

World on the Edge - Supporting Data for Chapter 9 - Solar

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

http://www.earth-policy.org/books/wote/wote_data

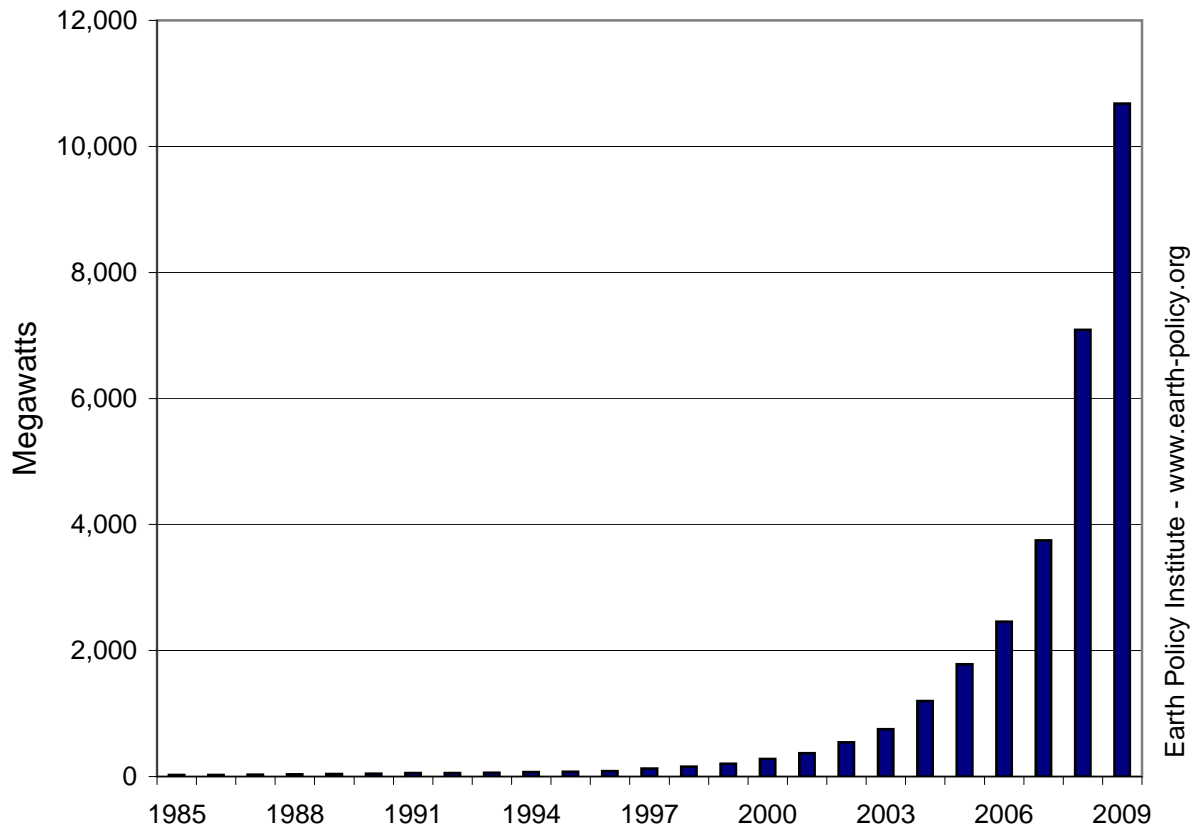
This is part of a supporting dataset for Lester R. Brown, **World On the Edge: How to Prevent Environmental and Economic Collapse** (New York: W.W. Norton & Company, 2010). For more information and a free download of the book, see Earth Policy Institute on-line at www.earth-policy.org.

World Solar Photovoltaics Production, 1975-2009

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	3,746	12,290
2008	7,089	19,380
2009	10,680	30,060

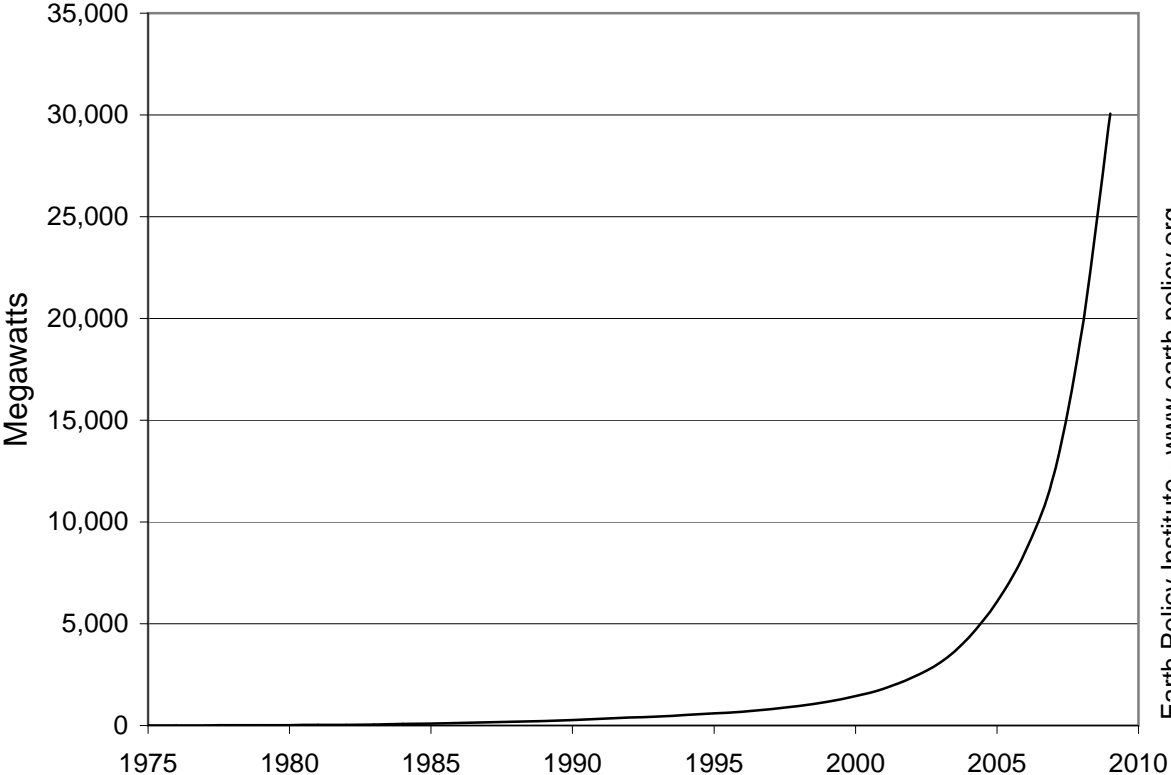
Source: Compiled by Earth Policy Institute with 1975-1979 data from Worldwatch Institute, *Signposts 2004*, CD-ROM (Washington, DC: 2004); 1980-2000 from Worldwatch Institute, *Vital Signs 2007-2008* (Washington DC: 2008), p. 39; 2001-2006 from Prometheus Institute and Greentech Media, "25th Annual Data Collection Results: PV Production Explodes in 2008," *PVNews*, vol. 28, no. 4 (April 2009), pp. 15-18; 2007-2009 from Shyam Mehta, GTM Research, e-mail to J. Matthew Roney, Earth Policy Institute, 21 June 2010.

World Annual Solar Photovoltaics Production, 1985-2009



Source: EPI from Worldwatch; Prometheus Institute; Greentech Media

World Cumulative Solar Photovoltaics Production, 1975-2009



Source: EPI from Worldwatch; Prometheus Institute; Greentech Media

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Annual Solar Photovoltaics Production by Country, 1995-2009

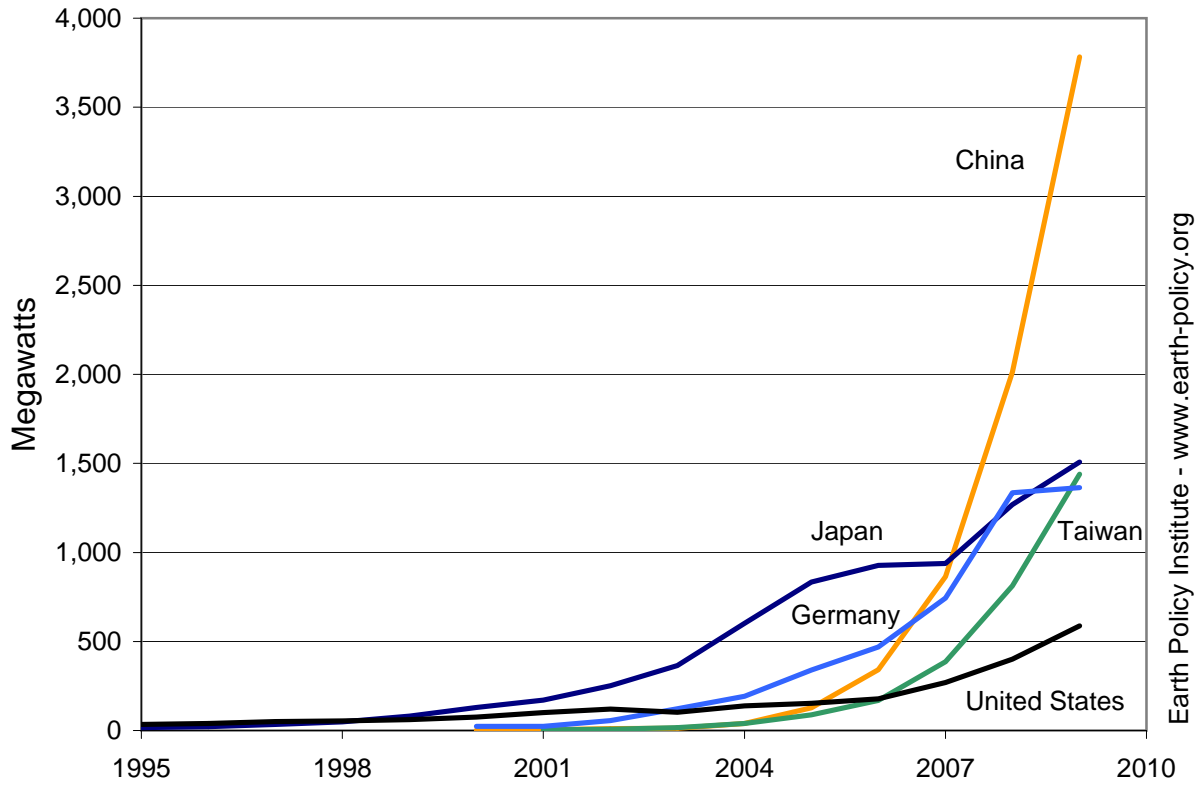
Year	China	Japan	Taiwan	Germany	United States	Others	Total
Megawatts							
1995	n.a.	16	n.a.	n.a.	35	n.a.	78
1996	n.a.	21	n.a.	n.a.	39	n.a.	89
1997	n.a.	35	n.a.	n.a.	51	n.a.	126
1998	n.a.	49	n.a.	n.a.	54	n.a.	155
1999	n.a.	80	n.a.	n.a.	61	n.a.	201
2000	3	129	n.a.	23	75	48	277
2001	3	171	4	24	100	70	371
2002	10	251	8	55	121	97	542
2003	13	364	17	122	103	131	749
2004	40	602	39	193	139	186	1,199
2005	128	833	88	339	153	241	1,782
2006	342	926	170	469	178	374	2,459
2007	864	938	387	744	269	545	3,746
2008	2,013	1,268	813	1,334	401	1,261	7,089
2009	3,782	1,508	1,439	1,364	587	2,000	10,680

Notes: n.a. = data not available. Rows may not add to totals due to rounding.

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; 2001-2006 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; 2007-2009 for Japan from Shyam Mehta, "26th Annual Data Collection Results: Another Bumper Year for Manufacturing Masks Turmoil," *PVNews*, vol. 29, no. 5 (May 2010), pp. 11-14; 2007-2009 for other countries and the world from Shyam Mehta, GTM Research, e-mail to J. Matthew Roney, Earth Policy Institute, 21 June 2010.

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Annual Solar Photovoltaics Production in Selected Countries, 1995-2009



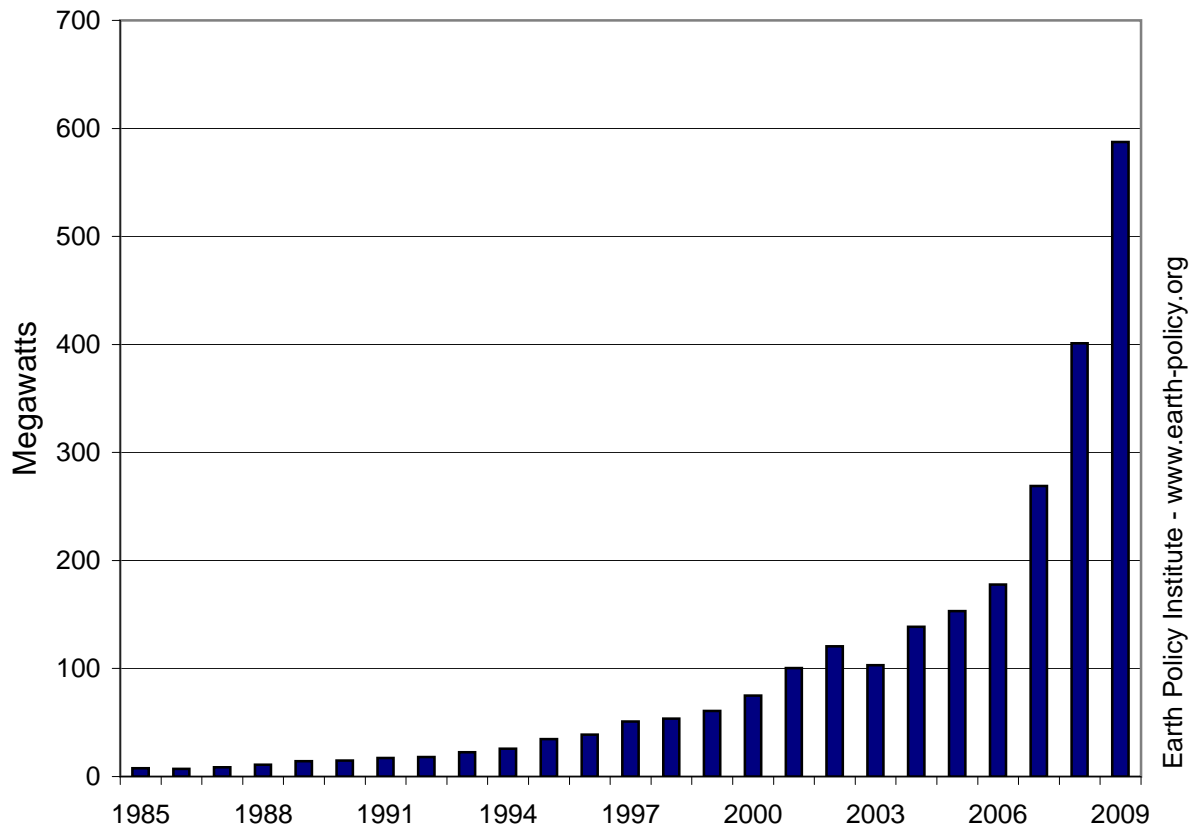
Source: EPI from Worldwatch; Prometheus Institute; Greentech Media

Solar Photovoltaics Production in the United States, 1976-2009

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	269.1	1,553.5
2008	401.1	1,954.6
2009	587.4	2,542.0

Source: Compiled by Earth Policy Institute with 1976-1993 from Hillary Flynn, Content Manager at Prometheus Institute for Sustainable Development, Cambridge, MA, e-mail to Joseph Florence, Earth Policy Institute, 21 March 2006; 1994-2000 data from Worldwatch Institute, *Signposts 2004*, CD-ROM (Washington, DC: 2005); 2001-2006 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; 2007-2009 from Shyam Mehta, GTM Research, e-mail to J. Matthew Roney, Earth Policy Institute, 21 June 2010.

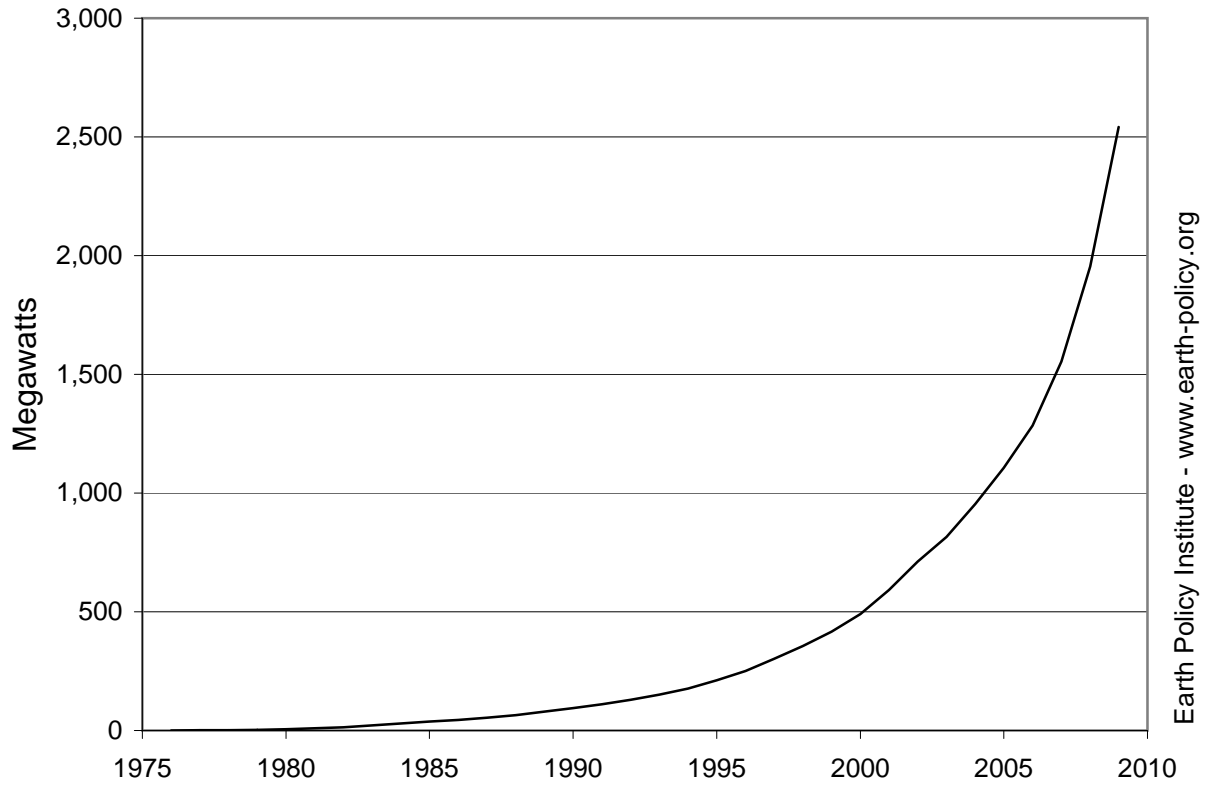
Annual Solar Photovoltaics Production in the United States, 1985-2009



Source: EPI from Prometheus Institute; Worldwatch; Greentech Media

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Cumulative Solar Photovoltaics Production in the United States, 1976-2009



Source: EPI from Prometheus Institute; Worldwatch; Greentech Media

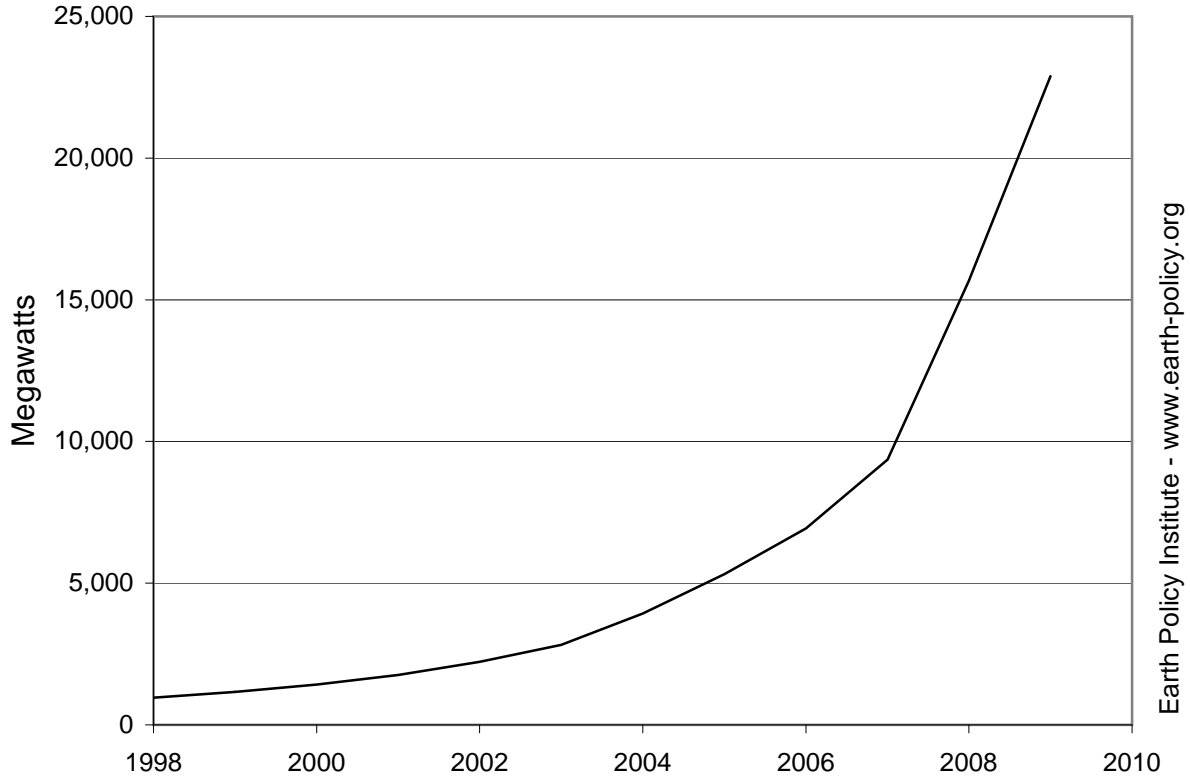
World Cumulative Solar Photovoltaics Installations, 1998-2009

Year	Cumulative Installations Megawatts
1998	962
1999	1,166
2000	1,428
2001	1,762
2002	2,229
2003	2,823
2004	3,924
2005	5,323
2006	6,929
2007	9,360
2008	15,677
2009	22,893

Source: Compiled by Earth Policy Institute from European Photovoltaic Industry Association (EPIA), *Global Market Outlook for Photovoltaics Until 2013* (Brussels: April 2009), p. 3; EPIA, *Global Market Outlook for Photovoltaics Until 2014* (Brussels: May 2010), p. 5.

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World Cumulative Solar Photovoltaics Installations, 1998-2009



Source: EPI from EPIA

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Annual Solar Photovoltaics Installations in Selected Countries and the World, 1998-2009

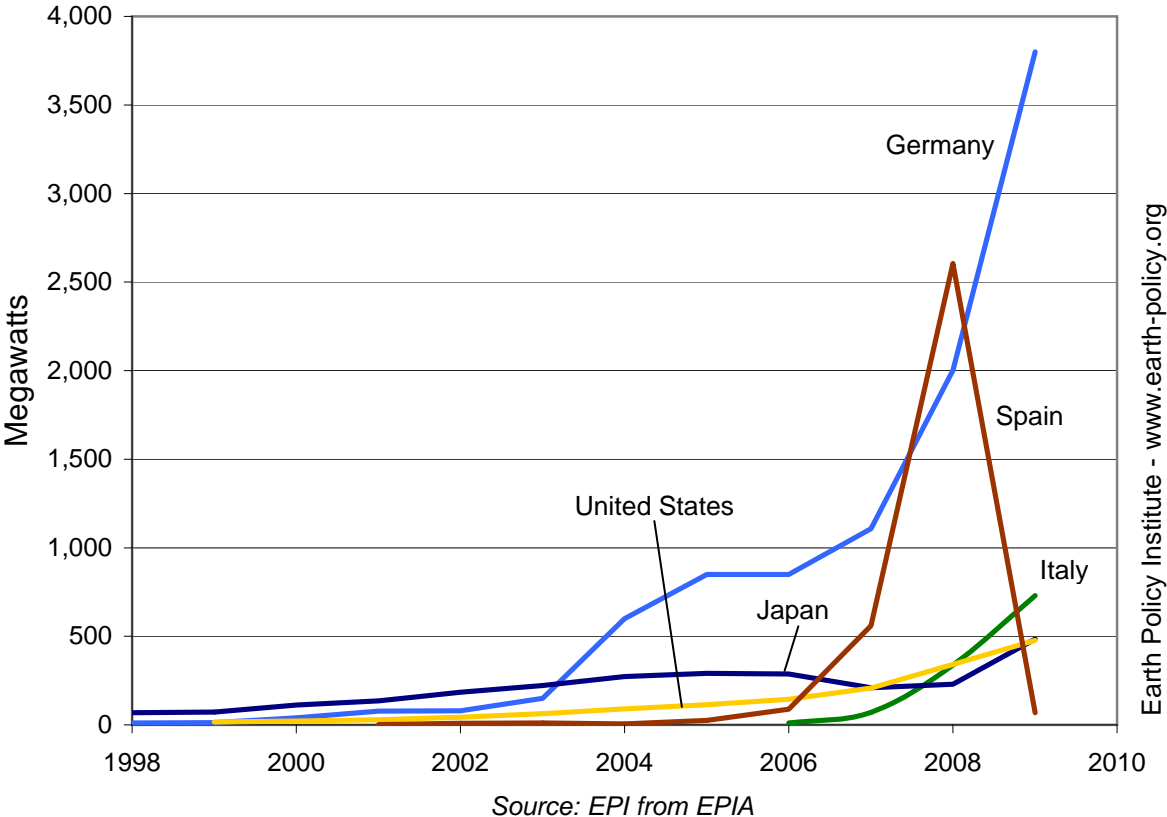
Year	Germany	Italy	Japan	U.S.	Spain	Others	World
	----- Megawatts -----						
1998	10	n.a.	69	n.a.	0	76	155
1999	12	n.a.	72	17	1	95	197
2000	40	n.a.	112	22	n.a.	94	278
2001	78	n.a.	135	29	2	90	334
2002	80	n.a.	185	44	9	121	439
2003	150	n.a.	223	63	10	148	594
2004	600	n.a.	272	90	6	84	1,052
2005	850	n.a.	290	114	26	41	1,321
2006	850	10	287	145	88	223	1,603
2007	1,107	70	210	207	560	276	2,430
2008	2,002	338	230	342	2,605	766	6,283
2009	3,800	730	484	477	69	1,656	7,216

Notes: n.a. = data not available. Values include both grid-connected and off-grid PV systems.

Source: Compiled by Earth Policy Institute with 1998-2006 from European Photovoltaic Industry Association (EPIA), *Global Market Outlook for Photovoltaics Until 2013* (Brussels: April 2009), p. 4; 2007-2009 from EPIA, *Global Market Outlook for Photovoltaics Until 2014* (Brussels: May 2010), pp. 5, 10, 15.

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Annual Solar Photovoltaics Installations in Selected Countries, 1998-2009



Cumulative Solar Photovoltaics Installations in Ten Leading Countries and the World, 2009

<u>Country</u>	<u>Cumulative Installed Capacity Megawatts</u>
Germany	9,779
Spain	3,386
Japan	2,633
United States	1,650
Italy	1,186
South Korea	520
Czech Republic	465
Belgium	363
China	305
France	272
India	120
<u>World Total</u>	<u>22,893</u>

Note: Values include both grid-connected and off-grid PV systems.

Source: Compiled by Earth Policy Institute from European Photovoltaic Industry Association (EPIA), *Global Market Outlook for Photovoltaics Until 2013* (Brussels: April 2009), p. 13; EPIA, *Global Market Outlook for Photovoltaics Until 2014* (Brussels: May 2010), pp. 5, 10-21.

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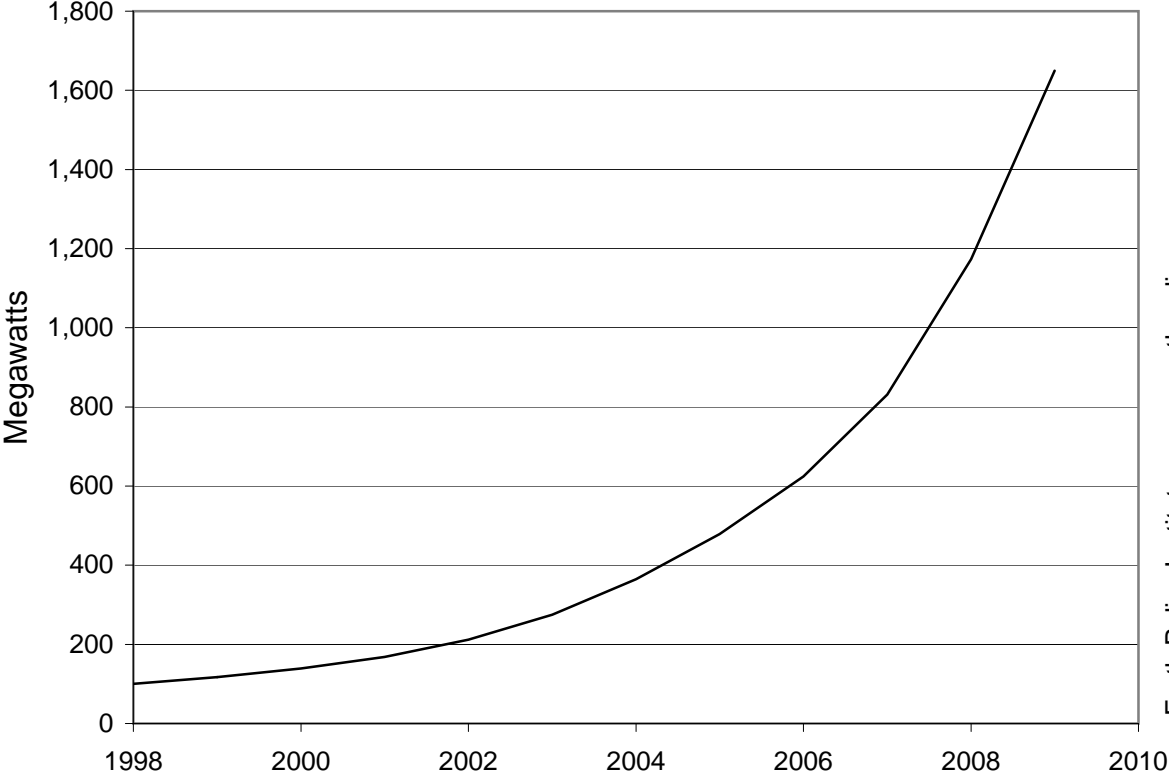
Cumulative Solar Photovoltaics Installations in the United States, 1998-2009

Year	Cumulative Installed Capacity Megawatts
1998	100
1999	117
2000	139
2001	168
2002	212
2003	275
2004	365
2005	479
2006	624
2007	831
2008	1,173
2009	1,650

Source: Compiled by Earth Policy Institute from European Photovoltaic Industry Association (EPIA), *Global Market Outlook for Photovoltaics Until 2013* (Brussels: April 2009), p. 4; EPIA, *Global Market Outlook for Photovoltaics Until 2014* (Brussels: May 2010), p. 5.

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Cumulative Solar Photovoltaics Installations in the United States, 1998-2009



Source: EPIA

Earth Policy Institute - www.earth-policy.org

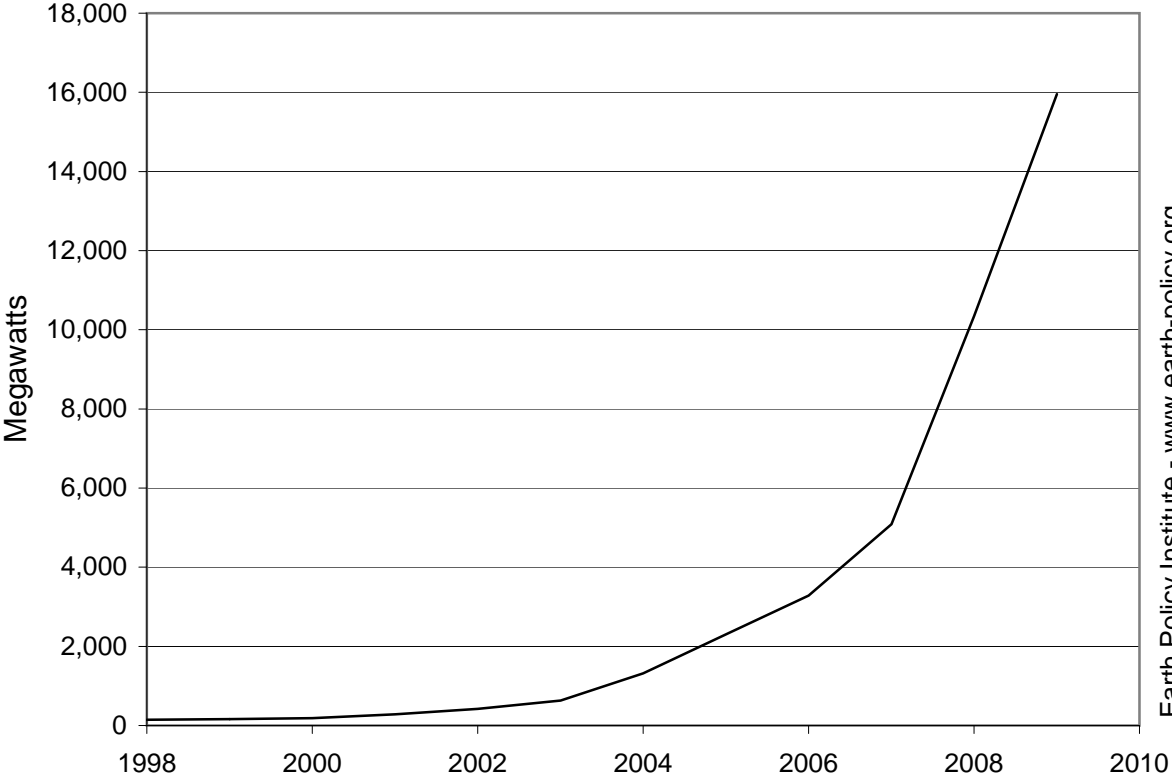
Cumulative Solar Photovoltaics Installations in the European Union, 1998-2009

Year	Cumulative Installed Capacity Megawatts
1998	147
1999	165
2000	189
2001	286
2002	422
2003	633
2004	1,319
2005	2303
2006	3,282
2007	5,088
2008	10,340
2009	15,958

Source: Compiled by Earth Policy Institute from European Photovoltaic Industry Association (EPIA), *Global Market Outlook for Photovoltaics Until 2013* (Brussels: April 2009), p. 4; EPIA, *Global Market Outlook for Photovoltaics Until 2014* (Brussels: May 2010), p. 5.

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Cumulative Solar Photovoltaics Installations in the European Union, 1998-2009



Source: EPIA

Earth Policy Institute - www.earth-policy.org

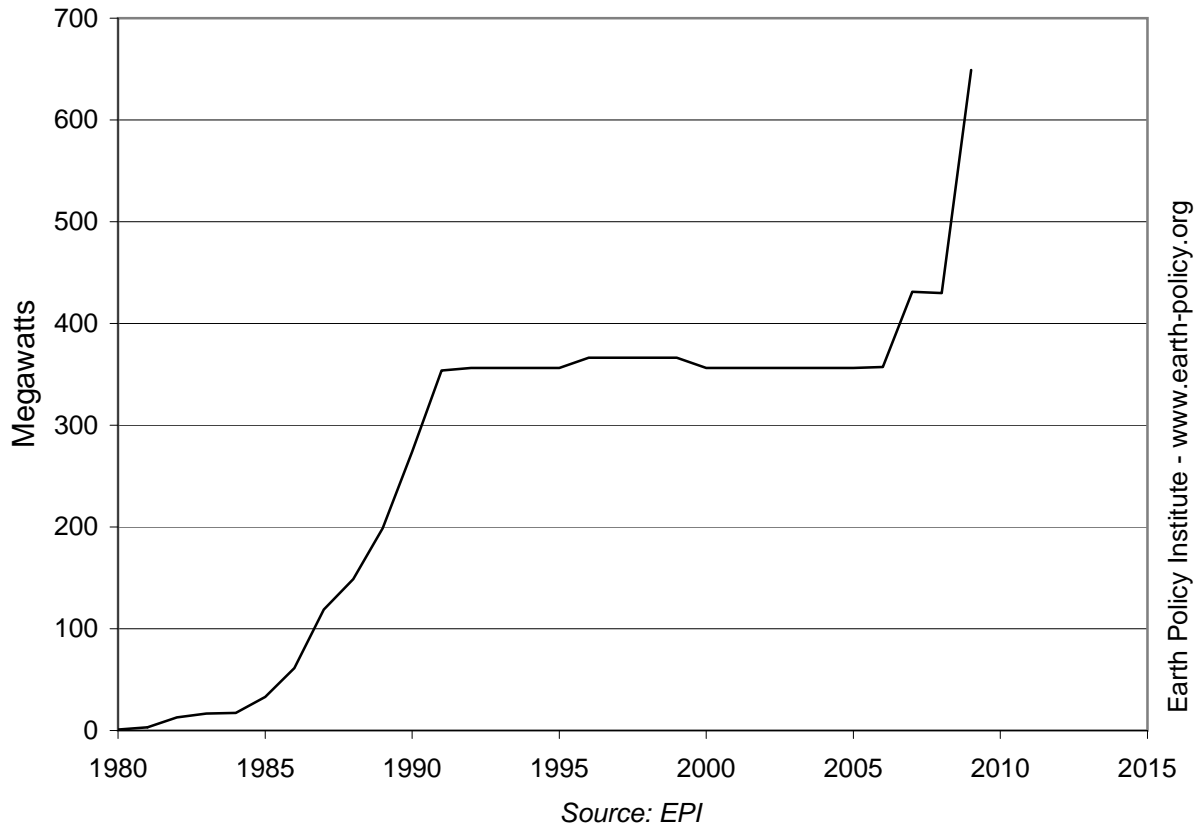
World Installed Concentrating Solar Thermal Power Capacity, 1980-2009

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	431
2008	430
2009	649

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; Reese Tisdale, "Solar CSP Developers...Friends or Foes," presentation at CSP Today 2008, San Francisco, CA, 29 January 2008; IHS Emerging Energy Research, "Global Concentrated Solar Power Markets and Strategies: 2010-2025," study announcement (Cambridge, MA: April 2010).

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World Installed Concentrating Solar Thermal Power Capacity, 1980-2009



Solar Water and Space Heating Area in Selected Countries and the World, Total and Per Person, 2008

Country	Total Area Thousand Square Meters	Population Thousands	Area Per Person Square Meters
Cyprus	804	862	0.93
Israel	3,773	7,051	0.54
Austria	3,340	8,337	0.40
Greece	3,870	11,137	0.35
Barbados	82	255	0.32
Jordan	893	6,136	0.15
Turkey	10,637	73,914	0.14
Germany	10,318	82,264	0.13
China	150,000	1,337,411	0.11
Australia	1,998	21,074	0.09
Malta	34	407	0.08
Denmark	413	5,458	0.08
Taiwan	1,696	23,000	0.07
Switzerland	540	7,541	0.07
Slovenia	123	2,015	0.06
Japan	5,874	127,293	0.05
Luxembourg	22	481	0.04
Spain	1,555	44,486	0.03
Portugal	353	10,677	0.03
New Zealand	128	4,230	0.03
Sweden	276	9,205	0.03
France	1,766	62,036	0.03
Tunisia	286	10,169	0.03
Italy	1,450	59,604	0.02
Belgium	228	10,590	0.02
Netherlands	343	16,528	0.02
Slovak Republic	107	5,400	0.02
Albania	58	3,143	0.02
Brazil	3,490	191,972	0.02
Ireland	76	4,437	0.02
Czech Republic	142	10,319	0.01
Macedonia	23	2,041	0.01
Poland	350	38,104	0.01
United States	2,725	311,666	0.01
United Kingdom	370	61,231	0.01
South Africa	276	49,668	0.01
World	212,857	6,750,062	0.03

Source: Compiled by Earth Policy Institute with China and world total from Li Junfeng and Ma Lingjuan, CREIA, cited in Renewable Energy Policy Network for the 21st Century (REN21), *Renewables 2010 Global Status Report* (Paris: REN21 Secretariat, 2010), p. 56; and with other countries from Werner Weiss and Franz Mauthner, *Solar Heat Worldwide: Markets and Contribution to the Energy Supply 2008* (Gleisdorf, Austria: International Energy Agency, Solar Heating & Cooling Programme, May 2010), p. 25; population from U.N. Population Division, *World Population Prospects: The 2008 Revision Population Database*, at esa.un.org/unpp, updated 11 March 2009; Taiwan population from Population Reference Bureau, *2008 World Population Data Sheet* (Washington, DC: August 2008).

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Cumulative Installed Solar Water and Space Heating Capacity in Ten Leading Countries and the World, 2008

Country	Cumulative Installed Capacity Thermal Megawatts
China	105,000
Turkey	7,446
Germany	7,223
Japan	4,112
Greece	2,709
Israel	2,641
Brazil	2,443
Austria	2,338
United States	1,907
India	1,772
World Total	149,000

Note: 2008 is the latest year for which complete data are available. The figure of 1.9 billion square feet of rooftop solar thermal collectors in China given in *World on the Edge* is an estimate for the end of 2009 from Li Junfeng of the Chinese Renewable Energy Industries Association (CREIA). This translates into 134,000 thermal megawatts for China in 2009.

Source: Compiled by Earth Policy Institute with China and world total from Li Junfeng and Ma Lingjuan, CREIA, cited in Renewable Energy Policy Network for the 21st Century (REN21), *Renewables 2010 Global Status Report* (Paris: REN21 Secretariat, 2010), p. 56; and with other countries from Werner Weiss and Franz Mauthner, *Solar Heat Worldwide: Markets and Contribution to the Energy Supply 2008* (Gleisdorf, Austria: International Energy Agency, Solar Heating & Cooling Programme, May 2010), p. 25.

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