

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

### [World Installed Hydroelectric Generating Capacity, 1980-2013](#)

GRAPH: World Installed Hydroelectric Generating Capacity, 1980-2013

### [Installed Hydroelectric Generating Capacity in the European Union and the United States, 1980-2012](#)

GRAPH: Installed Hydroelectric Generating Capacity in the European Union and the United States, 1980-2012

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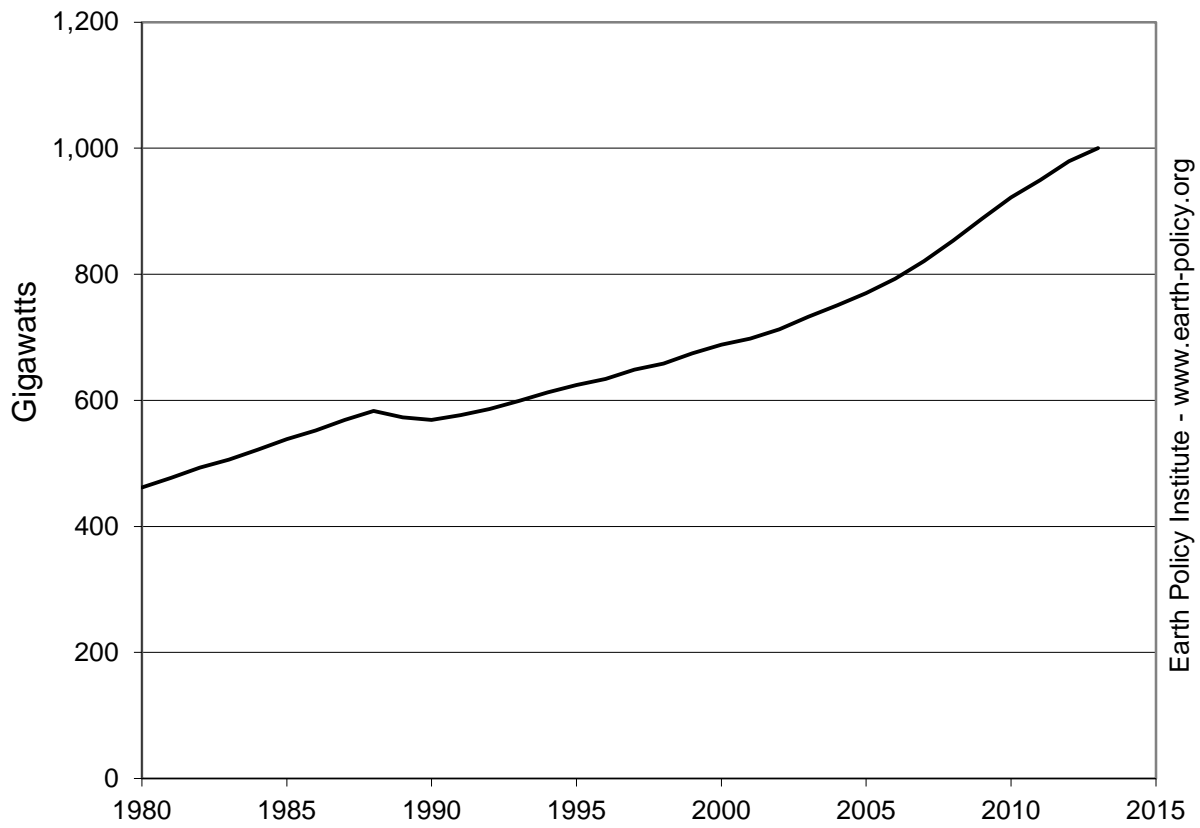
### [Hydropower Pumped Storage Capacity in Leading Countries, 1980-2012](#)

## World Installed Hydroelectric Generating Capacity, 1980-2013

Year	World Capacity	Annual Growth	
	Gigawatts	Gigawatts	Percent
1980	462		
1981	477	15	3.3
1982	493	16	3.4
1983	506	12	2.5
1984	522	16	3.1
1985	538	17	3.2
1986	552	14	2.6
1987	569	17	3.0
1988	583	14	2.4
1989	573	-10	-1.7
1990	569	-4	-0.8
1991	576	8	1.3
1992	586	10	1.7
1993	599	13	2.1
1994	613	14	2.3
1995	624	12	1.9
1996	634	10	1.6
1997	648	14	2.3
1998	658	10	1.5
1999	675	17	2.5
2000	688	14	2.0
2001	698	10	1.4
2002	713	15	2.1
2003	732	19	2.7
2004	751	18	2.5
2005	770	20	2.6
2006	793	23	3.0
2007	821	28	3.5
2008	853	32	3.9
2009	888	35	4.1
2010	922	34	3.8
2011	949	28	3.0
2012	979	30	3.1
2013	1,000	21	2.1

Source: Compiled by Earth Policy Institute from U.S. Department of Energy, Energy Information Administration, *International Energy Statistics*, electronic database, at [www.eia.gov/countries/data.cfm](http://www.eia.gov/countries/data.cfm), viewed 26 January 2015; with 2013 data from REN21, *Renewables 2014 Global Status Report* (Paris: REN21 Secretariat, 2014), p. 43.

# World Installed Hydroelectric Generating Capacity, 1980-2013



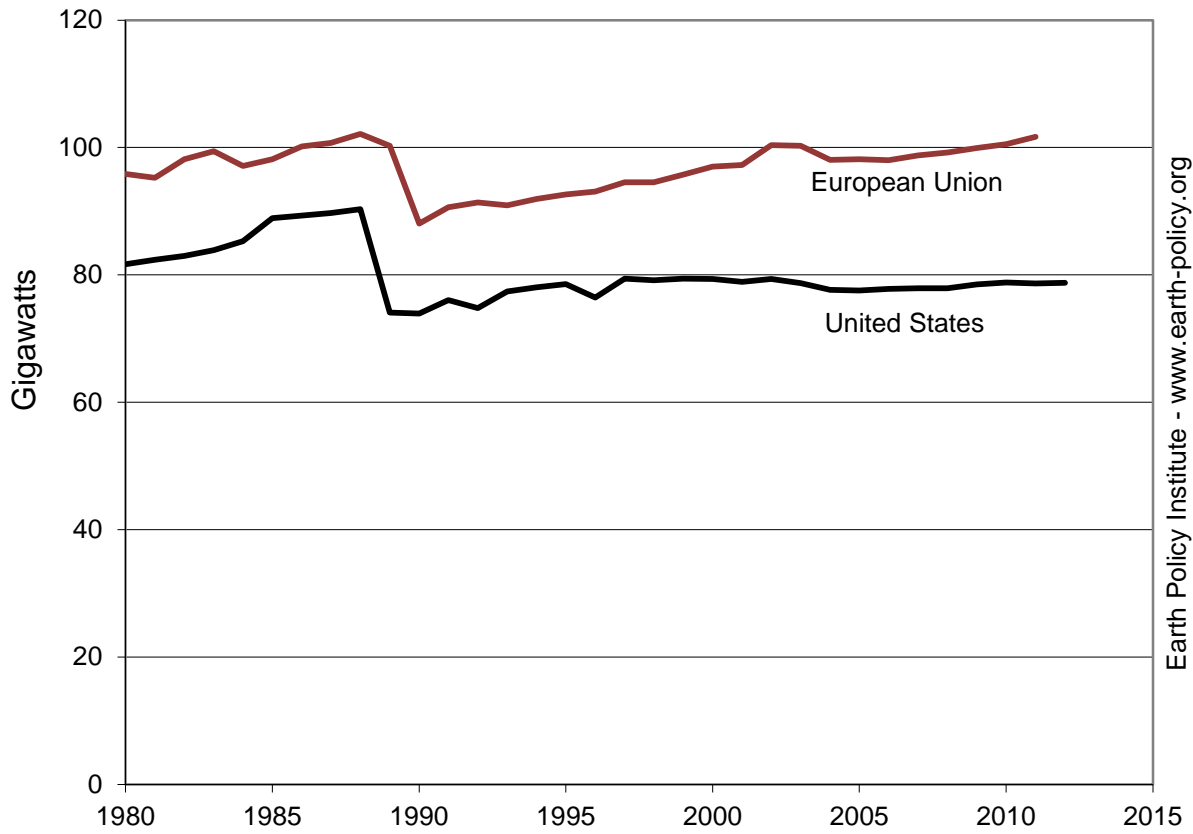
Source: EPI from EIA, REN21

## Installed Hydroelectric Generating Capacity in the European Union and the United States, 1980-2012

Year	European Union	United States
	Gigawatts	
1980	95.9	81.7
1981	95.2	82.4
1982	98.2	83.0
1983	99.4	83.9
1984	97.1	85.3
1985	98.1	88.9
1986	100.2	89.3
1987	100.7	89.7
1988	102.1	90.3
1989	100.3	74.1
1990	88.1	73.9
1991	90.6	76.0
1992	91.4	74.8
1993	90.9	77.4
1994	91.9	78.0
1995	92.7	78.6
1996	93.1	76.4
1997	94.5	79.4
1998	94.6	79.2
1999	95.7	79.4
2000	97.0	79.4
2001	97.3	78.9
2002	100.4	79.4
2003	100.3	78.7
2004	98.1	77.6
2005	98.2	77.5
2006	98.0	77.8
2007	98.8	77.9
2008	99.2	77.9
2009	99.9	78.5
2010	100.5	78.8
2011	101.7	78.7
2012	101.8	78.7

Source: Compiled by Earth Policy Institute from U.S. Department of Energy, Energy Information Administration, *International Energy Statistics*, electronic database, at [www.eia.gov/countries/data.cfm](http://www.eia.gov/countries/data.cfm), viewed 26 January 2015.

# Installed Hydroelectric Generating Capacity in the European Union and the United States, 1980-2012



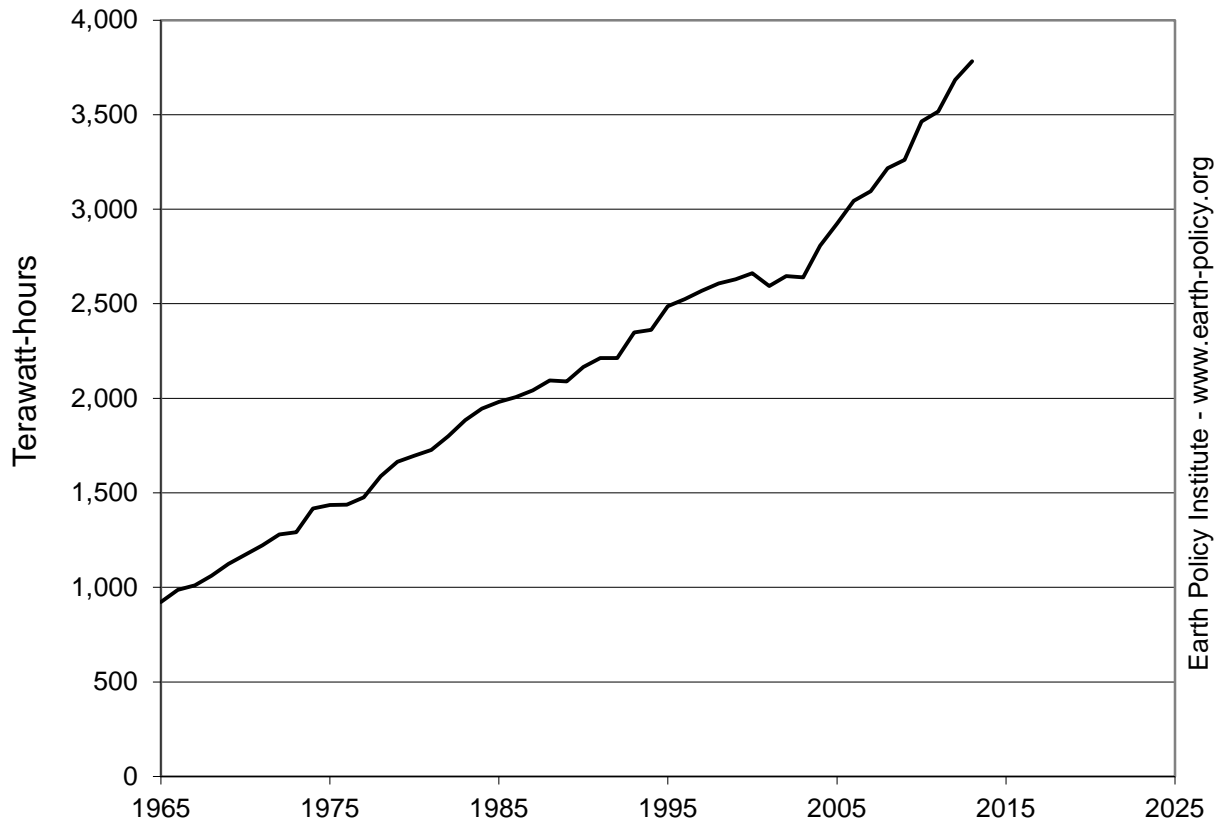
Source: EPI from EIA

## World Hydroelectric Generation, 1965-2013

Year	Generation Terawatt-hours	Share of Electricity from Hydropower Percent
1965	923	
1966	987	
1967	1,011	
1968	1,061	
1969	1,124	
1970	1,173	
1971	1,223	23.2
1972	1,280	22.4
1973	1,292	21.0
1974	1,417	22.5
1975	1,435	22.0
1976	1,438	20.6
1977	1,477	20.2
1978	1,589	20.6
1979	1,664	20.7
1980	1,696	20.4
1981	1,727	20.4
1982	1,799	21.0
1983	1,884	21.1
1984	1,945	20.6
1985	1,981	19.9
1986	2,006	19.5
1987	2,042	18.9
1988	2,095	18.6
1989	2,089	17.9
1990	2,165	18.2
1991	2,213	18.3
1992	2,214	18.1
1993	2,348	18.8
1994	2,361	18.4
1995	2,488	18.8
1996	2,524	18.4
1997	2,568	18.4
1998	2,607	18.2
1999	2,629	17.8
2000	2,662	17.3
2001	2,594	16.6
2002	2,646	16.3
2003	2,639	15.7
2004	2,807	16.0
2005	2,925	16.0
2006	3,044	16.0
2007	3,095	15.5
2008	3,218	15.9
2009	3,261	16.2
2010	3,464	16.2
2011	3,517	15.9
2012	3,684	16.3
2013	3,782	16.4

Source: Compiled by Earth Policy Institute from BP, *Statistical Review of World Energy June 2014* (London: 2014); 1971-1984 electricity generation from Organisation for Economic Co-operation and Development, *IEA World Energy Statistics*, electronic database, at [www.oecd-ilibrary.org/statistics](http://www.oecd-ilibrary.org/statistics), viewed 11 February 2015.

# World Hydroelectric Generation, 1965-2013



Source: BP, OECD

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

### Hydroelectric Generation by Country, 2013

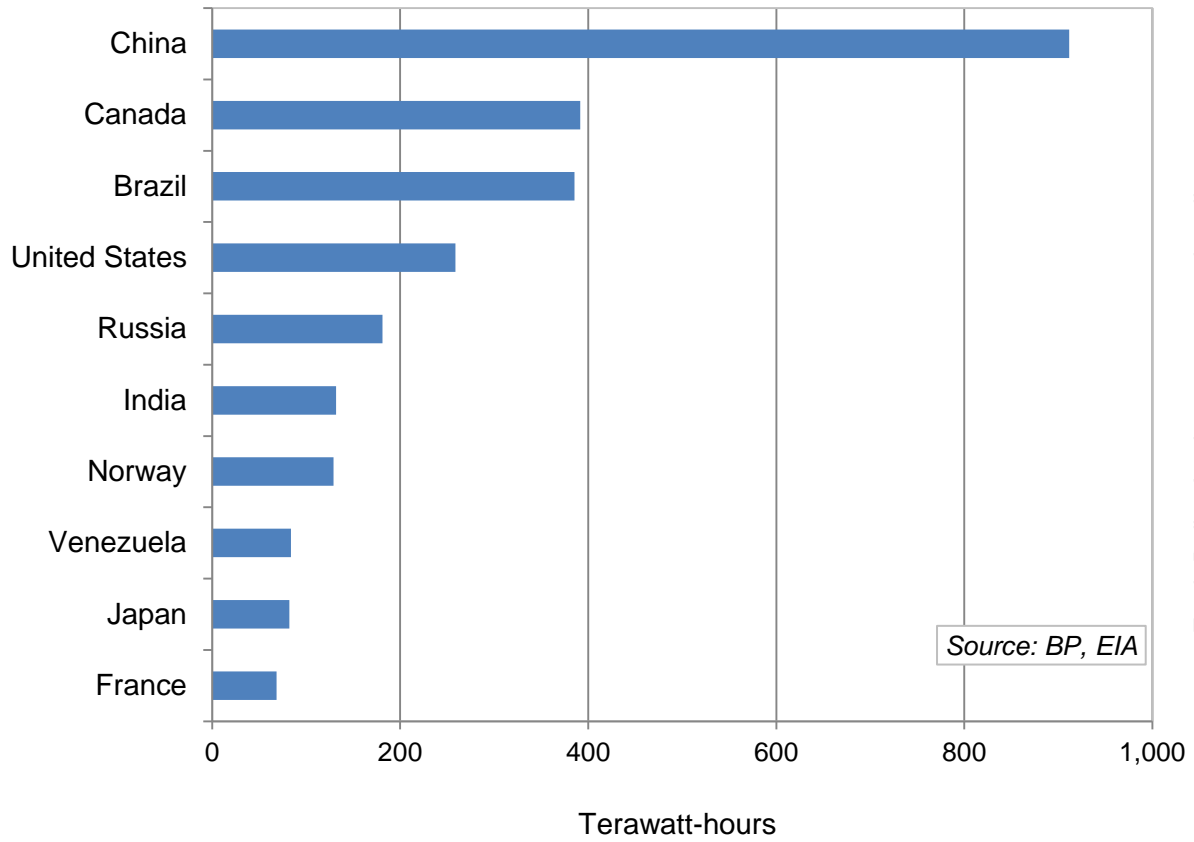
Country	Generation Terawatt-hours	Share of Electricity from Hydropower Percent
China	912	17
Canada	392	62
Brazil	385	69
United States	259	6
Russia	181	17
India	132	12
Norway	129	96
Venezuela	84	64
Japan	82	8
France	68	12
Other	1,145	14
<b>World Total</b>	<b>3,782</b>	<b>16</b>

Note: United States data are 2014 figures.

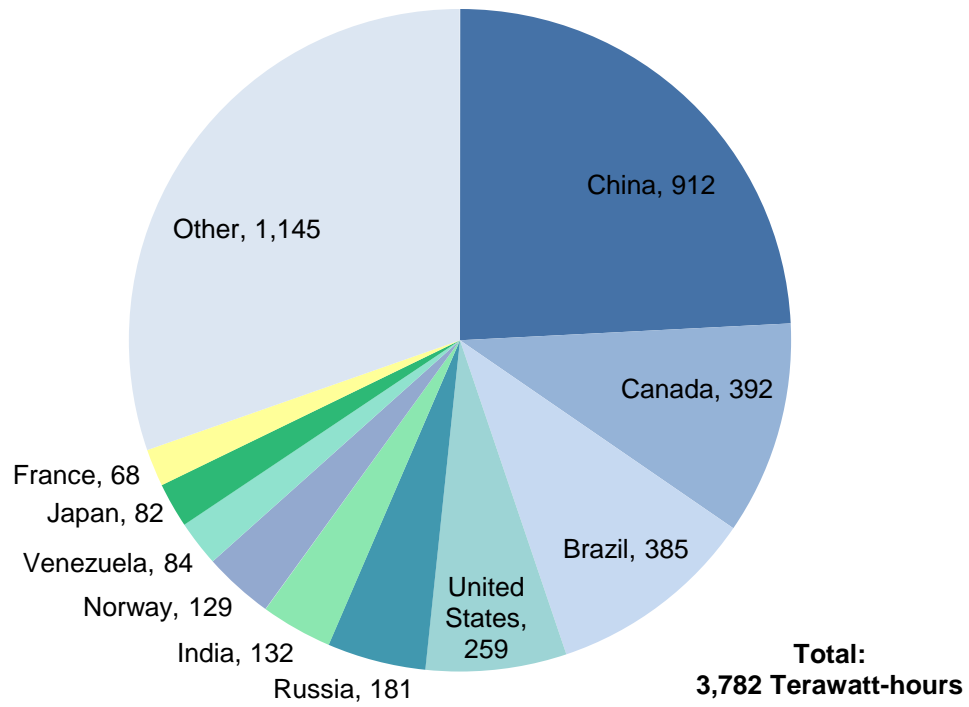
Source: Compiled by Earth Policy Institute from BP, *Statistical Review of World Energy June 2014* (London: 2014); with U.S. data from "Energy Source: Total - All Sectors" and "Renewable Sources: Total - All Sectors," Tables 1.1 and 1.1.A. in U.S. Department of Energy, Energy Information Administration, "Electric Power Monthly," at [www.eia.gov/electricity/monthly](http://www.eia.gov/electricity/monthly), updated 4 March 2014.



## Hydroelectric Generation in Leading Countries, 2013



## Hydroelectric Generation by Country, 2013 (Terawatt-hours)



## Share of Electricity Generation from Hydropower in Top 20 Countries, 2012

Country	Share Percent
Lesotho	100
Paraguay	100
Bhutan	100
Albania	100
Mozambique	100
Zambia	100
Congo (Kinshasa)	100
Nepal	99
Burundi	99
Ethiopia	99
Norway	97
Tajikistan	95
Kyrgyzstan	94
Laos	92
Namibia	89
Malawi	87
Central African Republic	86
French Guiana	85
Colombia	81
Togo	81

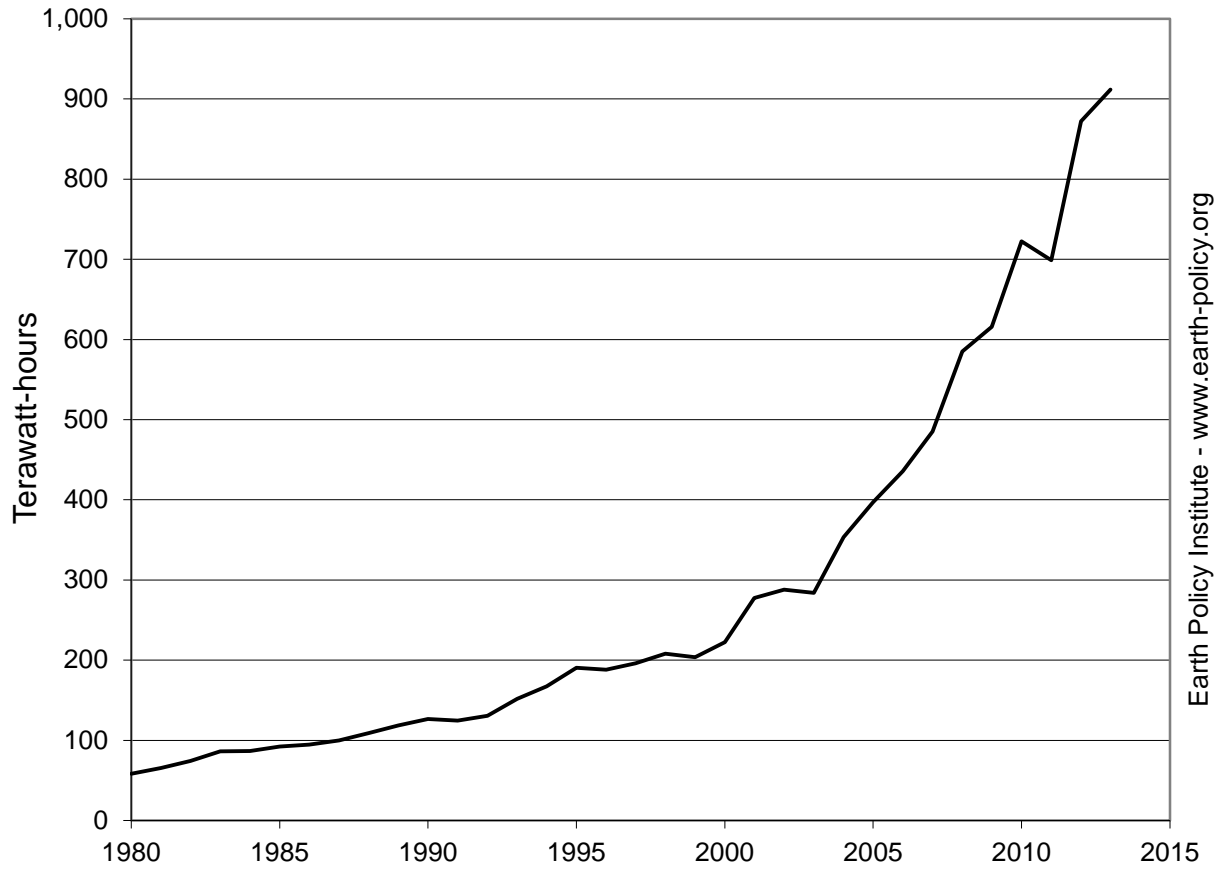
Source: Compiled by Earth Policy Institute from U.S. Department of Energy, Energy Information Administration, *International Energy Statistics*, electronic database, at [www.eia.gov/countries/data.cfm](http://www.eia.gov/countries/data.cfm), viewed 24 February 2015.

### Hydroelectric Generation in China, 1980-2013

Year	Generation Terawatt-hours	Share of Electricity Percent
1980	58	20.4
1981	66	22.3
1982	74	23.9
1983	86	25.8
1984	87	24.2
1985	92	22.5
1986	95	21.0
1987	100	20.1
1988	109	20.0
1989	118	20.2
1990	127	20.4
1991	125	18.4
1992	131	17.3
1993	152	18.7
1994	167	18.0
1995	191	18.9
1996	188	17.4
1997	196	17.7
1998	208	17.9
1999	204	17.0
2000	222	16.4
2001	277	18.7
2002	288	17.4
2003	284	14.9
2004	354	16.0
2005	397	15.9
2006	436	15.2
2007	485	14.8
2008	585	16.9
2009	616	16.6
2010	722	17.2
2011	699	14.8
2012	872	17.5
2013	912	17.0

Source: Compiled by Earth Policy Institute from BP, *Statistical Review of World Energy June 2014* (London: 2014); 1980-1984 electricity generation from U.S. Department of Energy, Energy Information Administration, *International Energy Statistics*, electronic database, at [www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm](http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm), downloaded 1 August 2014.

# Hydroelectric Generation in China, 1980-2013



Source: BP

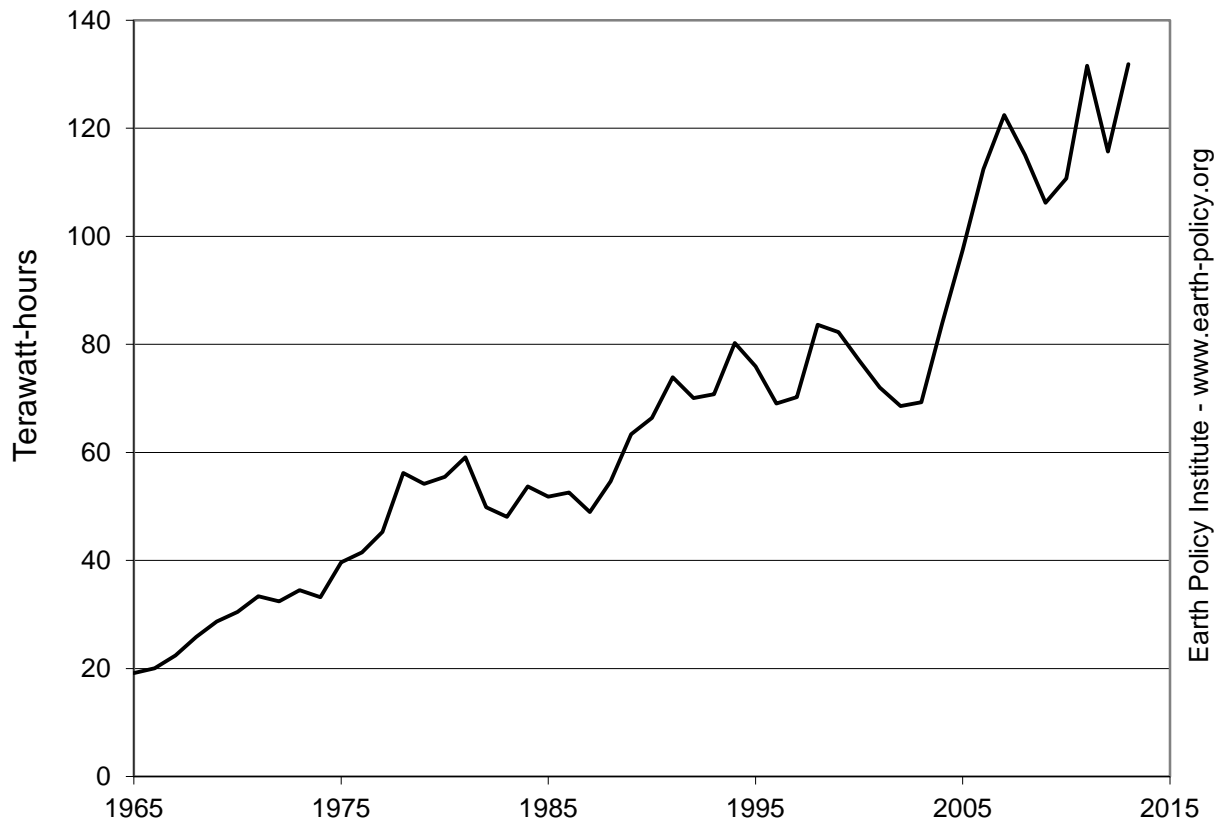
Earth Policy Institute - [www.earth-policy.org](http://www.earth-policy.org)

## Hydroelectric Generation in India, 1965-2013

<u>Year</u>	<u>Generation</u> Terawatt-hours
1965	19
1966	20
1967	22
1968	26
1969	29
1970	30
1971	33
1972	32
1973	35
1974	33
1975	40
1976	41
1977	45
1978	56
1979	54
1980	55
1981	59
1982	50
1983	48
1984	54
1985	52
1986	53
1987	49
1988	55
1989	63
1990	66
1991	74
1992	70
1993	71
1994	80
1995	76
1996	69
1997	70
1998	84
1999	82
2000	77
2001	72
2002	69
2003	69
2004	84
2005	97
2006	112
2007	122
2008	115
2009	106
2010	111
2011	132
2012	116
2013	132

Source: Compiled by Earth Policy Institute from BP, *Statistical Review of World Energy June 2014* (London: 2014).

# Hydroelectric Generation in India, 1965-2013



Source: BP

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

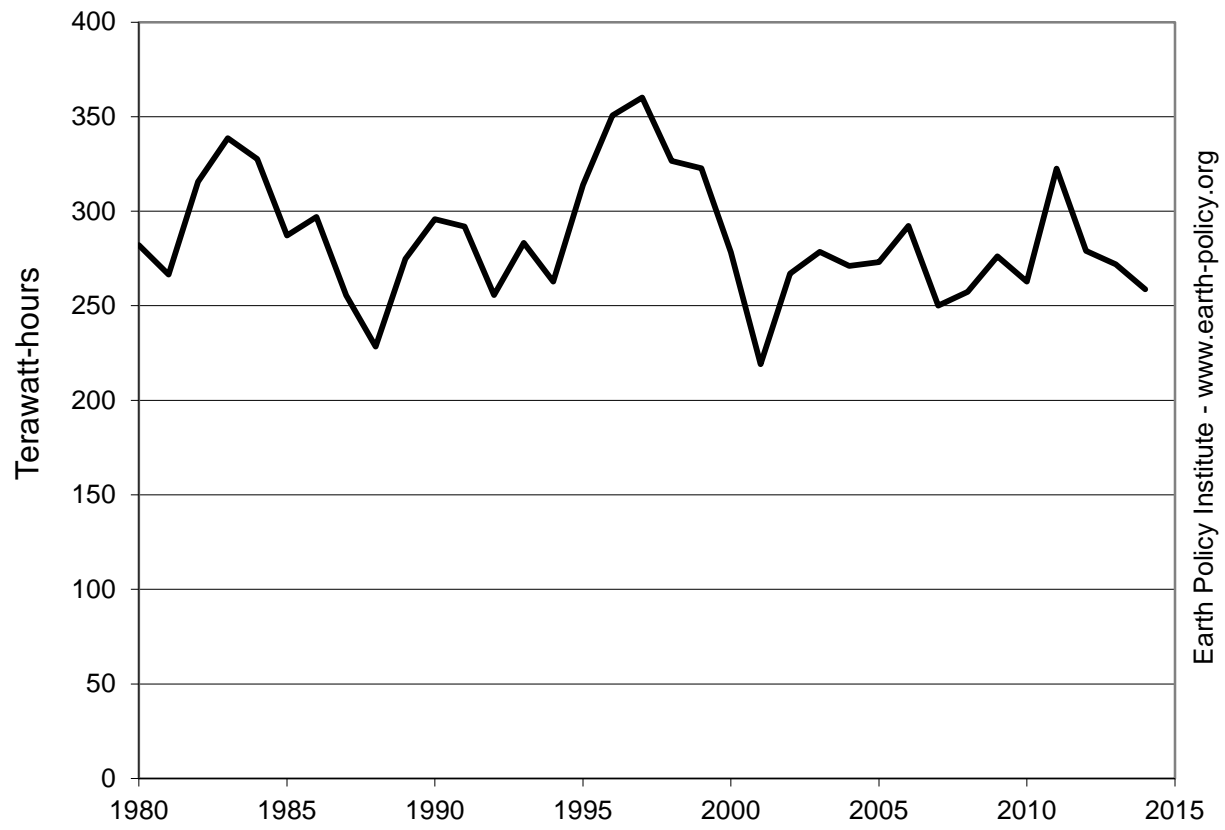
## Hydroelectric Generation in the United States, 1980-2014

Year	Generation Terawatt-hours	Share of Electricity Percent
1980	282	8.7
1981	267	8.7
1982	316	10.1
1983	339	9.9
1984	328	10.6
1985	287	9.4
1986	297	9.9
1987	255	9.8
1988	228	9.2
1989	275	9.8
1990	296	9.6
1991	292	9.0
1992	256	7.0
1993	283	8.5
1994	263	8.4
1995	314	8.0
1996	351	7.4
1997	360	8.6
1998	327	8.9
1999	323	8.5
2000	278	7.2
2001	219	7.6
2002	267	6.3
2003	279	5.6
2004	271	6.6
2005	273	6.9
2006	292	6.8
2007	250	5.9
2008	257	6.6
2009	276	6.3
2010	263	7.2
2011	323	8.2
2012	279	8.5
2013	272	7.7
2014	259	6.3

Source: Compiled by Earth Policy Institute from BP, *Statistical Review of World Energy June 2014* (London: 2014) with electricity generation 1980-1984 from U.S. Department of Energy (DOE), Energy Information Administration (EIA), *International Energy Statistics*, electronic database, at [www.eia.gov/countries/data.cfm](http://www.eia.gov/countries/data.cfm), viewed 12 June 2014 with 2014 data from "Energy Source: Total - All Sectors" and "Renewable Sources: Total - All Sectors," Tables 1.1 and 1.1.A. in DOE, EIA, "Electric Power Monthly," at [www.eia.gov/electricity/monthly](http://www.eia.gov/electricity/monthly), updated 4 March 2014.



## Hydroelectric Generation in the United States, 1980-2014



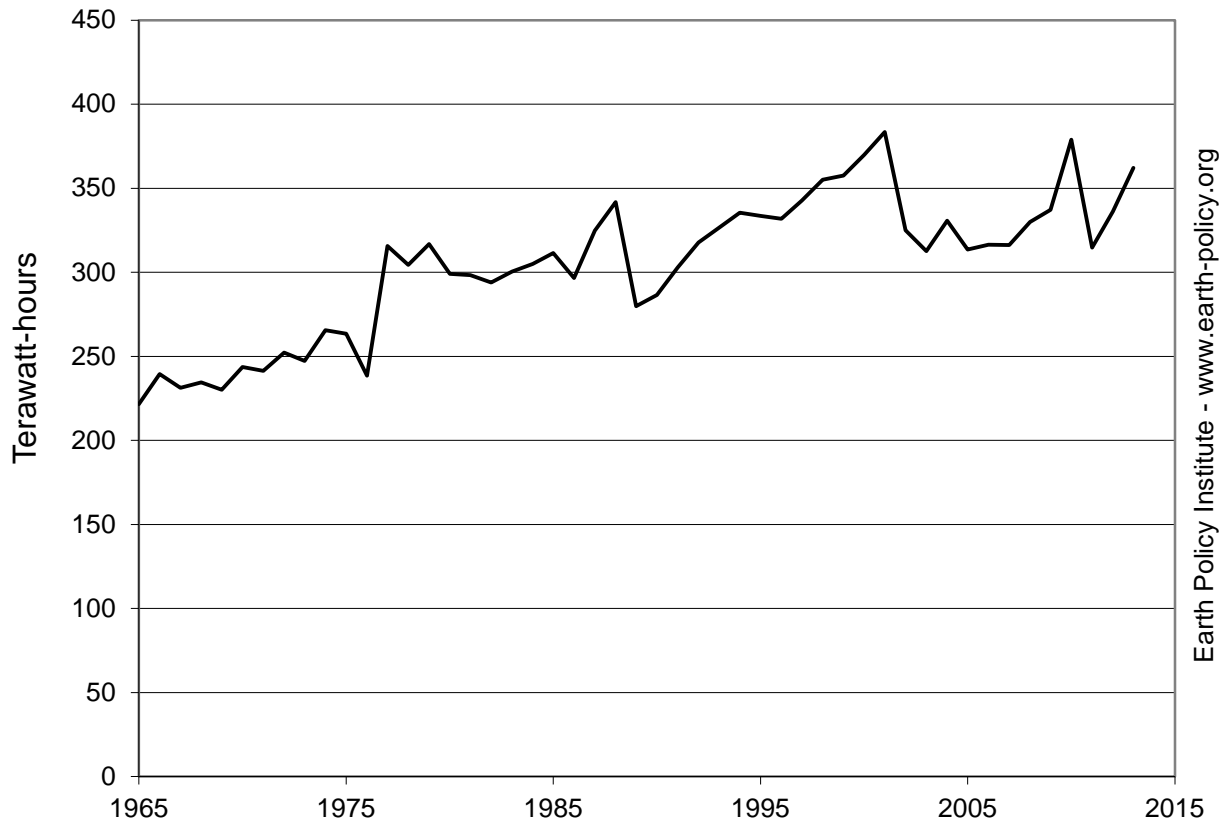
Source: BP, EIA

## Hydroelectric Generation in the European Union, 1965-2013

<u>Year</u>	<u>Generation</u> Terawatt-hours
1965	222
1966	239
1967	231
1968	235
1969	230
1970	244
1971	241
1972	252
1973	247
1974	266
1975	264
1976	239
1977	316
1978	304
1979	317
1980	299
1981	298
1982	294
1983	300
1984	305
1985	311
1986	297
1987	325
1988	342
1989	280
1990	286
1991	303
1992	318
1993	326
1994	335
1995	333
1996	332
1997	343
1998	355
1999	357
2000	370
2001	383
2002	325
2003	312
2004	331
2005	313
2006	316
2007	316
2008	330
2009	337
2010	379
2011	315
2012	336
2013	362

Source: Compiled by Earth Policy Institute from BP, *Statistical Review of World Energy June 2014* (London: 2014).

# Hydroelectric Generation in the European Union, 1965-2013



Source: BP

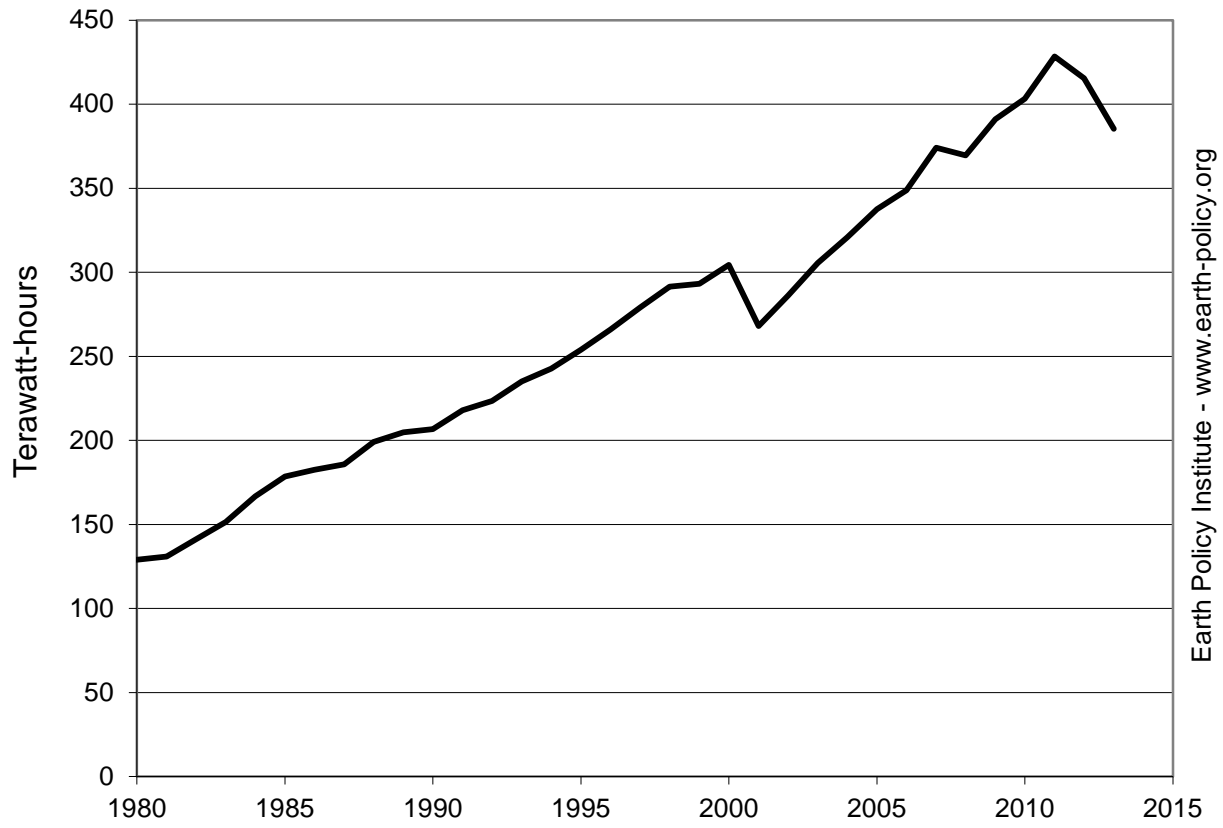
Earth Policy Institute - [www.earth-policy.org](http://www.earth-policy.org)

### Hydroelectric Generation in Brazil, 1980-2013

Year	Generation Terawatt-hours	Share of Electricity Percent
1980	129	
1981	131	
1982	141	
1983	152	
1984	167	
1985	178	92
1986	182	90
1987	186	91
1988	199	93
1989	205	92
1990	207	93
1991	218	93
1992	223	92
1993	235	93
1994	243	93
1995	254	92
1996	266	91
1997	279	91
1998	292	91
1999	293	88
2000	304	87
2001	268	82
2002	286	83
2003	306	84
2004	321	83
2005	337	84
2006	349	83
2007	374	84
2008	370	80
2009	391	84
2010	403	78
2011	428	81
2012	415	75
2013	385	69

Source: Compiled by Earth Policy Institute from BP, Statistical Review of World Energy June 2014 (London: 2014).

### Hydroelectric Generation in Brazil, 1980-2013



Source: BP

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

## Number of Large Dams by Country

Country	Number of Dams
China	23,842
United States	9,265
India	5,102
Japan	3,116
Brazil	1,392
South Korea	1,305
Canada	1,166
South Africa	1,114
Spain	1,082
Turkey	976
Iran	800
France	713
United Kingdom	607
Mexico	572
Italy	542
Australia	507
Norway	335
Albania	308
Germany	308
Zimbabwe	254
Romania	246
Thailand	218
Portugal	217
Sweden	190
Bulgaria	181
Austria	171
Switzerland	167
Greece	164
Algeria	156
Pakistan	154
Morocco	150
Indonesia	132
Czech Republic	118
Argentina	114
Mali	111
Tunisia	111
New Zealand	96
Chile	95
Sri Lanka	89
Venezuela	76
Russia	71
Poland	69
Peru	67
Malaysia	65
Serbia	63
Colombia	62
Cyprus	57
Finland	56
Nigeria	52
Viet Nam	51
Slovakia	50
Syria	43
Slovenia	41
Ukraine	38
Armenia	37
Cote d'Ivoire	31
Iraq	30
Iceland	29
Croatia	29
Myanmar	29
Macedonia	27
Bosnia and Herzegovina	25
Panama	21
Kenya	19
Burkina Faso	19
Ethiopia	19
Democratic Republic of the Congo	18
Lebanon	18
Philippines	17
Uzbekistan	17
Ireland	16
Belgium	15
Dominican Republic	14
Georgia	14
Libya	14
Cameroon	13
Netherlands	12
Costa Rica	11
Denmark	10
Madagascar	10
Honduras	10
Lesotho	9
Bolivia	9
Niger	8
Tajikistan	7
Egypt	7
Nepal	6
Uruguay	6
Sudan	5
Ghana	5
Guatemala	4
Paraguay	4
Zambia	4
Latvia	3
Luxembourg	3
<b>Total</b>	<b>57,651</b>

Source: International Commission on Large Dams, Number of Dams by Country Members, at [www.icold-cigb.org/GB/World\\_register/general\\_synthesis.asp?IDA=206](http://www.icold-cigb.org/GB/World_register/general_synthesis.asp?IDA=206), viewed 11 January 2015.

## Hydropower Pumped Storage Capacity by Continent, 1980-2012

Year	World	Asia & Oceania	Europe	North America	Central & South America	Africa
	Megawatts					
1980	18.0	11.5	6.5	0.0	0.0	0.0
1981	22.7	12.6	9.1	0.0	0.0	1.0
1982	25.1	12.6	11.5	0.0	0.0	1.0
1983	26.9	14.0	11.9	0.0	0.0	1.0
1984	33.2	15.1	17.1	0.0	0.0	1.0
1985	35.0	15.4	18.7	0.0	0.0	1.0
1986	37.4	15.4	20.0	0.0	1.0	1.0
1987	40.1	16.6	21.6	0.0	1.0	1.0
1988	41.3	17.2	21.8	0.0	1.0	1.4
1989	64.0	18.0	25.5	18.1	1.0	1.4
1990	72.0	18.9	31.0	19.6	1.0	1.4
1991	77.2	20.1	36.1	18.6	1.0	1.4
1992	80.8	20.5	36.5	21.4	1.0	1.4
1993	85.6	21.5	39.2	21.3	1.0	1.4
1994	89.7	26.6	38.1	21.4	1.0	1.4
1995	91.7	28.8	37.8	21.6	1.0	1.4
1996	93.5	29.9	38.7	21.3	1.0	1.4
1997	91.7	30.3	38.3	19.5	1.0	1.4
1998	95.2	31.9	40.0	19.7	1.0	1.4
1999	96.5	33.5	39.7	19.7	1.0	1.4
2000	98.5	35.0	40.2	19.7	1.0	1.4
2001	99.9	36.1	40.4	19.8	1.0	1.4
2002	99.4	36.1	38.4	20.5	1.0	1.4
2003	101.8	36.1	40.7	20.7	1.0	1.4
2004	102.6	36.0	40.9	20.9	1.0	1.9
2005	103.7	36.4	41.0	21.5	1.0	1.9
2006	107.7	38.6	42.5	21.6	1.0	1.9
2007	113.1	41.7	44.2	22.1	1.0	1.9
2008	114.8	42.9	44.7	22.0	1.0	1.9
2009	119.2	46.4	45.1	22.3	1.0	1.9
2010	121.1	47.9	45.4	22.4	1.0	1.9
2011	126.4	52.3	45.9	22.5	1.0	1.9
2012	130.9	52.6	50.0	22.5	1.0	1.9

Source: Compiled by Earth Policy Institute from U.S. Department of Energy, Energy Information Administration, *International Energy Statistics*, electronic database, at [www.eia.gov/countries/data.cfm](http://www.eia.gov/countries/data.cfm), viewed 12 June 2014.

Hydropower Pumped Storage Capacity in Leading Countries, 1980-2012

Year	Japan	United States	China	Italy	Austria	France	Germany	Spain	South Korea	United Kingdom	World
						Megawatts					
1980	11.5	n.a.	n.a.	n.a.	n.a.	1.6	n.a.	n.a.	n.a.	n.a.	18.0
1981	12.6	n.a.	n.a.	n.a.	n.a.	1.6	n.a.	2.6	n.a.	n.a.	22.7
1982	12.6	n.a.	n.a.	n.a.	n.a.	2.5	n.a.	2.8	n.a.	n.a.	25.1
1983	14.0	n.a.	n.a.	n.a.	n.a.	2.5	n.a.	3.1	n.a.	n.a.	26.9
1984	14.1	n.a.	n.a.	5.2	n.a.	2.5	n.a.	3.1	n.a.	n.a.	33.2
1985	14.4	n.a.	n.a.	5.7	n.a.	2.6	n.a.	3.6	n.a.	n.a.	35.0
1986	14.4	n.a.	n.a.	5.4	n.a.	3.0	n.a.	3.9	n.a.	n.a.	37.4
1987	15.6	n.a.	n.a.	5.4	n.a.	4.1	n.a.	4.3	n.a.	n.a.	40.1
1988	16.2	n.a.	n.a.	5.4	n.a.	4.2	n.a.	4.3	n.a.	n.a.	41.3
1989	17.0	18.1	n.a.	5.7	n.a.	4.2	n.a.	4.4	n.a.	2.8	64.0
1990	17.0	19.5	n.a.	6.2	1.8	7.0	n.a.	4.9	n.a.	2.8	72.0
1991	18.2	18.4	n.a.	6.4	1.8	7.1	4.5	4.9	n.a.	2.8	77.2
1992	18.5	21.2	n.a.	6.6	1.8	7.1	4.6	4.9	n.a.	2.8	80.8
1993	18.9	21.1	0.6	6.9	1.8	7.1	5.8	4.9	n.a.	2.8	85.6
1994	20.9	21.2	1.2	6.9	1.8	7.1	4.6	4.9	1.0	2.8	89.7
1995	22.3	21.4	1.4	6.9	1.8	7.1	4.5	5.1	1.6	2.8	91.7
1996	23.2	21.1	1.6	6.9	1.8	7.1	4.6	5.1	1.6	2.8	93.5
1997	23.2	19.3	2.0	6.9	1.8	7.1	4.5	5.1	1.6	2.8	91.7
1998	23.9	19.5	2.3	7.0	1.8	7.1	5.9	5.1	1.6	2.8	95.2
1999	24.3	19.6	3.5	7.0	1.8	7.2	5.5	5.1	1.6	2.8	96.5
2000	24.3	19.5	5.0	7.0	2.2	7.2	4.7	5.3	1.6	2.8	98.5
2001	24.7	19.7	5.0	7.0	2.2	7.2	4.6	5.3	2.3	2.8	99.9
2002	24.7	20.4	5.0	7.0	2.2	7.2	4.6	2.5	2.3	2.8	99.4
2003	24.7	20.5	5.0	7.0	2.2	7.2	4.2	5.4	2.3	2.8	101.8
2004	24.7	20.8	5.0	7.0	2.2	7.1	4.2	5.4	2.3	2.8	102.6
2005	25.2	21.3	5.6	7.1	2.2	7.1	4.2	5.4	2.3	2.8	103.7
2006	25.2	21.5	6.2	7.5	2.2	7.1	4.9	5.4	3.9	2.7	107.7
2007	25.5	21.9	8.9	7.5	2.2	7.1	6.6	5.4	3.9	2.7	113.1
2008	25.5	21.9	10.2	7.5	2.6	7.0	6.5	5.4	3.9	2.7	114.8
2009	25.5	22.2	13.7	7.5	2.8	7.0	6.7	5.4	3.9	2.7	119.2
2010	25.4	22.2	15.3	7.5	3.0	7.0	6.8	5.3	3.9	2.7	121.1
2011	26.3	22.3	18.0	7.5	3.4	7.0	6.8	5.3	4.7	2.7	126.4
2012	26.3	22.4	18.3	7.5	7.5	7.0	6.8	5.3	4.7	2.7	130.9

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

Source: Compiled by Earth Policy Institute from U.S. Department of Energy, Energy Information Administration, *International Energy Statistics*, electronic database, at [www.eia.gov/countries/data.cfm](http://www.eia.gov/countries/data.cfm), viewed 12 June 2014.