6	3.7	1.4	.7	.5
Pennsylvania	.8	.9	1.3	1.6	.6	.6	.9	.7	2.2	1.8
East North Central	**.3**	**.2**	**.4**	**.3**	**.3**	**.4**	**.3**	**.5**	**.6**	**.3**
Illinois	.7	.3	1.0	.6	.7	1.0	.7	.6	.5	.3
Indiana	.3	.3	.7	.7	.3	.4	.4	.4	2.5	1.9
Michigan	.6	.8	.6	.3	.5	1.2	.8	2.6	.4	1.8
Ohio	.5	.5	.8	.6	.5	.4	.5	.5	1.7	.7
Wisconsin	.3	.3	.5	.5	.3	.4	.3	.3	1.1	2.2
West North Central	**.8**	**.4**	**1.0**	**.4**	**1.3**	**.3**	**1.0**	**.4**	**1.7**	**1.4**
Iowa	4.0	.7	5.3	1.2	9.3	.5	5.3	.7	5.0	1.3
Kansas	1.5	.3	1.7	.8	1.3	.5	1.9	.5	3.1	1.8
Minnesota	.8	1.0	.9	1.3	.9	.8	.7	.9	.7	.9
Missouri	1.0	.8	1.1	.8	.7	.7	1.3	1.4	1.0	1.3
Nebraska	.9	.8	1.1	1.2	.8	.6	.6	1.1	5.4	5.0
North Dakota	.5	.5	.7	.5	.7	.6	.7	.5	.7	.8
South Dakota	.7	.7	.9	.9	.5	.6	.6	.6	2.4	2.6
South Atlantic	**.2**	**.2**	**.3**	**.3**	**.2**	**.3**	**.2**	**.3**	**.3**	**.5**
Delaware	.5	.3	.4	.2	.4	.3	.9	.8	.3	.3
District of Columbia	—	—	—	—	—	—	—	—	—	—
Florida	.4	.7	.5	.8	.4	.6	1.1	1.6	.9	1.2
Georgia	.5	.6	1.0	1.0	.2	.4	.3	.3	.6	1.1
Maryland	.5	.6	.6	.7	.7	1.3	.3	.9	.3	.8
North Carolina	.4	.4	.7	.7	.5	.5	.5	.5	1.0	1.1
South Carolina	.4	.5	.9	1.0	.3	.5	.4	.5	.4	.5
Virginia	.6	.4	.9	.7	.4	.2	.9	.4	.2	.6
West Virginia	.2	.3	.4	.5	.2	.3	.4	.4	.2	.4
East South Central	**.4**	**.4**	**.6**	**.6**	**.5**	**.3**	**.5**	**.6**	**.7**	**.6**
Alabama	.6	.6	1.2	1.2	1.1	.4	.5	.4	1.7	1.0
Kentucky	1.1	.8	1.7	1.5	.9	.7	1.5	.8	.6	.5
Mississippi	.7	.7	.8	.8	.6	.6	1.2	.7	3.0	1.2
Tennessee	.6	1.0	.9	.9	1.4	.8	.6	1.6	.7	2.1
West South Central	**.3**	**.7**	**.4**	**.8**	**.3**	**.6**	**.4**	**.5**	**1.3**	**1.4**
Arkansas	.4	.3	.5	.5	.4	.3	.7	.7	2.3	1.4
Louisiana	.3	.5	.5	.6	.3	.5	.2	.4	1.0	.7
Oklahoma	.8	1.2	1.3	1.3	1.1	1.2	.8	2.3	9.7	.6
Texas	.4	1.0	.6	1.2	.4	.9	.6	.8	1.0	2.0
Mountain	**.4**	**.2**	**.4**	**.2**	**.4**	**.3**	**.4**	**.3**	**2.9**	**.6**
Arizona	.4	.5	.3	.4	.4	.5	.6	.4	1.2	1.2
Colorado	1.5	.4	1.8	.4	1.6	1.1	1.4	.9	2.9	1.8
Idaho	.8	.6	.5	.5	1.5	1.4	1.6	1.6	1.3	1.6
Montana	1.1	.5	.8	.6	.7	.6	1.5	.5	2.9	3.3
Nevada	.8	1.0	.9	1.1	.4	.7	1.0	1.1	.5	.8
New Mexico	.6	.7	.9	.9	.6	.7	.7	1.2	7.6	1.3
Utah	.3	.2	.5	.3	.4	.2	.7	.2	21.3	1.3
Wyoming	.5	.6	.7	.7	1.2	1.1	.6	.6	3.1	4.6
Pacific Contiguous	**.3**	**.3**	**.3**	**.4**	**.6**	**.6**	**1.5**	**1.4**	**1.2**	**1.7**
California	.3	.4	.3	.5	.7	.7	1.9	1.8	1.7	2.5
Oregon	.6	.4	.9	.9	.3	.4	1.4	.9	4.0	.8
Washington	1.3	.7	.9	1.0	.5	.6	2.8	.7	1.4	.8
Pacific Noncontiguous	**.3**	**.2**	**.3**	**.2**	**.3**	**.3**	**.2**	**.2**	**2.1**	**1.7**
Alaska	.6	.4	.5	.3	.7	.6	1.6	1.0	2.7	2.2
Hawaii	.3	.2	.4	.2	.3	.1	.2	.2	.5	.9
U.S. Total	**.1**	**.1**	**.2**	**.2**	**.2**	**.2**	**.3**	**.2**	**.4**	**.3**

[1] Includes public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

Notes: •See technical notes for estimation methodology. •Estimates represent weighted values. •It should be noted such things as large changes in retail sales, reclassification of retail sales, or changes in billing procedures can contribute to unusually high coefficient of variations. •For an explanation of coefficient of variation, see the technical notes.

Source: Energy Information Administration, Form EIA-826, ''Monthly Electric Utility Sales and Revenue Report with State Distributions.''

Table 30. Estimated Average Revenue per Kilowatthour for U.S. Electric Utilities by Sector, Census Division, and State, 1993 and 1994

(Cents)

Census Division and State	All Sectors		Residential		Commercial		Industrial		Other [1]	
	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994
New England	**10.1**	**10.2**	**11.4**	**11.5**	**9.9**	**10.0**	**8.3**	**8.3**	**12.3**	**13.4**
Connecticut	10.3	10.2	11.4	11.5	10.1	10.0	8.3	8.1	14.2	14.0
Maine	9.2	9.7	11.7	12.3	9.6	10.2	7.0	7.3	10.8	14.8
Massachusetts	10.1	10.2	11.2	11.3	9.7	9.8	8.8	8.7	12.1	13.2
New Hampshire	10.8	11.3	12.5	13.1	11.2	11.4	8.6	9.0	14.6	14.9
Rhode Island	10.4	10.3	11.4	11.3	10.2	10.0	9.0	8.9	11.2	11.3
Vermont	9.0	9.0	9.7	9.7	9.3	9.4	7.5	7.5	12.8	13.3
Middle Atlantic	**9.5**	**9.5**	**11.4**	**11.5**	**10.1**	**10.3**	**6.5**	**6.1**	**9.8**	**9.3**
New Jersey	10.0	10.1	11.4	11.6	9.7	9.8	8.1	8.0	17.3	17.7
New York	10.8	10.8	13.3	13.5	11.7	11.8	6.7	5.5	9.3	8.8
Pennsylvania	7.8	7.8	9.5	9.5	8.3	8.2	5.9	5.9	11.7	11.5
East North Central	**6.5**	**6.4**	**8.3**	**8.4**	**7.4**	**7.3**	**4.6**	**4.4**	**7.0**	**6.6**
Illinois	7.7	7.4	10.3	9.9	7.9	7.7	5.5	5.2	6.9	6.6
Indiana	5.1	5.2	6.6	6.8	5.8	5.9	3.8	3.9	9.4	9.4
Michigan	7.1	7.1	8.1	8.3	8.3	8.0	5.7	5.3	8.7	5.0
Ohio	6.2	6.2	8.3	8.6	7.6	7.8	4.2	4.1	6.2	6.4
Wisconsin	5.5	5.5	7.1	7.1	6.0	5.9	4.0	3.9	7.2	7.3
West North Central	**6.0**	**6.0**	**7.3**	**7.4**	**6.3**	**6.3**	**4.4**	**4.4**	**6.1**	**5.4**
Iowa	5.9	5.8	8.0	8.1	6.4	6.3	3.9	3.9	5.5	2.4
Kansas	6.6	6.6	7.8	7.9	6.7	6.7	4.9	4.9	9.3	8.9
Minnesota	5.6	5.7	7.1	7.4	6.1	6.3	4.4	4.4	7.3	7.3
Missouri	6.3	6.2	7.2	7.3	6.2	6.2	4.8	4.6	6.9	7.0
Nebraska	5.5	5.4	6.3	6.3	5.7	5.6	4.1	3.9	6.0	5.9
North Dakota	5.9	5.8	6.3	6.3	6.6	6.5	4.9	4.7	3.8	4.0
South Dakota	6.2	6.2	7.0	7.1	6.7	6.9	4.6	4.6	4.4	4.5
South Atlantic	**6.6**	**6.5**	**7.9**	**7.8**	**6.7**	**6.6**	**4.7**	**4.6**	**6.3**	**6.5**
Delaware	6.9	6.8	9.0	8.9	7.2	7.0	4.8	4.6	11.5	11.1
District of Columbia	6.8	7.1	7.2	7.5	7.1	7.1	5.9	4.6	6.5	6.7
Florida	7.2	7.0	8.0	7.8	6.7	6.4	5.2	5.2	6.7	7.0
Georgia	6.7	6.6	7.8	7.8	7.4	7.4	4.7	4.6	8.8	8.8
Maryland	6.9	7.0	8.2	8.4	7.1	7.2	5.4	5.2	8.0	8.4
North Carolina	6.6	6.5	8.1	8.1	6.6	6.5	4.8	4.7	7.0	7.0
South Carolina	5.6	5.7	7.3	7.5	6.2	6.4	4.1	4.0	5.7	6.0
Virginia	6.4	6.3	8.0	7.9	6.1	6.2	4.2	4.2	5.6	5.6
West Virginia	5.2	5.2	6.3	6.4	5.8	5.8	4.0	4.0	9.2	9.1
East South Central	**5.2**	**5.1**	**6.3**	**6.2**	**6.4**	**6.3**	**4.1**	**3.9**	**5.8**	**5.9**
Alabama	5.7	5.4	6.8	6.7	6.9	6.7	4.3	4.0	5.9	5.8
Kentucky	4.3	4.3	5.7	5.7	5.3	5.3	3.3	3.3	4.6	4.7
Mississippi	6.2	6.0	7.2	7.0	7.4	7.1	4.6	4.5	8.9	8.5
Tennessee	5.2	5.2	5.8	5.9	6.1	6.1	4.3	4.2	7.1	7.4
West South Central	**6.4**	**6.3**	**7.9**	**7.9**	**6.9**	**7.0**	**4.4**	**4.3**	**6.6**	**6.8**
Arkansas	6.8	6.5	8.3	8.1	7.0	6.9	5.1	4.8	7.0	6.7
Louisiana	6.3	6.1	7.8	7.7	7.5	7.2	4.5	4.2	7.3	7.1
Oklahoma	6.1	5.9	7.2	7.0	6.3	6.1	4.3	4.1	5.9	5.2
Texas	6.4	6.5	8.0	8.1	6.9	7.1	4.3	4.3	6.6	7.0
Mountain	**6.2**	**6.2**	**7.6**	**7.7**	**6.7**	**6.8**	**4.3**	**4.4**	**6.0**	**5.6**
Arizona	8.3	8.1	9.7	9.6	8.7	8.6	5.8	5.7	6.7	5.7
Colorado	6.1	6.1	7.3	7.4	5.8	6.0	4.5	4.6	7.6	7.9
Idaho	4.0	4.0	5.0	5.0	4.4	4.3	2.8	2.8	4.7	4.7
Montana	4.3	4.5	5.7	5.8	5.1	5.1	3.1	3.3	4.2	4.3
Nevada	5.9	6.4	6.5	7.2	6.5	7.0	5.0	5.4	4.8	5.2
New Mexico	7.4	7.2	9.2	9.1	8.4	8.4	5.0	4.7	6.9	5.7
Utah	5.3	5.4	6.8	6.9	5.9	5.9	3.7	3.8	4.3	4.4
Wyoming	4.2	4.2	5.9	5.9	5.0	5.0	3.5	3.5	6.5	7.1
Pacific Contiguous	**7.4**	**7.6**	**8.6**	**8.9**	**8.9**	**9.1**	**5.2**	**5.2**	**4.7**	**5.0**
California	9.7	9.8	11.3	11.4	10.7	10.9	7.2	7.0	5.2	5.8
Oregon	4.4	4.6	5.0	5.3	4.9	4.9	3.3	3.4	6.4	5.0
Washington	3.7	4.0	4.6	4.9	4.5	4.7	2.4	2.8	3.5	3.7
Pacific Noncontiguous	**10.5**	**10.5**	**11.8**	**11.9**	**10.6**	**10.7**	**8.9**	**8.8**	**11.5**	**11.7**
Alaska	10.0	10.2	11.2	11.2	9.3	9.6	8.7	8.4	11.6	11.9
Hawaii	10.7	10.7	12.3	12.4	11.7	11.6	9.0	8.8	11.3	11.1
U.S. Average	**6.92**	**6.92**	**8.34**	**8.41**	**7.72**	**7.75**	**4.86**	**4.72**	**6.86**	**6.79**

[1] Includes public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

Notes: •See technical notes for estimation methodology. •Estimates represent weighted values. •Weather-related phenomena, reclassification of retail sales, changes in number of customers, prior period adjustments, and changes in billing procedures may contribute to substantial year-to-year changes in the data in this table. •The average revenue per kilowatthour of electricity sold is calculated by dividing revenue by sales. •Totals may not equal sum of components because of independent rounding.

Source: Energy Information Administration, Form EIA-826, ''Monthly Electric Utility Sales and Revenue Report with State Distributions.''

Appendix A

Technical Notes

Appendix A. Technical Notes

Data Sources

The *Electric Power Annual* is prepared by the Coal and Electric Data and Renewables Division; Office of Coal, Nuclear, Electric and Alternate Fuels; Energy Information Administration (EIA); U.S. Department of Energy (DOE). Data published in the *Electric Power Annual Volume 1* (EPA) are compiled from three statistical forms filed monthly and one form filed annually by electric utilities. Those forms are: the Form EIA-759, "Monthly Power Plant Report"; the Federal Energy Regulatory Commission (FERC) Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants"; the Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions"; and the Form EIA-860, "Annual Electric Generator Report." Each form is summarized below.

Form EIA-759

The Form EIA-759 is a mandatory census of all operators of electric utility plants producing electric power for public use. The Form EIA-759 is used to collect monthly data on net generation, consumption of coal, petroleum, and natural gas; and end-of-the-month stocks of coal and petroleum for each plant by prime mover and fuel-type combination. Summary data from the Form EIA-759 are also published in the *Electric Power Monthly (EPM)*, the *Monthly Energy Review (MER)*, and the *Annual Energy Review (AER)*. These reports present aggregated data for electric utilities at the U.S., Census division, and North American Electric Reliability Council Region (NERC) levels.

Instrument and Design History. Prior to 1936, the Bureau of the Census and the U.S. Geological Survey collected, compiled, and published data on the electric power industry. In 1936, the Federal Power Commission (FPC) assumed all data collection and publication responsibilities for the electric power industry and implemented the FPC Form 4. The Federal Power Act, Sections 311 and 312, and FPC Order 141 define the legislative authority to collect power production data. The Form EIA-759 replaced the FPC Form 4 in January 1982.

Data Processing. The Form EIA-759, along with a return envelope, is mailed to respondents approximately 4 working days before the end of the month. The respondents names are obtained from a computerized mailing address file. The completed forms are to be returned to the EIA by the 10th working day after the end of the reporting month. After receipt, data from the completed forms are manually logged in and edited before being keypunched for automatic data processing. An edit program checks the data for errors not found during manual editing. The electric utility companies are telephoned to obtain data in cases of missing reports and to verify data when questions arise during editing. Following EIA approval, the data are made available for public use.

FERC Form 423

The FERC Form 423, a restricted census, is a monthly record of delivered-fuel purchases, submitted by approximately 230 electric utilities for each plant with a total steam-electric and combined-cycle nameplate capacity of 50 or more megawatts. Summary data from the FERC Form 423 are also published in the *EPM*, the *MER*, and the *Cost and Quality of Fuels for Electric Utility Plants* annual report. These reports present aggregated data on electric utilities at the U.S. and Census division level.

Instrument and Design History. On July 7, 1972, the FPC issued Order Number 453 enacting the New Code of Federal Regulations, Section 141.61, legally creating the Form 423. Originally, the form was used to collect data only on fossil-steam plants, but was amended in 1974 to include data on internal combustion and combustion turbines. The FERC Form 423 replaced the FPC Form 423 in January 1983. Peaking units were eliminated from the FERC Form 423. In addition, the nameplate capacity threshold was changed from 25 megawatts to 50 megawatts. This reduction in coverage eliminated approximately 50 utilities and 250 plants. All Form 423 historical data in this publication have been revised to reflect the new nameplate capacity threshold of 50 or more megawatts.

In 1991, the FERC Form 423 was amended to include combined-cycle generating units. This increase in coverage added 5 electric utilities and approximately 15 additional electric plants. Several plants, already reporting on the FERC Form 423, began including fuel receipts for combined-cycle units starting with 1991 data.

Data Processing. Starting with the January 1993 data, the FERC began collection of the data directly from the respondents. The FERC processes the data through edits and each month provides the EIA with a diskette containing the data. The EIA reviews the data for accuracy. Following EIA approval, the data are made available for public use.

Form EIA-826

The Form EIA-826 is a monthly collection of data from 246 U.S. electric utilities, which generally account for the largest share of retail sales within the State for which they report.

Instrument and Design History. The collection of electric power sales, revenue, and income data began in the early 1940's and was established as FPC Form 5 by FPC Order 141 in 1947. In 1980, the report was revised with only selected income items remaining and became the FERC Form 5. The Form EIA-826 replaced the FERC Form 5 in January 1983. In January 1987, the Form EIA-826 was changed to the "Monthly Electric Utility Sales and Revenue Report with State Distributions;" it was formerly titled, "Electric Utility Company Monthly Statement." The Form EIA-826 was revised in January 1990, and some data elements were eliminated.

Frame. The current sample for the Form EIA-826, which was designed to obtain estimates of electricity sales and revenue per kilowatthour at the State level by end-use sector, was chosen to be in effect for the January 1993 data. The frame for the Form EIA-826 was originally based on the 1989 submission of the Form EIA-861, which consisted of approximately 3,250 electric utilities selling retail and/or sales for resale. Note that for the Form EIA-826, we are only interested in retail sales. Updates have been made to the frame to reflect mergers that affect data processing. Some electric utilities serve in more than one State. Thus, the State-service area is actually the sampling unit. For each State served by each utility, there is a utility State-part, or "State-service area." This approach allows for an explicit calculation of estimates for State, Census division, and U.S. level sales, revenue and revenue per kilowatthour by end-use sector (residential, commercial, industrial and other). Regressor data came from the Form EIA-861. (Note that estimates at the "State level" are for sales for the entire State, and similarly for "Census division" and "U.S." levels.)

The preponderance of electric power sales to ultimate consumers in each State are made by a few large utilities. Ranking of electric utilities by retail sales on a State-by-State basis revealed a consistent pattern of dominance by a few electric utilities in nearly all 50 States and the District of Columbia. These dominant electric utilities were selected as a model sample. These electric utilities constitute about 8 percent of the population of U.S. electric utilities, but provide three-quarters of the total U.S. retail electricity sales. The procedures used to derive electricity sales, revenue, average revenue per kilowatthour, and associated coefficient of variation (CV) estimates are provided in the Formulas and Calculations section of this Appendix.

Data Processing. The forms are mailed each year to the electric utilities with State-parts selected in the sample. The completed form is to be returned to the EIA by the last calendar day of the month following the reporting month. Nonrespondents are telephoned to obtain the data. Imputation, in model sampling, is an implicit part of the estimation. That is, data that are not available either because it was not part of the sample or because the data are missing are estimated using a model. The data are edited and entered into the computer where additional checks are completed. After all forms have been received from the respondents, the final automated edit is submitted. After EIA approval, the data are made available for public use.

Form EIA-860

The Form EIA-860 is a mandatory census of electric utilities in the United States that operate power plants or plan to operate a power plant within 10 years of the reporting year. The survey is used to collect data on existing power plants from the electric utilities and their 10-year plans for constructing new plants, and modifying and retiring existing plants. Data on the survey are collected at the generating unit level. These data are then aggregated by energy source, geographic area, and prime mover. Final data from the Form EIA-860 are also summarized in the *Inventory of Power Plants in the United States*.

Instrument and Design History. The Form EIA-860 was implemented in January 1985 to collect data as of year-end 1984. The Federal Energy Administration Act of 1974 (Public Law 93-275) defines the legislative authority to collect these data.

Data Processing. The Form EIA-860 is mailed to approximately 900 respondents in December and the completed forms are to be returned to the EIA by February 15 containing data as of the end of the preceding calendar year. Data for each respondent are preprinted from the applicable data base. Respondents are instructed to verify all preprinted data and to supply missing data. The data are manually edited before being keyed for automatic data processing. Computer programs containing additional edit checks are run. Respondents are telephoned to obtain correction or clarification of reported data and to obtain missing data, as a result of the manual and automatic editing process. After EIA approval, the data are made available for public use.

Quality of Data

The Office of Coal, Nuclear, Electric and Alternate Fuels (CNEAF) is responsible for routine data improvement and quality assurance activities. All operations in this office are done in accordance with formal standards established by the EIA. These standards are the measuring rod necessary for quality statistics. Data improvement efforts include verification of data-keyed input by automatic computerized

methods, editing by subject matter specialists, and follow up on nonrespondents. The CNEAF office supports the quality assurance efforts of the data collectors by providing advisory reviews of the structure of information requirements, and of proposed designs for new and revised data collection forms and systems. Once implemented, the actual performance of working data collection systems is also validated. Computerized respondent data files are checked to identify those who fail to respond to the survey. By law, nonrespondents may be fined or otherwise penalized for not filing a mandatory EIA data form. Before invoking the law, the EIA tries to obtain the required information by encouraging cooperation of nonrespondents.

Completed forms received by the CNEAF office are sorted, screened for completeness of reported information, and keyed onto computer tapes for storage and transfer to random access data bases for computer processing. The information coded on the computer tapes is manually spot-checked against the forms to certify accuracy of the tapes. To ensure the quality standards established by the EIA, formulas that use the past history of data values in the data base have been designed and implemented to check data input for errors automatically. Data values that fall outside the ranges prescribed in the formulas are verified by telephoning respondents to resolve any discrepancies.

Conceptual problems affecting the quality of data are discussed in the report, *An Assessment of the Quality of Selected EIA Data Series:*[21]

Data Editing System

Data from the form surveys are edited using automated systems. The edit includes both deterministic checks, in which records are checked for the presence of required fields and their validity; and statistical checks, in which estimation techniques are used to validate data according to their behavior in the past and in comparison to other current fields.

Rounding Rules for Data

Given a number with r digits to the left of the decimal and d+t digits in the fraction part, with d being the place to which the number is to be rounded and t being the remaining digits which will be truncated, this number is rounded to r+d digits by adding 5 to the (r+d+1)th digit when the number is positive or by subtracting 5 when the number is negative. The t digits are then truncated at the (r+d+1)th digit. The symbol for a rounded number truncated to zero is (*).

CNEAF Data Revision and Policy

The Office of Coal, Nuclear, Electric and Alternate Fuels has adopted the following policy with respect to the revision and correction of recurrent data in energy publications:

1. Annual survey data collected by this office are published either as preliminary or final when first appearing in a data report. Data initially released as preliminary will be so noted in the report. These data will be revised, if necessary, and declared final in the next publication of the data.
2. All monthly and quarterly survey data collected by this office are published as preliminary. These data are revised only after the completion of the 12-month cycle of the data. No revisions are made to the published data before this unless approved by the Office Director.
3. The magnitude of changes due to revisions experienced in the past will be included in the data reports, so that the reader can assess the accuracy of the data.
4. After data are published as final, corrections will be made only in the event of a greater than one percent difference at the national level. Corrections for differences that are less than the before-mentioned threshold are left to the discretion of the Office Director.

The EPA presents the most current annual data available to the EIA. The statistics may differ from those published previously in EIA publications due to corrections, revisions, or other adjustments to the data subsequent to its original release. On a chapter basis, the status (preliminary versus final) of the data contained in this report is:

- **Generating Capability at U.S. Electric Utilities**
  Total net summer capability data for 1994 from the Form EIA-860 are preliminary. Final 1994 data will be reported in the *Inventory of Power Plants in the United States 1994*, scheduled to be published in October 1995.
- **Net Generation at U.S. Electric Utilities**
  All Form EIA-759 data are final. A comparison of preliminary versus final data for 1994 is provided in the Technical Notes of the *Electric Power Monthly* (EPM), April 1995.
- **U.S. Electric Utility Fossil-Fuel Statistics**
  All FERC Form 423 data are final. A comparison of preliminary versus final data for 1994 from the FERC Form 423 is provided in the Technical Notes of the EPM, May 1995.
- **Estimated U.S. Electric Utility Retail Sales, Revenue, and Average Revenue per Kilowatthour**
  Estimates for sales, revenue, and average revenue per kilowatthour from the Form EIA-826 for 1994 are final. Preliminary annual data from the Form EIA-861, "Annual Electric Utility Report," will

[21] Energy Information Administration, Office of Statistical Standards, *An Assessment of the Quality of Selected EIA Data Series: Electric Power Data*, DOE/EIA-0292(87) (Washington, DC, 1989).

be provided in Volume 2 of the *EPA*. The data are revised and declared final in the *Electric Sales and Revenue 1994*. A comparison of preliminary versus final annual data at the national level for 1994 will be provided in the *EPA Volume 2* 1995.

Formulas and Calculations

Average Heat Content. In order to determine the Btu value per unit of consumption for each of the fossil fuels collected on the Form EIA-759, the heat content values contained on the FERC Form 423 were used. Data on the FERC Form 423 represent approximately 85 percent of the total generator nameplate capacity for all electric utilities.

Percent Difference. The following formula is used to calculate percent differences.

$$\text{Percent Difference} = \left(\frac{x(t_2) - x(t_1)}{x(t_1)} \right) \times 100,$$

where $x(t_1)$ and $x(t_2)$ denote the quantity at year t_1 and subsequent year t_2.

Form EIA-759

Data for the Form EIA-759 are collected at the plant level. These data are then aggregated to provide geographic totals at the State, Census division, and U.S. level, or totals by type of plant. Consumption of fuel(s) is converted from quantities (in short tons, barrels, or thousand cubic feet) to Btu at the plant level. End-of-month fuel stocks for a single generating plant may not equal beginning-of-the-month stocks, plus receipts, less consumption, for many reasons, including the fact that several plants may share the same fuel stock.

FERC Form 423

Data for the FERC Form 423 are collected at the plant level. These data are then used in the following formulas to produce aggregates and averages for each fuel type at the State, Census division, and U.S. level. For these formulas, receipts and average heat content are at the plant level. For each geographic region, the summation $\sum$ represents the sum of all plants in that geographic region. Additionally,

- For coal, units for receipts (R) are in tons, units for average heat content (A) are in Btu per pound, and the unit conversion (U) is 2,000 pounds per ton;
- For petroleum, units for receipts (R) are in barrels, units for average heat content (A) are in Btu per gallon, and the unit conversion (U) is 42 gallons per barrel;
- For gas, units for receipts (R) are in thousand cubic feet (Mcf), average heat content (A) are in Btu per cubic foot, and the unit conversion (U) is 1,000 cubic feet per Mcf.

Where i denotes a plant; R_i = receipts for plant i; A_i = average heat content for receipts at plant i; and, U = unit conversion:

$$\text{Total Btu} = \sum_i (R_i \times A_i \times U),$$

and

$$\text{Weighted Average Btu} = \frac{\sum_i (R_i \times A_i)}{\sum_i R_i}.$$

Where i denotes a plant; R_i = receipts for plant i; A_i = average heat content for receipts at plant i; and, C_i = cost at plant i:

Weighted Average Cost (cents per million Btu) =

$$\frac{\sum_i (R_i \times A_i \times U \times C_i)}{\sum_i (R_i \times A_i)},$$

and

Weighted Average Cost (dollars per unit) =

$$\frac{U \sum_i (R_i \times A_i \times C_i)}{(10^8) \sum_i R_i}.$$

Form EIA-826

The Form EIA-826 data are collected at the utility level by sector and State. When a utility has sales in more than one State, the data that may be required are dependent upon the sample selection that was done for each State. Data from the Form EIA-826 are used to determine estimates by sector at the State, Census division, and national level for the entire corresponding State, Census division, or national category. Form EIA-861 data were used as the frame from which the sample was selected, and also as regressor data.

The sample consists of 246 electric utilities. This includes a somewhat larger number of State-service areas for electric utilities. Estimation procedures include imputation to account for nonresponse. State-level sales-and-revenue estimates are calculated. Also, a ratio estimation procedure is used for estimation of average revenue per kilowatthour at the State level. These estimates are accumulated separately to produce estimates for Census division and U.S. levels.

The coefficient of variation (CV) statistic, usually given as a percent, is an estimate that describes the magnitude of sampling error that might reasonably be incurred. The CV, sometimes referred to as the relative standard error, is the square root of the estimated relative variance of the variable of interest. The variable of interest may be a single variable (for example,

sales) or it may be the ratio of two variables (for example, revenue to sales).

CV's do not account for nonsampling errors, such as errors of misclassification or transposed digits. They are, however, affected by nonsampling errors. Using the Central Limit Theorem, which applies to sums and means, there is an approximate 68-percent chance that the true sampling error is less than the corresponding CV.

As an example, suppose that a revenue-per-kilowatthour value is estimated to be 5.13 cents per kilowatthour with an estimated CV of 1.6 percent. This means that, ignoring any nonsampling error, there is approximately a 68-percent chance that the true average revenue per kilowatthour is within approximately 1.6 percent of 5.13 cents per kilowatthour (that is, between 5.05 and 5.21 cents per kilowatthour). There is approximately a 95-percent chance of a true sampling error being 2 CV's or less.

For sales or revenue in any sector at the State level, if we let x represent an observation from the Form EIA-861, y represents an observation from the Form EIA-826, and $\hat{y}$ represents an estimated value for data not collected, then

$$y_i = bx_i + x_i^{\gamma} e_o,$$

$$\hat{y}_i = \hat{b}x_i,$$

$$\hat{b}(\gamma) = \left[\sum_{k=1}^{n} x_k^{1-2\gamma} y_k\right] \left[\sum_{k=1}^{n} x_k^{2-2\gamma}\right]$$

Here, n is the Form EIA-826 sample size for that State, and b is the factor ('slope') relating x to y in the linear regression. γ is taken to be 1/2 although more research could refine this. For the Form EIA-826, $\gamma = 1/2$ has been shown to be adequate.

CV estimates are also provided for **annualized estimates** of sales and revenue. These CV estimates may be biased to larger than actual values, in general, because covariances between the various months of data are ignored. Even so, many of these estimates are less than one percent, and the national level estimates are quite small. Also, note that experience with past test data indicates that when CV estimates are only a few tenths of a percent, they may often be biased high even before aggregation. Thus, these CV estimates, especially at the national level, are likely to be conservative. Further, CV estimates, although designed to measure sampling error, are impacted by nonsampling error, and along with information given in the *Electric Power Monthly* (EPM) Table C2, "Comparison of Preliminary Versus Final Published Data at the U.S. Level," and Table C4, "Comparison of Sample Versus Census Published Data at the U.S. Level by End-Use Sector," give a fairly good indication of overall data accuracy.

Also, sales and revenue data are expected, generally, to be highly positively correlated, and when estimating CV's for average revenue per kilowatthour, that covariance should not be ignored. (For additional technical information, see the EPM, April 1995, page 254). CV estimates for annualized average revenue per kilowatthour will be published in future issues of this report. These CV's have not been included here because covariance estimates at the disaggregate level are not currently available and need to be recalculated for each month of the data year.

Form EIA-860

Data for the Form EIA-860 are submitted at the generating unit level and then aggregated by energy source, prime mover, and geographic area. Estimated values for net summer and net winter capability for nonnuclear[22] electric generating units were developed by use of a regression formula, using year-end 1992 data on net summer capability, net winter capability, and generator nameplate capacity of units in commercial operation during three intervals of time: 1940 or earlier, 1941 through 1980, and 1981 to present.

A heterogeneous, zero-intercept linear regression model with generator nameplate capacity as the regressor data was used since examination of the data shows that the intercepts are generally near zero.[23] In all formulas,

the symbol, *, is an operator meaning multiplied by.

For nonnuclear units,

Net Capability=b*(Nameplate Capacity),

where

b, represents the slope or factor by which nameplate capacity has to be multiplied to obtain a capability estimate, using this model,

σ, represents the standard error for b,

Generator Nameplate Capacity is expressed in kilowatts.

Net Summer Capability

b = .90, σ = .04, 1940 or earlier; b = .927, σ = .002, 1941-1980; b = .937, σ = .004, 1981 through present, for coal steam units (Unit Types, ST, AB, PB)

b = 1.00, σ = .03, 1940 or earlier; b = .961, σ = .002, 1941 - 1980; b = .93, σ = .01, 1981 through

[22] Respondents report summer and winter capability and nameplate for all nuclear units.

[23] This model is discussed in Knaub, J.R., Jr. (1994), "Relative Standard Error for a Ratio of Variables at an Aggregate Level Under Model Sampling," to appear in the *Proceedings of the Section on Survey Research Methods*, American Statistical Association.

present, for noncoal steam units (Unit Types, ST, AB, PB)

b = .856, σ = .003, 1980 or earlier; b = .85, σ = .01, 1981 through present, for gas-turbine units (Unit Types, GT, JE)

b = .94, σ = .01, 1940 or earlier; b = .84, σ = .01, 1941 - 1980; b = .86, σ = .02, 1981 through present, for combined-cycle units (Unit Types, CA, CS, CW, CT, IG)

b = .884, σ = .009, 1940 or earlier; b = .925, σ = .002, 1941 - 1980; b = .976, σ = .003, 1981 through present, for internal combustion units (Unit Type, IC)

b = .975, σ = .005, 1940 or earlier; b = 1.034, σ = .004, 1941 - 1980; b = .950, σ = .008, 1981 through present, for conventional and pipeline hydroelectric units (Unit Types, HC, HL)

b = .93, σ = .03, 1940 or earlier; b = 1.03, σ = .01, 1941 - 1980; b = 1.01, σ = .006, 1981 through present, for pumped-storage hydroelectric units (Unit Type, HR)

b = 1, for all other units (Including Unit Types, CG, FC, GE, OC, SP, SS, WT), where limited data are available.

Net Winter Capability

b = .88, σ = .05, 1940 or earlier; b = .934, σ = .002, 1941 - 1980; b = .940, σ = .004, 1981 through present, for coal steam units (Unit Types, ST, AB, PB)

b = 1.02, σ = .03, 1940 or earlier; b = .965, σ = .002, 1941 - 1980; b = .94, σ = .01, 1981 through present, for noncoal steam units (Unit Types, ST, AB, PB)

b = 1.023, σ = .004, 1980 or earlier; b = .98, σ = .01, 1981 through present, for gas-turbine units (Unit Types, GT, JE)

b = 1.02, σ = .03, 1940 or earlier; b = .96, σ = .01, 1941 - 1980; b = .94, σ = .02, 1981 through present, for combined-cycle units (Unit Types, CA, CS, CW, CT, IG)

b = .893, σ = .008, 1940 or earlier; b = .940, σ = .002, 1941 - 1980; b = .987, σ = .002, 1981 through present, for internal combustion units (Unit Type, IC)

b = .979, σ = .005, 1940 or earlier; b = 1.026, σ = .004, 1941 - 1980; b = .92, σ = .01, 1981 through present, for conventional and pipeline hydroelectric units (Unit Types, HC, HL)

b = .96, σ = .05, 1940 or earlier; b = 1.02, σ = .01, 1941 - 1980; b = 1.03, σ = .01, 1981 through present, for pumped-storage hydroelectric units (Unit Type, HR)

b = 1, for all other units (Unit Types, FC, GE, OC, SP, SS, WT, CG), where limited data are available.

General Information

Use of the Glossary

The terms in the glossary have been defined for general use. Restrictions on the definitions as used in these data collection systems are included in each definition when necessary to define the terms as they are used in this report.

Obtaining Copies of Data

These data are available on machine-readable tapes. Tapes may be purchased by using Visa, MasterCard, or American Express cards as well as money orders or checks payable to the National Technical Information Service (NTIS). Purchasers may also use NTIS and Government Printing Office depository accounts. To place an order, contact:

National Technical Information Service (NTIS)
Office of Data Base Services
U.S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161
(703) 487-4650

Table A1. Unit-of-Measure Equivalents

Unit	Equivalent
Kilowatt (kW)	1,000 (One Thousand) Watts
Megawatt (MW)	1,000,000 (One Million) Watts
Gigawatt (GW)	1,000,000,000 (One Billion) Watts
Terawatt (TW)	1,000,000,000,000 (One Trillion) Watts
Gigawatt	1,000,000 (One Million) Kilowatts
Thousand Gigawatts	1,000,000,000 (One Billion) Kilowatts
Kilowatthours (kWh)	1,000 (One Thousand) Watthours
Megawatthours (MWh)	1,000,000 (One Million) Watthours
Gigawatthours (GWh)	1,000,000,000 (One Billion) Watthours
Terawatthours (TWh)	1,000,000,000,000 (One Trillion) Watthours
Gigawatthours	1,000,000 (One Million) Kilowatthours
Thousand Gigawatthours	1,000,000,000 (One Billion) Kilowatthours
U.S. Dollar	1,000 (One Thousand) Mills
U.S. Cent	10 (Ten) Mills

Source: Energy Information Administration, Coal and Electric Data and Renewables Division.

Table A2. Metric Conversion

Glossary

Acid Rain: Also called acid precipitation or acid deposition, acid rain is precipitation containing harmful amounts of nitric and sulfuric acids formed primarily by nitrogen oxides and sulfur oxides released into the atmosphere when fossil fuels are burned. It can be wet precipitation (rain, snow, or fog) or dry precipitation (absorbed gaseous and particulate matter, aerosol particles or dust). Acid rain has a pH below 5.6. Normal rain has a pH of about 5.6, which is slightly acidic. The term pH is a measure of acidity or alkalinity and ranges from 0 to 14. A pH measurement of 7 is regarded as neutral. Measurements below 7 indicate increased acidity, while those above indicate increased alkalinity.

Actual Peak Reduction: The actual reduction in annual peak load (measured in kilowatts) achieved by consumers that participate in a utility DSM program. It reflects the changes in the demand for electricity resulting from a utility DSM program that is in effect at the same time the utility experiences its annual peak load, as opposed to the installed peak load reduction capability (i.e., Potential Peak Reduction). It should account for the regular cycling of energy efficient units during the period of annual peak load.

Allowance for Funds Used During Construction (AFUDC): A noncash item representing the estimated composite interest costs of debt and a return on equity funds used to finance construction. The allowance is capitalized in the property accounts and included in income.

Ampere: The unit of measurement of electrical current produced in a circuit by 1 volt acting through a resistance of 1 ohm.

Annual Effects: The total effects in energy use (measured in megawatthours) and peak load (measured in kilowatts) caused by all participants in the DSM programs that are in effect during a given year. It includes new and existing participants in existing programs (those implemented in prior years that are in place during the given year) and all participants in new programs (those implemented during the given year). The effects of new participants in existing programs and all participants in new programs should be based on their start-up dates (i.e., if participants enter a program in July, only the effects from July to December should be reported). If start-up dates are unknown and cannot be reasonably estimated, the effects can be annualized (i.e., assume the participants were initiated into the program on January 1 of the given year). The Annual Effects should consider the useful life of efficiency measures, by accounting for building demolition, equipment degradation and attrition.

Anthracite: A hard, black lustrous coal, often referred to as hard coal, containing a high percentage of fixed carbon and a low percentage of volatile matter. Comprises three groups classified according to the following ASTM Specification D388-84, on a dry mineral-matter-free basis:

	Fixed Carbon Limits		Volatile Matter	
	GE	LT	GT	LE
Meta-Anthracite	98	-	-	2
Anthracite	92	98	2	8
Semianthracite	86	92	8	14

Appliances: Energy Efficiency program promotion of high efficiency appliances such as dishwashers, ranges, refrigerators, and freezers in the residential, commercial, and industrial sectors. Includes programs aimed at improving the efficiency of refrigeration equipment and electrical cooking equipment, including replacement. It also includes the promotion and identification of high efficiency appliances in retail stores using a labeling system different from the federally-mandated Energy Guide. Energy Efficiency program promotion of high efficiency cooling and heating appliances are included under Cooling System and Heating System, respectively.

Ash: Impurities consisting of silica, iron, alumina, and other noncombustible matter that are contained in coal. Ash increases the weight of coal, adds to the cost of handling, and can affect its burning characteristics. Ash content is measured as a percent by weight of coal on an “as received” or a “dry” (moisture-free, usually part of a laboratory analysis) basis.

Asset: An economic resource, tangible or intangible, which is expected to provide benefits to a business.

Available but not Needed Capability: Net capability of main generating units that are operable but not considered necessary to carry load, and cannot be connected to load within 30 minutes.

Average Revenue per Kilowatthour: The average revenue per kilowatthour of electricity sold by sector (residential, commercial, industrial, or other) and geographic area (State, Census division, and national), is calculated by dividing the total monthly revenue by the corresponding total monthly sales for each sector and geographic area.

Barrel: A volumetric unit of measure for crude oil and petroleum products equivalent to 42 U.S. gallons.

Base Bill: A charge calculated through multiplication of the rate from the appropriate electric rate schedule by the level of consumption.

Baseload: The minimum amount of electric power delivered or required over a given period of time at a steady rate.

Baseload Capacity: The generating equipment normally operated to serve loads on an around-the-clock basis.

Baseload Plant: A plant, usually housing high-efficiency steam-electric units, which is normally operated to take all or part of the minimum load of a system, and which consequently produces electricity at an essentially constant rate and runs continuously. These units are operated to maximize system mechanical and thermal efficiency and minimize system operating costs.

Bbl: The abbreviation for barrel.

Bcf: The abbreviation for 1 billion cubic feet.

Bituminous Coal: The most common coal. It is dense and black (often with well-defined bands of bright and dull material). Its moisture content usually is less than 20 percent. It is used for generating electricity, making coke, and space heating. Comprises five groups classified according to the following ASTM Specification D388-84, on a dry mineral-matter-free (mmf) basis for fixed-carbon and volatile matter and a moist mmf basis for calorific value.

	Fixed Carbon Limits		Volatile Matter Limits		Calorific Value Limits	
					Btu/lb	
	GE	LT	GT	LT	GE	LE
LV	78	86	14	22	-	-
MV	69	78	22	31	-	-
HVA	-	69	31	-	14000	-
HVB	-	-	-	-	13000	14000
HVC	-	-	-	-	10500	13000

LV = Low-volatile bituminous coal
MV = Medium-volatile bituminous coal
HVA = High-volatile A bituminous coal
HVB = High-volatile B bituminous coal
HVC = High-volatile C bituminous coal

Boiler: A device for generating steam for power, processing, or heating purposes or for producing hot water for heating purposes or hot water supply. Heat from an external combustion source is transmitted to a fluid contained within the tubes in the boiler shell. This fluid is delivered to an end-use at a desired pressure, temperature, and quality.

Btu (British Thermal Unit): A standard unit for measuring the quantity of heat energy equal to the quantity of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit.

Capability: The maximum load that a generating unit, generating station, or other electrical apparatus can carry under specified conditions for a given period of time without exceeding approved limits of temperature and stress.

Capacity: The amount of electric power delivered or required for which a generator, turbine, transformer, transmission circuit, station, or system is rated by the manufacturer.

Capacity (Purchased): The amount of energy and capacity available for purchase from outside the system.

Capacity Charge: An element in a two-part pricing method used in capacity transactions (energy charge is the other element). The capacity charge, sometimes called Demand Charge, is assessed on the amount of capacity being purchased.

Capital (Financial): The line items on the right side of a balance sheet, that include debt, preferred stock, and common equity. A net increase in assets must be financed by an increase in one or more forms of capital.

Census Divisions: The nine geographic divisions of the United States established by the Bureau of the Census, U.S. Department of Commerce, for the purpose of statistical analysis. The boundaries of Census divisions coincide with State boundaries. The Pacific Division is subdivided into the Pacific Contiguous and Pacific Noncontiguous areas.

Circuit: A conductor or a system of conductors through which electric current flows.

Coal: A black or brownish-black solid combustible substance formed by the partial decomposition of vegetable matter without access to air. The rank of coal, which includes anthracite, bituminous coal, subbituminous coal, and lignite, is based on fixed carbon, volatile matter, and heating value. Coal rank indicates the progressive alteration from lignite to anthracite. Lignite contains approximately 9 to 17 million Btu per ton. The contents of subbituminous and bituminous coal range from 16 to 24 million Btu per ton and from 19 to 30 million Btu per ton, respectively. Anthracite contains approximately 22 to 28 million Btu per ton.

Cogenerator: A generating facility that produces electricity and another form of useful thermal energy (such as heat or steam), used for industrial, commercial, heating, or cooling purposes. To receive status as a qualifying facility (QF) under the Public Utility Regulatory Policies Act (PURPA), the facility must produce electric energy and "another form of useful thermal energy through the sequential use of energy," and meet certain ownership, operating, and efficiency criteria established by the Federal Energy Regulatory Commission (FERC). (See the Code of Federal Regulations, Title 18, Part 292.)

Coincidental Demand: The sum of two or more demands that occur in the same time interval.

Coincidental Peak Load: The sum of two or more peakloads that occur in the same time interval.

Coke (Petroleum): A residue high in carbon content and low in hydrogen that is the final product of thermal decomposition in the condensation process in cracking. This product is reported as marketable coke or catalyst coke. The conversion factor is 5 barrels (42 U.S. gallons each) per short ton.

Combined Cycle: An electric generating technology in which electricity is produced from otherwise lost waste heat exiting from one or more gas (combustion) turbines. The exiting heat is routed to a conventional boiler or to a heat recovery steam generator for utilization by a steam turbine in the production of electricity. This process increases the efficiency of the electric generating unit.

Combined Cycle Unit: An electric generating unit that consists of one or more combustion turbines and one or more boilers with a portion of the required energy input to the boiler(s) provided by the exhaust gas of the combustion turbine(s).

Combined Pumped-Storage Plant: A pumped-storage hydroelectric power plant that uses both pumped water and natural streamflow to produce electricity.

Commercial: The commercial sector is generally defined as nonmanufacturing business establishments, including hotels, motels, restaurants, wholesale businesses, retail stores, and health, social, and educational institutions. The utility may classify commercial service as all consumers whose demand or annual use exceeds some specified limit. The limit may be set by the utility based on the rate schedule of the utility.

Commercial Operation: Commercial operation begins when control of the loading of the generator is turned over to the system dispatcher.

Connection: The physical connection (e.g. transmission lines, transformers, switch gear, etc.) between two electric systems permitting the transfer of electric energy in one or both directions.

Conservation and Other DSM: This Demand-Side Management category represents the amount of consumer load reduction at the time of system peak due to utility programs that reduce consumer load during many hours of the year. Examples include utility rebate and shared savings activities for the installation of energy efficient appliances, lighting and electrical machinery, and weatherization materials. In addition, this category includes all other Demand-Side Management activities, such as thermal storage, time-of-use rates, fuel substitution, measurement and evaluation, and any other utility-administered Demand-Side Management activity designed to reduce demand and/or electricity use.

Construction Work In Progress (CWIP): The balance shown on a utility's balance sheet for construction work not yet completed but in process. This balance line item may or may not be included in the rate base.

Consumption (Fuel): The amount of fuel used for gross generation, providing standby service, start-up and/or flame stabilization.

Contract Price: Price of fuels marketed on a contract basis covering a period of 1 or more years. Contract prices reflect market conditions at the time the contract was negotiated and therefore remain constant throughout the life of the contract or are adjusted through escalation clauses. Generally, contract prices do not fluctuate widely.

Contract Receipts: Purchases based on a negotiated agreement that generally covers a period of 1 or more years.

Cooling System: Energy Efficiency program promotion aimed at improving the efficiency of the cooling delivery system, including replacement, in the residential, commercial, or industrial sectors.

Cooperative Electric Utility: An electric utility legally established to be owned by and operated for the benefit of those using its service. The utility company will generate, transmit, and/or distribute supplies of electric energy to a specified area not being serviced by another utility. Such ventures are generally exempt from Federal income tax laws. Most electric cooperatives have been initially financed by the Rural Electrification Administration, U.S. Department of Agriculture.

Cost: The amount paid to acquire resources, such as plant and equipment, fuel, or labor services.

Current (Electric): A flow of electrons in an electrical conductor. The strength or rate of movement of the electricity is measured in amperes.

Demand (Electric): The rate at which electric energy is delivered to or by a system, part of a system, or piece of equipment, at a given instant or averaged over any designated period of time.

Demand-Side Management: The planning, implementation, and monitoring of utility activities designed to encourage consumers to modify patterns of electricity usage, including the timing and level of electricity demand. It refers only to energy and load-shape modifying activities that are undertaken in response to utility-administered programs. It does not refer to energy and load-shape changes arising from the normal operation of the marketplace or from government-mandated energy-efficiency standards. Demand-Side Management (DSM) covers the complete range of load-shape objectives, including strategic conservation and load management, as well as strategic load growth.

Demand-Side Management Expenditures: The expenditures incurred by the utility to achieve the capacity and energy savings from the Demand-Side Management Program. Expenditures incurred by consumers or third parties are to be excluded. The expenditures are to be reported in nominal dollars in the year in which they are incurred, regardless of when the savings occur. Program expenditures include

expensed items incurred to implement the program, incentive payments provided to consumers to install Demand-Side Management measures, and annual operation and maintenance expenses incurred during the year. Utility expenditures that are general, administrative, or not specific to a particular Demand-Side Management category are to be excluded.

Direct Load Control: Refers to program activities that can interrupt consumer load at the time of annual peak load by direct control of the utility system operator by interrupting power supply to individual appliances or equipment on consumer premises. This type of control usually involves residential consumers. Direct Load Control excludes Interruptible Load and Other Load Management effects. (Direct Load Control, as defined here, is synonymous with Direct Load Control Management reported to the North American Electric Reliability Council on the voluntary Office of Energy Emergency Operations Form OE-411, "Coordinated Regional Bulk Power Supply Program Report," with the exception that annual peakload effects are reported here and seasonal (i.e., summer and winter) peakload effects are reported on the OE-411.)

Direct Utility Cost: A utility cost that is identified with one of the DSM program categories (i.e. Energy Efficiency, Direct Load Control, Interruptible Load, Other Load Management, Other DSM Programs, Load Building).

Distillate Fuel Oil: A general classification for one of the petroleum fractions produced in conventional distillation operations. It is used primarily for space heating, on-and-off-highway diesel engine fuel (including railroad engine fuel and fuel for agriculture machinery), and electric power generation. Included are Fuel Oils No. 1, No. 2, and No. 4; and Diesel Fuels No. 1, No. 2, and No. 4.

Distribution System: The portion of an electric system that is dedicated to delivering electric energy to an end user.

Diversity Exchange: An exchange of capacity or energy, or both, between systems whose peakloads occur at different times.

Electric Plant (Physical): A facility containing prime movers, electric generators, and auxiliary equipment for converting mechanical, chemical, and/or fission energy into electric energy.

Electric Rate Schedule: A statement of the electric rate and the terms and conditions governing its application, including attendant contract terms and conditions that have been accepted by a regulatory body with appropriate oversite authority.

Electric Utility: A corporation, person, agency, authority, or other legal entity or instrumentality that owns and/or operates facilities within the United States, its territories, or Puerto Rico for the generation, transmission, distribution, or sale of electric energy primarily for use by the public and files forms listed in the Code of Federal Regulations, Title 18, Part 141. Facilities that qualify as cogenerators or small power producers under the Public Utility Regulatory Policies Act (PURPA) are not considered electric utilities.

Energy: The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Energy has several forms, some of which are easily convertible and can be changed to another form useful for work. Most of the world's convertible energy comes from fossil fuels that are burned to produce heat that is then used as a transfer medium to mechanical or other means in order to accomplish tasks. Electrical energy is usually measured in kilowatthours, while heat energy is usually measured in British thermal units.

Energy Charge: That portion of the charge for electric service based upon the electric energy (kWh) consumed or billed.

Energy Deliveries: Energy generated by one electric utility system and delivered to another system through one or more transmission lines.

Energy Effects: The changes in aggregate electricity use (measured in megawatthours) for customers that participate in a utility DSM program. Energy Effects should represent changes at the consumer meter (i.e. exclude transmission and distribution effects) and reflect only activities that are undertaken specifically in response to utility-administered programs, including those activities implemented by third parties under contract to the utility. To the extent possible, Energy Effects should exclude non-program related effects such as changes in energy usage attributable to nonparticipants, government-mandated energy-efficiency standards that legislate improvements in building and appliance energy usage, changes in consumer behavior that result in greater energy use after initiation in a DSM program, the natural operations of the marketplace, and weather and business-cycle adjustments.

Energy Efficiency: Refers to programs that are aimed at reducing the energy used by specific end-use devices and systems, typically without affecting the services provided. These programs reduce overall electricity consumption (reported in megawatthours), often without explicit consideration for the timing of program-induced savings. Such savings are generally achieved by substituting technically more advanced equipment to produce the same level of end-use services (e.g. lighting, heating, motor drive) with less electricity. Examples include high-efficiency appliances, efficient lighting programs, high-efficiency heating, ventilating and air conditioning (HVAC) systems or control modifications, efficient building design, advanced electric motor drives, and heat recovery systems.

Energy Receipts: Energy generated by one electric utility system and received by another system through one or more transmission lines.

Energy Source: The primary source that provides the power that is converted to electricity through chemical, mechanical, or other means. Energy sources include coal, petroleum and petroleum products, gas, water, uranium, wind, sunlight, geothermal, and other sources.

Equity Capital: The sum of capital from retained earnings and the issuance of stocks.

Expenditure: The incurrence of a liability to obtain an asset or service.

Facility: An existing or planned location or site at which prime movers, electric generators, and/or equipment for converting mechanical, chemical, and/or nuclear energy into electric energy are situated, or will be situated. A facility may contain more than one generator of either the same or different prime mover type. For a cogenerator, the facility includes the industrial or commercial process.

Federal Energy Regulatory Commission (FERC): A quasi-independent regulatory agency within the Department of Energy having jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, oil pipeline rates, and gas pipeline certification.

Federal Power Act: Enacted in 1920, and amended in 1935, the Act consists of three parts. The first part incorporated the Federal Water Power Act administered by the former Federal Power Commission, whose activities were confined almost entirely to licensing non-Federal hydroelectric projects. Parts II and III were added with the passage of the Public Utility Act. These parts extended the Act's jurisdiction to include regulating the interstate transmission of electrical energy and rates for its sale as wholesale in interstate commerce. The Federal Energy Regulatory Commission is now charged with the administration of this law.

Federal Power Commission: The predecessor agency of the Federal Energy Regulatory Commission. The Federal Power Commission (FPC) was created by an Act of Congress under the Federal Water Power Act on June 10, 1920. It was charged originally with regulating the electric power and natural gas industries. The FPC was abolished on September 20, 1977, when the Department of Energy was created. The functions of the FPC were divided between the Department of Energy and the Federal Energy Regulatory Commission.

FERC: The Federal Energy Regulatory Commission.

Firm Gas: Gas sold on a continuous and generally long-term contract.

Firm Power: Power or power-producing capacity intended to be available at all times during the period covered by a guaranteed commitment to deliver, even under adverse conditions.

Flue Gas Desulfurization Unit (Scrubber): Equipment used to remove sulfur oxides from the combustion gases of a boiler plant before discharge to the atmosphere. Chemicals, such as lime, are used as the scrubbing media.

Flue Gas Particulate Collectors: Equipment used to remove fly ash from the combustion gases of a boiler plant before discharge to the atmosphere. Particulate collectors include electrostatic precipitators, mechanical collectors (cyclones), fabric filters (baghouses), and wet scrubbers.

Fly Ash: Particule matter from coal ash in which the particle diameter is less than 1×10^{-4} meter. This is removed from the flue gas using flue gas particulate collectors such as fabric filters and electrostatic precipitators.

Forced Outage: The shutdown of a generating unit, transmission line or other facility, for emergency reasons or a condition in which the generating equipment is unavailable for load due to unanticipated breakdown.

Fossil Fuel: Any naturally occurring organic fuel, such as petroleum, coal, and natural gas.

Fossil-Fuel Plant: A plant using coal, petroleum, or gas as its source of energy.

Fuel: Any substance that can be burned to produce heat; also, materials that can be fissioned in a chain reaction to produce heat.

Fuel Expenses: These costs include the fuel used in the production of steam or driving another prime mover for the generation of electricity. Other associated expenses include unloading the shipped fuel and all handling of the fuel up to the point where it enters the first bunker, hopper, bucket, tank, or holder in the boiler-house structure.

Full-Forced Outage: The net capability of main generating units that is unavailable for load for emergency reasons.

Gas: A fuel burned under boilers and by internal combustion engines for electric generation. These include natural, manufactured and waste gas.

Gas Turbine Plant: A plant in which the prime mover is a gas turbine. A gas turbine consists typically of an axial-flow air compressor, one or more combustion chambers, where liquid or gaseous fuel is burned and the hot gases are passed to the turbine and where the hot gases expand to drive the generator and are then used to run the compressor.

Generating Unit: Any combination of physically connected generator(s), reactor(s), boiler(s), combustion turbine(s), or other prime mover(s) operated together to produce electric power.

Generation (Electricity): The process of producing electric energy by transforming other forms of energy; also, the amount of electric energy produced, expressed in watthours (Wh).

Gross Generation: The total amount of electric energy produced by the generating units at a generating station or stations, measured at the generator terminals.

Net Generation: Gross generation less the electric energy consumed at the generating station for station use.

Generator: A machine that converts mechanical energy into electrical energy.

Generator Nameplate Capacity: The full-load continuous rating of a generator, prime mover, or other electric power production equipment under specific conditions as designated by the manufacturer. Installed generator nameplate rating is usually indicated on a nameplate physically attached to the generator.

Geothermal Plant: A plant in which the prime mover is a steam turbine. The turbine is driven either by steam produced from hot water or by natural steam that derives its energy from heat found in rocks or fluids at various depths beneath the surface of the earth. The energy is extracted by drilling and/or pumping.

Gigawatt (GW): One billion watts.

Gigawatthour (GWh): One billion watthours.

Greenhouse Effect: The increasing mean global surface temperature of the earth caused by gases in the atmosphere (including carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbon). The greenhouse effect allows solar radiation to penetrate but absorbs the infrared radiation returning to space.

Grid: The layout of an electrical distribution system.

Gross Generation: The total amount of electric energy produced by a generating facility, as measured at the generator terminals.

Heating System: Energy Efficiency program promotion aimed at improving the efficiency of the heating delivery system, including replacement, in the residential, commercial, or industrial sectors.

Heavy Oil: The fuel oils remaining after the lighter oils have been distilled off during the refining process. Except for start-up and flame stabilization, virtually all petroleum used in steam plants is heavy oil.

Hydroelectric Plant: A plant in which the turbine generators are driven by falling water.

Incremental Effects: The annual effects in energy use (measured in megawatthours) and peakload (measured in kilowatts) caused by new participants in existing DSM programs and all participants in new DSM programs during a given year. Reported Incremental Effects should be annualized to indicate the program effects that would have occurred had these participants been initiated into the program on January 1 of the given year. Incremental effects are not simply the Annual Effects of a given year minus the Annual Effects of the prior year, since these net effects would fail to account for program attrition, degradation, demolition, and participant dropouts.

Indirect Utility Cost: A utility cost that may not be meaningfully identified with any particular DSM program category. Indirect costs could be attributable to one of several accounting cost categories (i.e., Administrative, Marketing, Monitoring & Evaluation, Utility-Earned Incentives, Other). Accounting costs that are known DSM program costs should not be reported under Indirect Utility Cost, rather those costs should be reported as Direct Utility Costs under the appropriate DSM program category.

Industrial: The industrial sector is generally defined as manufacturing, construction, mining agriculture, fishing and forestry establishments Standard Industrial Classification (SIC) codes 01-39. The utility may classify industrial service using the SIC codes, or based on demand or annual usage exceeding some specified limit. The limit may be set by the utility based on the rate schedule of the utility.

Interdepartmental Service (Electric): Interdepartmental service includes amounts charged by the electric department at tariff or other specified rates for electricity supplied by it to other utility departments.

Intermediate Load (Electric System): The range from base load to a point between base load and peak. This point may be the midpoint, a percent of the peakload, or the load over a specified time period.

Internal Combustion Plant: A plant in which the prime mover is an internal combustion engine. An internal combustion engine has one or more cylinders in which the process of combustion takes place, converting energy released from the rapid burning of a fuel-air mixture into mechanical energy. Diesel or gas-fired engines are the principal types used in electric plants. The plant is usually operated during periods of high demand for electricity.

Interruptible Gas: Gas sold to customers with a provision that permits curtailment or cessation of service at the discretion of the distributing company under certain circumstances, as specified in the service contract.

Interruptible Load: Refers to program activities that, in accordance with contractual arrangements, can interrupt consumer load at times of seasonal peak load by direct control of the utility system operator or by action of the consumer at the direct request of the system operator. It usually involves commercial and industrial consumers. In some instances the load reduction may be affected by direct action of the system operator (remote tripping) after notice to the consumer in accordance with contractual provisions. For example, loads that can be interrupted to fulfill planning or operation reserve requirements should be reported as Interruptible Load. Interruptible Load as defined here excludes Direct Load Control and Other Load Management. (Interruptible Load, as reported here, is synonymous with Interruptible Demand

reported to the North American Electric Reliability Council on the voluntary Office of Energy Emergency Operations Form OE-411, "Coordinated Regional Bulk Power Supply Program Report," with the exception that annual peakload effects are reported on the Form EIA-861 and seasonal (i.e., summer and winter) peakload effects are reported on the OE-411).

Kilowatt (kW): One thousand watts.

Kilowatthour (kWh): One thousand watthours.

Leverage Ratio: A measure that indicates the financial ability to meet debt service requirements and increase the value of the investment to the stockholders. (i.e. the ratio of total debt to total assets).

Liability: An amount payable in dollars or by future services to be rendered.

Light Oil: Lighter fuel oils distilled off during the refining process. Virtually all petroleum used in internal combustion and gas-turbine engines is light oil.

Lignite: A brownish-black coal of low rank with high inherent moisture and volatile matter (used almost exclusively for electric power generation). It is also referred to as brown coal. Comprises two groups classified according to the following ASTM Specification D388-84 for calorific values on a moist material-matter-free basis:

	Limits Btu/lb.	
	GE	LT
Lignite A	6300	8300
Lignite B	-	6300

Load (Electric): The amount of electric power delivered or required at any specific point or points on a system. The requirement originates at the energy-consuming equipment of the consumers.

Load Building: Refers to programs that are aimed at increasing the usage of existing electric equipment or the addition of electric equipment. Examples include industrial technologies such as induction heating and melting, direct arc furnaces and infrared drying; cooking for commercial establishments; and heat pumps for residences. Load Building should include programs that promote electric fuel substitution. Load Building effects should be reported as a negative number, shown with a minus sign.

Marketing Cost: Expenses directly associated with the preparation and implementation of the strategies designed to encourage participation in a DSM program. The category excludes general market and load research costs.

Monitoring & Evaluation Cost: Expenditures associated with the planning, collection, and analysis of data used to assess program operation and effects. It includes the activities such as load metering, customer surveys, new technology testing, and program evaluations that are intended to establish or improve the ability to monitor and evaluate the impacts of DSM programs, collectively or individually.

Maximum Demand: The greatest of all demands of the load that has occurred within a specified period of time.

Mcf: One thousand cubic feet.

Megawatt (MW): One million watts.

Megawatthour (MWh): One million watthours.

MMcf: One million cubic feet.

Natural Gas: A naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in porous geological formations beneath the earth's surface, often in association with petroleum. The principal constituent is methane.

Net Capability: The maximum load-carrying ability of the equipment, exclusive of station use, under specified conditions for a given time interval, independent of the characteristics of the load. (Capability is determined by design characteristics, physical conditions, adequacy of prime mover, energy supply, and operating limitations such as cooling and circulating water supply and temperature, headwater and tailwater elevations, and electrical use.)

Net Generation: Gross generation minus plant use from all electric utility owned plants. The energy required for pumping at a pumped-storage plant is regarded as plant use and must be deducted from the gross generation.

Net Summer Capability: The steady hourly output, which generating equipment is expected to supply to system load exclusive of auxiliary power, as demonstrated by tests at the time of summer peak demand.

Net Winter Capability: The steady hourly output which generating equipment is expected to supply to system load exclusive of auxiliary power, as demonstrated by tests at the time of winter peak demand.

New Construction: Energy-efficiency program promotion to encourage the building of new homes, buildings, and plants to exceed standard government-mandated energy efficiency codes; it may include major renovations of existing facilities.

Noncoincidental Peak Load: The sum of two or more peakloads on individual systems that do not occur in the same time interval. Meaningful only when considering loads within a limited period of time, such as a day, week, month, a heating or cooling season, and usually for not more than 1 year.

Non-Firm Power: Power or power-producing capacity supplied or available under a commitment having limited or no assured availability.

Nonutility Power Producer: A corporation, person, agency, authority, or other legal entity or

instrumentality that owns electric generating capacity and is not an electric utility. Nonutility power producers include qualifying cogenerators, qualifying small power producers, and other nonutility generators (including independent power producers) without a designated franchised service area, and which do not file forms listed in the Code of Federal Regulations, Title 18, Part 141.

North American Electric Reliability Council (NERC): A council formed in 1968 by the electric utility industry to promote the reliability and adequacy of bulk power supply in the electric utility systems of North America. NERC consists of ten regional reliability councils and encompasses essentially all the power regional of the contiguous United States, Canada, and Mexico. The NERC Regions are:

ASCC - Alaskan System Coordination Council

ECAR - East Central Area Reliability Coordination Agreement

ERCOT - Electric Reliability Council of Texas

MAIN - Mid-America Interconnected Network

MAAC - Mid-Atlantic Area Council

MAPP - Mid-Continent Area Power Pool

NPCC - Northeast Power Coordinating Council

SERC - Southeastern Electric Reliability Council

SPP - Southwest Power Pool

WSCC - Western Systems Coordinating Council

Nuclear Fuel: Fissionable materials that have been enriched to such a composition that, when placed in a nuclear reactor, will support a self-sustaining fission chain reaction, producing heat in a controlled manner for process use.

Nuclear Power Plant: A facility in which heat produced in a reactor by the fissioning of nuclear fuel is used to drive a steam turbine.

Off-Peak Gas: Gas that is to be delivered and taken on demand when demand is not at its peak.

Ohm: The unit of measurement of electrical resistance. The resistance of a circuit in which a potential difference of 1 volt produces a current of 1 ampere.

Operable Nuclear Unit: A nuclear unit is "operable" after it completes low-power testing and is granted authorization to operate at full power. This occurs when it receives its full power amendment to its operating license from the Nuclear Regulatory Commission.

Other Cost: A residual category to capture the Indirect Costs of DSM programs that cannot be meaningfully included in any of the other cost categories listed and defined herein. Included are costs such as those incurred in the research and development of DSM technologies.

Other DSM Programs: A residual category to capture the effects of DSM programs that cannot be meaningfully included in any of the program categories listed and defined herein. The energy effects attributable to this category should be the net effects of all the residual programs. Programs that promote consumer's substitution of electricity by other energy types should be included in Other DSM Programs. Also, self-generation should be included in Other DSM Programs to the extent that it is not accounted for as backup generation in Other Load Management or Interruptible Load categories.

Other Incentives: Energy Efficiency programs that offer cash or noncash awards to electric energy efficiency deliverers, such as appliance and equipment dealers, building contractors, and architectural and engineering firms, that encourage consumer participation in a DSM program and adoption of recommended measures.

Other Load Management: Refers to programs other than Direct Load Control and Interruptible Load that limit or shift peak load from on-peak to off-peak time periods. It includes technologies that primarily shift all or part of a load from one time-of-day to another and secondarily may have an impact on energy consumption. Examples include space heating and water heating storage systems, cool storage systems, and load limiting devices in energy management systems. This category also includes programs that aggressively promote time-of-use (TOU) rates and other innovative rates such as real time pricing. These rates are intended to reduce consumer bills and shift hours of operation of equipment from on-peak to off-peak periods through the application of time-differentiated rates.

Outage: The period during which a generating unit, transmission line, or other facility is out of service.

Peak Demand: The maximum load during a specified period of time.

Peak Load Plant: A plant usually housing old, low-efficiency steam units; gas turbines; diesels; or pumped-storage hydroelectric equipment normally used during the peak-load periods.

Peaking Capacity: Capacity of generating equipment normally reserved for operation during the hours of highest daily, weekly, or seasonal loads. Some generating equipment may be operated at certain times as peaking capacity and at other times to serve loads on an around-the-clock basis.

Percent Difference: The relative change in a quantity over a specified time period. It is calculated as follows: the current value has the previous value subtracted from it; this new number is divided by the absolute value of the previous value; then this new number is multiplied by 100.

Petroleum: A mixture of hydrocarbons existing in the liquid state found in natural underground reservoirs, often associated with gas. Petroleum includes fuel oil No. 2, No. 4, No. 5, No. 6; topped crude; Kerosene; and jet fuel.

Petroleum Coke: See Coke (Petroleum).

Petroleum (Crude Oil): A naturally occurring, oily, flammable liquid composed principally of hydrocarbons. Crude oil is occasionally found in springs or pools but usually is drilled from wells beneath the earth's surface.

Planned Generator: A proposal by a company to install electric generating equipment at an existing or planned facility or site. The proposal is based on the owner having obtained (1) all environmental and regulatory approvals, (2) a signed contract for the electric energy, or (3) financial closure for the facility.

Plant: A facility at which are located prime movers, electric generators, and auxiliary equipment for converting mechanical, chemical, and/or nuclear energy into electric energy. A plant may contain more than one type of prime mover. Electric utility plants exclude facilities that satisfy the definition of a qualifying facility under the Public Utility Regulatory Policies Act of 1978.

Plant Use: The electric energy used in the operation of a plant. Included in this definition is the energy required for pumping at pumped-storage plants.

Plant-Use Electricity: The electric energy used in the operation of a plant. This energy total is subtracted from the gross energy production of the plant; for reporting purposes the plant energy production is then reported as a net figure. The energy required for pumping at pumped-storage plants is, by definition, subtracted, and the energy production for these plants is then reported as a net figure.

Potential Peak Reduction: The potential annual peak load reduction (measured in kilowatts) that can be deployed from Direct Load Control, Interruptible Load, Other Load Management, and Other DSM Program activities. It represents the load that can be reduced either by the direct control of the utility system operator or by the consumer in response to a utility request to curtail load. It reflects the installed load reduction capability, as opposed to the Actual Peak Reduction achieved by participants, during the time of annual system peak load.

Power: The rate at which energy is transferred. Electrical energy is usually measured in watts. Also used for a measurement of capacity.

Power Pool: An association of two or more interconnected electric systems having an agreement to coordinate operations and planning for improved reliability and efficiencies.

Price: The amount of money or consideration-in-kind for which a service is bought, sold, or offered for sale.

Prime Mover: The engine, turbine, water wheel, or similar machine that drives an electric generator; or, for reporting purposes, a device that converts energy to electricity directly (e.g., photovoltaic solar and fuel cell(s)).

Process Heating: Energy Efficiency program promotion of increased electric energy efficiency applications in industrial process heating.

Profit: The income remaining after all business expenses are paid.

Public Authority Service to Public Authorities: Public authority service includes electricity supplied and services rendered to municipalities or divisions or agencies of State or Federal governments, under special contracts or agreements or service classifications applicable only to public authorities.

Public Street and Highway Lighting: Public street and highway lighting includes electricity supplied and services rendered for the purposes of lighting streets, highways, parks, and other public places; or for traffic or other signal system service, for municipalities, or other divisions or agencies of State or Federal governments.

Pumped-Storage Hydroelectric Plant: A plant that usually generates electric energy during peak-load periods by using water previously pumped into an elevated storage reservoir during off-peak periods when excess generating capacity is available to do so. When additional generating capacity is needed, the water can be released from the reservoir through a conduit to turbine generators located in a power plant at a lower level.

Purchased Power Adjustment: A clause in a rate schedule that provides for adjustments to the bill when energy from another electric system is acquired and it varies from a specified unit base amount.

Pure Pumped-Storage Hydroelectric Plant: A plant that produces power only from water that has previously been pumped to an upper reservoir.

Qualifying Facility (QF): A cogeneration or small power production facility that meets certain ownership, operating, and efficiency criteria established by the Federal Energy Regulatory Commission (FERC) pursuant to the Public Utility Regulatory Policies Act (PURPA). (See the Code of Federal Regulations, Title 18, Part 292.) Part 292.

Railroad and Railway Services: Railroad and railway services include electricity supplied and services rendered to railroads and interurban and street railways, for general railroad use, including the propulsion of cars or locomotives, where such electricity is supplied under separate and distinct rate schedules.

Rate Base: The value of property upon which a utility is permitted to earn a specified rate of return as established by a regulatory authority. The rate base generally represents the value of property used by the utility in providing service and may be calculated by any one or a combination of the following accounting methods: fair value, prudent investment, reproduction cost, or original cost. Depending on which method is used, the rate base includes cash, working capital, materials and supplies, and deductions for accumu-

lated provisions for depreciation, contributions in aid of construction, customer advances for construction, accumulated deferred income taxes, and accumulated deferred investment tax credits.

Ratemaking Authority: A utility commission's legal authority to fix, modify, approve, or disapprove rates, as determined by the powers given the commission by a State or Federal legislature.

Receipts: Purchases of fuel.

Regulation: The governmental function of controlling or directing economic entities through the process of rulemaking and adjudication.

Reserve Margin (Operating): The amount of unused available capability of an electric power system at peakload for a utility system as a percentage of total capability.

Residential: The residential sector is defined as private household establishments which consume energy primarily for space heating, water heating, air conditioning, lighting, refrigeration, cooking and clothes drying. The classification of an individual consumer's account, where the use is both residential and commercial, is based on principal use. For the residential class, do not duplicate consumer accounts due to multiple metering for special services (water, heating, etc.). Apartment houses are also included.

Residual Fuel Oil: The topped crude of refinery operation, includes No. 5 and No. 6 fuel oils as defined in ASTM Specification D396 and Federal Specification VV-F-815C; Navy Special fuel oil as defined in Military Specification MIL-F-859E including Amendment 2 (NATO Symbol F-77); and Bunker C fuel oil. Residual fuel oil is used for the production of electric power, space heating, vessel bunkering, and various industrial purposes. Imports of residual fuel oil include imported crude oil burned as fuel.

Restricted-Universe Census: This is the complete enumeration of data from a specifically defined subset of entities including, for example, those that exceed a given level of sales or generator nameplate capacity.

Retail: Sales covering electrical energy supplied for residential, commercial, and industrial end-use purposes. Other small classes, such as agriculture and street lighting, also are included in this category.

Revenue: The total amount of money received by a firm from sales of its products and/or services, gains from the sales or exchange of assets, interest and dividends earned on investments, and other increases in the owner's equity except those arising from capital adjustments.

Running and Quick-Start Capability: The net capability of generating units that carry load or have quick-start capability. In general, quick-start capability refers to generating units that can be available for load within a 30-minute period.

Sales: The amount of kilowatthours sold in a given period of time; usually grouped by classes of service, such as residential, commercial, industrial, and other. Other sales include public street and highway lighting, other sales to public authorities and railways, and interdepartmental sales.

Sales for Resale: Energy supplied to other electric utilities, cooperatives, municipalities, and Federal and State electric agencies for resale to ultimate consumers.

Scheduled Outage: The shutdown of a generating unit, transmission line, or other facility, for inspection or maintenance, in accordance with an advance schedule.

Short Ton: A unit of weight equal to 2,000 pounds.

Small Power Producer (SPP): Under the Public Utility Regulatory Policies Act (PURPA), a small power production facility (or small power producer) generates electricity using waste, renewable (water, wind and solar), or geothermal energy as a primary energy source. Fossil fuels can be used, but renewable resource must provide at least 75 percent of the total energy input. (See Code of Federal Regulations, Title 18, Part 292.)

Spinning Reserve: That reserve generating capacity running at a zero load and synchronized to the electric system.

Spot Purchases: A single shipment of fuel or volumes of fuel, purchased for delivery within 1 year. Spot purchases are often made by a user to fulfill a certain portion of energy requirements, to meet unanticipated energy needs, or to take advantage of low-fuel prices.

Stability: The property of a system or element by virtue of which its output will ultimately attain a steady state. The amount of power that can be transferred from one machine to another following a disturbance. The stability of a power system is its ability to develop restoring forces equal to or greater than the disturbing forces so as to maintain a state of equilibrium.

Standard Industrial Classification (SIC): A set of codes developed by the Office of Management and Budget, which categorizes business into groups with similar economic activities.

Standby Facility: A facility that supports a utility system and is generally running under no-load. It is available to replace or supplement a facility normally in service.

Standby Service: Support service that is available, as needed, to supplement a consumer, a utility system, or to another utility if a schedule or an agreement authorizes the transaction. The service is not regularly used.

Steam-Electric Plant (Conventional): A plant in which the prime mover is a steam turbine. The steam

used to drive the turbine is produced in a boiler where fossil fuels are burned.

Stocks: A supply of fuel accumulated for future use. This includes coal and fuel oil stocks at the plant site, in coal cars, tanks, or barges at the plant site, or at separate storage sites.

Subbituminous Coal: Subbituminous coal, or black lignite, is dull black and generally contains 20 to 30 percent moisture. The heat content of subbituminous coal ranges from 16 to 24 million Btu per ton as received and averages about 18 million Btu per ton. Subbituminous coal, mined in the western coal fields, is used for generating electricity and space heating.

Substation: Facility equipment that switches, changes, or regulates electric voltage.

Sulfur: One of the elements present in varying quantities in coal which contributes to environmental degradation when coal is burned. In terms of sulfur content by weight, coal is generally classified as low (less than or equal to 1 percent), medium (greater than 1 percent and less than or equal to 3 percent), and high (greater than 3 percent). Sulfur content is measured as a percent by weight of coal on an "as received" or a "dry" (moisture-free, usually part of a laboratory analysis) basis.

Switching Station: Facility equipment used to tie together two or more electric circuits through switches. The switches are selectively arranged to permit a circuit to be disconnected, or to change the electric connection between the circuits.

System (Electric): Physically connected generation, transmission, and distribution facilities operated as an integrated unit under one central management, or operating supervision.

Total DSM Cost: Refers to the sum of total utility cost and nonutility cost.

Total DSM Programs: Refers to the total net effects of all the utility's DSM programs. For the purpose of this survey, it is the sum of the effects for Energy Efficiency, Direct Load Control, Interruptible Load, Other Load Management, Other DSM Programs, and Load Building. Net growth in energy or load effects should be reported as a negative number, shown with a minus sign.

Total Nonutility Cost: Refers to total cash expenditures incurred by consumers and trade allies that are associated with participation in a DSM program, but that are not reimbursed by the utility. The nonutility expenditures should include only those additional costs necessary to purchase or install an efficient measure relative to a less efficient one. Costs are to be reported in nominal dollars in the year in which they are incurred, regardless of when the actual effects occur. To the extent possible, provide the best estimate of nonutility costs if actual costs are unavailable.

Total Utility Cost: Refers to the sum of the total Direct and Indirect Utility Costs for the year. Utility costs should reflect the total cash expenditures for the year, reported in nominal dollars, that flowed out to support DSM programs. They should be reported in the year they are incurred, regardless of when the actual effects occur.

Transformer: An electrical device for changing the voltage of alternating current.

Transmission: The movement or transfer of electric energy over an interconnected group of lines and associated equipment between points of supply and points at which it is transformed for delivery to consumers, or is delivered to other electric systems. Transmission is considered to end when the energy is transformed for distribution to the consumer.

Transmission System (Electric): An interconnected group of electric transmission lines and associated equipment for moving or transferring electric energy in bulk between points of supply and points at which it is transformed for delivery over the distribution system lines to consumers, or is delivered to other electric systems.

Turbine: A machine for generating rotary mechanical power from the energy of a stream of fluid (such as water, steam, or hot gas). Turbines convert the kinetic energy of fluids to mechanical energy through the principles of impulse and reaction, or a mixture of the two.

Uniform System of Accounts: Prescribed financial rules and regulations established by the Federal Energy Regulatory Commission for utilities subject to its jurisdiction under the authority granted by the Federal Power Act.

Useful Thermal Output: The thermal energy made available for use in any industrial or commercial process, or used in any heating or cooling application, i.e., total thermal energy made available for processes and applications other than electrical generation.

Utility-Earned Incentives: Costs in the form of incentives paid to the utility for achievement in consumer participation in DSM programs. These financial incentives are intended to influence the utility's consideration of DSM as a resource option by addressing cost recovery, lost revenue, and profitability.

Voltage Reduction: Any intentional reduction of system voltage by 3 percent or greater for reasons of maintaining the continuity of service of the bulk electric power supply system.

Water Heating: Energy Efficiency program promotion to increase efficiency in water heating, including low-flow shower heads and water heater insulation wraps. Could be applicable to residential, commercial, or industrial consumer sectors.

Watt: The electrical unit of power. The rate of energy transfer equivalent to 1 ampere flowing under a pressure of 1 volt at unity power factor.

Watthour (Wh): An electrical energy unit of measure equal to 1 watt of power supplied to, or taken from, an electric circuit steadily for 1 hour.

Wheeling Service: The movement of electricity from one system to another over transmission facilities of intervening systems. Wheeling service contracts can be established between two or more systems.

Wholesale Sales: Energy supplied to other electric utilities, cooperatives, municipals, and Federal and State electric agencies for resale to ultimate consumers.

This skyline scene in Dallas, Texas, depicts the consumption of electricity, which provides energy to light homes and shopping centers, and to run factories.

The H.B. Robinson Nuclear Power Plant is owned by the Carolina Power and Light Company. This 665-megawatt pressurized water reactor, located near Hartsville, South Carolina, was the first commercial-size nuclear plant in the Southeast.

The Geysers Geothermal Powerplant is owned by the Pacific Gas and Electric Company. This plant, located in California, is the largest geothermal facility in the world.

The average cost of coal includes the cost of transporting the coal from the mine to the utility.

This transmission line, the most powerful in the Western World, is cosponsored by the American Electric Power System and Westinghouse Electric Corporation.

Operation and maintenance expenses consist of maintaining the physical condition and operating efficiency of the plant, including the generation room shown here.

This skyline scene in Dallas, Texas, depicts the consumption of electricity, which provides energy to light homes and shopping centers, and to run factories.

The H.B. Robinson Nuclear Power Plant is owned by the Carolina Power and Light Company. This 665-megawatt pressurized water reactor, located near Hartsville, South Carolina, was the first commercial-size nuclear plant in the Southeast.

The Geysers Geothermal Powerplant is owned by the Pacific Gas and Electric Company. This plant, located in California, is the largest geothermal facility in the world.

The average cost of coal includes the cost of transporting the coal from the mine to the utility.

This transmission line, the most powerful in the Western World, is cosponsored by the American Electric Power System and Westinghouse Electric Corporation.

Operation and maintenance expenses consist of maintaining the physical condition and operating efficiency of the plant, including the generation room shown here.

In addition to the demand-side management (DSM) data provided in this report, three EIA surveys measure end users' participation in electric utility, natural gas utility, and other DSM programs. The Residential Energy Consumption Survey (RECS) was used to collect data on household participation in DSM programs, and the results were published in *Housing Characteristics 1990* (Table 43). RECS data are also scheduled for release in 1993 in the *Household Energy Consumption and Expenditures 1990.* The Commercial Buildings Energy Consumption Survey (CBECS) was used to collect data on commercial buildings' participation in DSM programs. Those results were published in *Commercial Buildings Characteristics 1989* and *Commercial Buildings Consumption and Expenditures 1989.* The Manufacturing Energy Consumption Survey (MECS) is used to collect data on the kinds of DSM projects manufacturers are engaged in, the characteristics of those manufacturers, and the extent of their involvement. The results are scheduled for release in 1993. See Appendix A for further information.

In addition to the "Annual Nonutility Power Producer Report," two EIA surveys are conducted triennially to measure generation of electricity by end users. The Commercial Buildings Energy Consumption Survey is used to collect data on commercial building generation of electricity. The Manufacturing Energy Consumption Survey (MECS) is used to collect data on generation by the manufacturing industry and its growth. The MECS data are provided in *Manufacturing Energy Consumption Survey: Consumption of Energy 1988* (Tables 19-22). See Appendix A for further information.