

## The Great Transition: Shifting from Fossil Fuels to Solar and Wind Energy Supporting Data - Nuclear Power

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GRAPH: Electricity Generation from Nuclear Power Plants in India, 1970-2013

A full listing of data for the entire book is on-line at:

[http://www.earth-policy.org/books/tgt/tgt\\_data](http://www.earth-policy.org/books/tgt/tgt_data)

This is part of a supporting dataset for **The Great Transition: Shifting from Fossil Fuels to Solar and Wind Energy**, by Lester R. Brown, with Janet Larsen, J. Matthew Roney, and Emily E. Adams (New York: W.W. Norton & Company, 2015).

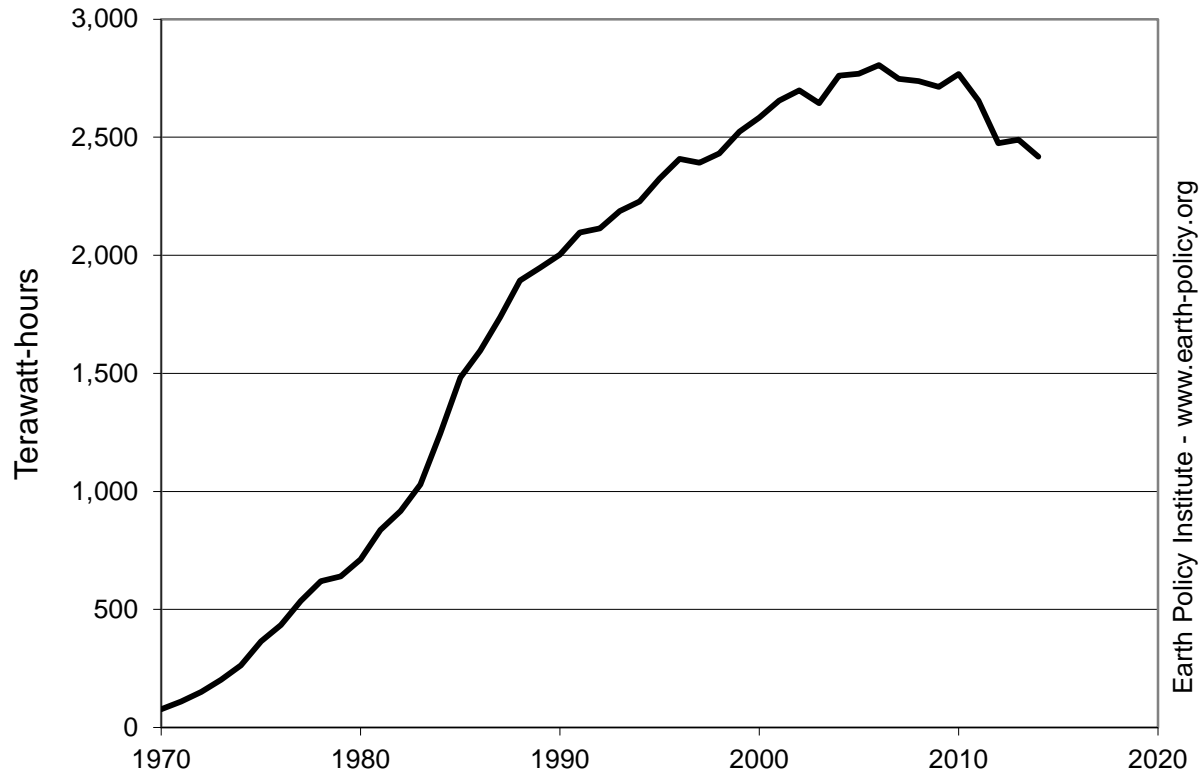
For more information, see Earth Policy Institute on-line at [www.earth-policy.org](http://www.earth-policy.org).

## World Electricity Generation from Nuclear Power Plants, 1970-2014

Year	Generation Terawatt-hours
1970	77
1971	110
1972	151
1973	203
1974	263
1975	364
1976	433
1977	535
1978	619
1979	640
1980	711
1981	836
1982	917
1983	1,030
1984	1,245
1985	1,482
1986	1,597
1987	1,736
1988	1,893
1989	1,947
1990	2,002
1991	2,097
1992	2,114
1993	2,187
1994	2,228
1995	2,324
1996	2,408
1997	2,391
1998	2,431
1999	2,524
2000	2,582
2001	2,655
2002	2,698
2003	2,644
2004	2,761
2005	2,768
2006	2,806
2007	2,748
2008	2,738
2009	2,714
2010	2,767
2011	2,655
2012	2,474
2013	2,489
2014	2,418

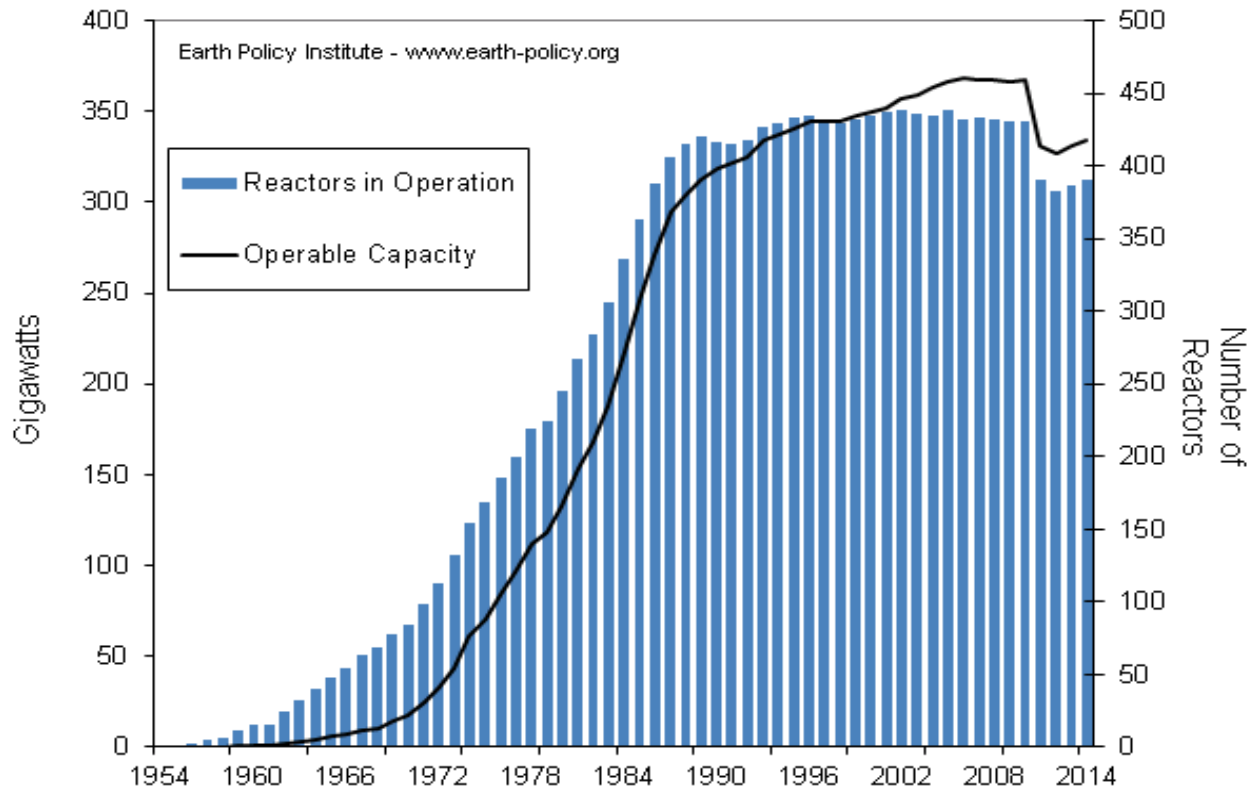
Source: Compiled by Earth Policy Institute with data for 1970-2013 from *BP, Statistical Review of World Energy June 2014* (London: 2014); 2014 from International Atomic Energy Agency data, cited in Bernard Chabot, *Analysis of Nuclear Market and Electricity Production Up to 2014 and 2040 with Some Strategic Comparisons with Renewables* (Valbonne, France: BCCONSULT, 2015).

# World Electricity Generation from Nuclear Power Plants, 1970-2014



Source: EPI from BP, IAEA/Chabot

## World Nuclear Reactors and Net Operating Capacity, 1954-2014



Source: Mycle Schneider Consulting

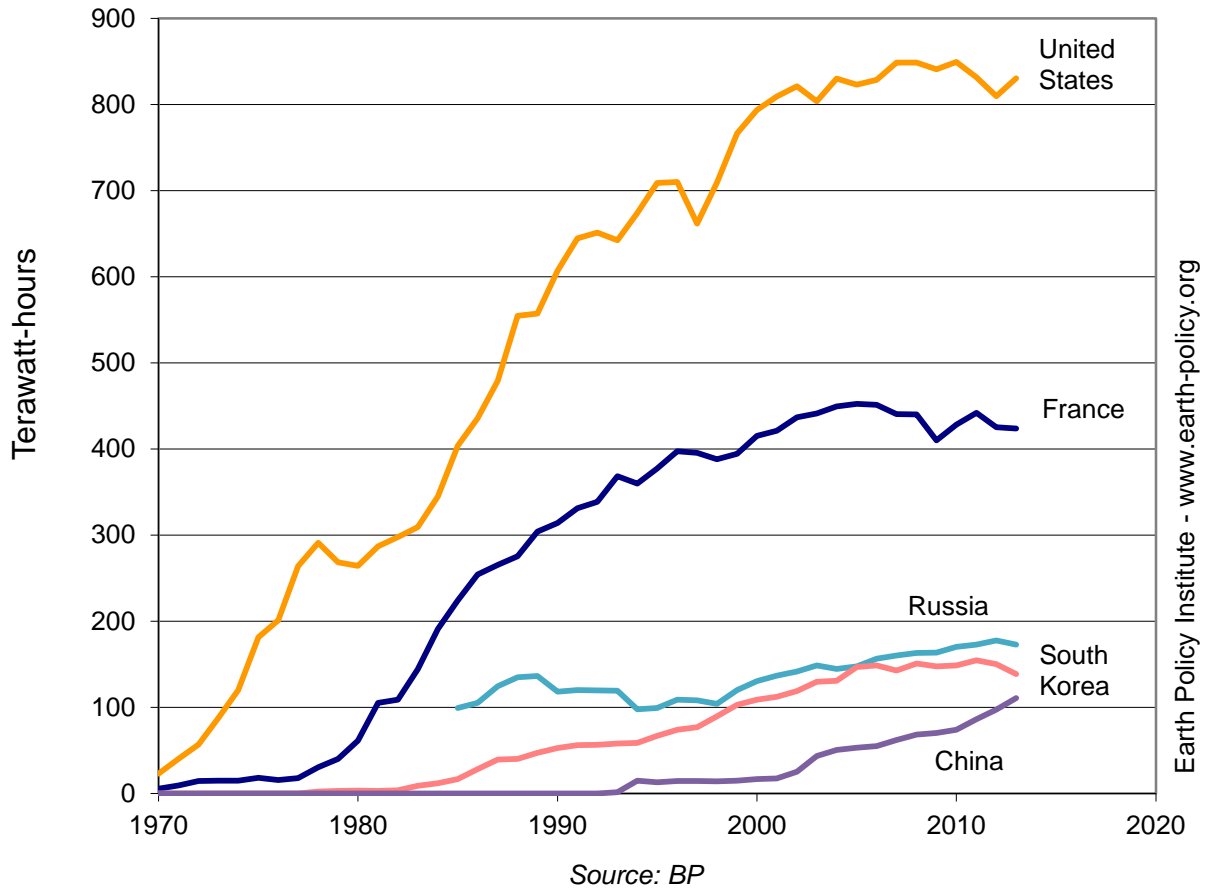
### Nuclear-generated Electricity in Top 10 Countries and the World, 1970-2013

Year	United States	France	Russian Federation	South Korea	China	Canada	Germany	Ukraine	United Kingdom	Sweden	World
---Terawatt-hours---											
1970	23	6	n.a.	0	0	0	6	n.a.	26	0	77
1971	40	9	n.a.	0	0	4	6	n.a.	28	0	110
1972	57	15	n.a.	0	0	7	10	n.a.	29	1	151
1973	88	15	n.a.	0	0	14	12	n.a.	28	2	203
1974	120	15	n.a.	0	0	14	14	n.a.	34	2	263
1975	182	18	n.a.	0	0	12	24	n.a.	30	12	364
1976	201	16	n.a.	0	0	16	30	n.a.	36	16	433
1977	264	18	n.a.	0	0	27	41	n.a.	40	20	535
1978	291	30	n.a.	2	0	33	44	n.a.	37	24	619
1979	269	40	n.a.	3	0	33	52	n.a.	38	21	640
1980	264	61	n.a.	3	0	36	56	n.a.	37	26	711
1981	287	105	n.a.	3	0	36	66	n.a.	38	38	836
1982	298	109	n.a.	4	0	38	74	n.a.	44	39	917
1983	309	144	n.a.	9	0	49	78	n.a.	50	41	1,030
1984	345	191	n.a.	12	0	52	104	n.a.	54	51	1,245
1985	404	224	99	17	0	61	139	53	61	59	1,482
1986	436	254	105	28	0	71	131	43	59	70	1,597
1987	479	266	125	39	0	77	142	50	55	68	1,736
1988	555	276	135	40	0	83	157	72	63	69	1,893
1989	557	304	136	47	0	79	162	67	72	66	1,947
1990	607	314	118	53	0	72	152	76	66	68	2,002
1991	645	331	120	56	0	84	148	75	71	77	2,097
1992	651	339	120	57	0	80	159	74	77	64	2,114
1993	642	368	119	58	2	93	154	75	89	61	2,187
1994	674	360	98	59	15	107	151	69	88	73	2,228
1995	709	377	99	67	13	97	154	71	89	70	2,324
1996	710	397	109	74	14	92	162	80	95	73	2,408
1997	662	396	108	77	14	82	170	79	98	70	2,391
1998	709	388	104	90	14	71	162	75	100	70	2,431
1999	767	394	120	103	15	73	170	72	95	73	2,524
2000	794	415	131	109	17	72	170	77	85	57	2,582
2001	809	421	137	112	17	76	171	76	90	72	2,655
2002	821	437	142	119	25	75	165	78	88	68	2,698
2003	804	441	149	130	43	74	165	81	89	67	2,644
2004	830	449	145	131	50	90	167	87	80	77	2,761
2005	823	453	148	147	53	91	163	89	82	72	2,768
2006	829	451	156	149	55	97	167	90	75	67	2,806
2007	849	441	160	143	62	93	140	93	63	67	2,748
2008	849	440	163	151	68	93	149	90	52	64	2,738
2009	841	410	164	148	70	90	135	83	69	53	2,714
2010	849	428	170	149	74	90	141	89	62	59	2,767
2011	832	442	173	155	86	95	108	90	69	61	2,655
2012	810	425	178	150	97	96	99	90	70	65	2,474
2013	831	424	173	139	111	102	97	83	71	67	2,489

Note: "n.a." indicates data not available.

Source: BP, *Statistical Review of World Energy June 2014* (London: 2014).

# Nuclear-generated Electricity in Top Countries, 1970-2013

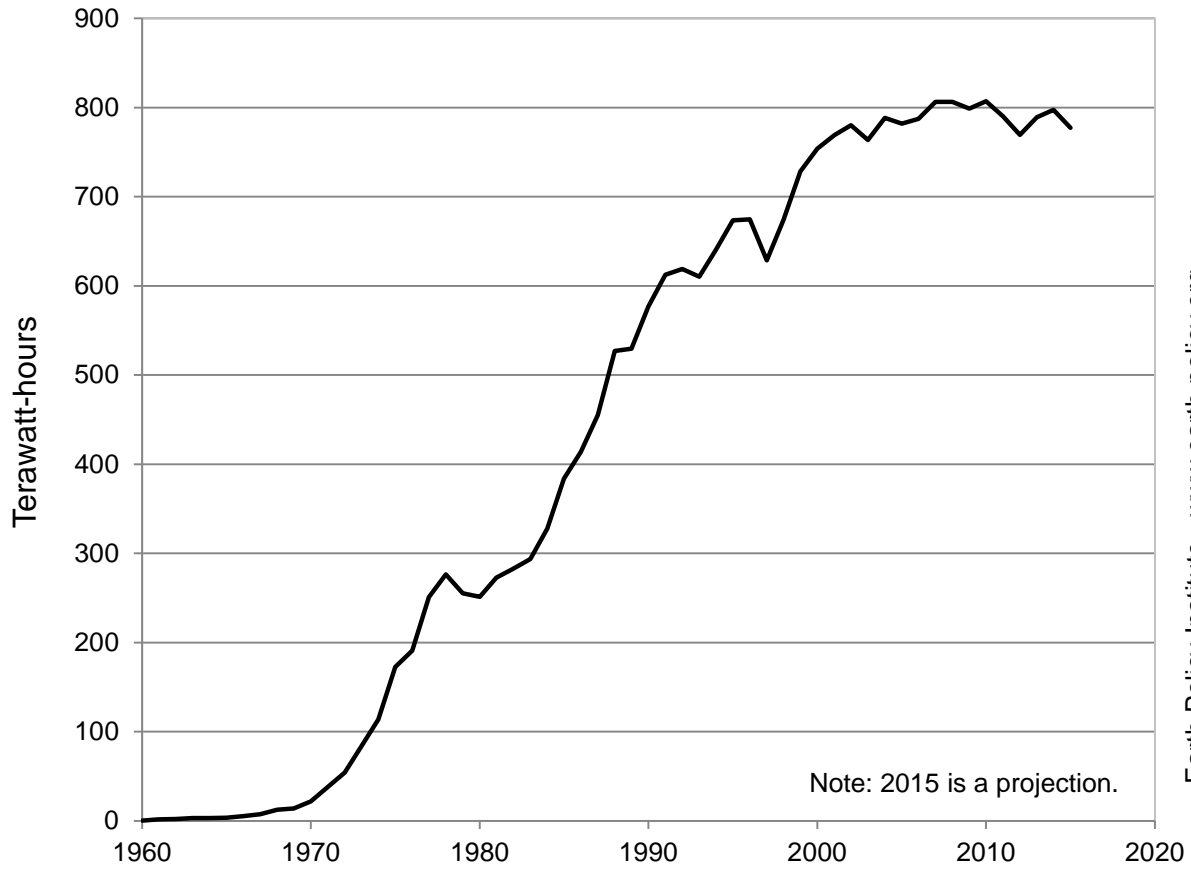


## U.S. Net Electricity Generation from Nuclear Power, 1960-2014, with Projection to 2015

Year	Generation Terawatt-hours
1960	1
1961	2
1962	2
1963	3
1964	3
1965	4
1966	6
1967	8
1968	13
1969	14
1970	22
1971	38
1972	54
1973	83
1974	114
1975	173
1976	191
1977	251
1978	276
1979	255
1980	251
1981	273
1982	283
1983	294
1984	328
1985	384
1986	414
1987	455
1988	527
1989	529
1990	577
1991	613
1992	619
1993	610
1994	640
1995	673
1996	675
1997	629
1998	674
1999	728
2000	754
2001	769
2002	780
2003	764
2004	789
2005	782
2006	787
2007	806
2008	806
2009	799
2010	807
2011	790
2012	769
2013	789
2014	797
2015	777

Source: Compiled by Earth Policy Institute with 1960-2013 from "Electricity Net Generation: Total (All Sectors)," Table 7.2a in U.S. Department of Energy (DOE), Energy Information Administration (EIA), "Monthly Energy Review," at [www.eia.gov/totalenergy/data/monthly](http://www.eia.gov/totalenergy/data/monthly), updated 24 February 2015; and with 2014-2015 from DOE, EIA, "Short Term Energy Outlook: Electricity," at [www.eia.gov/forecasts/steo/report/electricity.cfm](http://www.eia.gov/forecasts/steo/report/electricity.cfm), updated 10 February 2015.

# U.S. Net Electricity Generation from Nuclear Power, 1960-2015



Note: 2015 is a projection.

Source: EPI from EIA

Earth Policy Institute - [www.earth-policy.org](http://www.earth-policy.org)



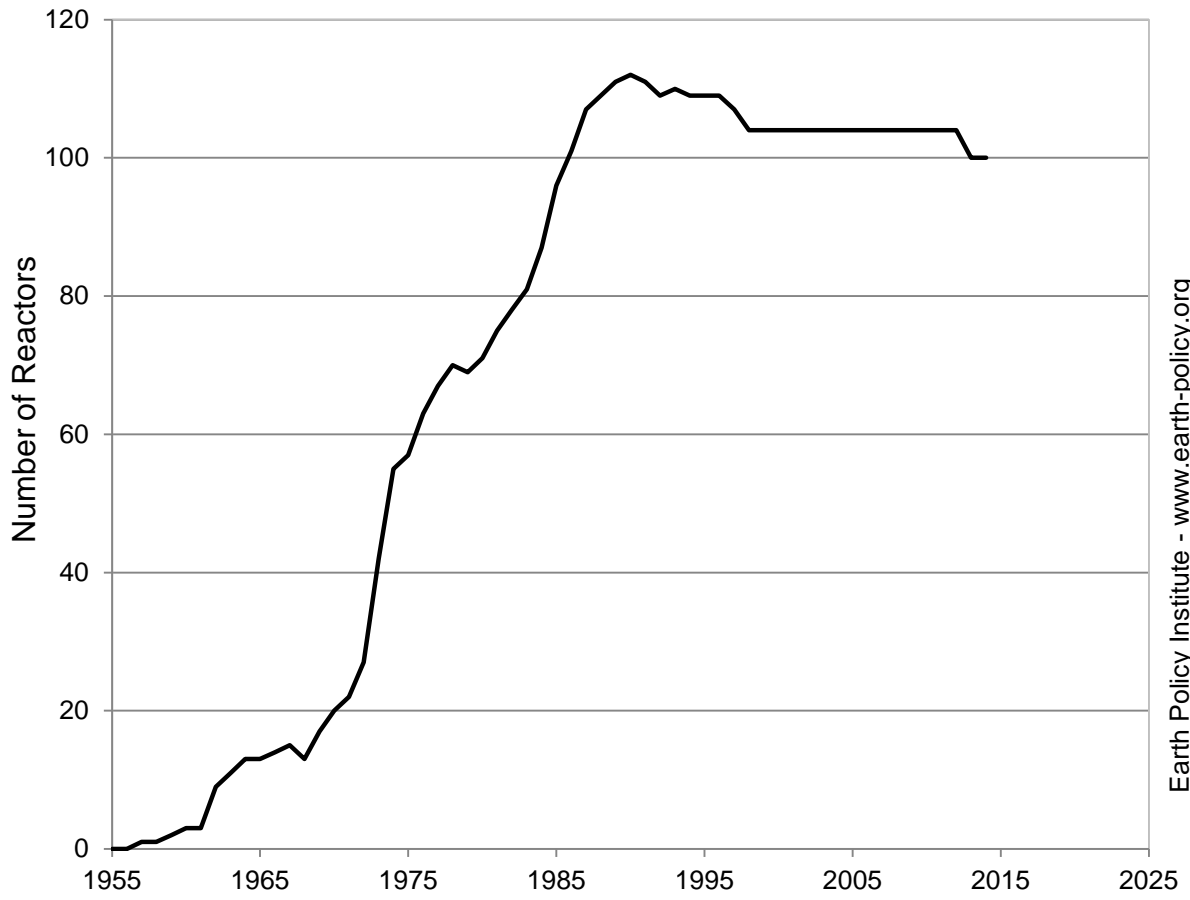
## U.S. Nuclear Power Reactors in Operation, 1955-2014

Year	Number of Reactors
1955	0
1956	0
1957	1
1958	1
1959	2
1960	3
1961	3
1962	9
1963	11
1964	13
1965	13
1966	14
1967	15
1968	13
1969	17
1970	20
1971	22
1972	27
1973	42
1974	55
1975	57
1976	63
1977	67
1978	70
1979	69
1980	71
1981	75
1982	78
1983	81
1984	87
1985	96
1986	101
1987	107
1988	109
1989	111
1990	112
1991	111
1992	109
1993	110
1994	109
1995	109
1996	109
1997	107
1998	104
1999	104
2000	104
2001	104
2002	104
2003	104
2004	104
2005	104
2006	104
2007	104
2008	104
2009	104
2010	104
2011	104
2012	104
2013	100
2014	100

Note: The Vermont Yankee reactor, counted as operational in the 2014 total, was permanently shut down on December 29, 2014, leaving 99 operating reactors as of early 2015.

Source: Compiled by Earth Policy Institute from "Nuclear Energy Overview," Table 8.1. in U.S. Department of Energy, Energy Information Administration, "Monthly Energy Review," at [www.eia.gov/totalenergy/data/monthly](http://www.eia.gov/totalenergy/data/monthly), updated 28 January 2015.

# U.S. Nuclear Power Reactors in Operation, 1955-2014



Source: EPI from EIA

Earth Policy Institute - [www.earth-policy.org](http://www.earth-policy.org)

## U.S. Nuclear Power Reactors Permanently Shut Down

Reactor Name	Location	First Grid Connection	Shut-Down Date	Age at Shut-Down
GE Vallecitos	Sunol, CA	10/19/1957	12/9/1963	6
Hallam	Hallam, NE	9/1/1963	9/1/1964	1
Piqua	Piqua, OH	7/1/1963	1/1/1966	2
CVTR	Parr, SC	12/18/1963	1/1/1967	3
Pathfinder	Sioux Falls, SD	7/25/1966	9/16/1967	1
Elk River	Elk River, MN	8/24/1963	2/1/1968	4
GE Bonus	Punta Higuera, PR	8/14/1964	6/1/1968	4
Saxton	Saxton, PA	3/1/1967	5/1/1972	5
Fermi 1	Newport, MI	8/5/1966	9/22/1972	6
Indian Point 1	Buchanan, NY	9/16/1962	10/31/1974	12
Peach Bottom 1	Delta, PA	1/27/1967	10/31/1974	8
Humboldt Bay 3	Eureka, CA	4/18/1963	7/2/1976	13
Dresden 1	Morris, IL	4/15/1960	10/31/1978	19
Three Mile Island 2	Middletown, PA	4/21/1978	3/28/1979	1
Shippingport*	Shippingport, PA	12/2/1957	10/1/1982	25
La Crosse	Genoa, WI	4/26/1968	4/30/1987	19
Rancho Seco	Herald, CA	10/13/1974	6/7/1989	15
Shoreham	Wading River, NY	8/1/1986	6/28/1989	3
Fort St. Vrain	Platteville, CO	12/11/1976	8/18/1989	13
Yankee-Rowe	Rowe, MA	11/10/1960	10/1/1991	31
Trojan	Rainier, OR	12/23/1975	11/9/1992	17
San Onofre 1	San Clemente, CA	7/16/1967	11/30/1992	25
Zion 2	Zion, IL	12/26/1973	9/19/1996	23
Haddam Neck	Meriden, CT	8/7/1967	12/5/1996	29
Maine Yankee	Wiscasset, ME	11/8/1972	12/6/1996	24
Zion 1	Zion, IL	6/28/1973	2/21/1997	24
Big Rock Point	Charlevoix, MI	12/8/1962	8/29/1997	35
Millstone 1	Waterford, CT	11/29/1970	7/21/1998	28
Crystal River 3	Crystal River, FL	1/30/1977	2/20/2013	36
Kewaunee Power Station	Kewaunee, WI	4/8/1974	5/7/2013	39
San Onofre 2	San Clemente, CA	9/20/1982	6/12/2013	31
San Onofre 3	San Clemente, CA	9/25/1983	6/12/2013	30
Vermont Yankee	Vernon, VT	9/20/1972	12/29/2014	42

\* Because discussions on Shippingport's construction and funding began in 1953, prior to the 1954 Atomic Energy Act that first required a licensing process for nuclear facilities, this reactor was not formally licensed for operation.

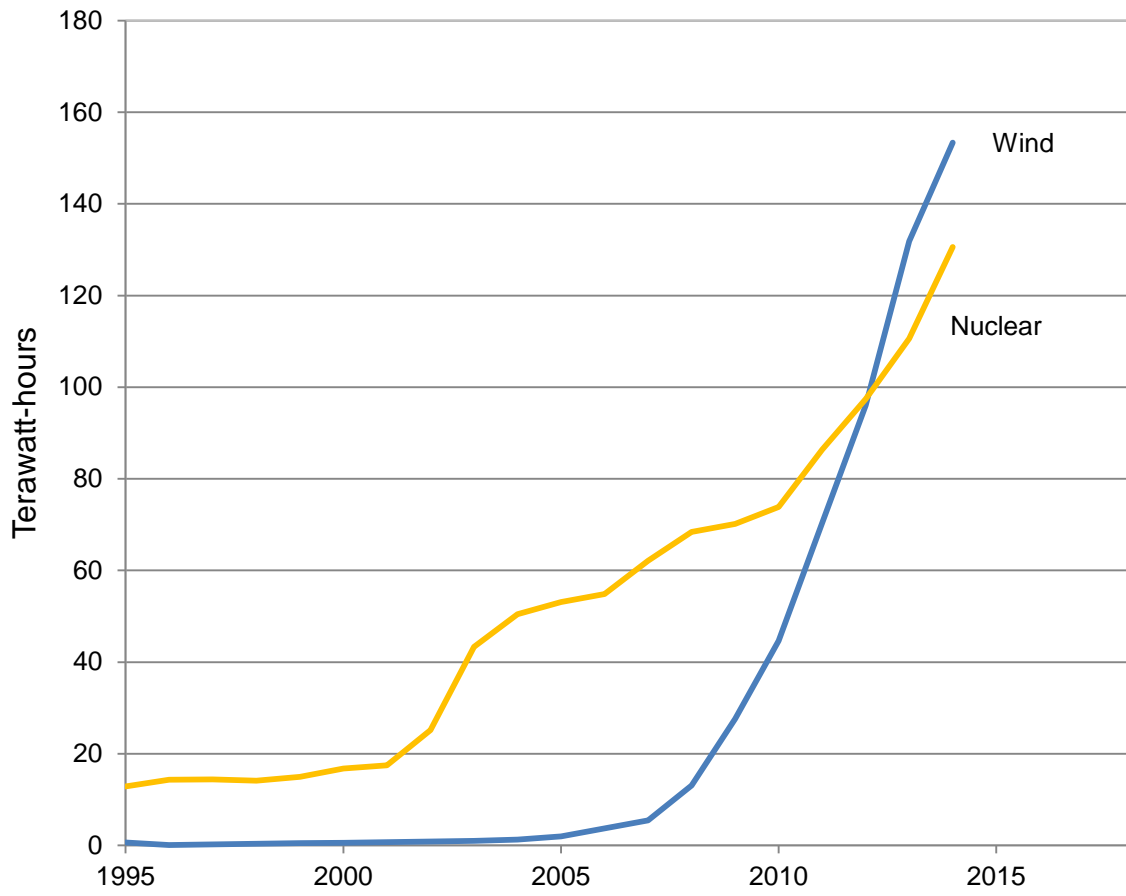
Source: Compiled by Earth Policy Institute (EPI) with grid connection dates and Vermont Yankee shut-down date from International Atomic Energy Agency, "United States of America," at [www.iaea.org/PRIS/CountryStatistics/CountryDetails.aspx?current=US](http://www.iaea.org/PRIS/CountryStatistics/CountryDetails.aspx?current=US), updated 9 February 2015; and with all other shut-down dates from "U.S. Commercial Nuclear Power Reactors Formerly Licensed to Operate," Appendix C in U.S. Nuclear Regulatory Commission (NRC), "Information Digest, 2014–2015 (NUREG-1350, Volume 26)," at [www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350](http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350), updated 12 November 2014; license information for Shippingport reactor from Ivonne L. Couret, NRC, e-mail to J. Matthew Roney, EPI, 9 September 2013.

## Wind- and Nuclear-generated Electricity in China, 1995-2014

Year	Wind	Nuclear
Terawatt-hours		
1995	0.6	12.8
1996	0.1	14.3
1997	0.2	14.4
1998	0.4	14.1
1999	0.5	15.0
2000	0.6	16.7
2001	0.7	17.5
2002	0.8	25.1
2003	1.0	43.3
2004	1.3	50.5
2005	1.9	53.1
2006	3.7	54.8
2007	5.5	62.1
2008	13.1	68.4
2009	27.6	70.1
2010	44.6	73.9
2011	70.3	86.3
2012	96.0	97.4
2013	131.9	110.6
2014	153.4	130.6

Source: Compiled by Earth Policy Institute with data for 1995-2013 from BP, *Statistical Review of World Energy June 2014* (London: 2014); and with data for 2014 from National Energy Administration, "2014 Wind Power Industry Monitoring," press release (Beijing: 12 February 2015); and from China Nuclear Energy Association, "China Nuclear Industry Association Released 2014 Report on the Operation of the National Nuclear," press release (Beijing: 6 February 2015).

# Wind- and Nuclear-generated Electricity in China, 1995-2014



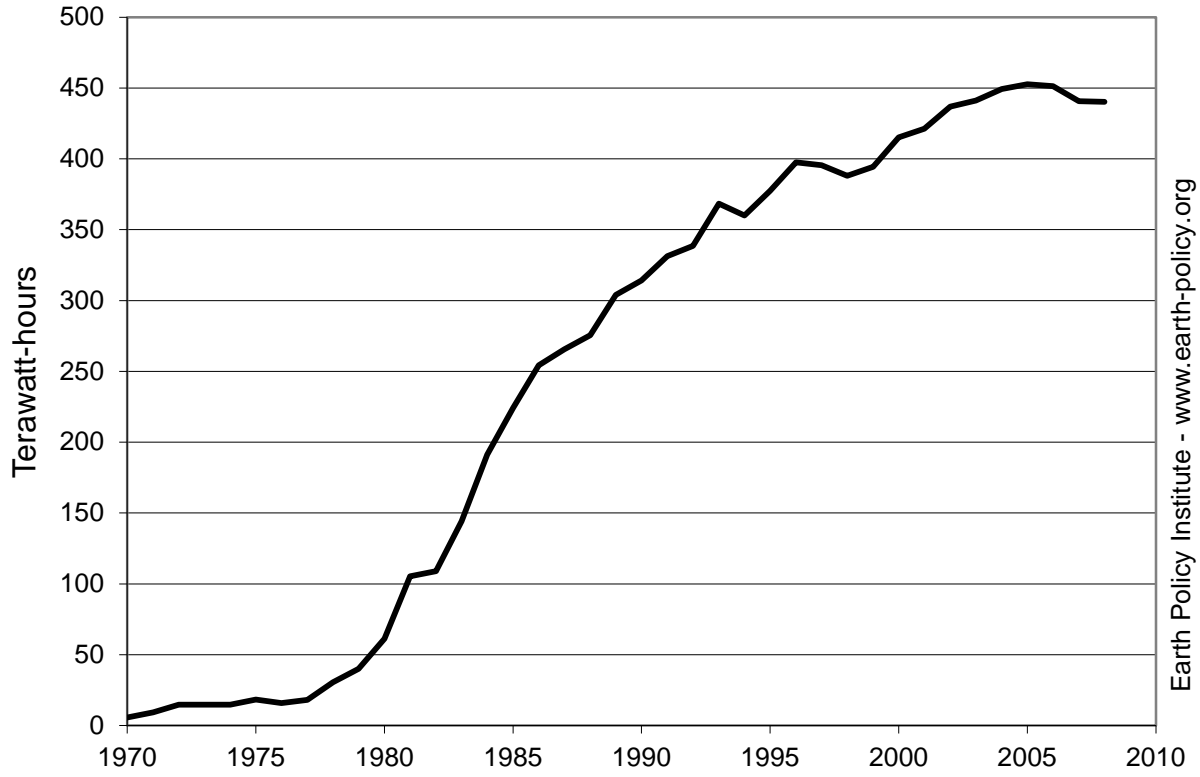
Source: EPI from BP, NEA, CNEA

## Electricity Generation from Nuclear Power Plants in the European Union, 1965-2013

Year	Generation Terawatt-hours
1965	20
1966	26
1967	31
1968	35
1969	42
1970	43
1971	50
1972	64
1973	68
1974	80
1975	108
1976	128
1977	153
1978	173
1979	192
1980	225
1981	307
1982	337
1983	398
1984	504
1985	616
1986	670
1987	691
1988	748
1989	793
1990	790
1991	819
1992	827
1993	863
1994	859
1995	882
1996	927
1997	938
1998	930
1999	944
2000	946
2001	979
2002	991
2003	999
2004	1,012
2005	999
2006	991
2007	936
2008	939
2009	895
2010	917
2011	907
2012	883
2013	877

Source: BP, *Statistical Review of World Energy June 2014* (London: 2014).

# Electricity Generation from Nuclear Power Plants in the European Union, 1965-2013



Source: BP

Earth Policy Institute - [www.earth-policy.org](http://www.earth-policy.org)

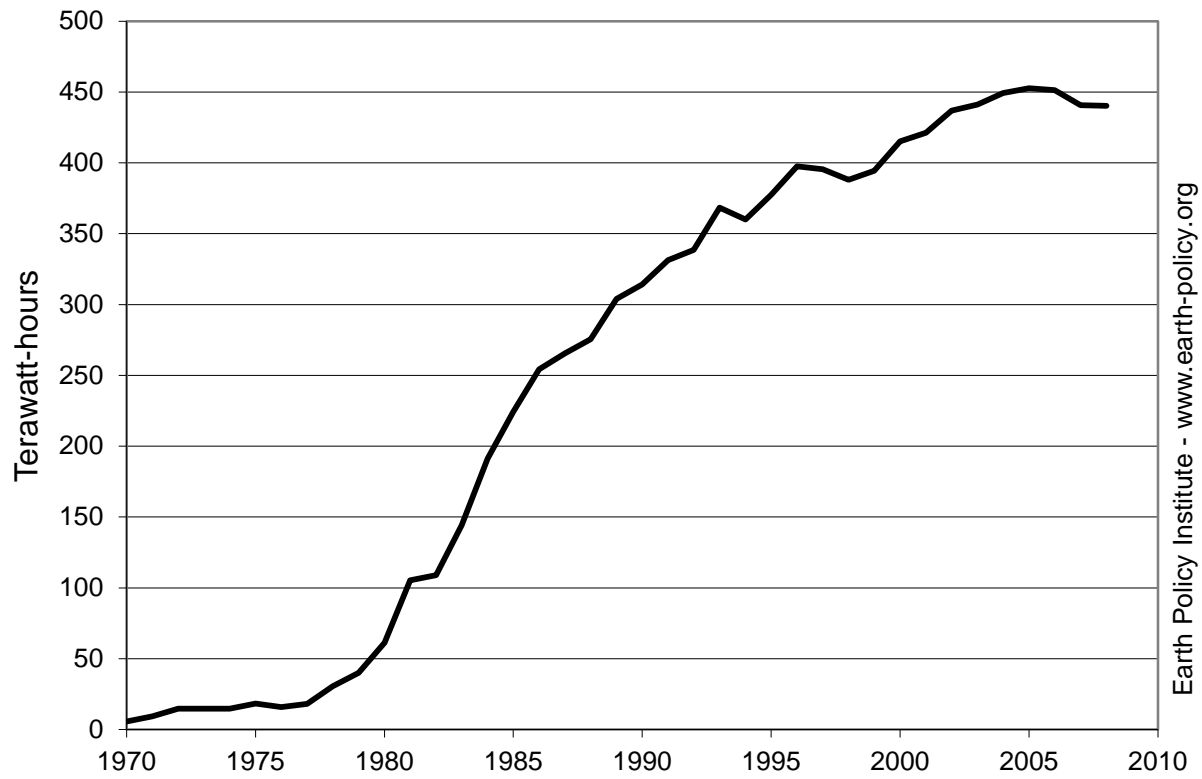
## Electricity Generation from Nuclear Power Plants in France, 1965-2013

Year	Generation Terawatt-hours
1965	1.1
1966	1.6
1967	2.9
1968	3.5
1969	5.0
1970	5.7
1971	9.3
1972	14.6
1973	14.7
1974	14.7
1975	18.3
1976	15.8
1977	18.0
1978	30.5
1979	40.0
1980	61.3
1981	105.3
1982	108.9
1983	144.3
1984	191.3
1985	224.2
1986	254.2
1987	265.6
1988	275.6
1989	304.0
1990	314.1
1991	331.4
1992	338.5
1993	368.3
1994	360.0
1995	377.3
1996	397.4
1997	395.5
1998	388.1
1999	394.3
2000	415.2
2001	421.1
2002	436.8
2003	441.2
2004	449.4
2005	452.6
2006	451.3
2007	440.6
2008	440.3
2009	410.1
2010	428.3
2011	442.1
2012	425.4
2013	423.7

Source: BP, *Statistical Review of World Energy June 2014* (London: 2014).



## Electricity Generation from Nuclear Power Plants in France, 1965-2013



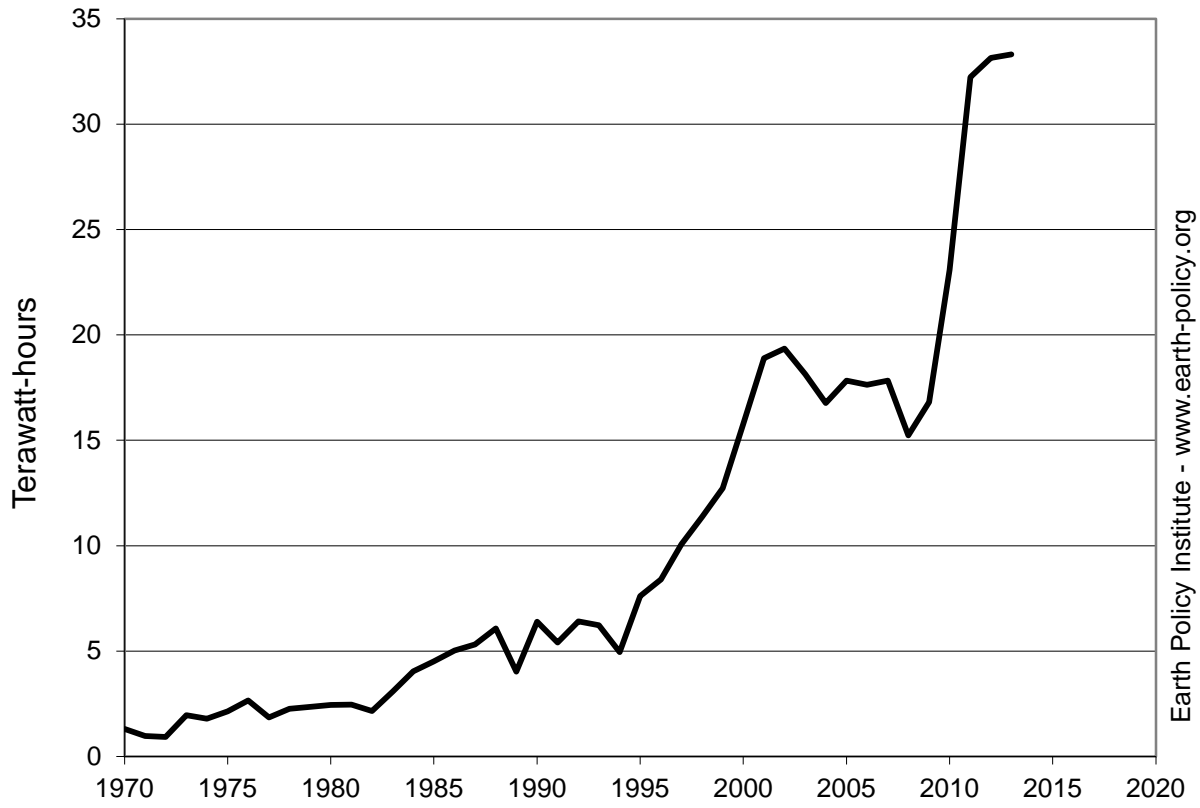
Source: BP

## Electricity Generation from Nuclear Power Plants in India, 1970-2013

<u>Year</u>	<u>Generation</u> Terawatt-hours
1970	1.3
1971	1.0
1972	0.9
1973	2.0
1974	1.8
1975	2.1
1976	2.7
1977	1.9
1978	2.3
1979	2.3
1980	2.4
1981	2.5
1982	2.2
1983	3.1
1984	4.0
1985	4.5
1986	5.0
1987	5.3
1988	6.1
1989	4.0
1990	6.4
1991	5.4
1992	6.4
1993	6.2
1994	4.9
1995	7.6
1996	8.4
1997	10.1
1998	11.4
1999	12.7
2000	15.8
2001	18.9
2002	19.4
2003	18.1
2004	16.8
2005	17.8
2006	17.6
2007	17.8
2008	15.2
2009	16.8
2010	23.1
2011	32.2
2012	33.1
2013	33.3

Source: BP, *Statistical Review of World Energy June 2014* (London: 2014).

# Electricity Generation from Nuclear Power Plants in India, 1970-2013



Source: BP

Earth Policy Institute - [www.earth-policy.org](http://www.earth-policy.org)