

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

[World Cumulative Installed Geothermal Electricity-Generating Capacity, 1950-2013](#)

GRAPH: World Cumulative Installed Geothermal Electricity-Generating Capacity, 1950-2013

[Cumulative Installed Geothermal Electricity-Generating Capacity by Country, 1990-2013](#)

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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).

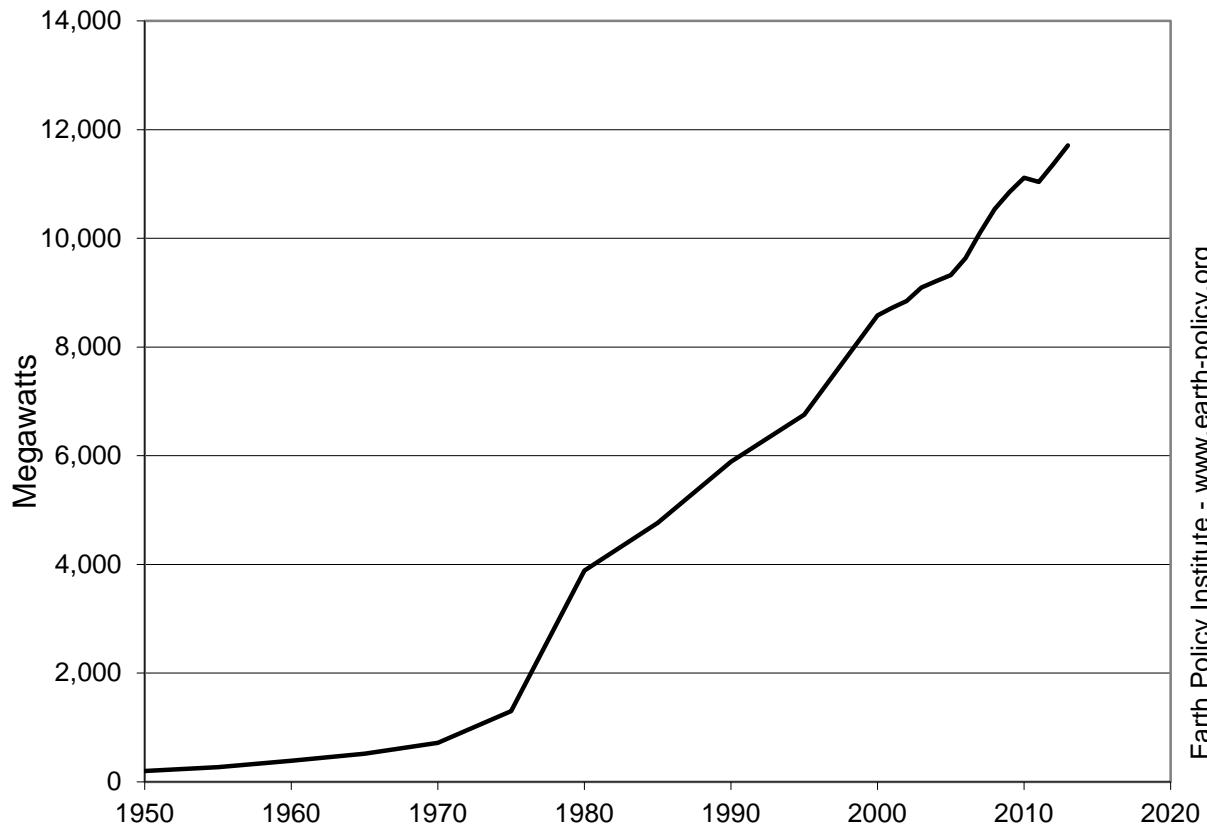
For more information, see Earth Policy Institute on-line at [www.earth-policy.org](http://www.earth-policy.org).

### World Cumulative Installed Geothermal Electricity-Generating Capacity, 1950-2013

<u>Year</u>	<u>Cumulative Installed Capacity Megawatts</u>
1950	200
1955	270
1960	386
1965	520
1970	720
1975	1,300
1980	3,887
1985	4,764
1990	5,892
1995	6,755
2000	8,584
2001	8,722
2002	8,849
2003	9,093
2004	9,209
2005	9,325
2006	9,637
2007	10,103
2008	10,537
2009	10,851
2010	11,116
2011	11,036
2012	11,361
2013	11,709

Source: Compiled by Earth Policy Institute with 1950-1970 from International Energy Agency Geothermal Implementing Agreement, *Annual Report 2011* (Taupo, New Zealand: October 2013), p. 8; and 1975-2013 from BP, *Statistical Review of World Energy June 2014* (London: 2014).

# World Cumulative Installed Geothermal Electricity-Generating Capacity, 1950-2013



Source: EPI from IEA-GIA; BP

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

### Cumulative Installed Geothermal Electricity-Generating Capacity by Country, 1990-2013

Country	1990	1995	2000	2005	2010	2013
	Megawatts					
Austria	0	0	0	1	1	1
Australia	0	0	0	0	1	2
China	31	28	28	28	24	27
Costa Rica	0	55	143	163	166	208
El Salvador	95	105	161	151	204	204
Ethiopia	0	0	7	7	7	7
France	4	4	4	15	16	17
Germany	0	0	0	0	8	17
Guatemala	0	0	28	33	52	48
Iceland	45	50	172	202	575	665
Indonesia	145	310	590	850	1,193	1,339
Italy	545	632	785	791	883	876
Japan	215	414	535	534	502	503
Kenya	45	45	45	167	209	253
Mexico	743	743	843	960	965	823
New Zealand	292	292	436	436	769	855
Nicaragua	35	70	70	78	88	160
Papua New Guinea	0	0	0	6	56	56
Philippines	888	1,154	1,931	1,978	1,966	1,868
Portugal	3	5	16	16	29	29
Russia	11	11	23	79	82	82
Thailand	0	0	0	0	0	0
Turkey	21	20	20	20	94	226
United States	2,775	2,817	2,746	2,811	3,226	3,442
<b>World Total</b>	<b>5,892</b>	<b>6,755</b>	<b>8,584</b>	<b>9,325</b>	<b>11,116</b>	<b>11,709</b>

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

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

**Cumulative Installed Geothermal Electricity-Generating Capacity in the United States, 1990-2013**

<u>Year</u>	<u>Cumulative Installed Capacity Megawatts</u>
1990	2,775
1995	2,817
2000	2,746
2005	2,811
2010	3,226
<u>2013</u>	<u>3,442</u>

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

### U.S. Cumulative Installed Geothermal Electricity-Generating Capacity by State, 2013

<u>State</u>	<u>Cumulative Installed Capacity</u> Megawatts
California	2,711
Nevada	566
Utah	73
Hawaii	38
Oregon	33
Idaho	16
New Mexico	4
Alaska	1
<u>Total</u>	<u>3,442</u>

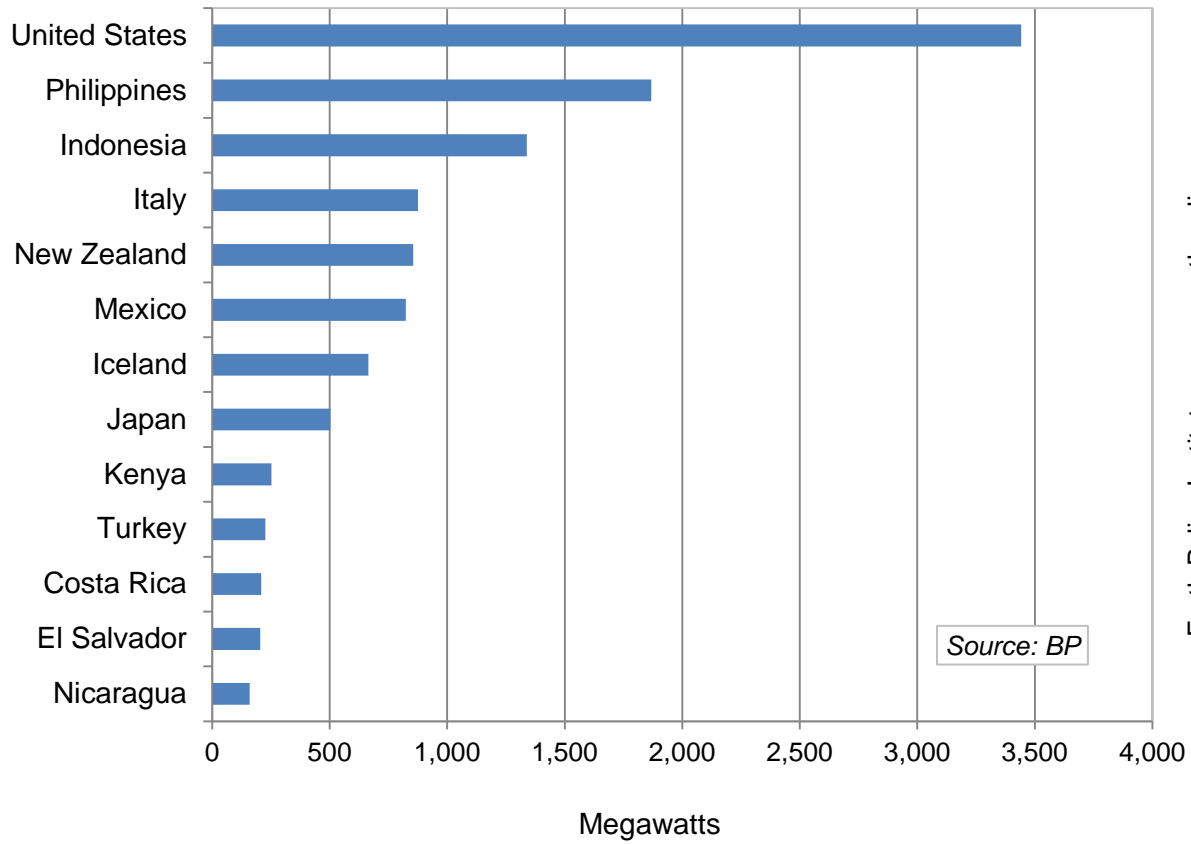
Source: Benjamin Matek, *Annual Geothermal Power Production and Development Report: April 2014* (Washington, DC: Geothermal Energy Association, April 2014), p. 16.

### Geothermal Electricity-Generating Capacity in Leading Countries, 2013

<u>Country</u>	<u>Capacity</u> Megawatts
United States	3,442
Philippines	1,868
Indonesia	1,339
Italy	876
New Zealand	855
Mexico	823
Iceland	665
Japan	503
Kenya	253
Turkey	226
Costa Rica	208
El Salvador	204
Nicaragua	160
<u>World Total</u>	<u>11,709</u>

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

## Geothermal Electricity-Generating Capacity in Leading Countries, 2013



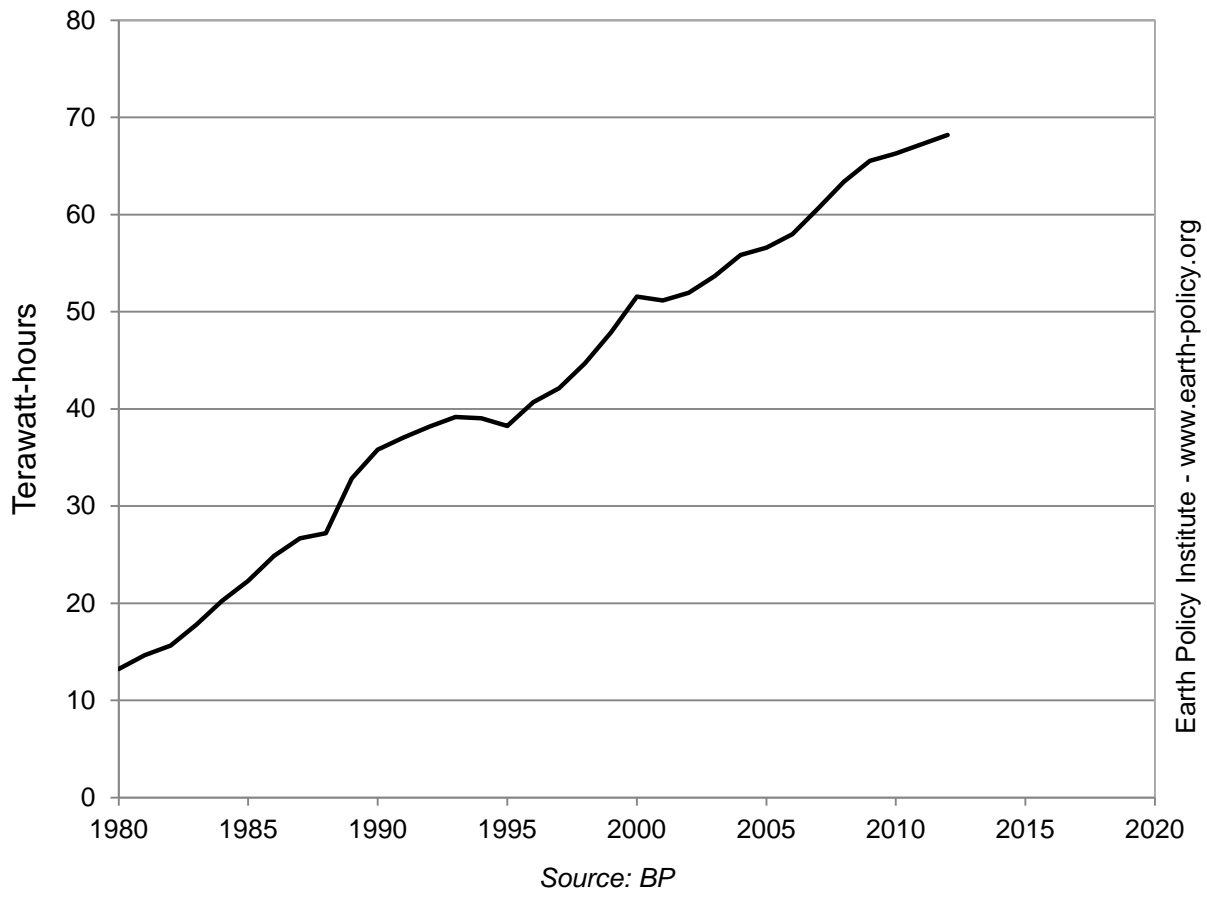


## World Electricity Generation from Geothermal Power, 1980-2012

Year	Geothermal-Generated Electricity Terawatt-hours
1980	13
1981	15
1982	16
1983	18
1984	20
1985	22
1986	25
1987	27
1988	27
1989	33
1990	36
1991	37
1992	38
1993	39
1994	39
1995	38
1996	41
1997	42
1998	45
1999	48
2000	52
2001	51
2002	52
2003	54
2004	56
2005	57
2006	58
2007	61
2008	63
2009	66
2010	66
2011	67
2012	68

Source: U.S. Department of Energy, Energy Information Administration, *International Energy Statistics*, electronic database, at <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm>, viewed 20 February 2015.

# World Electricity Generation from Geothermal Power, 1980-2012

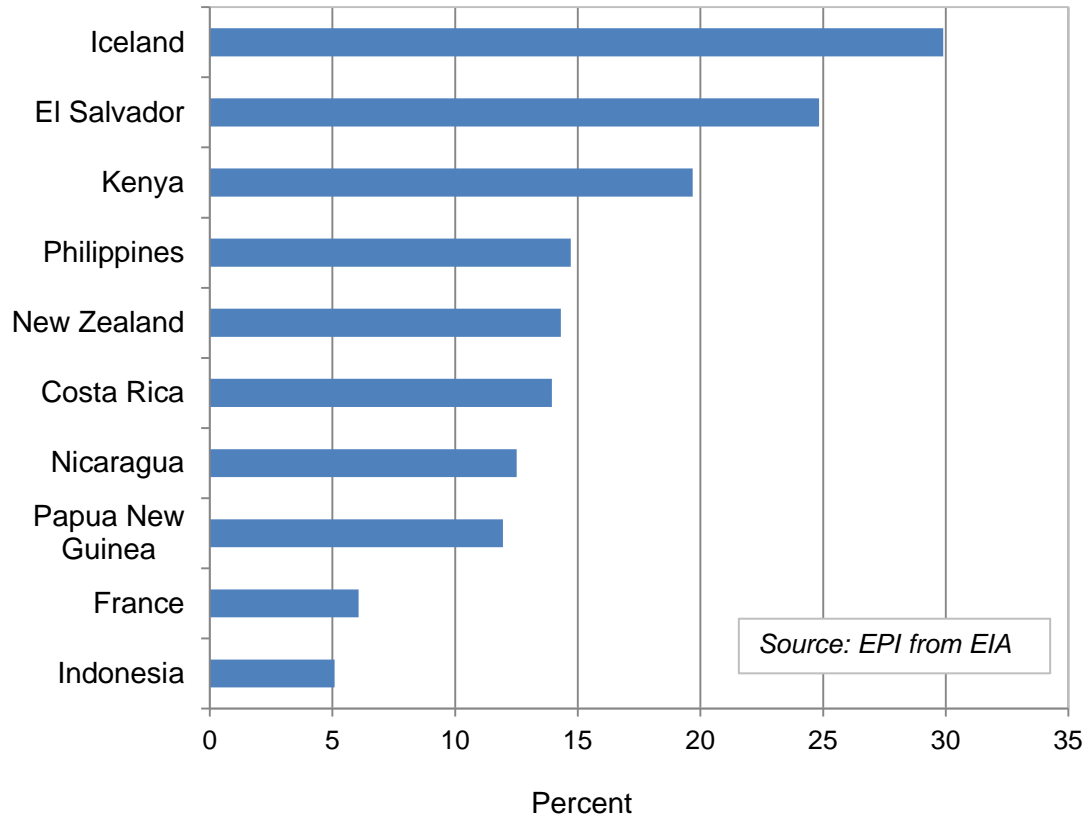


## Geothermal Share of Electricity Generation in Selected Countries, 2012

Country	Geothermal Share Percent
Iceland	29.9
El Salvador	24.8
Kenya	19.7
Philippines	14.7
New Zealand	14.3
Costa Rica	13.9
Nicaragua	12.5
Papua New Guinea	11.9
France	6.1
Indonesia	5.1
Guatemala	2.7
Mexico	2.1
Italy	2.0
United States	0.4
Japan	0.3

Source: Compiled by Earth Policy Institute 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 24 February 2015.

## Geothermal Share of Electricity Generation in Top 10 Countries, 2012



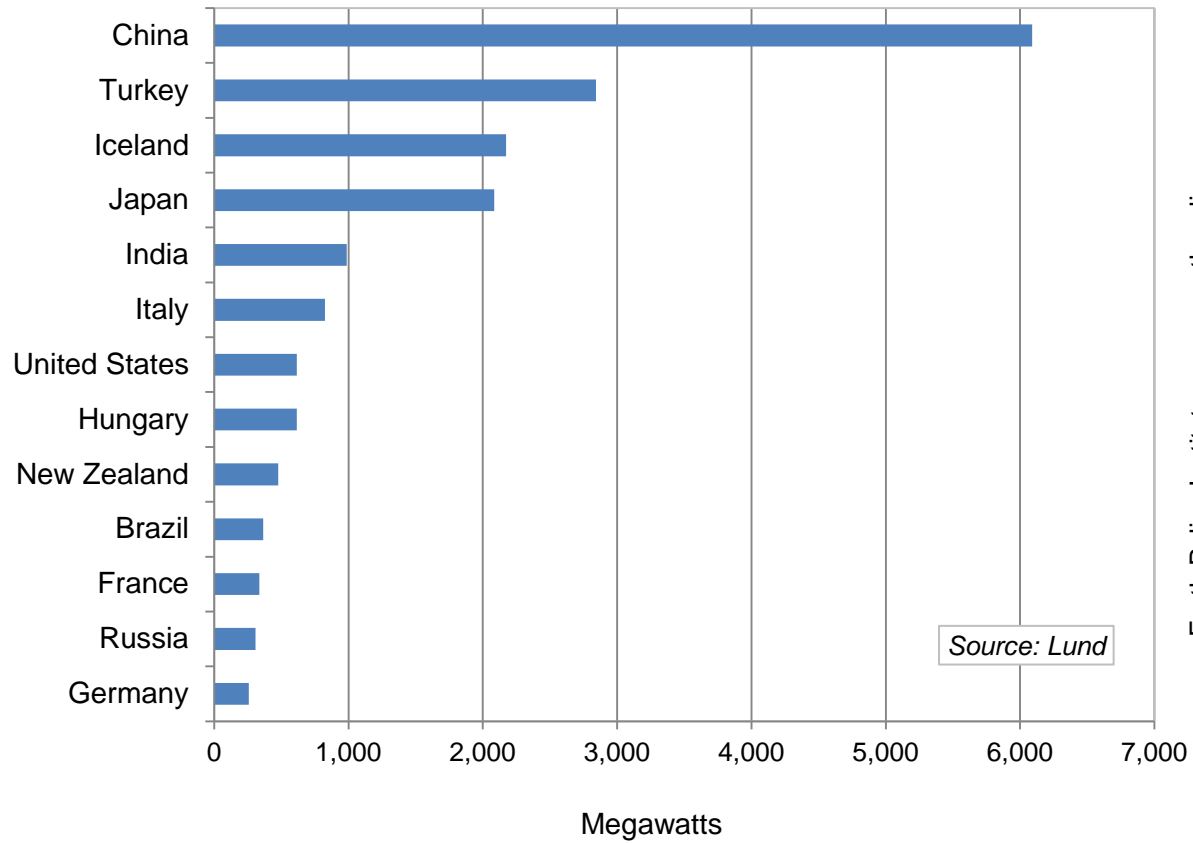
## Installed Direct-Use Geothermal Capacity by Country, 2014

Country	Direct-Use Geothermal Capacity* Thermal Megawatts
China	6,089.0
Turkey	2,843.5
Iceland	2,173.0
Japan	2,086.2
India	986.0
Italy	825.0
United States	615.9
Hungary	614.6
New Zealand	478.0
Brazil	365.0
France	336.9
Russia	307.0
Germany	258.6
Romania	205.1
Argentina	163.3
Mexico	155.8
Jordan	153.3
Slovakia	147.8
Thailand	127.5
Serbia	104.6
Netherlands	100.0
Poland	98.8
Greece	86.9
Bulgaria	83.1
Israel	82.4
Iran	81.3
Croatia	75.4
Georgia	73.4
Slovenia	67.1
Austria	63.4
Algeria	54.5
Macedonia	46.2
Saudi Arabia	44.0
Tunisia	43.8
South Korea	43.6
Vietnam	31.2
Switzerland	31.1
Bosnia & Herzegovina	22.7
Kenya	22.4
Spain	21.0
Portugal	20.2
Mongolia	19.4
Columbia	18.0
Australia	13.6
Albania	11.7
Chile	11.3
Ukraine	10.9
Canada	8.8
Egypt	6.8
Ecuador	5.2
Morocco	5.0
Belgium	4.8
Czech Republic	4.5
United Kingdom	3.8
El Salvador	3.4
Nepal	3.3
Philippines	3.3
Peru	3.0
Tajikistan	2.9
Madagascar	2.8
Guatemala	2.3
South Africa	2.3
Indonesia	2.3
Ethiopia	2.2
Honduras	1.9
Latvia	1.3
Costa Rica	1.0
Greenland	1.0
Yemen	1.0
Venezuela	0.7
Pakistan	0.5
Caribbean Islands	0.1
Papua New Guinea	0.1

\*Note: Figures reflect the direct use of geothermal energy for applications including: space heating, bathing and swimming, and aquaculture. Figures do not include ground source heat pumps.

Source: John W. Lund, Oregon Institute of Technology (retired), e-mail to Lindsay Garten, Earth Policy Institute, 5 November 2014.

## Installed Direct-Use Geothermal Capacity in Leading Countries, 2014

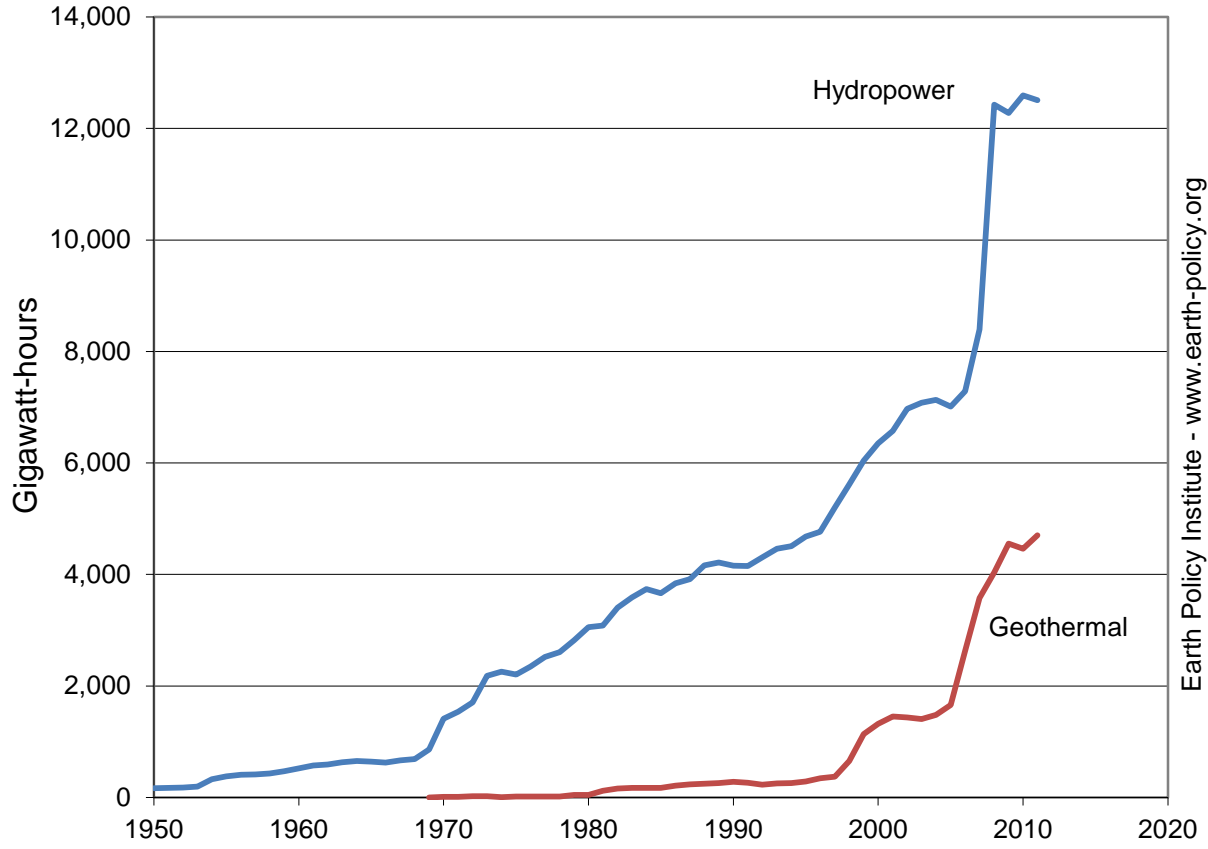


**Electricity Generation by Source in Iceland, 1950-2013**

Year	Hydropower	Geothermal	Diesel, Methane, Waste-to-Energy	Wind	Total
			Gigawatt-hours		
1950	167	0	26	--	193
1951	170	0	40	--	210
1952	176	0	39	--	215
1953	198	0	32	--	229
1954	327	0	12	--	338
1955	379	0	12	--	391
1956	406	0	12	--	417
1957	415	0	13	--	428
1958	431	0	15	--	446
1959	470	0	14	--	484
1960	523	0	13	--	536
1961	576	0	13	--	589
1962	593	0	13	--	606
1963	629	0	12	--	641
1964	653	0	13	--	666
1965	641	0	22	--	663
1966	624	0	44	--	668
1967	665	0	31	--	696
1968	687	0	32	--	719
1969	860	2	41	--	903
1970	1,413	12	35	--	1,460
1971	1,540	12	40	--	1,592
1972	1,703	22	44	--	1,768
1973	2,181	24	80	--	2,285
1974	2,258	8	77	--	2,343
1975	2,206	18	72	--	2,296
1976	2,350	19	53	--	2,421
1977	2,520	16	66	--	2,602
1978	2,605	18	51	--	2,674
1979	2,819	46	54	--	2,919
1980	3,053	45	45	--	3,143
1981	3,085	123	50	--	3,258
1982	3,407	159	9	--	3,575
1983	3,588	172	6	--	3,766
1984	3,738	173	3	--	3,914
1985	3,663	171	3	--	3,837
1986	3,842	212	4	--	4,058
1987	3,914	234	4	--	4,152
1988	4,165	246	6	--	4,416
1989	4,213	258	5	--	4,475
1990	4,159	283	6	--	4,447
1991	4,154	267	6	--	4,427
1992	4,306	230	5	--	4,541
1993	4,462	254	4	--	4,721
1994	4,511	260	4	--	4,774
1995	4,678	290	8	--	4,977
1996	4,764	346	3	--	5,113
1997	5,203	375	3	--	5,581
1998	5,617	655	4	--	6,276
1999	6,043	1,138	4	--	7,185
2000	6,352	1,323	5	--	7,680
2001	6,574	1,451	3	--	8,029
2002	6,972	1,433	6	--	8,411
2003	7,082	1,406	5	--	8,493
2004	7,131	1,484	5	--	8,619
2005	7,015	1,658	8	--	8,681
2006	7,289	2,631	5	--	9,925
2007	8,394	3,579	4	--	11,976
2008	12,427	4,038	3	--	16,468
2009	12,279	4,553	3	--	16,835
2010	12,592	4,465	2	--	17,059
2011	12,507	4,701	2	--	17,210
2012	12,337	5,210	3	0	17,550
2013	12,863	5,245	3	5	18,116

Source: National Energy Authority of Iceland, "Generation of Electricity in Iceland," at [www.nea.is/the-national-energy-authority/energy-statistics/generation-of-electricity](http://www.nea.is/the-national-energy-authority/energy-statistics/generation-of-electricity), viewed 18 March 2015.

# Hydropower- and Geothermal-generated Electricity in Iceland, 1950-2013



Source: EPI from Orkustofnun



## Countries that Could Meet 100 Percent of Electricity Demand with Geothermal Energy

Country	Population Thousands
Bolivia	10,848
Burundi	10,483
Comoros Islands	752
Costa Rica	4,938
Djibouti	886
Dominica	72
Ecuador	15,983
El Salvador	6,384
Ethiopia	96,506
Fiji	887
Grenada	106
Guadeloupe	468
Guatemala	15,860
Honduras	8,261
Iceland	333
Indonesia	252,812
Kenya	45,546
Madagascar	23,572
Malawi	16,829
Martinique	405
Montserrat	5
Mozambique	26,473
Nicaragua	6,169
Panama	3,926
Papua New Guinea	7,476
Peru	30,769
Philippines	100,096
Rwanda	12,100
Saint Kitts and Nevis	55
Saint Lucia	184
Saint Vincent	109
Solomon Islands	573
Somalia	10,806
Sudan	38,764
Tanzania	50,757
Tonga	106
Uganda	38,845
Vanuatu	258
Yemen	24,969
<b>Total</b>	<b>864,371</b>

Source: Compiled by Earth Policy Institute with list of countries from Karl Gawell et al., *Preliminary Report: Geothermal Energy, the Potential for Clean Power from the Earth* (Washington, DC: Geothermal Energy Association, 7 April 1999); 2014 population from U.N. Population Division, *World Population Prospects: The 2012 Revision*, electronic database, at [esa.un.org/unpd/wpp/index.htm](http://esa.un.org/unpd/wpp/index.htm), updated 14 April 2014.