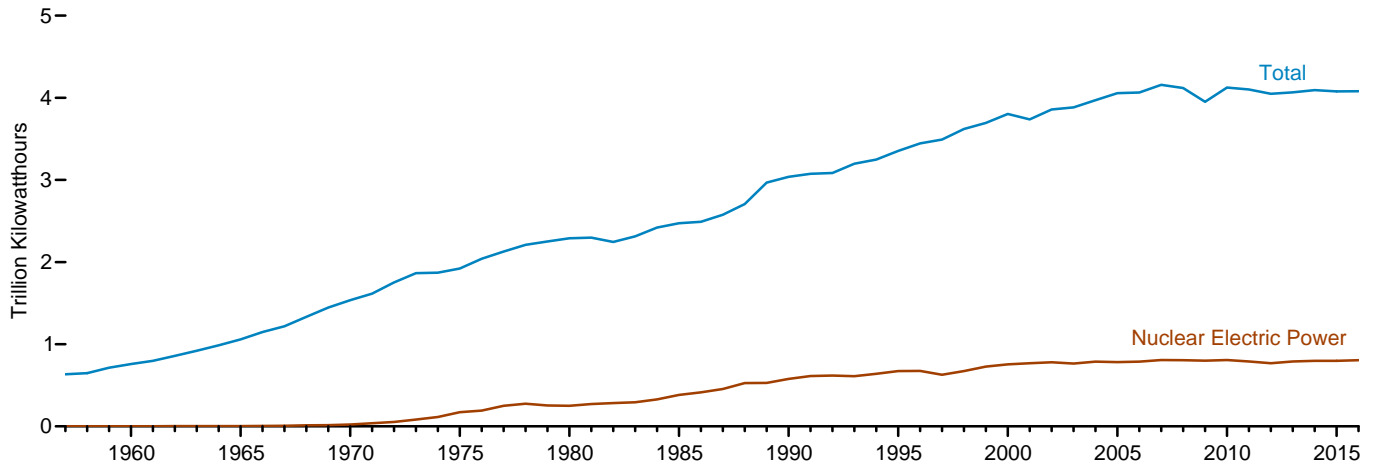


# 8. Nuclear Energy

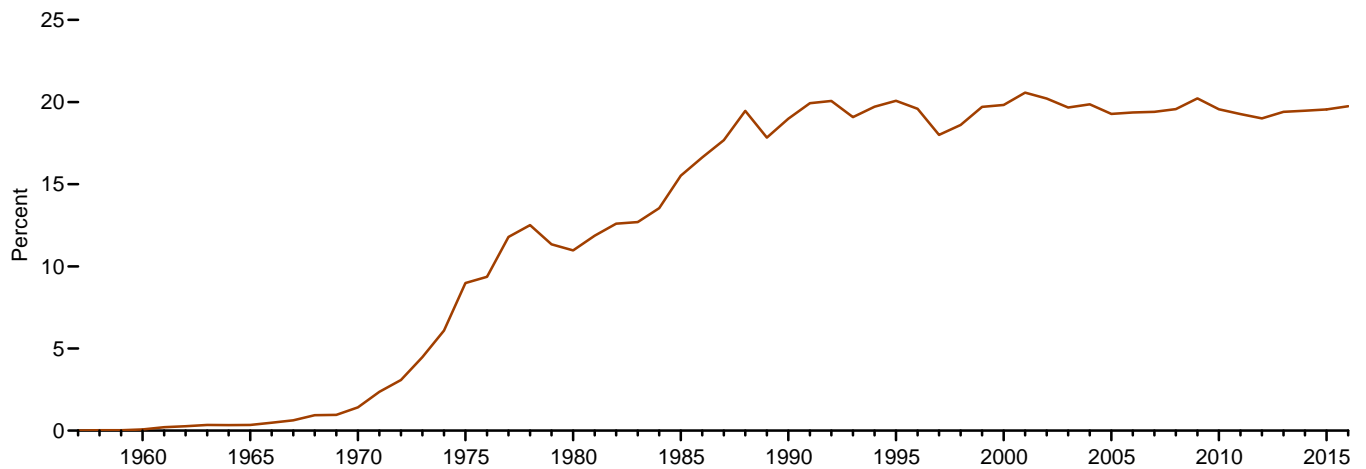
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## Figure 8.1 Nuclear Energy Overview

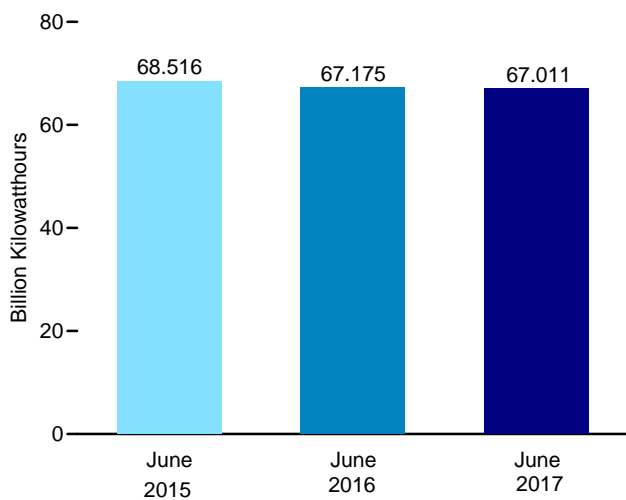
Electricity Net Generation, 1957–2016



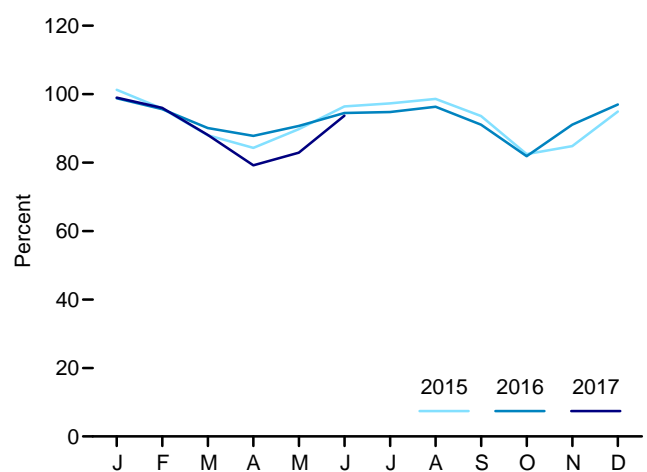
Nuclear Share of Electricity Net Generation, 1957–2016



Nuclear Electricity Net Generation



Capacity Factor, Monthly



Web Page: <http://www.eia.gov/totalenergy/data/monthly/#nuclear>.  
Sources: Tables 7.2a 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>1957 Total</b> .....	<b>1</b>	<b>0.055</b>	<b>10</b>	<b>(s)</b>	<b>NA</b>
<b>1960 Total</b> .....	<b>3</b>	<b>.411</b>	<b>518</b>	<b>.1</b>	<b>NA</b>
<b>1965 Total</b> .....	<b>13</b>	<b>.793</b>	<b>3,657</b>	<b>.3</b>	<b>NA</b>
<b>1970 Total</b> .....	<b>20</b>	<b>7.004</b>	<b>21,804</b>	<b>1.4</b>	<b>NA</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>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 Total</b> .....	<b>104</b>	<b>100.266</b>	<b>806,425</b>	<b>19.4</b>	<b>91.8</b>
<b>2008 Total</b> .....	<b>104</b>	<b>100.755</b>	<b>806,208</b>	<b>19.6</b>	<sup>d</sup> <b>91.1</b>
<b>2009 Total</b> .....	<b>104</b>	<b>101.004</b>	<b>798,855</b>	<b>20.2</b>	<b>90.3</b>
<b>2010 Total</b> .....	<b>104</b>	<b>101.167</b>	<b>806,968</b>	<b>19.6</b>	<b>91.1</b>
<b>2011 Total</b> .....	<b>104</b>	<sup>c</sup> <b>101.419</b>	<b>790,204</b>	<b>19.3</b>	<b>89.1</b>
<b>2012 Total</b> .....	<b>104</b>	<b>101.885</b>	<b>769,331</b>	<b>19.0</b>	<b>86.1</b>
<b>2013 Total</b> .....	<b>100</b>	<b>99.240</b>	<b>789,016</b>	<b>19.4</b>	<b>89.9</b>
<b>2014 Total</b> .....	<b>99</b>	<b>98.569</b>	<b>797,166</b>	<b>19.5</b>	<b>91.7</b>
<b>2015 January</b> .....	<b>99</b>	<b>98.533</b>	<b>74,270</b>	<b>20.6</b>	<b>101.3</b>
February .....	<b>99</b>	<b>98.533</b>	<b>63,461</b>	<b>19.0</b>	<b>95.8</b>
March .....	<b>99</b>	<b>98.533</b>	<b>64,547</b>	<b>19.9</b>	<b>88.0</b>
April .....	<b>99</b>	<b>98.533</b>	<b>59,784</b>	<b>20.3</b>	<b>84.3</b>
May .....	<b>99</b>	<b>98.533</b>	<b>65,827</b>	<b>20.4</b>	<b>89.8</b>
June .....	<b>99</b>	<b>98.672</b>	<b>68,516</b>	<b>18.9</b>	<b>96.4</b>
July .....	<b>99</b>	<b>98.672</b>	<b>71,412</b>	<b>17.8</b>	<b>97.3</b>
August .....	<b>99</b>	<b>98.672</b>	<b>72,415</b>	<b>18.5</b>	<b>98.6</b>
September .....	<b>99</b>	<b>98.672</b>	<b>66,476</b>	<b>19.0</b>	<b>93.6</b>
October .....	<b>99</b>	<b>98.672</b>	<b>60,571</b>	<b>19.4</b>	<b>82.5</b>
November .....	<b>99</b>	<b>98.672</b>	<b>60,264</b>	<b>20.0</b>	<b>84.8</b>
December .....	<b>99</b>	<b>98.672</b>	<b>69,634</b>	<b>21.5</b>	<b>94.9</b>
<b>Total</b> .....	<b>99</b>	<b>98.672</b>	<b>797,178</b>	<b>19.6</b>	<b>92.3</b>
<b>2016 January</b> .....	<b>99</b>	<sup>E</sup> <b>98.672</b>	<b>72,525</b>	<b>20.6</b>	<sup>E</sup> <b>98.8</b>
February .....	<b>99</b>	<sup>E</sup> <b>98.672</b>	<b>65,638</b>	<b>20.9</b>	<sup>E</sup> <b>95.6</b>
March .....	<b>99</b>	<sup>E</sup> <b>98.672</b>	<b>66,149</b>	<b>21.7</b>	<sup>E</sup> <b>90.1</b>
April .....	<b>99</b>	<sup>E</sup> <b>98.672</b>	<b>62,365</b>	<b>21.3</b>	<sup>E</sup> <b>87.8</b>
May .....	<b>99</b>	<sup>E</sup> <b>98.672</b>	<b>66,576</b>	<b>21.0</b>	<sup>E</sup> <b>90.7</b>
June .....	<b>99</b>	<sup>E</sup> <b>99.794</b>	<b>67,175</b>	<b>18.2</b>	<sup>E</sup> <b>94.5</b>
July .....	<b>100</b>	<sup>E</sup> <b>99.794</b>	<b>70,349</b>	<b>17.1</b>	<sup>E</sup> <b>94.8</b>
August .....	<b>100</b>	<sup>E</sup> <b>99.794</b>	<b>71,526</b>	<b>17.4</b>	<sup>E</sup> <b>96.3</b>
September .....	<b>100</b>	<sup>E</sup> <b>99.794</b>	<b>65,448</b>	<b>18.6</b>	<sup>E</sup> <b>91.1</b>
October .....	<b>99</b>	<sup>E</sup> <b>99.316</b>	<b>60,733</b>	<b>19.4</b>	<sup>E</sup> <b>81.9</b>
November .....	<b>99</b>	<sup>E</sup> <b>99.316</b>	<b>65,179</b>	<b>21.9</b>	<sup>E</sup> <b>91.1</b>
December .....	<b>99</b>	<sup>E</sup> <b>99.316</b>	<b>71,662</b>	<b>20.8</b>	<sup>E</sup> <b>97.0</b>
<b>Total</b> .....	<b>99</b>	<sup>E</sup> <b>99.316</b>	<b>805,327</b>	<b>19.7</b>	<sup>E</sup> <b>92.5</b>
<b>2017 January</b> .....	<b>99</b>	<sup>E</sup> <b>99.316</b>	<b>73,121</b>	<b>21.4</b>	<sup>E</sup> <b>99.0</b>
February .....	<b>99</b>	<sup>E</sup> <b>99.328</b>	<b>64,053</b>	<b>22.2</b>	<sup>E</sup> <b>96.0</b>
March .....	<b>99</b>	<sup>E</sup> <b>99.331</b>	<b>65,093</b>	<b>20.5</b>	<sup>E</sup> <b>88.1</b>
April .....	<b>99</b>	<sup>E</sup> <b>99.467</b>	<b>56,743</b>	<b>19.3</b>	<sup>E</sup> <b>79.2</b>
May .....	<b>99</b>	<sup>E</sup> <b>99.455</b>	<b>61,309</b>	<b>19.1</b>	<sup>E</sup> <b>82.9</b>
June .....	<b>99</b>	<sup>E</sup> <b>99.370</b>	<b>67,011</b>	<b>18.8</b>	<sup>E</sup> <b>93.7</b>
<b>6-Month Total</b> .....	<b>99</b>	<sup>E</sup> <b>99.370</b>	<b>387,330</b>	<b>20.2</b>	<sup>E</sup> <b>89.7</b>
<b>2016 6-Month Total</b> .....	<b>99</b>	<sup>E</sup> <b>99.794</b>	<b>400,429</b>	<b>20.5</b>	<sup>E</sup> <b>92.9</b>
<b>2015 6-Month Total</b> .....	<b>99</b>	<b>98.672</b>	<b>396,405</b>	<b>19.8</b>	<b>92.6</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.  
<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. Beginning in 2011, monthly capacity values are estimated in two steps: 1) updates and derates reported on Form EIA-860M are added to specific months; and 2) the difference between the resulting year-end capacity (from data reported on Form EIA-860M) and final capacity (reported on Form EIA-860) is allocated to the month of January.  
<sup>d</sup> Beginning in 2008, capacity factor data are calculated using a new

methodology. For an explanation of the method of calculating the capacity factor, see Note 2, "Nuclear Capacity," at end of section.  
<sup>E</sup>=Estimate. NA=Not available. (s)=Less than 0.05%.  
 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.gov/totalenergy/data/monthly/#nuclear> (Excel and CSV files) for all available annual data beginning in 1957 and monthly data beginning in 1973.  
 Sources: See end of section.

## Nuclear Energy

**Note 1. Operable Nuclear Reactors.** A reactor is defined as operable when it possesses 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 includes units retaining full-power licenses during long, non-routine shutdowns that for a time rendered them unable to generate electricity.

Year	Retirements	Openings and Restarts
2007		Browns Ferry 1 <sup>a</sup> (AL)
2008		
2009		
2010		
2011		
2012		
2013	Kewaunee (WI); San Onofre 2 and 3 (CA); Crystal River 3 <sup>b</sup> (FL)	
2014	Vermont Yankee (VT)	
2015		
2016	Fort Calhoun (NE)	Watts Bar 2 (TN)

<sup>a</sup> Restarted after long-term shutdown from 1986 to 2006, but counted as operable for those years.

<sup>b</sup> Official 2013 retirement for reactor closed in 2009.

Note: “Opening” refers to the plant’s commercial operations date.

Source: International Atomic Energy Agency, Power Reactor Information System database. See <https://www.iaea.org/PRIS/CountryStatistics/CountryDetails.aspx?current=US>.

**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% 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.

Through 2007, 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). For the methodology used to calculate capacity factors beginning in 2008, see U.S. Energy Information Administration, *Electric Power Monthly*, Appendix C notes on “Average Capacity Factors.”

### Table 8.1 Sources

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

1957–1982: 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 predecessor forms; Form EIA-860M, “Monthly Update to the Annual Electric Generator Report”; and monthly updates as appropriate. See <https://www.eia.gov/nuclear/generation/index.html> for a list of operable units.

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

1957 forward: Table 7.2a.

#### Capacity Factor

1973–2007: Calculated by EIA using the method described above in Note 2.

2008 forward: EIA, Form EIA-860, “Annual Electric Generator Report”; Form EIA-860M, “Monthly Update to the Annual Electric Generator Report”; and Form EIA-923, “Power Plant Operations Report.”