

Plan B 4.0 - Supporting Data for Chapters 4 and 5 - Solar

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GRAPH: World Annual Solar Photovoltaics Production, 1975-2008

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[World Solar Photovoltaics Installations, 1998-2008](#)

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[Cumulative Installed Solar Water and Space Heating Capacity in Ten Leading Countries and the World, 2007](#)

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

http://www.earthpolicy.org/index.php?/books/pb4/pb4_data

This is part of a supporting dataset for Lester R. Brown, **Plan B 4.0: Mobilizing to Save Civilization** (New York: W.W. Norton & Company, 2009). For more information and a free download of the book, see Earth Policy Institute on-line at www.earthpolicy.org.

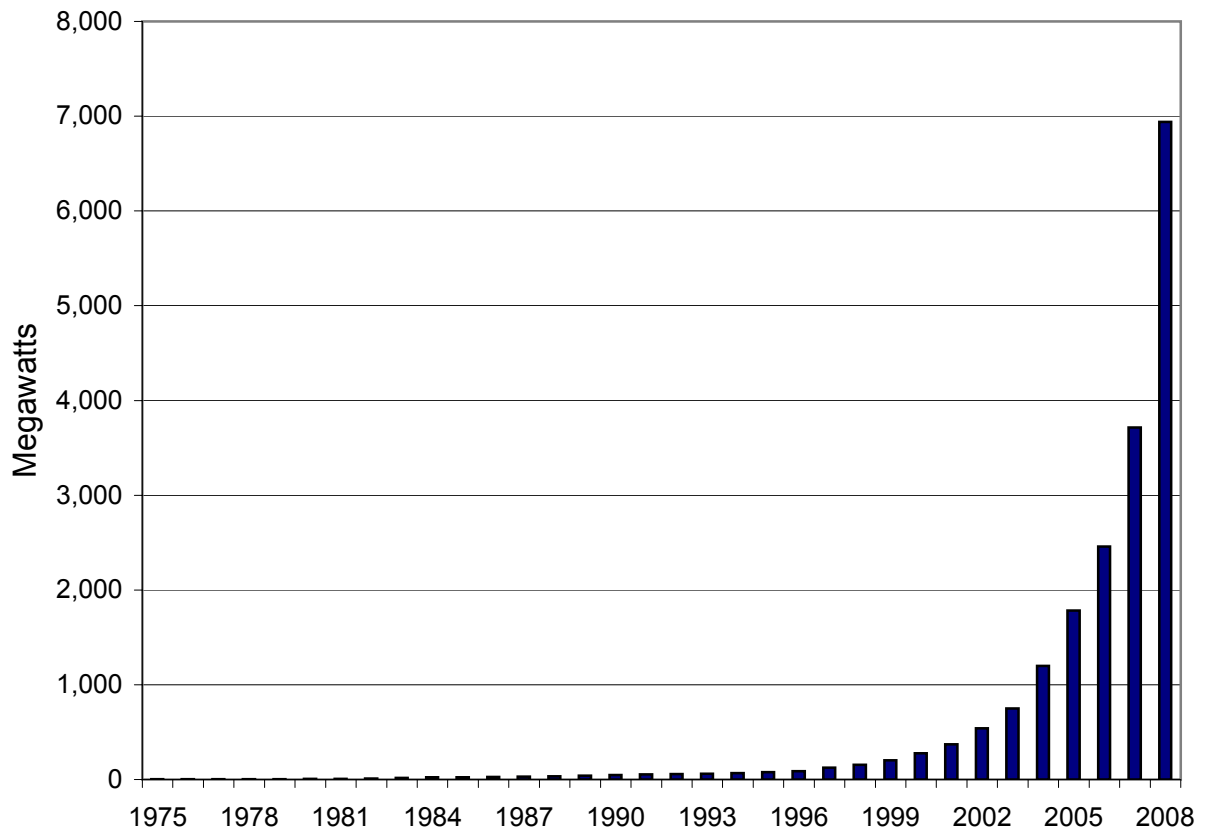
World Solar Photovoltaics Production, 1975-2008

Year	Annual Production	Cumulative Production
	Megawatts	
1975	2	2
1976	2	4
1977	2	6
1978	3	9
1979	4	13
1980	7	20
1981	8	28
1982	9	37
1983	17	54
1984	22	76
1985	23	99
1986	26	125
1987	29	154
1988	34	188
1989	40	228
1990	47	275
1991	55	330
1992	58	388
1993	60	448
1994	69	517
1995	78	594
1996	89	683
1997	126	809
1998	155	964
1999	201	1,165
2000	277	1,442
2001	371	1,813
2002	542	2,355
2003	749	3,104
2004	1,199	4,303
2005	1,782	6,086
2006	2,459	8,544
2007	3,715	12,259
2008	6,941	19,200

Source: Compiled by Earth Policy Institute with 1975-1979 data from Worldwatch Institute, *Signposts 2004*, CD-ROM (Washington, DC: 2004); 1980-2000 from Worldwatch Institute, *Vital Signs 2007-2008* (Washington DC: 2008), p. 39; 2001-2008 from Prometheus Institute and Greentech Media, "25th Annual Data Collection Results: PV Production Explodes in 2008," *PVNews*, vol. 28, no. 4 (April 2009), pp. 15-18.

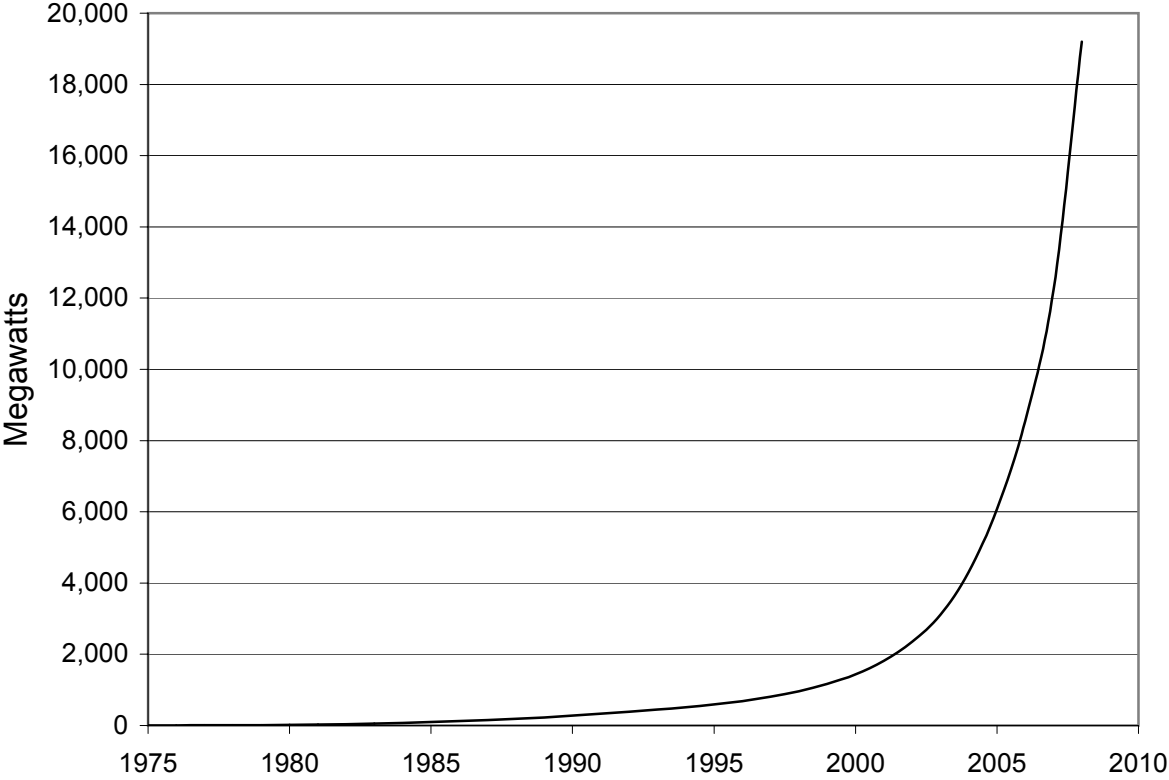
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World Annual Solar Photovoltaics Production, 1975-2008



Source: Worldwatch; Prometheus Institute and Greentech Media

World Cumulative Solar Photovoltaics Production, 1975-2008



Source: Worldwatch; Prometheus Institute and Greentech Media

Annual Solar Photovoltaics Production by Country, 1995-2008

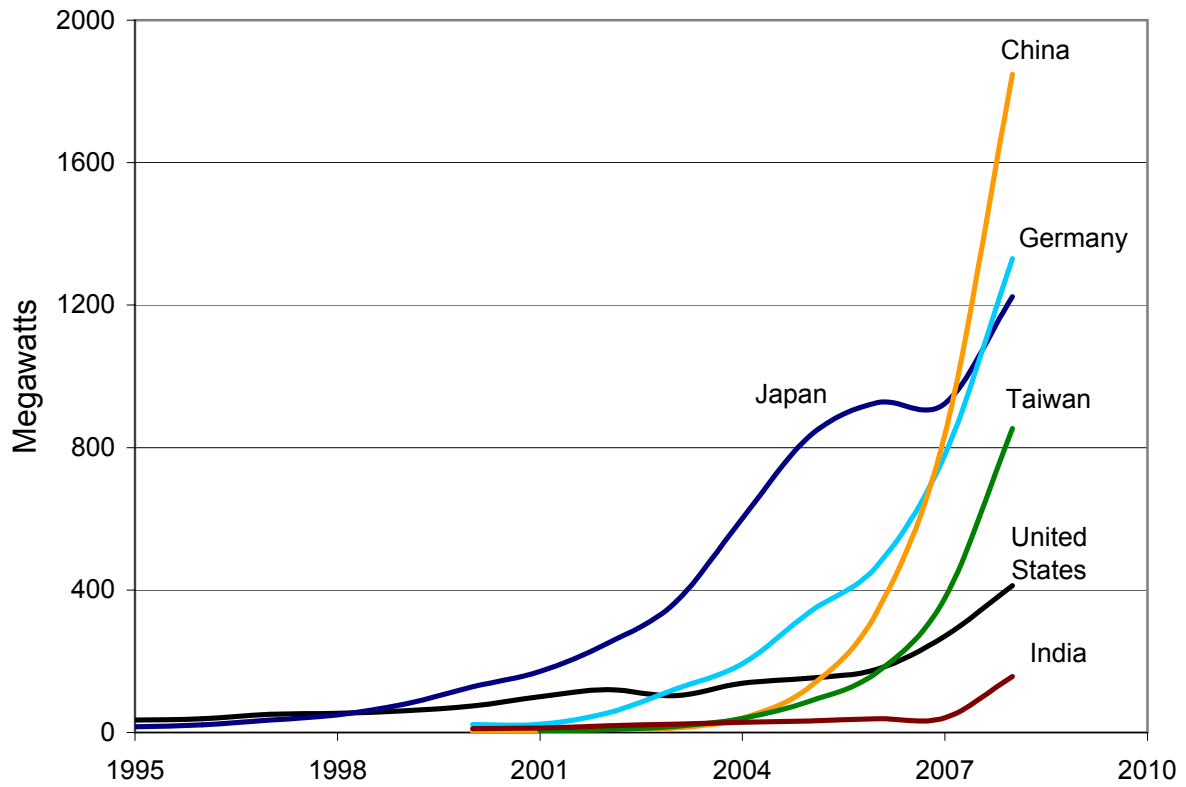
Year	United States	Japan	Germany	Total Europe	China	Taiwan	India	Others	Total
Megawatts									
1995	35	16	n.a.	20	n.a.	n.a.	n.a.	n.a.	78
1996	39	21	n.a.	19	n.a.	n.a.	n.a.	n.a.	89
1997	51	35	n.a.	30	n.a.	n.a.	n.a.	n.a.	126
1998	54	49	n.a.	34	n.a.	n.a.	n.a.	n.a.	155
1999	61	80	n.a.	40	n.a.	n.a.	n.a.	n.a.	201
2000	75	129	23	50	3	n.a.	10	10	277
2001	100	171	24	74	3	4	13	7	371
2002	121	251	55	123	10	8	19	11	542
2003	103	364	122	201	13	17	23	29	749
2004	139	602	193	312	40	39	29	38	1,199
2005	153	833	339	473	128	88	32	75	1,782
2006	178	926	469	673	342	170	38	132	2,459
2007	271	924	780	1,069	838	377	41	195	3,715
2008	412	1,224	1,331	1,907	1,848	854	157	539	6,941

Note: n.a. = data not available

Source: Compiled by Earth Policy Institute with 1995-1999 data from Worldwatch Institute, *Signposts 2004*, CD-ROM (Washington, DC: 2005); 2000 data from Prometheus Institute, "23rd Annual Data Collection - Final," *PVNews*, vol. 26, no. 4 (April 2007), pp. 8-9; 2001-2008 data from Prometheus Institute and Greentech Media, "25th Annual Data Collection Results: PV Production Explodes in 2008," *PVNews*, vol. 28, no. 4 (April 2009), pp. 15-18.

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Annual Solar Photovoltaics Production in Selected Countries, 1995-2008



Source: Worldwatch; Prometheus Institute and Greentech Media

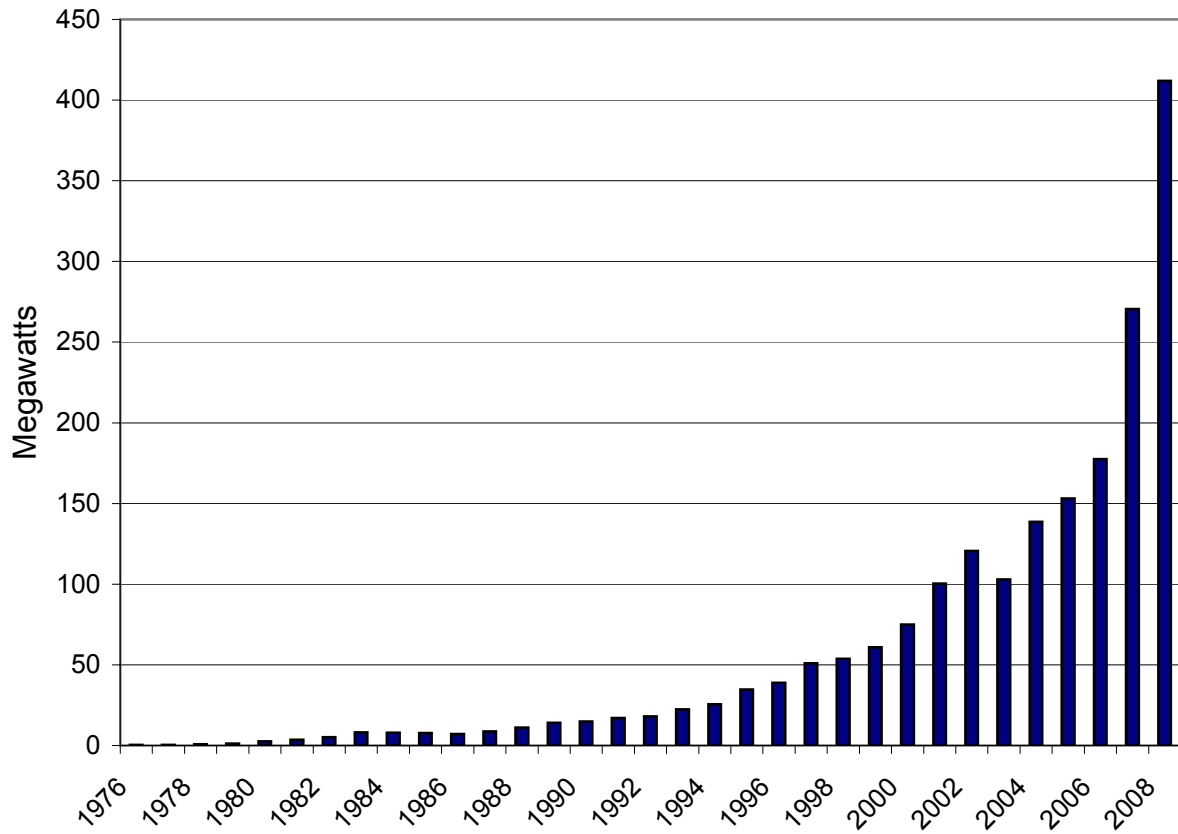
U.S. Solar Photovoltaics Production, 1976-2008

Year	Annual Production	Cumulative Production
	Megawatts	
1976	0.3	0.3
1977	0.4	0.7
1978	0.8	1.6
1979	1.2	2.8
1980	2.5	5.3
1981	3.5	8.8
1982	5.2	14.0
1983	8.2	22.2
1984	8.0	30.2
1985	7.7	37.9
1986	7.1	45.0
1987	8.7	53.7
1988	11.1	64.8
1989	14.1	78.9
1990	14.8	93.7
1991	17.1	110.8
1992	18.1	128.9
1993	22.4	151.4
1994	25.6	177.0
1995	34.8	211.8
1996	38.9	250.6
1997	51.0	301.6
1998	53.7	355.3
1999	60.8	416.1
2000	75.0	491.1
2001	100.3	591.4
2002	120.6	712.0
2003	103.0	815.0
2004	138.7	953.7
2005	153.1	1,106.8
2006	177.6	1,284.4
2007	270.6	1,555.0
2008	412.0	1,967.0

Source: Compiled by Earth Policy Institute with 1976-1993 from Hillary Flynn, Content Manager at Prometheus Institute for Sustainable Development, Cambridge, MA, email to Joseph Florence, Earth Policy Institute, 21 March 2006; 1994-2000 data from Worldwatch Institute, *Signposts 2004*, CD-ROM (Washington, DC: 2005); 2001-2008 from Prometheus Institute and Greentech Media, "25th Annual Data Collection Results: PV Production Explodes in 2008," *PVNews*, vol. 28, no. 4 (April 2009), pp. 15-18.

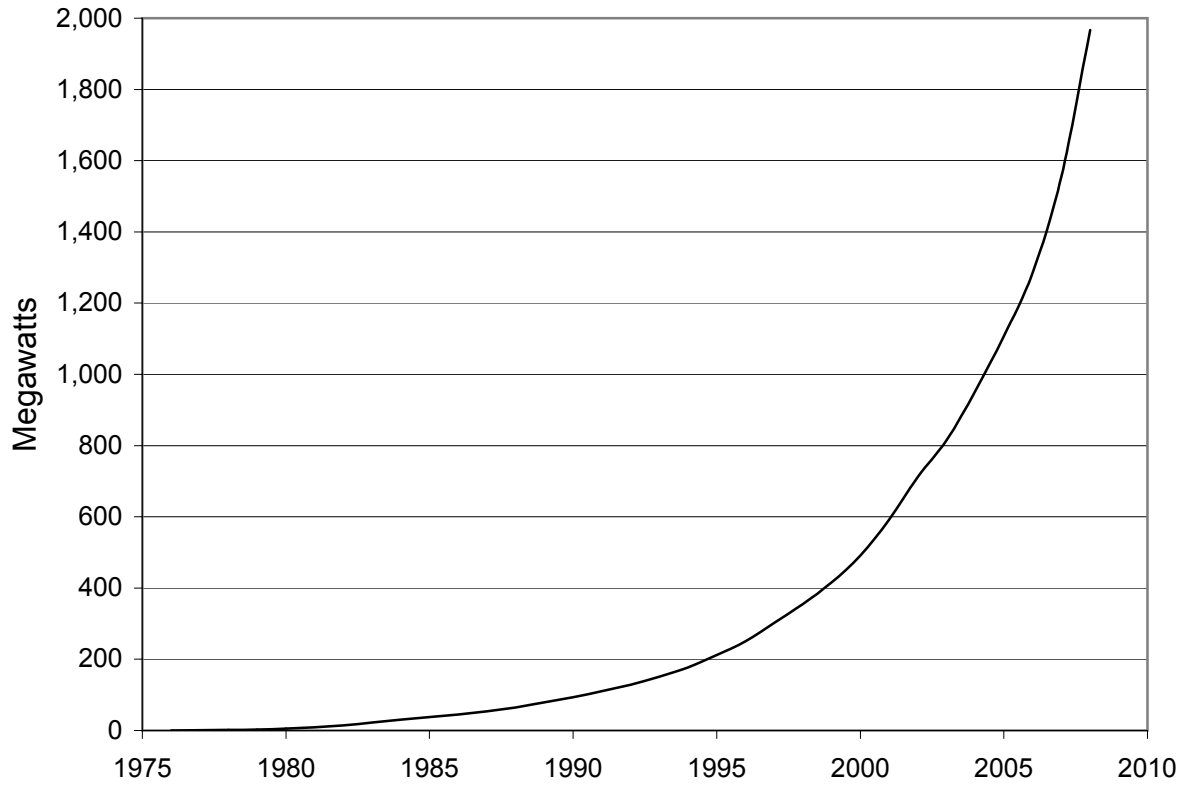
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U.S. Annual Solar Photovoltaics Production, 1976-2008



Source: Worldwatch; Prometheus Institute and Greentech Media

U.S. Cumulative Solar Photovoltaics Production, 1976-2008



Source: Worldwatch; Prometheus Institute and Greentech Media

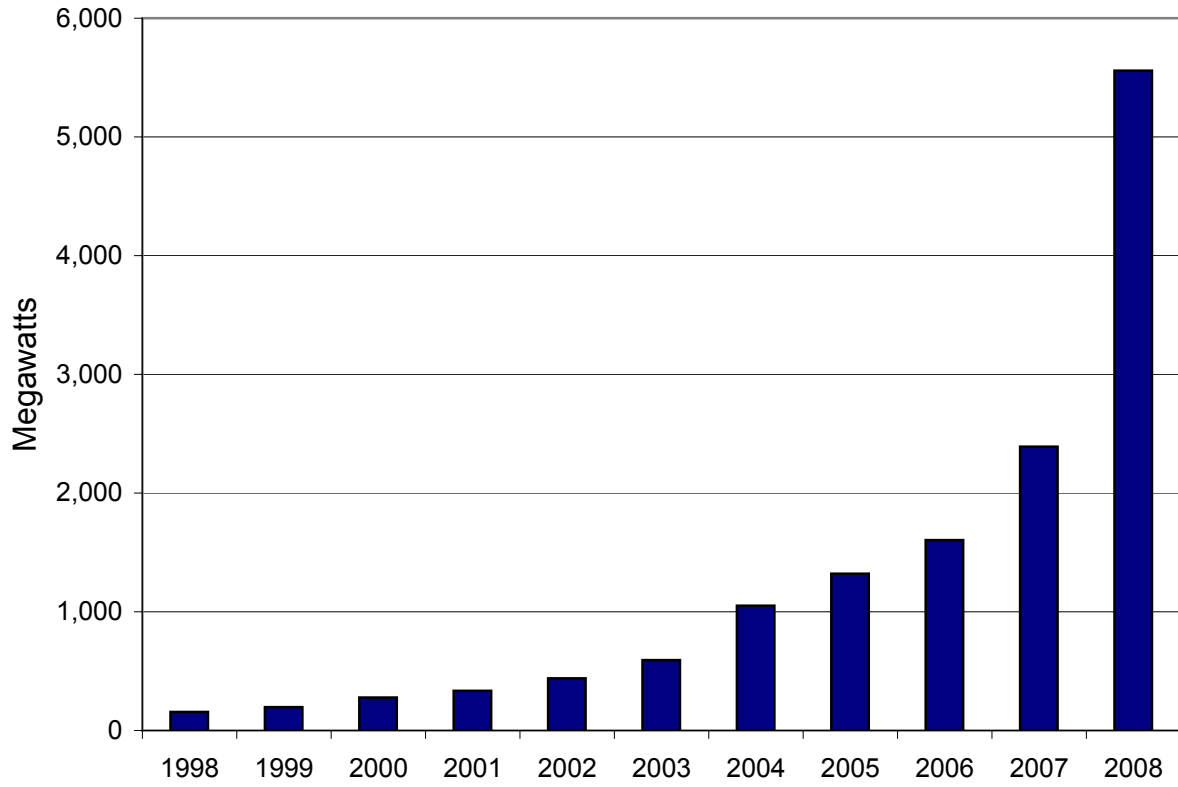
World Solar Photovoltaics Installations, 1998-2008

Year	Annual Installations Megawatts	Cumulative Installations
1998	155	962
1999	197	1,166
2000	278	1,428
2001	334	1,762
2002	439	2,201
2003	594	2,795
2004	1,052	3,847
2005	1,321	5,167
2006	1,603	6,770
2007	2,392	9,162
2008	5,559	14,730

Source: Compiled by Earth Policy Institute from European Photovoltaic Industry Association, *Global Market Outlook for Photovoltaics Until 2013* (Brussels: April 2009), pp. 3-4.

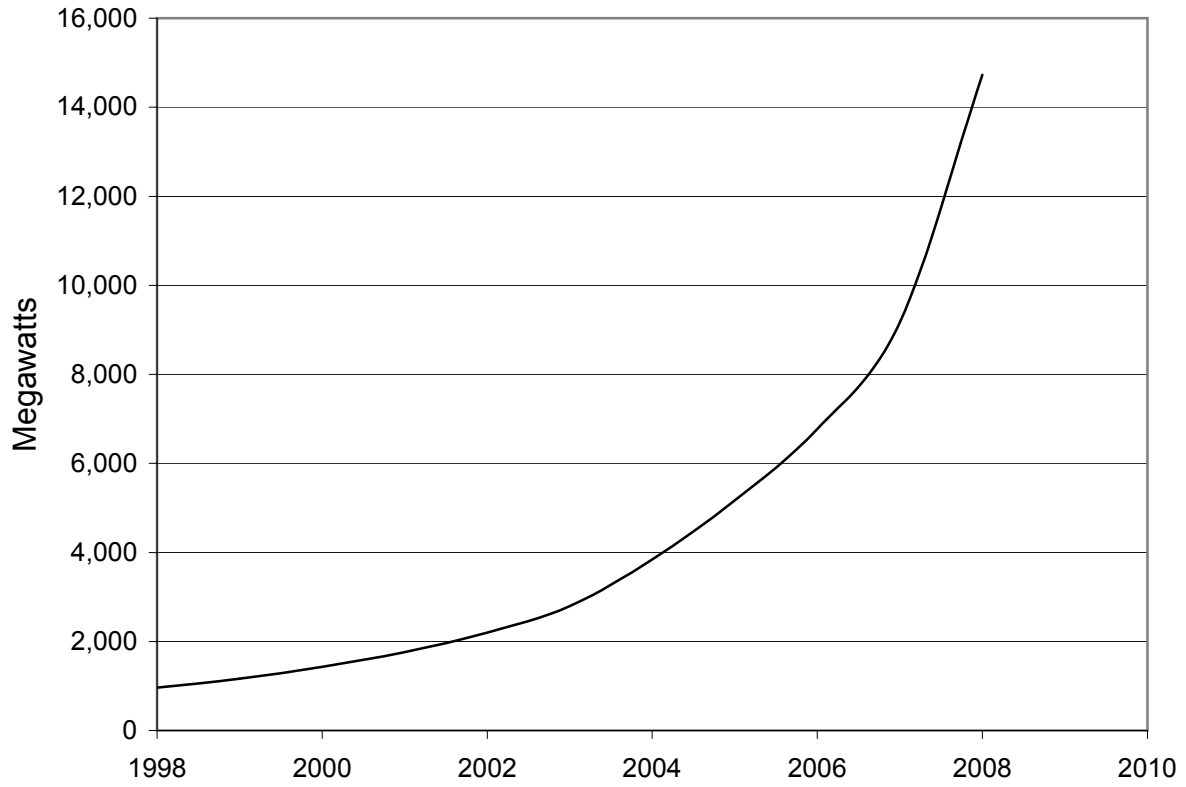
This is part of a supporting dataset for Lester R. Brown, **Plan B 4.0: Mobilizing to Save Civilization** (New York: W.W. Norton & Company, 2009). For more information and a free download of the book, see Earth Policy Institute on-line at www.earthpolicy.org.

World Annual Solar Photovoltaics Installations, 1998-2008



Source: EPIA

World Cumulative Solar Photovoltaics Installations, 1998-2008



Source: EPIA

Annual Installed Solar Photovoltaics Capacity in Selected Countries and the World, 1998-2008

Year	Japan	U.S.	Spain	Germany	Other Europe	Rest of World	World
	----- Megawatts -----						
1998	69	n.a.	0	10	8	68	155
1999	72	17	1	12	11	84	197
2000	112	22	n.a.	40	10	94	278
2001	135	29	2	78	16	75	334
2002	185	44	9	80	16	104	439
2003	223	63	10	150	50	98	594
2004	272	90	6	600	30	53	1,052
2005	290	114	26	850	30	12	1,321
2006	287	145	88	850	37	196	1,603
2007	210	207	560	1,100	108	207	2,392
2008	230	342	2,511	1,500	492	485	5,559

Note: n.a. = data not available. Columns may not add to world totals due to rounding.

Source: European Photovoltaic Industry Association, *Global Market Outlook for Photovoltaics Until 2013* (Brussels: April 2009), p. 4.

This is part of a supporting dataset for Lester R. Brown, **Plan B 4.0: Mobilizing to Save Civilization** (New York: W.W. Norton & Company, 2009). For more information and a free download of the book, see Earth Policy Institute on-line at www.earthpolicy.org.

Cumulative Installed Solar Photovoltaics Capacity in Ten Leading Countries and the World, 2008

<u>Country</u>	<u>Cumulative Installed Capacity Megawatts</u>
Germany	5,308
Spain	3,223
Japan	2,149
United States	1,173
South Korea	352
Italy	350
China	145
India	90
France	87
Belgium	70
<u>World Total</u>	14,730

Source: Compiled by Earth Policy Institute from European Photovoltaic Industry Association, *Global Market Outlook for Photovoltaics Until 2013* (Brussels: April 2009), pp. 7-13.

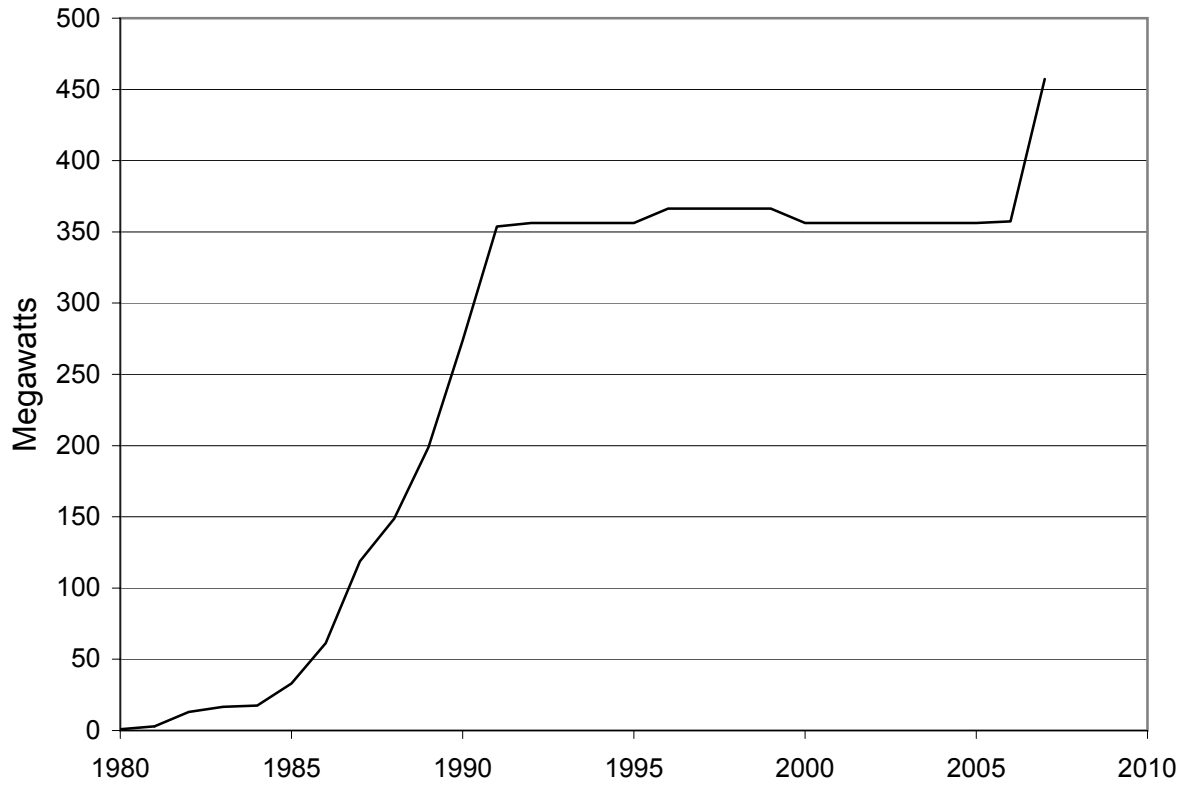
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World Installed Concentrating Solar Thermal Power Capacity, 1980-2007

Year	Cumulative Installed Capacity Megawatts
1980	1
1981	3
1982	13
1983	17
1984	17
1985	33
1986	61
1987	119
1988	149
1989	199
1990	274
1991	354
1992	356
1993	356
1994	356
1995	356
1996	366
1997	366
1998	366
1999	366
2000	356
2001	356
2002	356
2003	356
2004	356
2005	356
2006	357
2007	457

Source: Compiled by Earth Policy Institute from Shirish Garud, *Making Solar Thermal Power Generation in India a Reality* (New Delhi: The Energy and Resources Institute, 2006), p. 9; Rainer Aringhoff et al., *Concentrated Solar Thermal Power – Now!* (Brussels, Almeria, and Amsterdam: European Solar Thermal Industry Association, IEA SolarPACES, and Greenpeace International, September 2005), p. 10; U.S. Department of Energy (DOE), National Renewable Energy Laboratory (NREL), *U.S. Parabolic Trough Power Plant Data*, electronic database, at www.nrel.gov/csp/troughnet/power_plant_data.html, updated 8 May 2007; DOE, NREL, *Concentrating Solar Power: Energy from Mirrors* (Golden, CO: March 2001), p. 5; Acciona Energy, "CSP - 64 MW Plant in the United States," at www.acciona-energia.com/default.asp?x=0002020401, viewed 15 April 2008; Abengoa Solar, "PS10: The First Commercial Tower of the World," at www.abengoasolar.com/sites/solar/en/nproyectos_ps10.jsp, viewed 15 April 2008; Peter Fairley, "Solar Without the Panels," *Technology Review*, 29 February 2008.

World Installed Concentrating Solar Thermal Power Capacity, 1980-2007



Source: EPI

World's Top Ten Largest Proposed Concentrating Solar Thermal Projects as of June 2008

Location	Company	Project	Power Capacity ⁽¹⁾ Megawatts	Scheduled Year of Completion
California, USA	Solel Solar Systems, Ltd.	Mojave Solar Park	553	2011
California, USA	Stirling Energy Systems	Solar One	500 (850)	2011
California, USA	BrightSource Energy, Inc.	Ivanpah Solar Electricity Generating System	400 (900)	2011
California, USA	Stirling Energy Systems	Solar Two	300 (900)	not set
Andalucía, Spain	Abengoa Solar	Solúcar Platform	300	2013 ⁽²⁾
Florida, USA	Ausra, Inc.	n.a.	300	2011
Arizona, USA	Abengoa Solar	Solana	280	2011
California, USA	Beacon Solar, LLC	Beacon Solar Energy Project	250	2011
California, USA	Harper Lake, LLC	Harper Lake Energy Park	250 (500)	2010
Ramat Negev, Israel ⁽³⁾	n.a.	n.a.	250	2011

Notes: ⁽¹⁾ Power capacity lists proposed size with possible expansions noted in parentheses; ⁽²⁾ Some CSP projects such as the Solúcar Platform are modular and part can come online before the total project is complete; ⁽³⁾ Israel's Ministry for National Infrastructures issued a tender in early 2008 for 250 megawatts of CSP.

Source: Compiled by Jonathan G. Dorn, Earth Policy Institute, June 2008. References available upon request.

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Solar Water and Space Heating Area in Select Countries and the World, Total and Per Person, 2007

Country	Total Area Thousand Square Meters	Population Thousands	Area Per Person Square Meters
Cyprus	796	854	0.93
Israel	4,937	6,932	0.71
Austria	2,993	8,307	0.36
Barbados	83	255	0.33
Greece	3,573	11,112	0.32
Jordan	848	5,941	0.14
Turkey	10,150	73,004	0.14
Germany	8,648	82,343	0.11
China	114,140	1,329,090	0.09
Australia	1,683	20,854	0.08
Denmark	397	5,445	0.07
Malta	29	406	0.07
Switzerland	459	7,513	0.06
Slovenia	117	2,010	0.06
Taiwan	1,255	22,900	0.05
Japan	6,952	127,396	0.05
Luxembourg	19	475	0.04
Sweden	252	9,159	0.03
Spain	1,210	44,051	0.03
New Zealand	113	4,193	0.03
Portugal	282	10,641	0.03
France	1,450	61,714	0.02
Tunisia	218	10,069	0.02
Netherlands	330	16,460	0.02
Brazil	3,588	190,120	0.02
Slovak Republic	98	5,394	0.02
Italy	976	59,305	0.02
Albania	50	3,132	0.02
Belgium	146	10,531	0.01
Czech Republic	113	10,268	0.01
Macedonia	19	2,040	0.01
Ireland	36	4,355	0.01
United States	2,477	308,674	0.01
Poland	235	38,132	0.01
South Africa	248	49,173	0.01
United Kingdom	305	60,899	0.01
World	172,158	6,670,801	0.03

Source: Werner Weiss, Irene Bergmann, and Roman Stelzer, *Solar Heat Worldwide: Markets and Contribution to the Energy Supply 2007* (Gleisdorf, Austria: International Energy Agency, Solar Heating & Cooling Programme, May 2009), p. 21; U.N. Population Division, *World Population Prospects: The 2008 Revision Population Database*, at <http://esa.un.org/unpp>, updated 11 March 2009; Taiwan population from Population Reference Bureau, *2007 World Population Data Sheet* (Washington, DC: August 2007).

Cumulative Installed Solar Water and Space Heating Capacity in Ten Leading Countries and the World, 2007

Country	Cumulative Installed Capacity Thermal Megawatts
China	79,898
Turkey	7,105
Germany	6,054
Japan	4,866
Israel	3,456
Brazil	2,512
Greece	2,501
Austria	2,095
United States	1,734
India	1,505
World Total	120,511

Source: Werner Weiss, Irene Bergmann, and Roman Stelzer, *Solar Heat Worldwide: Markets and Contribution to the Energy Supply 2007* (Gleisdorf, Austria: International Energy Agency, Solar Heating & Cooling Programme, May 2009), p. 21

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