

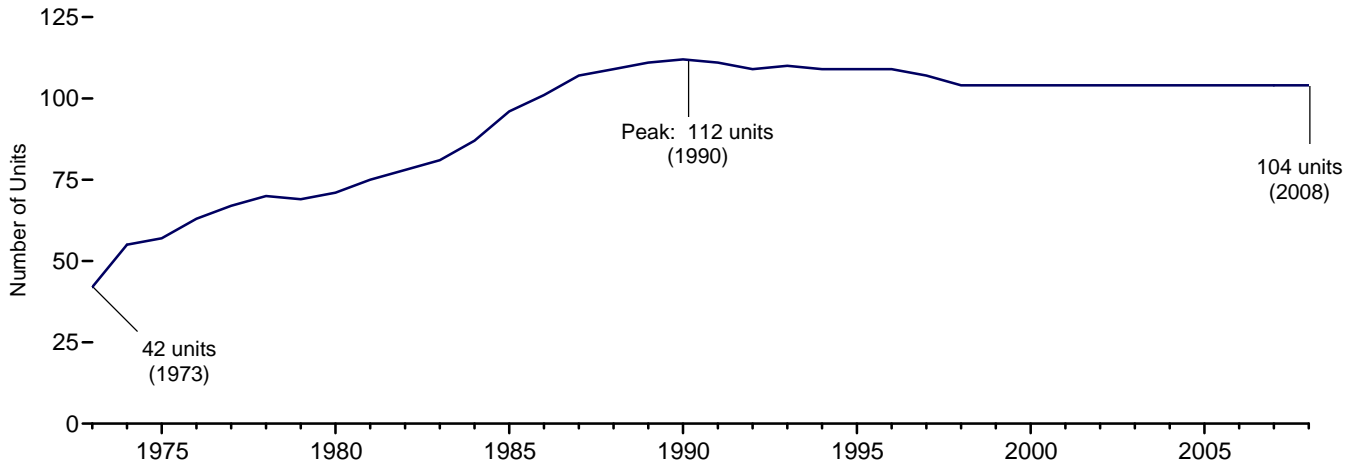
# Nuclear Energy



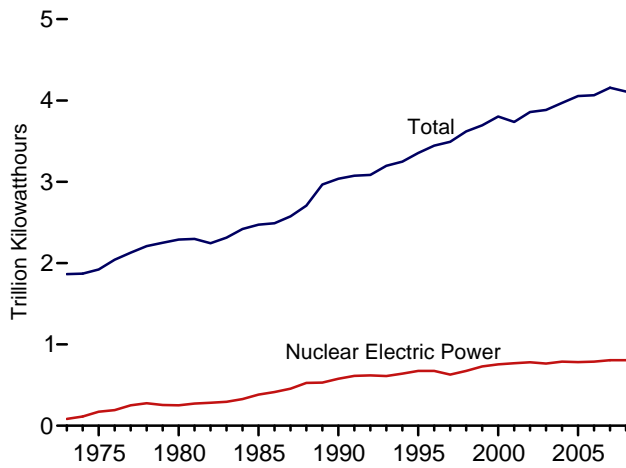
Site of Shippingport atomic power station, the first commercial nuclear power plant in the United States (rectangular reactor building and foreground); background, Beaver Valley 1 and 2 nuclear power plants and Bruce Mansfield coal-fired power plant (southwestern Pennsylvania). Source: U.S. Department of Energy.

### Figure 8.1 Nuclear Energy Overview

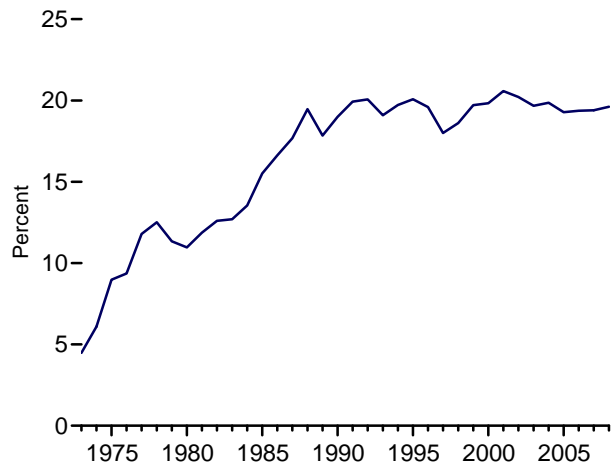
Operable Units, End of Year, 1973-2008



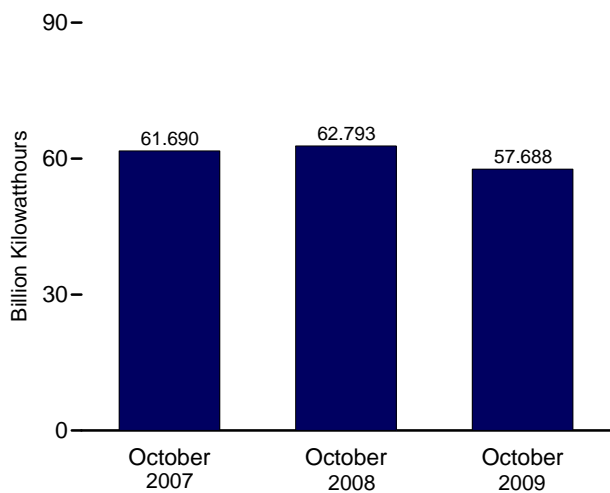
Electricity Net Generation, 1973-2008



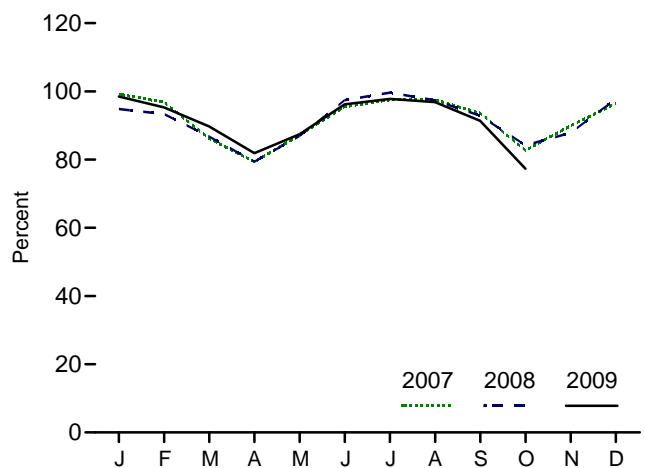
Nuclear Share of Electricity Net Generation, 1973-2008



Nuclear Electricity Net Generation



Capacity Factor, Monthly



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

**Table 8.1 Nuclear Energy Overview**

	Total Operable Units <sup>a,b</sup>	Net Summer Capacity of Operable Units <sup>b,c</sup>	Nuclear Electricity Net Generation	Nuclear Share of Electricity Net Generation	Capacity Factor <sup>d</sup>
	Number	Million Kilowatts	Million Kilowatthours	Percent	
<b>1973 Total</b> .....	<b>42</b>	<b>22,683</b>	<b>83,479</b>	<b>4.5</b>	<b>53.5</b>
<b>1975 Total</b> .....	<b>57</b>	<b>37,267</b>	<b>172,505</b>	<b>9.0</b>	<b>55.9</b>
<b>1980 Total</b> .....	<b>71</b>	<b>51,810</b>	<b>251,116</b>	<b>11.0</b>	<b>56.3</b>
<b>1985 Total</b> .....	<b>96</b>	<b>79,397</b>	<b>383,691</b>	<b>15.5</b>	<b>58.0</b>
<b>1990 Total</b> .....	<b>112</b>	<b>99,624</b>	<b>576,862</b>	<b>19.0</b>	<b>66.0</b>
<b>1995 Total</b> .....	<b>109</b>	<b>99,515</b>	<b>673,402</b>	<b>20.1</b>	<b>77.4</b>
<b>1996 Total</b> .....	<b>109</b>	<b>100,784</b>	<b>674,729</b>	<b>19.6</b>	<b>76.2</b>
<b>1997 Total</b> .....	<b>107</b>	<b>99,716</b>	<b>628,644</b>	<b>18.0</b>	<b>71.1</b>
<b>1998 Total</b> .....	<b>104</b>	<b>97,070</b>	<b>673,702</b>	<b>18.6</b>	<b>78.2</b>
<b>1999 Total</b> .....	<b>104</b>	<b>97,411</b>	<b>728,254</b>	<b>19.7</b>	<b>85.3</b>
<b>2000 Total</b> .....	<b>104</b>	<b>97,860</b>	<b>753,893</b>	<b>19.8</b>	<b>88.1</b>
<b>2001 Total</b> .....	<b>104</b>	<b>98,159</b>	<b>768,826</b>	<b>20.6</b>	<b>89.4</b>
<b>2002 Total</b> .....	<b>104</b>	<b>98,657</b>	<b>780,064</b>	<b>20.2</b>	<b>90.3</b>
<b>2003 Total</b> .....	<b>104</b>	<b>99,209</b>	<b>763,733</b>	<b>19.7</b>	<b>87.9</b>
<b>2004 Total</b> .....	<b>104</b>	<b>99,628</b>	<b>788,528</b>	<b>19.9</b>	<b>90.1</b>
<b>2005 Total</b> .....	<b>104</b>	<b>99,988</b>	<b>781,986</b>	<b>19.3</b>	<b>89.3</b>
<b>2006 Total</b> .....	<b>104</b>	<b>100,334</b>	<b>787,219</b>	<b>19.4</b>	<b>89.6</b>
<b>2007</b> January .....	104	100,266	74,006	20.9	99.2
February .....	104	100,266	65,225	20.2	96.8
March .....	104	100,266	64,305	20.1	86.2
April .....	104	100,266	57,301	18.9	79.4
May .....	104	100,266	65,025	19.7	87.2
June .....	104	100,266	68,923	19.0	95.5
July .....	104	100,266	72,739	18.5	97.5
August .....	104	100,266	72,751	17.2	97.5
September .....	104	100,266	67,579	19.0	93.6
October .....	104	100,266	61,690	18.5	82.7
November .....	104	100,266	64,899	20.7	89.9
December .....	104	100,266	71,983	20.8	96.5
<b>Total</b> .....	<b>104</b>	<b>100,266</b>	<b>806,425</b>	<b>19.4</b>	<b>91.8</b>
<b>2008</b> January .....	104	100,266	70,736	19.5	94.8
February .....	104	100,266	65,130	20.1	93.3
March .....	104	100,266	64,716	20.0	86.8
April .....	104	100,266	57,333	18.8	79.4
May .....	104	100,266	64,826	20.0	86.9
June .....	104	100,266	70,319	18.9	97.4
July .....	104	100,266	74,318	18.5	99.6
August .....	104	100,266	72,617	18.7	97.3
September .....	104	100,266	67,054	19.9	92.9
October .....	104	100,266	62,793	19.7	84.2
November .....	104	100,266	63,408	20.5	87.8
December .....	104	100,266	72,931	21.3	97.8
<b>Total</b> .....	<b>104</b>	<b>100,266</b>	<b>806,182</b>	<b>19.6</b>	<b>91.5</b>
<b>2009</b> January .....	104	100,266	73,479	20.8	98.5
February .....	104	100,266	64,227	21.4	95.3
March .....	104	100,266	66,920	21.6	89.7
April .....	104	100,266	59,129	20.5	81.9
May .....	104	100,266	65,229	20.9	87.4
June .....	104	100,266	69,435	20.0	96.2
July .....	104	100,266	72,949	19.6	97.8
August .....	104	100,266	72,245	19.0	96.8
September .....	104	100,266	65,941	20.2	91.3
October .....	104	100,266	57,688	18.8	77.3
<b>10-Month Total</b> .....	<b>104</b>	<b>100,266</b>	<b>667,241</b>	<b>20.2</b>	<b>91.2</b>
<b>2008 10-Month Total</b> .....	<b>104</b>	<b>100,266</b>	<b>669,842</b>	<b>19.4</b>	<b>91.3</b>
<b>2007 10-Month Total</b> .....	<b>104</b>	<b>100,266</b>	<b>669,543</b>	<b>19.1</b>	<b>91.5</b>

<sup>a</sup> Total of nuclear generating units holding full-power licenses, or equivalent permission to operate, at end of period. See Note 1, "Operable Nuclear Reactors," at end of section. For additional information on nuclear generating units, see *Annual Energy Review 2008*, June 2009, Table 9.1, <http://www.eia.doe.gov/emeu/aer/nuclear.html>.

<sup>b</sup> At end of period.

<sup>c</sup> For the definition of "Net Summer Capacity," see Note 2, "Nuclear Capacity," at end of section.

<sup>d</sup> For an explanation of the method of calculating the capacity factor, see Note

2, "Nuclear Capacity," at end of section.

Notes: • For a discussion of nuclear reactor unit coverage, see Note 1, "Operable Nuclear Reactors," at end of section. • 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: See <http://www.eia.doe.gov/emeu/mer/nuclear.html> for all available data beginning in 1973.

Sources: See end of section.

## Nuclear Energy

**Note 1. Operable Nuclear Reactors.** 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. All five units were idle for several years, restarting in 2007, 1991, 1995, 1988, and 1988, respectively and were counted as operable during the shutdowns.

(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. Nuclear 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 calculated as the monthly nuclear electricity net generation divided by the maximum possible nuclear electricity net generation for that month. The maximum possible nuclear electricity net generation is the number of hours in the month (assuming 24-hour days, with no adjustment for changes to or from Daylight Savings Time) multiplied by the net summer capacity of operable nuclear generating units at the end of the month. That fraction is then multiplied by 100 to obtain a percentage. Annual capacity factors are calculated as the annual nuclear electricity net generation divided by the annual maximum possible nuclear electricity net generation (the sum of the monthly values for maximum possible nuclear electricity net generation).

### Table 8.1 Sources

#### Total Operable Units and Net Summer Capacity of Operable Units

1973-1982: Compiled from various sources, primarily U.S. Department of Energy, Office of Nuclear Reactor Programs, "U.S. Central Station Nuclear Electric Generating Units: Significant Milestones."

1983 forward: U.S. 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://www.eia.doe.gov/cneaf/nuclear/page/nuc\\_reactors/operational.xls](http://www.eia.doe.gov/cneaf/nuclear/page/nuc_reactors/operational.xls).

#### Nuclear Electricity Net Generation and Nuclear Share of Electricity Net Generation

See Table 7.2a.

#### Capacity Factor

Calculated by EIA using the method described above in Note 2.