

Section 8. Nuclear Energy

U.S. nuclear electricity net generation during July 2004 was 72 net terawatt-hours (billion kilowatt-hours) of electricity, 3 percent higher than the level in July 2003.

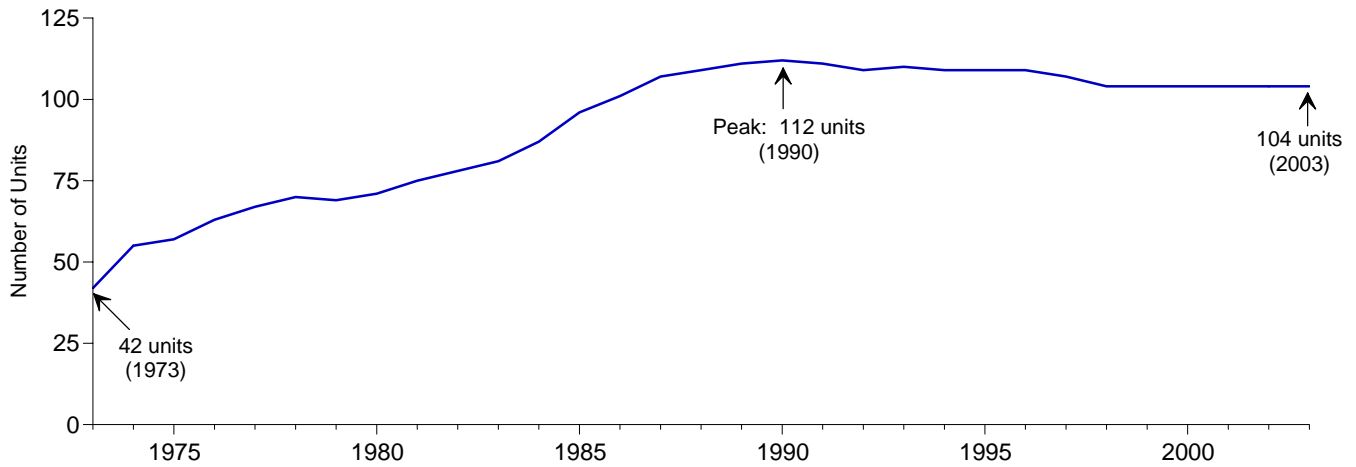
Nuclear units generated at an average capacity factor of 97.9 percent in July 2004, 3.1 percentage points higher than the capacity factor in July 2003.

The nuclear share of total electricity net generation in July 2004 was 19.4 percent, compared with 18.7 percent 1 year earlier.

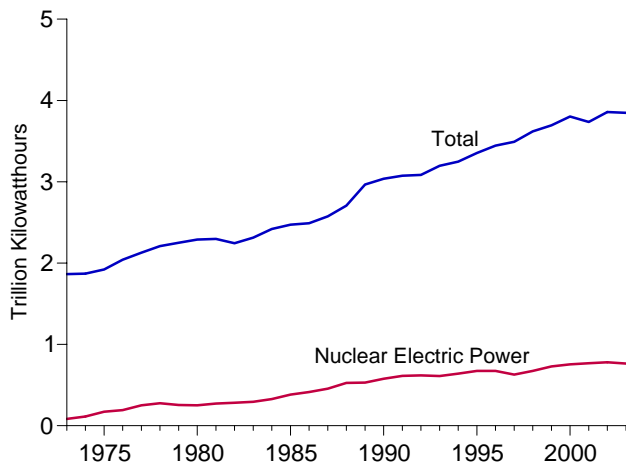
On July 31, 2004, there were 104 operable nuclear generating units in the United States, with a collective net summer capacity of 98.8 million kilowatts of electricity.

Figure 8.1 Nuclear Energy Overview

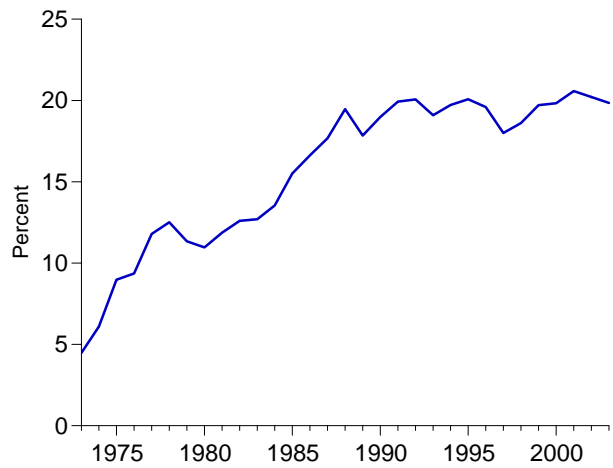
Operable Units, End of Year, 1973-2003



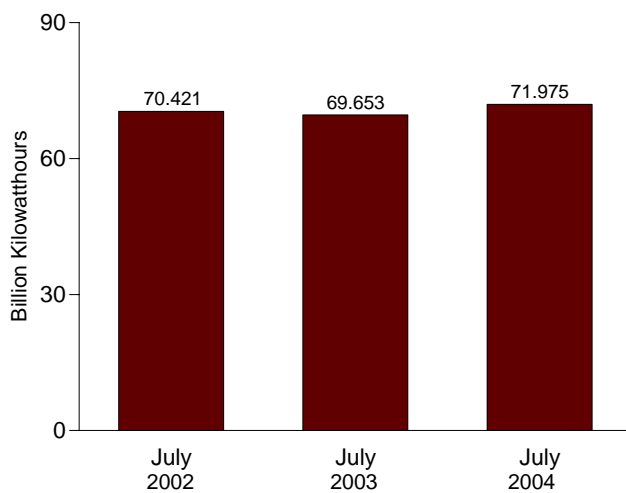
Electricity Net Generation, 1973-2003



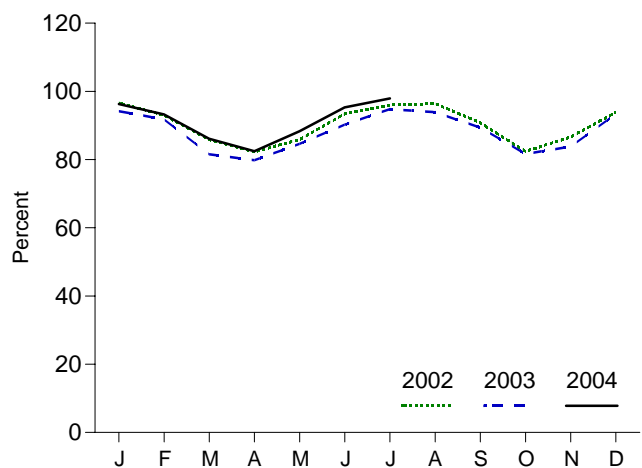
Nuclear Share of Electricity Net Generation, 1973-2003



Nuclear Electricity Net Generation



Capacity Factor, Monthly



Web Page: <http://www.eia.doe.gov/emeu/mer/nuclear.html>.
Sources: Table 7.1 and 8.1.

Table 8.1 Nuclear Energy Overview

	Total Operable Units ^{a,b}	Net Summer Capacity of Operable Units ^{b,c}	Nuclear Electricity Net Generation	Nuclear Share of Electricity Net Generation	Capacity Factor ^d
	Number	Million Kilowatts	Million Kilowatthours	Percent	
1973 Year	42	22.683	83,479	4.5	53.5
1974 Year	55	31.867	113,976	6.1	47.8
1975 Year	57	37.267	172,505	9.0	55.9
1976 Year	63	43.822	191,104	9.4	54.7
1977 Year	67	46.303	250,883	11.8	63.3
1978 Year	70	50.824	276,403	12.5	64.5
1979 Year	69	49.747	255,155	11.3	58.4
1980 Year	71	51.810	251,116	11.0	56.3
1981 Year	75	56.042	272,674	11.9	58.2
1982 Year	78	60.035	282,773	12.6	56.6
1983 Year	81	63.009	293,677	12.7	54.4
1984 Year	87	69.652	327,634	13.5	56.3
1985 Year	96	79.397	383,691	15.5	58.0
1986 Year	101	85.241	414,038	16.6	56.9
1987 Year	107	93.583	455,270	17.7	57.4
1988 Year	109	94.695	526,973	19.5	63.5
1989 Year	111	98.161	529,355	17.8	62.2
1990 Year	112	99.624	576,862	19.0	66.0
1991 Year	111	99.589	612,565	19.9	70.2
1992 Year	109	98.985	618,776	20.1	70.9
1993 Year	110	99.041	610,291	19.1	70.5
1994 Year	109	99.148	640,440	19.7	73.8
1995 Year	109	99.515	673,402	20.1	77.4
1996 Year	109	100.784	674,729	19.6	76.2
1997 Year	107	99.716	628,644	18.0	71.1
1998 Year	104	97.070	673,702	18.6	78.2
1999 Year	104	97.411	728,254	19.7	85.3
2000 Year	104	97.860	753,893	19.8	88.1
2001 Year	104	98.159	768,826	20.6	89.4
2002 January	104	98.657	70,926	22.2	96.6
February	104	98.657	61,658	21.9	93.0
March	104	98.657	63,041	20.8	85.9
April	104	98.657	58,437	20.2	82.3
May	104	98.657	63,032	20.5	85.9
June	104	98.657	66,372	19.5	93.4
July	104	98.657	70,421	18.5	95.9
August	104	98.657	70,778	18.9	96.4
September	104	98.657	64,481	19.5	90.8
October	104	98.657	60,493	19.7	82.4
November	104	98.657	61,520	20.8	86.6
December	104	98.657	68,905	21.2	93.9
Year	104	98.657	780,064	20.2	90.3
2003 January	104	98.794	69,211	20.5	94.2
February	104	98.794	60,942	20.5	91.8
March	104	98.794	59,933	19.8	81.5
April	104	98.794	56,776	20.1	79.8
May	104	98.794	62,194	20.4	84.6
June	104	98.794	64,181	19.8	90.2
July	104	98.794	69,653	18.7	94.8
August	104	98.794	69,024	18.3	93.9
September	104	98.794	63,584	20.1	89.4
October	104	98.794	60,016	19.7	81.7
November	104	98.794	59,600	20.0	83.8
December	104	98.794	68,612	20.7	93.3
Year	104	98.794	763,725	19.8	88.2
2004 January	104	98.794	70,789	20.6	96.3
February	104	98.794	64,103	20.5	93.2
March	104	98.794	63,285	20.7	86.1
April	104	98.794	58,635	20.4	82.4
May	104	98.794	64,917	20.0	88.3
June	104	98.794	67,787	R 19.9	95.3
July	104	98.794	71,975	19.4	97.9
7 Months	104	98.794	461,493	20.2	91.4
2003 7 Months	104	98.794	442,889	19.9	88.1
2002 7 Months	104	98.657	453,887	20.4	90.4

^a Total of nuclear generating units holding full-power licenses, or equivalent permission to operate, at the end of the period—see Note 1 at end of section. Although Browns Ferry 1 was shut down in 1985, the unit has remained fully licensed and thus has continued to be counted as operable during the shutdown; in May 2002, the Tennessee Valley Authority announced its intention to have the unit resume operation in 2007—see Note 1(a) at end of section. For additional information on nuclear generating units, see *Annual Energy Review 2003*, September 2004, Table 9.1.

^b At end of period.

^c For the definition of "Net Summer Capacity," see Note 2(a) at end of section.

^d For an explanation of the method of calculating the capacity factor, see Note 2 at end of section.

R=Revised.

Notes: • See Note 1 at end of section for discussion of reactor unit coverage.
 • Nuclear electricity net generation totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 States and the District of Columbia.

Web Page: <http://www.eia.doe.gov/emeu/mer/nuclear.html>.

Sources: See end of section.

Nuclear Energy

Note 1. A reactor is generally defined as operable while it possessed a full-power license from the Nuclear Regulatory Commission or its predecessor the Atomic Energy Commission, or equivalent permission to operate, at the end of the year or month shown. The definition is liberal in that it does not exclude units retaining full-power licenses during long, non-routine shutdowns that for a time rendered them unable to generate electricity. Examples are:

(a) In 1985 the five then-active Tennessee Valley Authority (TVA) units (Browns Ferry 1, 2, and 3 and Sequoyah 1 and 2) were shut down under a regulatory forced outage. Browns Ferry 1 remains shut down and has been defueled, while the other units were idle for several years, restarting in 1991, 1995, 1988, and 1988, respectively. All five units are counted as operable during the shutdowns. Browns Ferry 1 is the only one of the five TVA plants that has not returned to service. Because it is still fully licensed to operate, it continues to meet the definition of operable.

(b) Shippingport was shut down from 1974 through 1976 for conversion to a light-water breeder reactor, but is counted as operable from 1957 until its retirement in 1982.

(c) Calvert Cliffs 2 was shut down in 1989 and 1990 for replacement of pressurizer heater sleeves but is counted as operable during those years.

Exceptions to the definition are Shoreham and Three Mile Island 2. Shoreham was granted a full-power license in April 1989, but was shut down two months later and never restarted. In 1991, the license was changed to Possession Only. Although not operable at the end of the year, Shoreham is counted as operable during 1989. A major accident closed Three Mile Island 2 in 1979, and although the unit retained its full-power license for several years, it is considered permanently shut down since that year.

Note 2. Capacity: Nuclear generating units may have more than one type of net capacity rating, including the following:

(a) Net Summer Capacity—The steady hourly output that generating equipment is expected to supply to system load, exclusive of auxiliary power, as demonstrated by test at the time of summer peak demand. Auxiliary power of a typical nuclear power plant is about 5 percent of gross generation.

(b) Net Design Capacity or Net Design Electrical Rating (DER)—The nominal net electrical output of a unit, specified by the utility and used for plant design.

The monthly capacity factors are computed as the actual monthly generation divided by the maximum possible generation for that month. The maximum possible generation is the number of hours in the month multiplied by the net summer capacity at the end of the month. That fraction is then multiplied by 100 to obtain a percentage. Annual capacity factors are averages of the monthly values for that year.

Table 8.1 Sources

Total Operable Units and Net Summer Capacity of Operable Units: 1973-1982: Compiled from various sources, primarily DOE, Office of Nuclear Reactor Programs, "U.S. Central Station Nuclear Electric Generating Units: Significant Milestones." 1983 forward: Energy Information Administration (EIA), Form EIA-860, "Annual Electric Generator Report," and monthly updates as appropriate. For a list of currently operable units, see: http://eia.doe.gov/cneaf/nuclear/page/nuc_reactors/operational.html.

Nuclear Electricity Net Generation and Nuclear Share of Electricity Net Generation: See Table 7.2a for actual data.

Capacity Factor: EIA, Office of Coal, Nuclear, Electric and Alternate Fuels for actual data.