Plan B 4.0 - Supporting Data for Chapters 4 and 5 - World Energy Profile

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A full listing of data for the entire book is on-line at:
http://www.earthpolicy.org/index.php?/books/pb4/pb4_data

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World Primary Energy Demand in 2006, with IEA Projection for 2008 and 2020

Energy Source	Growth Rate, 2006-2015	Growth Rate, 2015-2020	World Primary Energy Demand 2006	World Primary Energy Demand 2008	World Primary Energy Demand 2020
	Percent		Million Tons Oil Equivalent		
Coal	3.1	1.7	3,053	3,246	4,374
Oil	1.3	0.9	4,029	4,134	4,744
of which Transport	*1.7*	*1.4*	*2,105*	*2,177*	*2,620*
Gas	2.1	1.5	2,407	2,509	3,130
Nuclear	1.3	0.6	728	747	842
Hydro	2.3	1.9	261	273	353
Biomass and Waste	1.7	1.3	396	422	582
Other Renewables	10.2	6.4	66	80	215
Total			10,940	11,412	14,240
Total Non-renewable			10,217	10,637	13,090
Total Renewable			723	775	1,150

Notes: Primary energy demand equals primary energy supply. Nuclear refers to the primary heat equivalent of the electricity produced by a nuclear plant with an average thermal efficiency of 33 percent. Biomass and waste includes commercially traded solid biomass and animal products, gas and liquids derived from biomass, industrial waste, and municipal waste. Other renewables include geothermal, solar, wind, tide, and wave energy for electricity and the direct use of geothermal and solar heat.

Source: Calculated by Earth Policy Institute from International Energy Agency (IEA), *World Energy Outlook 2008* (Paris: 2008), p. 506; IEA, *World Energy Outlook 2004* (Paris: 2004).

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World Electricity Demand in 2006, with IEA Projection for 2008 and 2020

Electricity Source	Growth Rate, 2006-2015	Growth Rate, 2015-2020	World Electricity Demand, 2006	World Electricity Demand, 2008	World Electricity Demand, 2020
	Percent			Terawatt-hours	
Coal	4.1	2.3	7,756	8,399	12,442
Oil	-0.5	-2.1	1,096	1,085	941
Gas	2.4	2.1	3,807	3,994	5,243
Nuclear	1.3	0.6	2,793	2,865	3,232
Hydro	2.3	1.9	3,035	3,178	4,101
Biomass and Waste	6.4	5.3	239	271	542
Wind	19.9	7.9	130	187	970
Geothermal	5.8	4.5	59	66	122
Solar	33.3	15.9	4	7	111
Tidal/Wave	8.0	8.4	1	1	3
Total Non-renewable			15,452	16,343	21,858
Total Renewable			3,468	3,710	5,849
Total			18,920	20,053	27,707

Notes: Electricity generation is equal to electricity demand and is defined as the electricity generated by power plants including own use and transmission and distribution losses. Hydropower includes both macro and micro hydropower generation. Biomass and waste includes solid biomass and animal products, gas and liquids derived from biomass, industrial waste, and municipal waste. Electricity generation from solar power includes both PV and solar thermal.

Source: Calculated by Earth Policy Institute from International Energy Agency, *World Energy Outlook 2008* (Paris: 2008), p. 507.

World Carbon Dioxide Emissions from Fossil Fuel Combustion in 2006, with IEA Projection for 2008 and 2020

Emissions	Growth Rate, 2006-2015	Growth Rate, 2015-2020	CO_2 Emissions, 2006	CO_2 Emissions, 2008	CO_2 Emissions, 2020
	Percent		Million Tons Carbon		
By Fuel:					
Coal	3.1	1.6	3,185	3,387	4,555
Oil	1.3	0.9	2,937	3,013	3,454
Gas	2.0	1.5	1,484	1,545	1,918
By Sector:					
Power Generation	2.9	1.6	3,119	3,303	4,365
Coal	3.2	1.7	2,273	2,423	3,300
Oil	-0.4	-1.9	241	239	211
Gas	2.8	2.0	605	639	853
Total Final Consumption	1.7	1.1	4,123	4,267	5,090
Coal	2.7	1.1	855	902	1,150
Oil	1.5	1.2	2,515	2,588	3,033
of which transport	*1.7*	*1.3*	*1,708*	*1,767*	*2,126*
of which marine bunkers	*1.0*	*1.0*	*159*	*162*	*181*
of which international aviation	*2.2*	*1.8*	*108*	*113*	*145*
Gas	1.4	1.2	754	775	907
Other Energy Sector			364	379	472
Total CO_2 Emissions	2.2	1.4	7,606	7,949	9,927

Notes: Power Generation refers to fuel use in electricity plants, heat plants, and combined heat and power, including both public plants and small plants that produce fuel for their own use. Total Final Consumption includes industry (e.g. construction, mining, manufacturing, and petrochemical feedstocks), transport, agriculture, residential, and non-energy use. Other Energy Sector includes transformation and transmission losses.

Source: Calculated by Earth Policy Institute from International Energy Agency (IEA), *World Energy Outlook 2008* (Paris: 2008), p. 507.

World Electricity Consumption for Lighting by Sector and Potential Electricity Savings, 2005

Lighting Sector	Worldwide Electricity Consumption for Lighting in 2005	Potential Electricity Savings	Potential Electricity Savings
	Terawatt-hours	Terawatt-hours	Percent
Total Residential Lighting	1,045	826	79
Total Commercial Lighting	1,460	971	66
OECD countries	915		
Non-OECD countries	545		
Total Industrial Lighting	632	307	49
Total Outdoor Stationary Lighting	281	113	40
Street lighting	147		
Car parks	113		
Traffic lights	19		
World Total, All Sectors	3,418	2,217	65

Notes: The World Total electricity consumption for lighting in 2005 of 3,418 TWh represents 19% of the world's total electricity consumption of 17,982 TWh. IEA's *Light's Labour's Lost* presents electricity use as final energy consumption (13,952 TWh in 2005), omitting transmission and distribution losses. Because we are interested in total primary energy consumption, including these losses, a conversion factor of 1.288 was applied to all values obtained from *Light's Labour's Lost* (1.288 = 17,982/13,952).

As outlined in *Plan B 4.0*, reducing lighting electricity consumption by 65% would decrease the share of electricity consumption for lighting from 19% to 7% of world total electricity consumption. The resulting electricity savings is enough to close 705 coal-fired power plants of 500 MW each (a 500-MW coal-fired power plant produces 3.15 TWh of electricity per year operating at 72% capacity).

Source: Compiled by Earth Policy Institute from International Energy Agency (IEA), *Light's Labour's Lost: Policies for Energy-efficient Lighting* (Paris: 2006); 2005 electricity consumption estimated from IEA, *World Energy Outlook 2006* (Paris: 2006).

Potential Worldwide Electricity Savings by Switching to More-Efficient Lighting and Implementing System Control Technologies, 2005

Measure	Electricity Savings
	Terawatt-hours per Year
Residential - average efficacy equaling compact fluorescent (CFL) efficacy[1]	680
Residential - control systems[2]	146
Commercial, non-OECD - switching to best fluorescent systems[3]	235
Commercial, non-OECD - control systems[2]	124
Commercial, OECD - switching to best fluorescent systems[4]	409
Commercial, OECD - control systems[2]	202
Industrial - switching to best fluorescent systems[5]	91
Industrial - control systems[2]	216
Traffic lights - converting to LEDs[6]	15
External signage, U.S. - neon signs to LEDs[7]	9
Street lighting - mercury vapor lamps to high pressure sodium[8]	32
Car parks - dimming lights during off-peak hours[9]	57
Total Electricity Savings	**2,217**

Notes: Unless otherwise noted, electricity savings is calculated by assuming the average efficacy of lighting in a particular sector is increased to the lighting efficacy of the best fluorescent systems in use today (92.3 lm/W).

[1] Worldwide, residential lighting has an average source-lumen efficacy of 21.5 lm/W. Source-lumen refers to the lumens emitted by the light source (i.e. a lamp) as opposed to a luminaire. A 13-watt CFL has an average system efficacy (lamp plus ballast efficacy) of approximately 60 lm/W. The residential energy savings is calculated assuming that the average efficacy of lighting in the residential sector is increased to the average efficacy of a 13-watt CFL (i.e., from 21.5 lm/W to 60 lm/W).

[2] A study by CADDET estimates that lighting energy consumption in the commercial sector can be reduced by 30-50% through the implementation of control systems (i.e., sensors that turn lights off in unoccupied spaces or reduce lighting during daylight hours). The potential electricity savings in the residential and industrial sectors from control systems are likely similar to the commercial sector, so a 40% reduction in energy consumption is assumed for implementation of control systems.

[3] Average efficacy of commercial lighting in non-OECD countries is 52.6 lm/W.

[4] Average efficacy of commercial lighting in OECD countries including ballast losses is 51 lm/W.

[5] Worldwide, industrial sector lighting has an average source-lumen efficacy of 79 lm/W.

[6] Worldwide, traffic signals consume approximately 19.3 TWh/yr. Worldwide, if all incandescent-based signals were replaced by CFLs the energy saving would be around 15.5 TWh/yr.

[7] This value is for U.S. only; no good data exists for worldwide savings.

[8] Mercury vapor lamps provide 30% of outdoor lighting. Electricity savings are calculated by assuming that these mercury vapor lamps, with a luminaire efficacy of 13.5 lm/W, are replaced with tubular high-pressure sodium lamps with a luminaire efficacy of 50 lm/W.

[9] Assuming that 50% of illuminated hours are off-peak. All lights could be dimmed or 50% of lights could be switched off during non-peak hours.

Source: Calculated by Earth Policy Institute from International Energy Agency (IEA), *Light's Labour's Lost: Policies for Energy-efficient Lighting* (Paris: 2006); a conversion factor of 1.288 used to convert electricity consumption into final consumption calculated from IEA, *World Energy Outlook 2006* (Paris: 2006); IEA Centre for the Analysis and Dissemination of Demonstrated Energy Technologies (CADDET), *Saving Energy with Efficient Lighting in Commercial Buildings*, *CADDET Maxi Brochure 01 (*Sittard, Netherlands: CADDET), p. 5.

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.

Energy Savings from Plan B Efficiency Improvements, 2020

Sector	Energy Savings in 2020
	Petajoules
Lighting	20,434
Appliances	20,434
Buildings	6,611
Industry	30,794
Petrochemical	*11,805*
Steel	*5,374*
Cement	*3,615*
Other (motor systems, aluminum, paper)	*10,000*
Transport	78,655
Total	156,927

Summary:

Projected increase in energy demand from 2006 to 2020	138,156
Total energy savings from efficiency improvements in 2020	156,927
Net change in energy demand from 2006 to 2020	-18,771

Source: Earth Policy Institute, 2009. Data sources include International Energy Agency (IEA), *World Energy Outlook 2008* (Paris: 2008), pp. 506-07; IEA, *Light's Labour's Lost: Policies for Energy-efficient Lighting* (Paris: 2006), pp. 25, 29; Florian Bressand, et al., *Curbing Global Energy Demand Growth: The Energy Productivity Opportunity* (Washington, DC: McKinsey Global Institute, May 2007), p. 33, 106; Claude Mandil et al., *Tracking Industrial Energy Efficiency and CO_2 Emissions* (Paris: IEA, 2007), pp. 22-25, 39, 59–61, 140.

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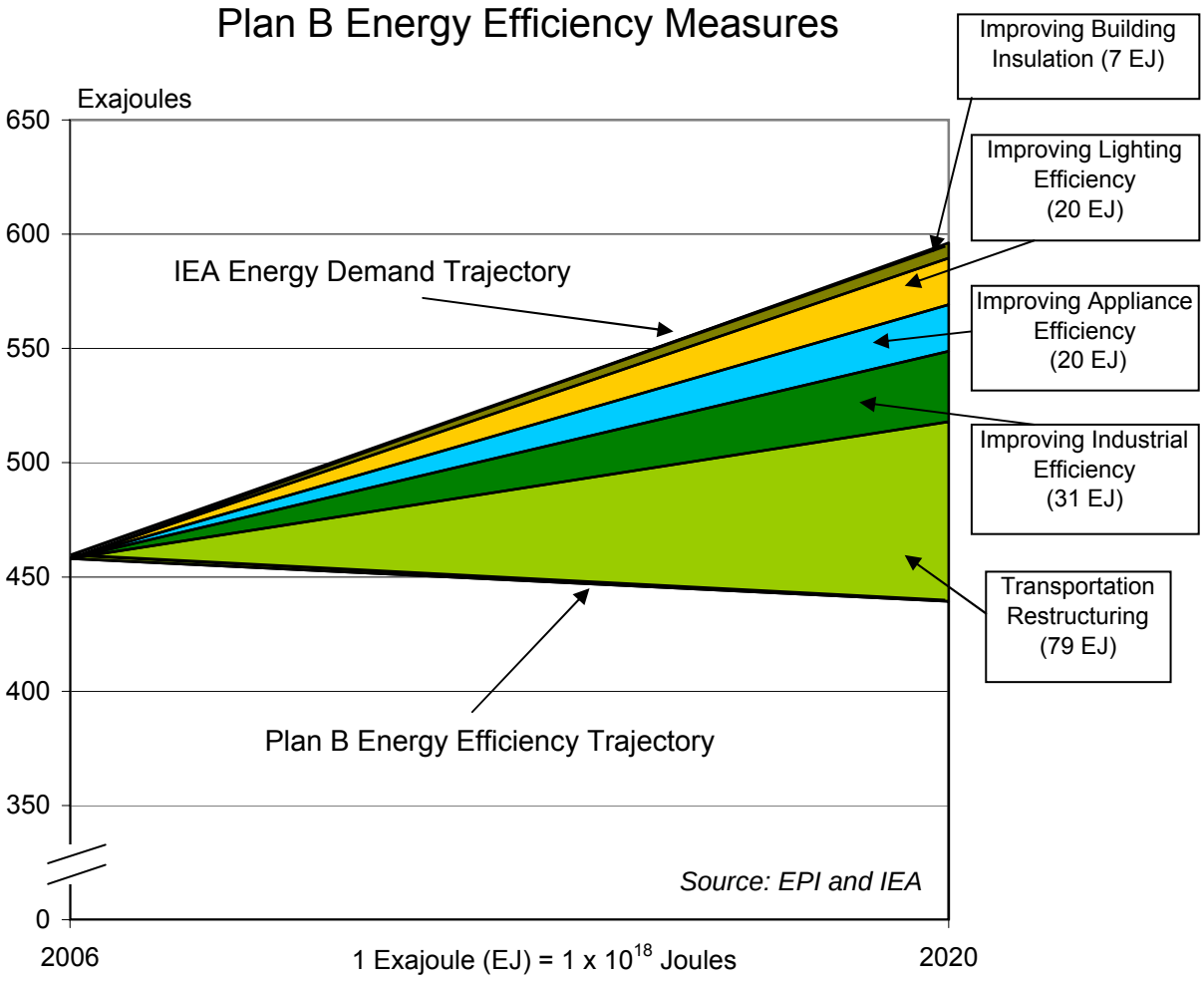
Plan B Energy Efficiency Measures
Exajoules
650
600
550
500
450
400
350
0
IEA Energy Demand Trajectory
Plan B Energy Efficiency Trajectory
Improving Building Insulation (7 EJ)
Improving Lighting Efficiency (20 EJ)
Improving Appliance Efficiency (20 EJ)
Improving Industrial Efficiency (31 EJ)
Transportation Restructuring (79 EJ)
Source: EPI and IEA
2006
1 Exajoule (EJ) = 1 x 10^18 Joules
2020

Table 5-1. World Power and Energy from Renewables in 2008 and Plan B Goals for 2020

Source	Installed Capacity 2008 [1]	Installed Capacity 2020	Electricity and Heat Generation 2008	Electricity and Heat Generation 2020
Electricity Generating Capacity	Electrical Gigawatts		Petajoules	
Wind	121	3,000	1,371	34,059
Rooftop Solar Electric Systems [2]	13	1,400	92	9,934
Solar Electric Power Plants [2]	2	100	12	710
Solar Thermal Power Plants	0	200	3	1,539
Solar Thermal Power Plants	10	200	298	5,676
Biomass	52	200	1,312	5,046
Hydropower	945	1,350	13,172	18,818
Total	1,143	6,450	16,261	75,781
Thermal Energy Capacity	Thermal Gigawatts		Petajoules	
Solar Rooftop Water and Space Heaters	120	1,100	851	7,805
Geothermal	100	500	2,838	14,191
Biomass	250	350	6,307	8,830
Total	470	1,950	9,997	30,826

Notes: [1] Columns may not add to totals due to rounding; [2] Total PV installed capacity in 2008 estimated at 14.73 GW with the vast majority in rooftop installations.

Source: Compiled by Earth Policy Institute, with wind electricity from Global Wind Energy Council, *Global Wind 2008 Report* (Brussels: 2009), p. 10; rooftop solar electric systems and solar electric power plants calculated by Earth Policy Institute using European Photovoltaic Industry Association (EPIA), *Global Market Outlook for Photovoltaics Until 2013* (Brussels: April 2009), pp. 3–4, and Ines Rutschmann, "A Country of Megawatt Parks," *PHOTON International* (September 2008), pp. 32–39; solar thermal power plants from Christoph Richter, Sven Teske, and Rebecca Short, *Concentrating Solar Power Global Outlook 2009* (Amsterdam, Tabernas, and Brussels: Greenpeace International, SolarPACES, and European Solar Thermal Electricity Association, May 2009), p. 7; geothermal electricity from Emerging Energy Research, *Global Geothermal Markets and Strategies 2009–2020* (Cambridge, MA: May 2009); biomass electricity and heat and hydropower, including tidal and wave power,

from Renewable Energy Policy Network for the 21st Century, *Renewables Global Status Report: 2009 Update* (Paris and Washington, DC: REN21 Secretariat and Worldwatch Institute, 2009), p. 23; rooftop solar water and space heaters from 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; geothermal heat from Jefferson Tester et al., *The Future of Geothermal Energy: Impact of Enhanced Geothermal Systems (EGS) on the United States in the 21st Century* (Cambridge, MA: Massachusetts Institute of Technology, 2006), p. 9; capacity factors used to convert installed capacity into actual electricity generation are from U.S. Department of Energy, National Renewable Energy Laboratory, *Power Technologies Energy Data Book* (Golden, CO: August 2006), p. 201.

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World Energy Consumption in 2008 and Plan B Goals for 2020

Source	2008	Goal for 2020 *
	Petajoules	
Electricity and Heat from Fossil Fuels and Nuclear	70,600	14,600
Electricity from Renewable Sources	16,300	75,800
Thermal Energy from Renewable Sources	10,000	30,800
Transportation	93,000	26,200

* Note: Transportation energy consumption in 2020 is lower than in 2008 because, due to efficiency gains, an electrified transport system requires far less energy than a fossil-fuel-based one. 1 petajoule is equal to 1 billion megajoules.

Source: Calculated by Earth Policy Institute from Table 5-1 using capacity factors from U.S. Department of Energy, National Renewable Energy Laboratory, *Power Technologies Energy Data Book*, (Golden, CO: August 2006), p. 201, with fossil fuels and nuclear data from International Energy Agency (IEA), *World Energy Outlook 2008*, (Paris: 2008), p. 507; and with transportation data from IEA, *World Energy Outlook 2008*, (Paris: 2008), p. 507; F.O. Licht, *World Ethanol and Biofuels Report*, vol. 7, no. 18 (26 May 2009), p. 365; F.O. Licht, *World Ethanol and Biofuels Report*, vol. 7, no. 14, (26 March 2009), p. 288; energy conversion factors from Oak Ridge National Laboratory, "Bioenergy Conversion Factors," at bioenergy.ornl.gov/papers/misc/energy_conv.html, viewed 10 August 2009.

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World Energy Consumption in 2008 and Plan B Goals for 2020

Source	2008 [1]	Goal for 2020
	Petajoules	
Electricity and Heat Generation from Fossil Fuels and Nuclear		
Coal	30,237	0
Oil	3,905	0
Gas	14,379	4,314
Nuclear	10,316	10,316
Heat	11,774	0
Total	70,611	14,629
Electricity Generation from Renewables		
Wind	1,371	34,059
Rooftop Solar Electric Systems	92	9,934
Solar Electric Power Plants	12	710
Solar Thermal Power Plants	3	1,539
Geothermal	298	5,676
Biomass	1,312	5,046
Hydropower	13,172	18,818
Total	16,261	75,781
Thermal Energy Capture from Renewable Sources		
Solar Rooftop Water and Space Heaters	851	7,805
Geothermal	2,838	14,191
Biomass	6,307	8,830
Total	9,997	30,826
Transportation Fuel Consumption [2]		
Oil	91,155	22,789
Fuel Ethanol	1,400	2,396
Biodiesel	490	1,045
Total	93,045	26,230
Total Energy Consumption	189,914	147,467

Notes: [1] Columns may not add to totals due to rounding; [2] Transportation energy consumption in 2020 is lower than in 2008 because, due to efficiency gains, an electrified transport system requires far less energy than a fossil-fuel-based one. 1 petajoule is equal to 1 billion megajoules.

Source: Calculated by Earth Policy Institute from Table 5-1 using capacity factors from U.S. Department of Energy, National Renewable Energy Laboratory, *Power Technologies Energy Data Book*, (Golden, CO: August 2006), p. 201, with fossil fuels and nuclear data from International Energy Agency (IEA), *World Energy Outlook 2008*, (Paris: 2008), p. 507; and with transportation data from IEA, *World Energy Outlook 2008*, (Paris: 2008); F.O. Licht, *World Ethanol and Biofuels Report*, vol. 7, no. 18 (26 May 2009), p. 365; F.O. Licht, *World Ethanol and Biofuels Report*, vol. 7, no. 14, (26 March 2009), p. 288; energy conversion factors from Oak Ridge National Laboratory, "Bioenergy Conversion Factors," at bioenergy.ornl.gov/papers/misc/energy_conv.html, viewed 10 August 2009.

World Energy Growth Rates by Source, 2000-2008

Energy Source	Average Annual Growth Rate	Compound Annual Growth Rate
	Percent	Percent
Wind Power	27.5	27.4
Solar Photovoltaics	33.0	33.9
Geothermal Power *	3.4	3.1
Geothermal Heat	18.9	16.1
Hydroelectric	2.2	2.3
Oil	1.3	1.3
Natural Gas	3.0	2.8
Nuclear Power	0.9	0.7
Coal	4.4	4.4
Biodiesel	41.2	43.8
Fuel Ethanol	15.7	18.5

* Note: Due to lack of 2008 data, growth rates for geothermal power are for 2000-2009.

Source: Compiled by Earth Policy Institute with wind power from Global Wind Energy Council, *Global Wind 2008 Report* (Brussels: 2009); solar photovoltaics from European Photovoltaic Industry Association, *Global Market Outlook for Photovoltaics Until 2013* (Brussels: April 2009), pp. 3-4; geothermal power from Ruggero Bertani, "World Geothermal Generation in 2007," *GHC Bulletin*, September 2007; Kara Slack, *Update on US Geothermal Power Production and Development* (Washington, DC: Geothermal Energy Association, 16 January 2008); Emerging Energy Research, *Global Geothermal Markets and Strategies 2009–2020* (Cambridge, MA: May 2009); geothermal heat from International Geothermal Association, "Direct Uses," at www.iga.1it.pl/246,direct_uses.html, viewed 7 August 2009; Renewable Energy Policy Network for the 21st Century (REN21), *Renewables Global Status Report* (Paris and Washington, DC: REN21 Secretariat and Worldwatch Institute, various years); hydroelectric, oil, natural gas, nuclear, and coal from BP, *Statistical Review of World Energy June 2009* (London: 2009); biodiesel from F.O. Licht, *World Ethanol and Biofuels Report*, vol. 7, no. 2 (23 September 2008), p. 29; F.O. Licht, *World Ethanol and Biofuels Report*, vol. 7, no. 14, (26 March 2009), p. 288; fuel ethanol from F.O. Licht, *World Ethanol and Biofuels Report*, vol. 7, no. 18 (26 May 2009), p. 365.

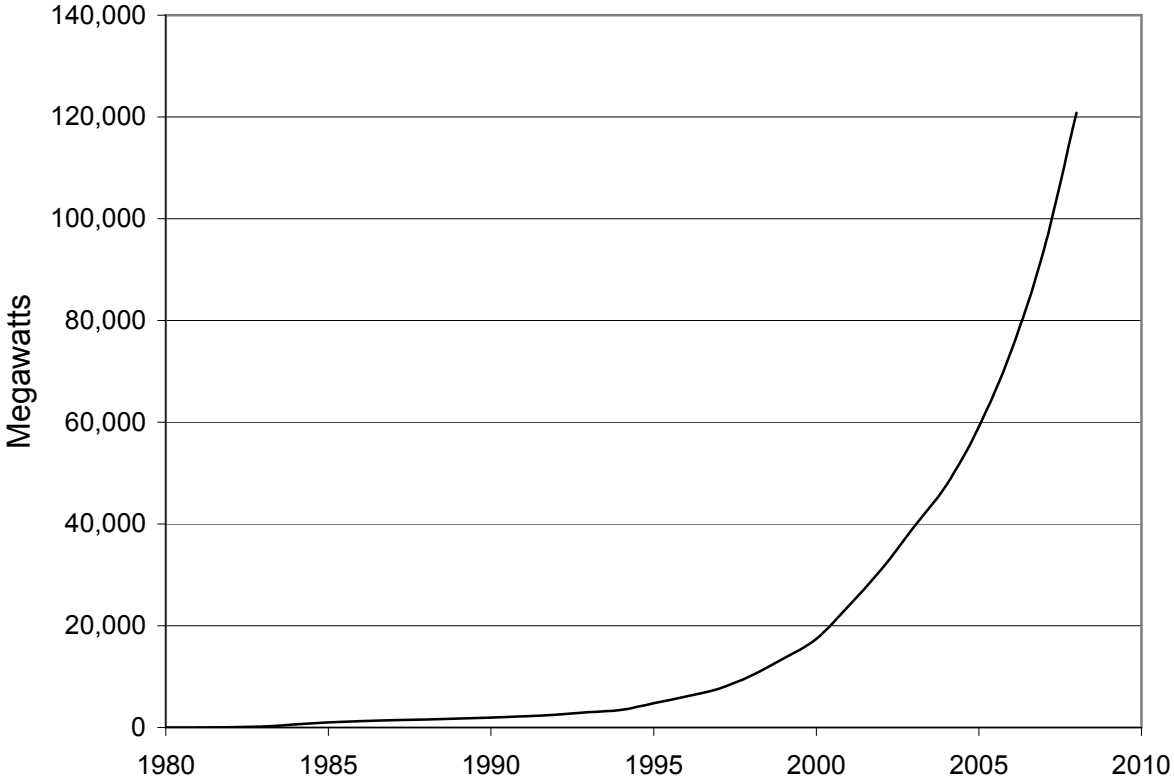
World Installed Wind Electricity-Generating Capacity, 1980-2008

Year	Cumulative Installed Capacity	Net Annual Addition*
	Megawatts	
1980	10	
1981	25	15
1982	90	65
1983	210	120
1984	600	390
1985	1,020	420
1986	1,270	250
1987	1,450	180
1988	1,580	130
1989	1,730	150
1990	1,930	200
1991	2,170	240
1992	2,510	340
1993	2,990	480
1994	3,490	500
1995	4,800	1,310
1996	6,100	1,300
1997	7,600	1,500
1998	10,200	2,600
1999	13,600	3,400
2000	17,400	3,800
2001	23,900	6,500
2002	31,100	7,200
2003	39,431	8,331
2004	47,620	8,189
2005	59,091	11,471
2006	74,052	14,961
2007	93,835	19,783
2008	120,798	26,963

* Note: Net annual addition equals new installations minus retirements.

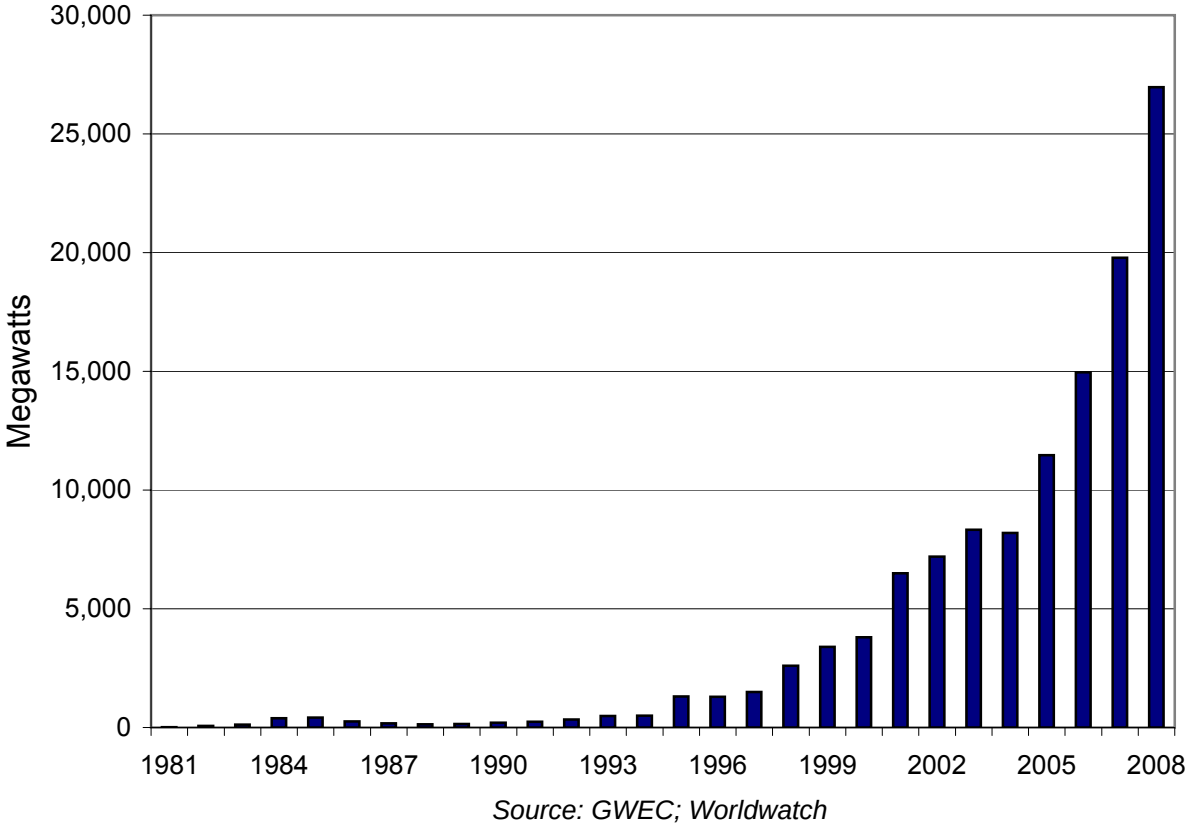
Source: Compiled by Earth Policy Institute with 1980-1994 data from Worldwatch Institute, *Signposts 2004* , CD-ROM (Washington, DC: 2004); 1995 data from Global Wind Energy Council (GWEC), *Global Wind 2006 Report* (Brussels: 2007), p. 8; 1996-2007 data from GWEC, *Global Wind 2008 Report* (Brussels: 2009), p. 10.

World Cumulative Installed Wind Electricity-Generating Capacity, 1980-2008



Source: GWEC; Worldwatch

World Net Annual Installed Wind Electricity-Generating Capacity Additions, 1981-2008



Source: GWEC; Worldwatch

Cumulative Installed Wind Electricity-Generating Capacity in Leading Countries and the World, 1980-2008

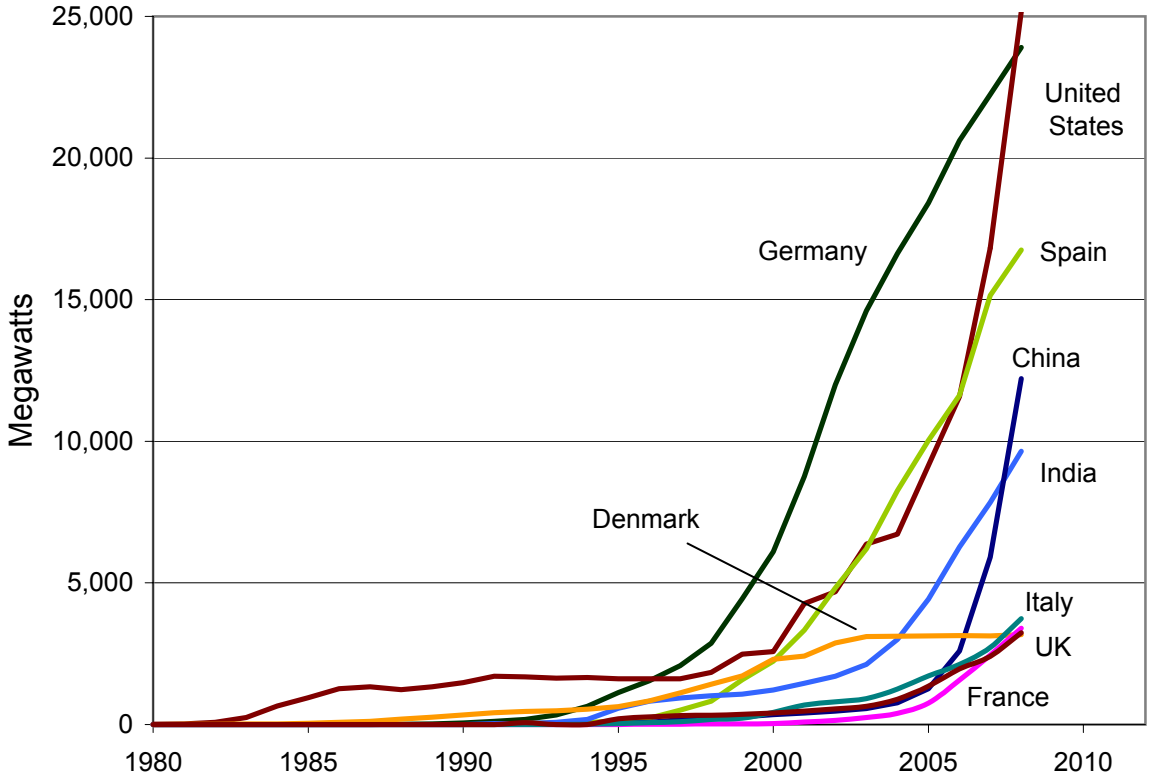
Year	U.S.	Germany	Spain	China	India	Italy	France	U.K.	Denmark	World
					Megawatts					
1980	8	0	0	n.a.	0	0	0	0	5	10
1981	18	0	0	n.a.	0	0	0	0	7	25
1982	84	0	0	n.a.	0	0	0	0	12	90
1983	254	0	0	n.a.	0	0	0	0	20	210
1984	653	0	0	n.a.	0	0	0	0	27	600
1985	945	0	0	n.a.	0	0	0	0	50	1,020
1986	1,265	0	0	n.a.	0	0	0	0	82	1,270
1987	1,333	5	0	n.a.	0	0	0	0	115	1,450
1988	1,231	15	0	n.a.	0	0	0	0	197	1,580
1989	1,332	27	0	n.a.	0	0	0	0	262	1,730
1990	1,484	62	0	n.a.	0	0	0	0	343	1,930
1991	1,709	112	5	n.a.	39	0	0	4	413	2,170
1992	1,680	180	50	n.a.	39	2	0	69	458	2,510
1993	1,635	335	60	n.a.	79	4	2	n.a.	487	2,990
1994	1,663	643	70	n.a.	185	16	n.a	n.a.	539	3,490
1995	1,612	1,130	140	38	576	32	3	200	637	4,780
1996	1,614	1,548	230	79	820	70	6	273	835	6,100
1997	1,611	2,080	512	170	940	103	10	319	1,120	7,600
1998	1,837	2,870	830	224	1,015	180	19	333	1,428	10,200
1999	2,490	4,445	1,584	268	1,077	227	25	362	1,718	13,600
2000	2,578	6,104	2,235	346	1,220	427	30	406	2,300	17,400
2001	4,275	8,754	3,337	402	1,456	690	93	474	2,417	23,900
2002	4,685	11,994	4,825	469	1,702	797	148	552	2,880	31,100
2003	6,372	14,609	6,203	567	2,125	913	253	648	3,110	39,431
2004	6,725	16,629	8,263	764	3,000	1,255	390	888	3,117	47,620
2005	9,149	18,415	10,027	1,260	4,430	1,718	757	1,353	3,128	59,091
2006	11,575	20,622	11,623	2,599	6,270	2,123	1,567	1,962	3,136	74,052
2007	16,824	22,247	15,145	5,910	7,845	2,726	2,454	2,406	3,125	93,835
2008	25,170	23,903	16,754	12,210	9,645	3,736	3,404	3,241	3,180	120,798

Note: n.a. = data not available. The sum of individual country totals may not match world total since data are from different sources; breakdown for countries with less than 3,000 MW of capacity in 2008 is not presented here.

Source: Compiled by Earth Policy Institute with world data from Global Wind Energy Council (GWEC), *Global Wind 2008 Report* (Brussels: 2009), and Janet L. Sawin, "Wind Power Still Soaring," in Worldwatch Institute, *Vital Signs 2007-2008* (New York: W. W. Norton & Company, 2007). Country data from Worldwatch Institute, *Signposts 2001*, CD-ROM (Washington, DC: 2001); Chinese Renewable Energy Industries Association, *China Wind Power Report 2007* (Beijing: China Environmental Science Press, 2007); American Wind Energy Association, *Global Wind Energy Market Report*, various issues (Washington, DC: 2002-2005); GWEC, op. cit. this note; GWEC, *Global Wind 2006 Report* (Brussels: 2007); François Demarcq, "Perspectives in France for the Coming Ten Years: WIND ENERGY," in *1999 European Wind Energy Conference* (Nice, France: 1999); British Wind Energy Association, *Wind Energy in the UK* (London: 2008); Associazione Nazionale Energia del Vento (ANEV), "Installed Capacity Until 1999," email to Amy Heinzerling, Earth Policy Institute, 22 September 2009; and European Wind Energy Association, "Wind Energy - The Facts," (Brussels: 1999 and 2004).

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 Wind Electricity-Generating Capacity in Selected Countries, 1980-2008



Source: Worldwatch; CREIA; AWEA; GWEC; Demarcq; BWEA; ANEV; EWEA

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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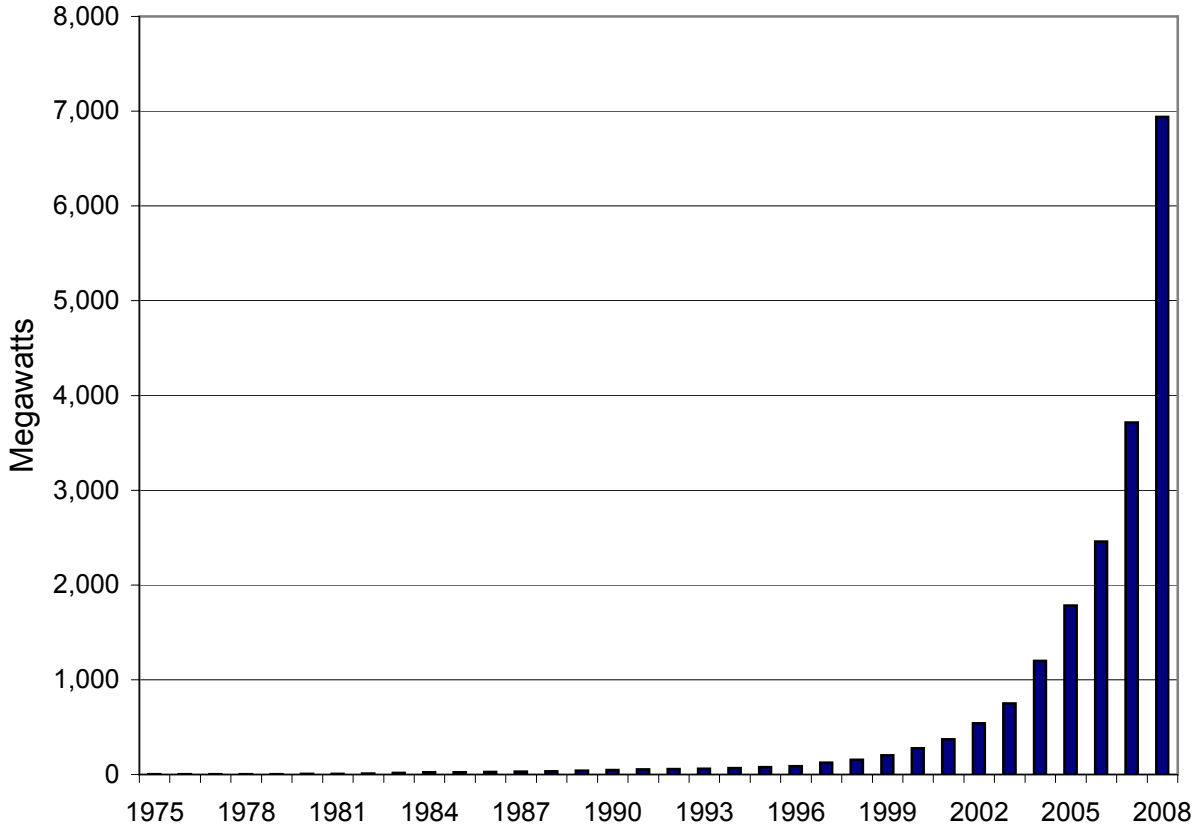
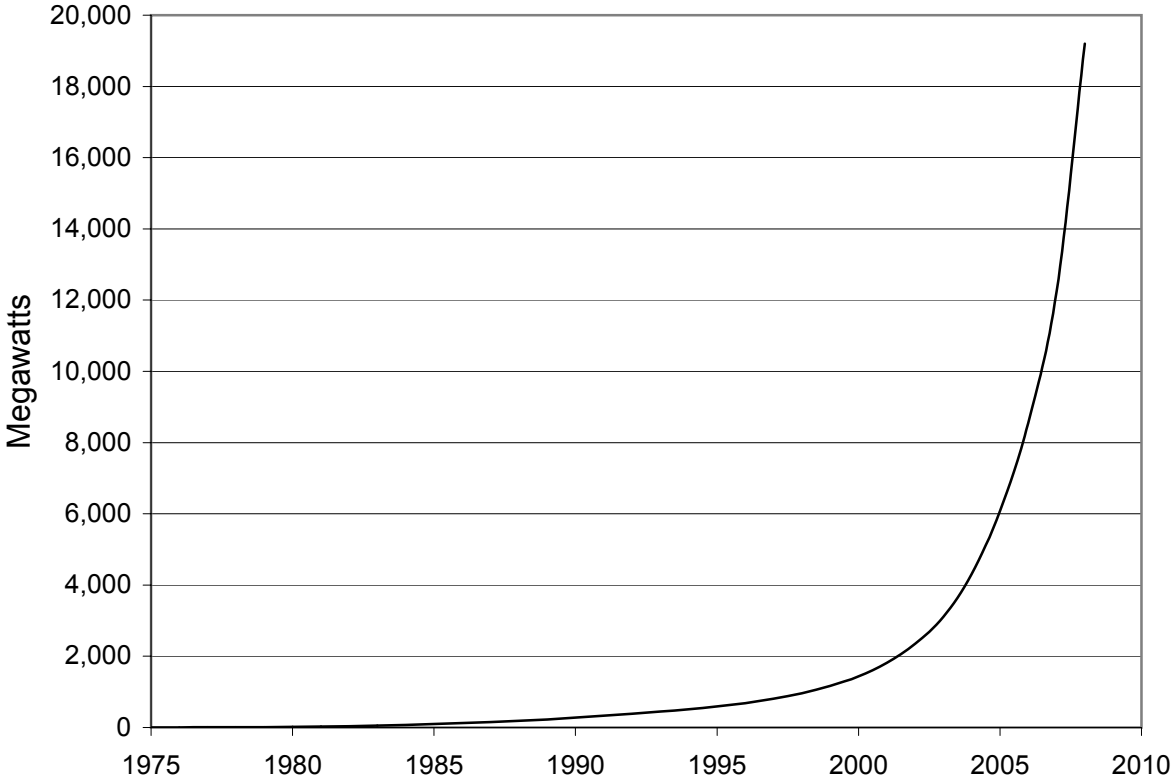
World Annual Solar Photovoltaics Production, 1975-2008



Source: Worldwatch; Prometheus Institute and Greentech Media

World Cumulative Solar Photovoltaics Production,
1975-2008



Source: Worldwatch; Prometheus Institute and Greentech Media

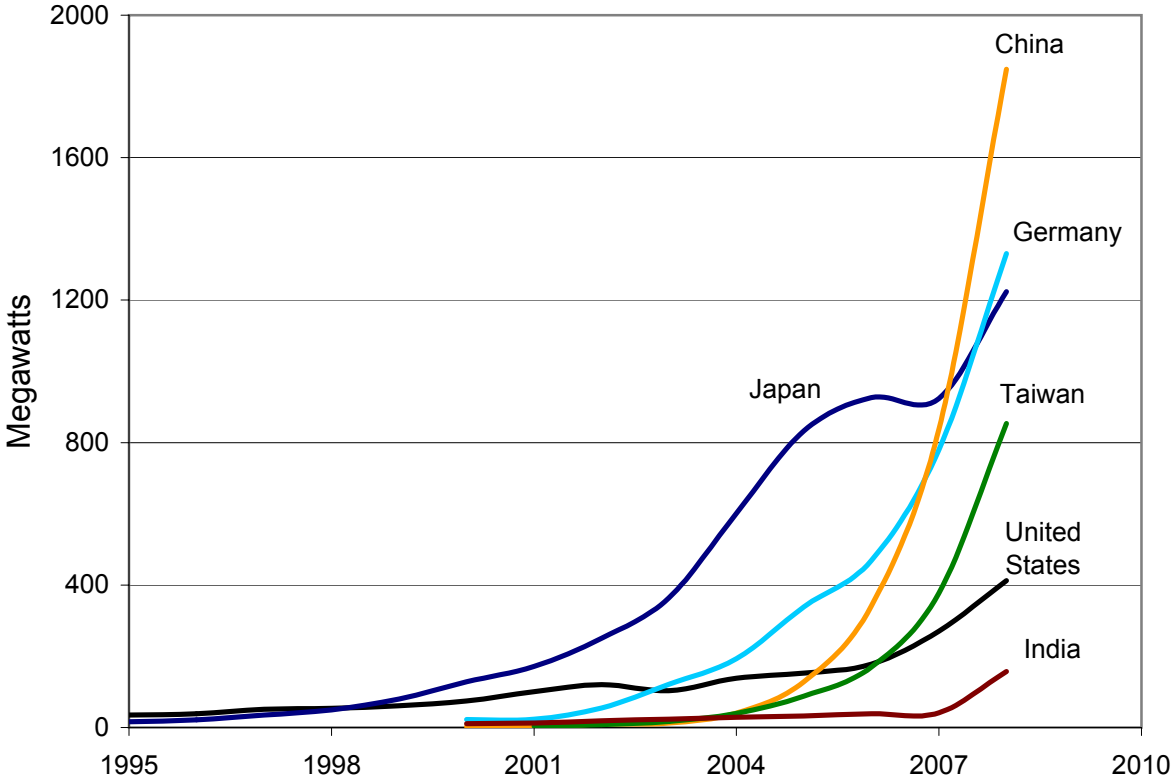
Annual Solar Photovoltaics Production by Country, 1995-2008

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.

Annual Solar Photovoltaics Production in Selected Countries, 1995-2008



Source: Worldwatch; Prometheus Institute and Greentech Media

World Solar Photovoltaics Installations, 1998-2008

Year	Annual Installations	Cumulative Installations
	Megawatts	
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.

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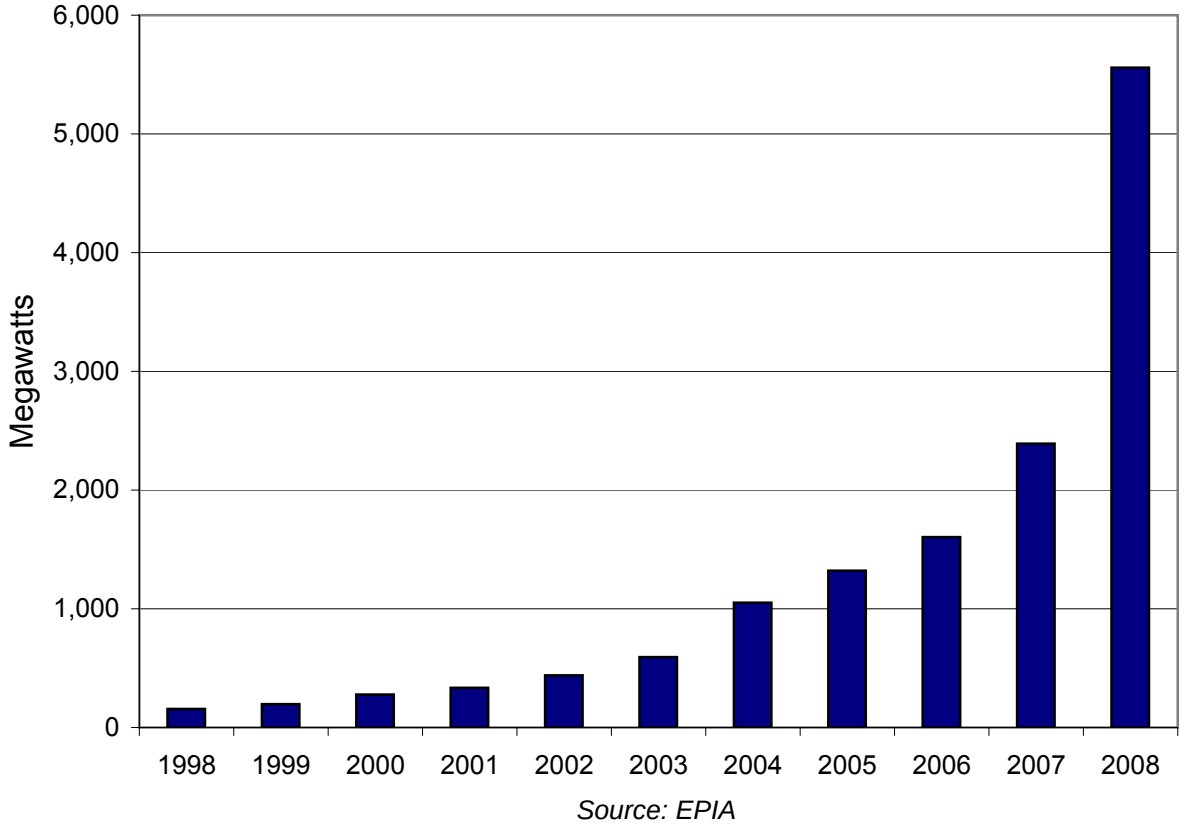
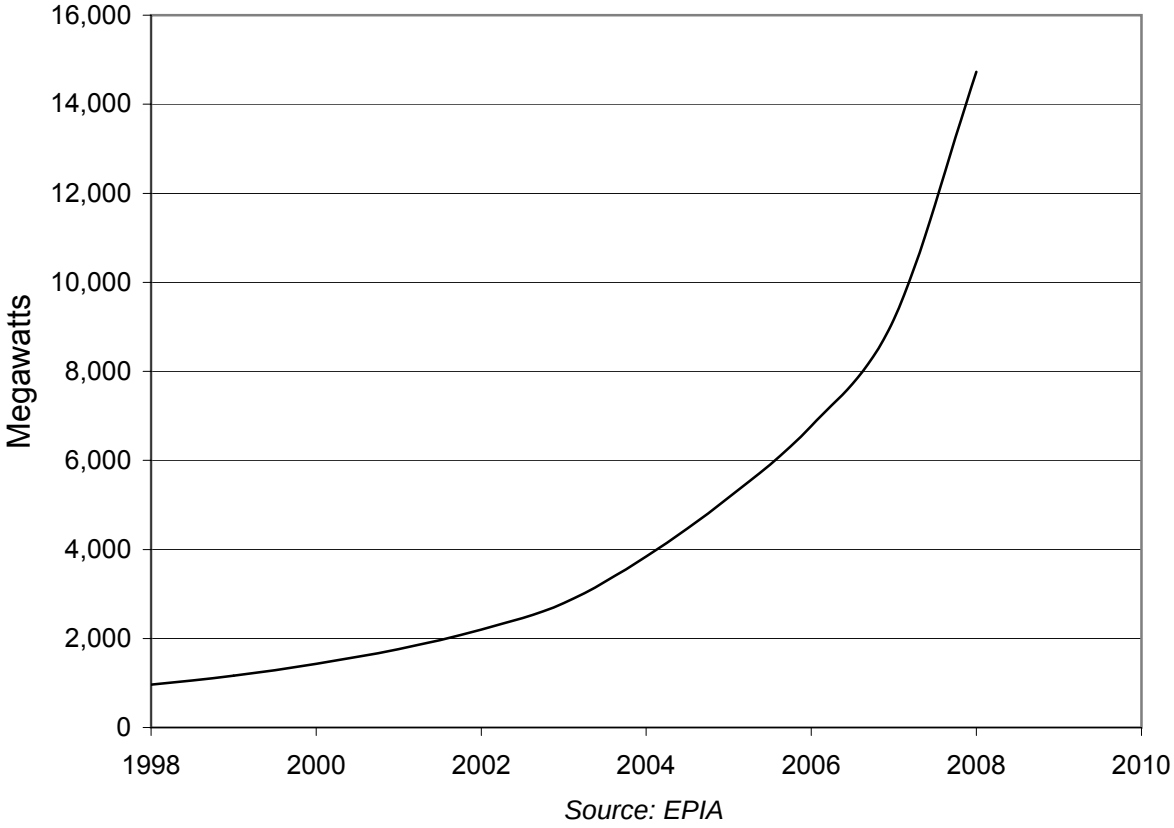
World Annual Solar Photovoltaics Installations,
1998-2008



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.

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

Country	Cumulative Installed Capacity
	Megawatts
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
World Total	**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.

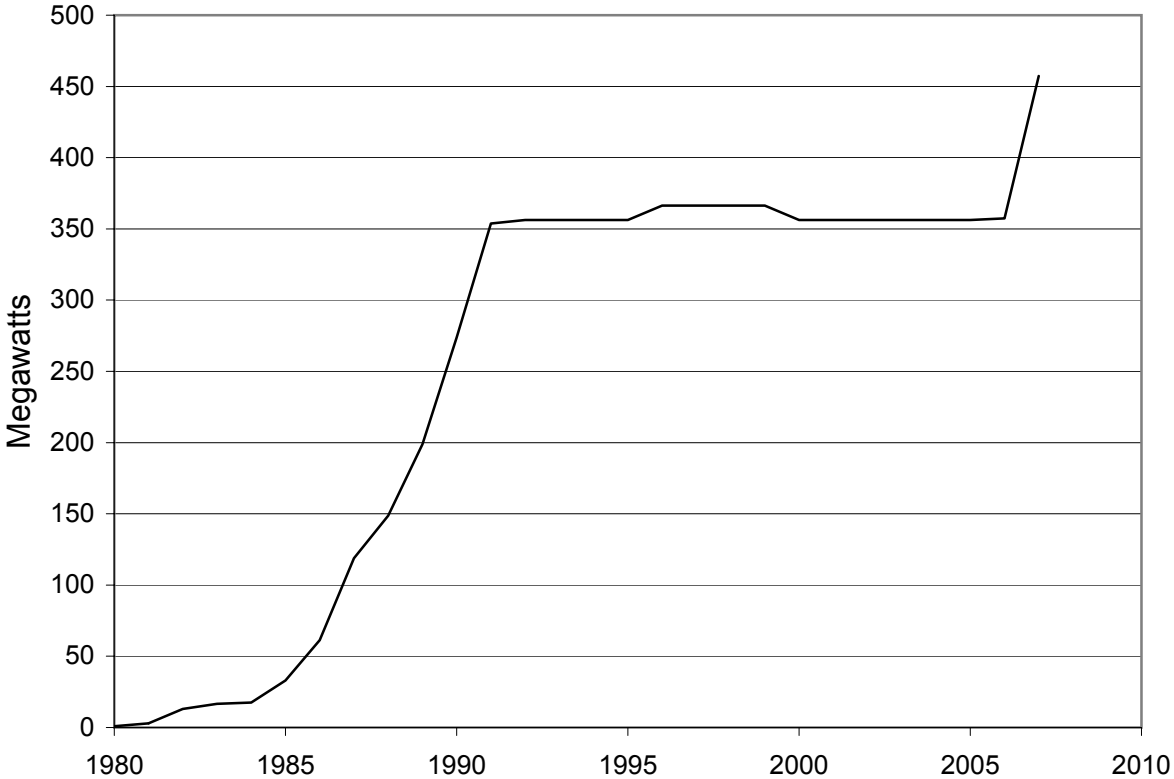
This is part of a supporting dataset for Lester R. Brown, **Plan B 4.0: Mobilizing to Save Civilization** (New York: W.W. Norton & Company, 2009). For more information and a free download of the book, see Earth Policy Institute on-line at www.earthpolicy.org.

World 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]	Scheduled Year of Completion
			Megawatts	
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	Population	Area Per Person
	Thousand Square Meters	Thousands	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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World Cumulative Installed Geothermal Electricity-Generating Capacity, 1950-2009

Year	Cumulative Installed Capacity
	Megawatts
1950	200
1955	262
1960	374
1965	556
1970	711
1975	1,300
1980	3,887
1985	4,764
1990	5,832
1995	6,833
2000	7,972
2005	8,933
2007 *	9,968
2009 *	10,500

* Note: Data for 2007 and 2009 are estimates.

Source: Compiled by Earth Policy Institute with 1950-1970 data from Worldwatch Institute, *Signposts 2004*, CD-ROM (Washington, DC: 2004); 1975-2005 data from Ruggero Bertani, "World Geothermal Generation in 2007," *GHC Bulletin*, September 2007, p. 8; 2007 figure calculated from Ruggero Bertani, "World Geothermal Generation in 2007," *GHC Bulletin*, September 2007 with U.S. data from Mark Taylor, *Update on US Geothermal Power Production and Development* (Washington, DC: Geothermal Energy Association, 16 January 2008); 2009 estimate from Emerging Energy Research, *Global Geothermal Markets and Strategies 2009–2020* (Cambridge, MA: May 2009).

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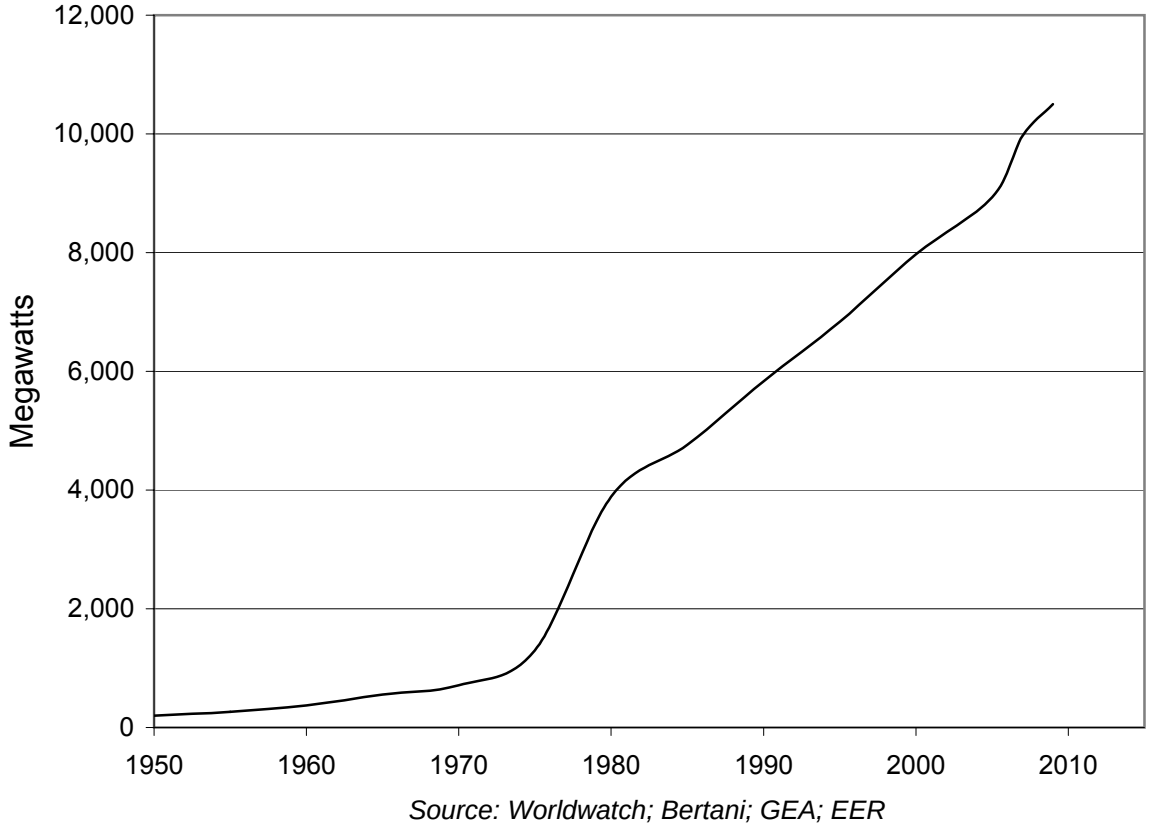
World Cumulative Installed Geothermal Electricity-Generating Capacity, 1950-2009



Source: Worldwatch; Bertani; GEA; EER

Cumulative Installed Geothermal Electricity-Generating Capacity by Country, 1990-2007

Country	1990	1995	2000	2005	2007 *
			Megawatts		
Australia	0.0	0.2	0.2	0.2	0.2
Austria	0.0	0.0	0.0	1.1	1.1
China	19.2	28.8	29.2	27.8	27.8
Costa Rica	0.0	55.0	142.5	163.0	162.5
El Salvador	95.0	105.0	161.0	151.0	204.2
Ethiopia	0.0	0.0	7.3	7.3	7.3
France	4.2	4.2	4.2	14.7	14.7
Germany	0.0	0.0	0.0	0.2	8.4
Guatemala	0.0	33.4	33.4	33.0	53.0
Iceland	44.6	50.0	170.0	202.0	421.2
Indonesia	144.8	309.8	589.5	797.0	992.0
Italy	545.0	631.7	785.0	791.0	810.5
Japan	214.6	413.7	546.9	535.0	535.2
Kenya	45.0	45.0	45.0	129.0	128.8
Mexico	700.0	753.0	755.0	953.0	953.0
New Zealand	283.2	286.0	437.0	435.0	471.6
Nicaragua	35.0	70.0	70.0	77.0	87.4
Papua New Guinea	0.0	0.0	0.0	6.0	56.0
Philippines	891.0	1,227.0	1,909.0	1,930.0	1,969.7
Portugal	3.0	5.0	16.0	16.0	23.0
Russia	11.0	11.0	23.0	79.0	79.0
Thailand	0.3	0.3	0.3	0.3	0.3
Turkey	20.6	20.4	20.4	20.0	38.0
United States	2,774.6	2,816.7	2,228.0	2,564.0	2,923.5
World Total	5,831.1	6,866.1	7,972.9	8,932.6	9,968.4

* Estimates.

Source: Compiled by Earth Policy Institute with 1990 and 1995 from International Geothermal Association, "Installed Generating Capacity," at http://iga.igg.cnr.it/geoworld/geoworld.php?sub=elgen, updated 29 July 2008; 2000, 2005, and 2007 from Ruggero Bertani, "World Geothermal Generation in 2007," *GHC Bulletin*, September 2007, p. 9; 2007 U.S. data from Geothermal Energy Association, *Update on US Geothermal Power Production and Development* (Washington, DC: 16 January 2008).

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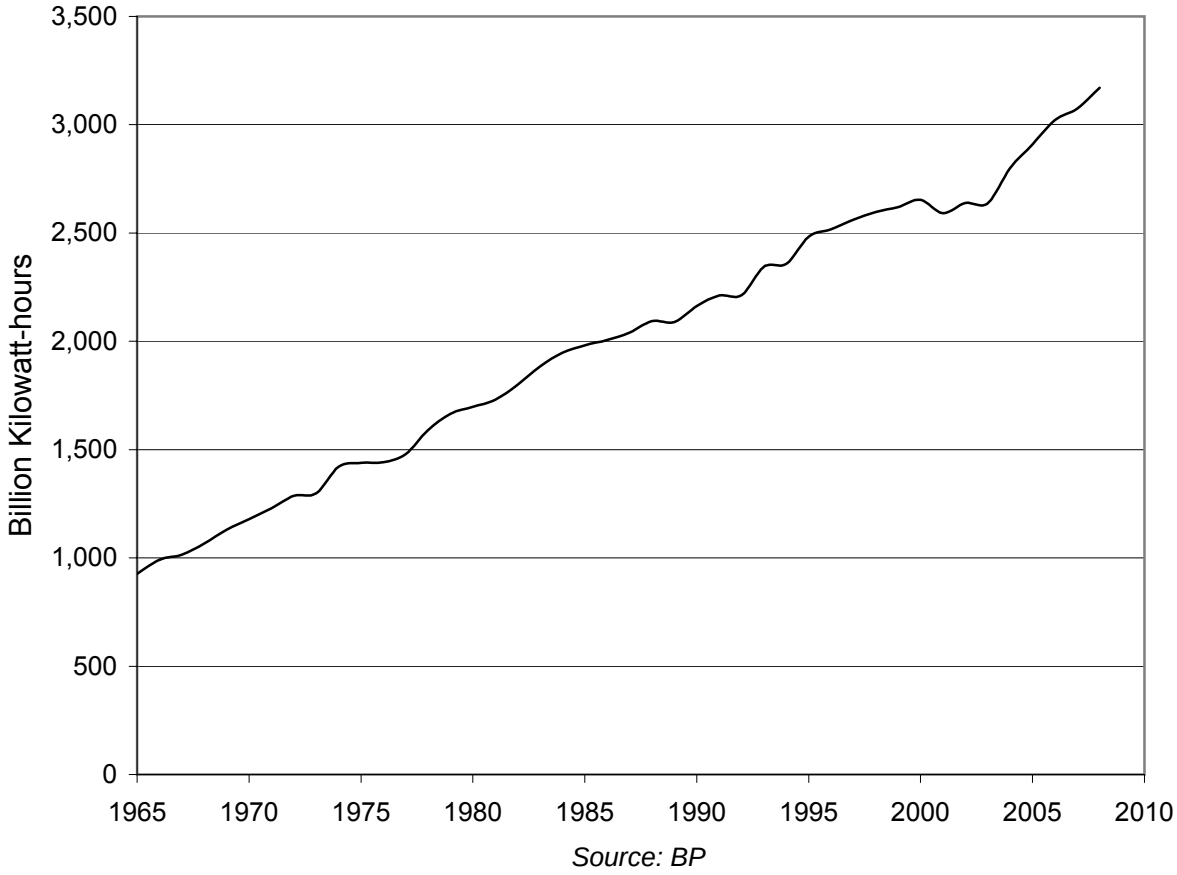
World Hydroelectric Consumption, 1965-2008

Year	Consumption
	Billion Kilowatt-hours
1965	926
1966	991
1967	1,015
1968	1,066
1969	1,130
1970	1,179
1971	1,230
1972	1,287
1973	1,299
1974	1,421
1975	1,440
1976	1,442
1977	1,479
1978	1,590
1979	1,665
1980	1,698
1981	1,731
1982	1,800
1983	1,884
1984	1,947
1985	1,981
1986	2,006
1987	2,040
1988	2,094
1989	2,089
1990	2,164
1991	2,211
1992	2,214
1993	2,344
1994	2,357
1995	2,484
1996	2,518
1997	2,562
1998	2,597
1999	2,619
2000	2,654
2001	2,591
2002	2,639
2003	2,637
2004	2,800
2005	2,909
2006	3,022
2007	3,075
2008	3,171

Source: BP, *Statistical Review of World Energy June 2009* (London: 2009).

World Hydroelectric Consumption, 1965-2008



Source: BP

World Annual Fuel Ethanol Production, 1975-2009

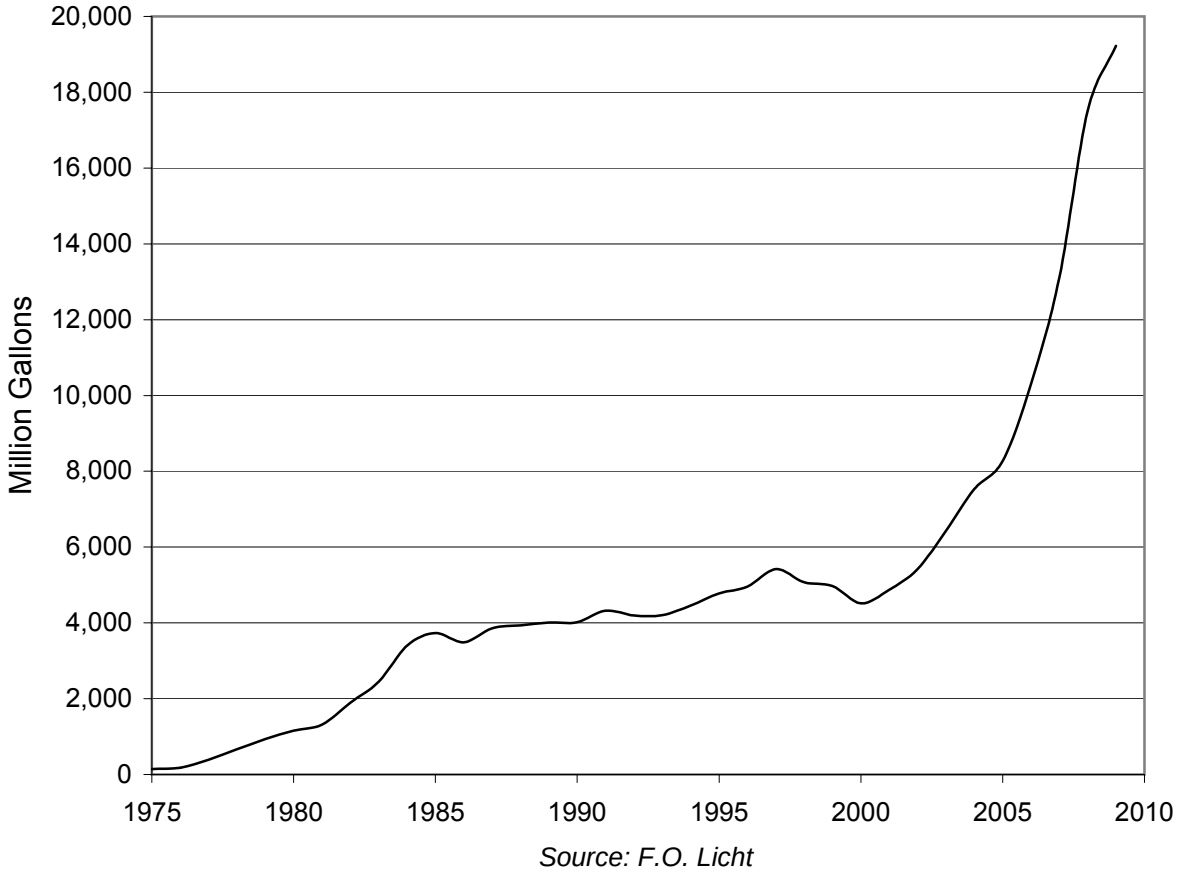
Year	Annual Production
	Million Gallons
1975	147
1976	175
1977	388
1978	668
1979	933
1980	1,154
1981	1,315
1982	1,889
1983	2,452
1984	3,403
1985	3,732
1986	3,485
1987	3,857
1988	3,937
1989	4,013
1990	4,019
1991	4,325
1992	4,196
1993	4,201
1994	4,458
1995	4,775
1996	4,954
1997	5,420
1998	5,073
1999	4,972
2000	4,519
2001	4,874
2002	5,420
2003	6,430
2004	7,531
2005	8,276
2006	10,293
2007	13,113
2008	17,524
2009 *	19,227

* Projection.

Source: Compiled by Earth Policy Institute with data for 1975-1998 from F.O. Licht, *World Ethanol and Biofuels Report*, vol. 6, no. 4 (23 October 2007), p. 63; 1999-2009 from F.O. Licht, *World Ethanol and Biofuels Report*, vol. 7, no. 18 (26 May 2009), p. 365.

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 Fuel Ethanol Production, 1975-2009



Source: F.O. Licht

World Annual Biodiesel Production, 1991-2009

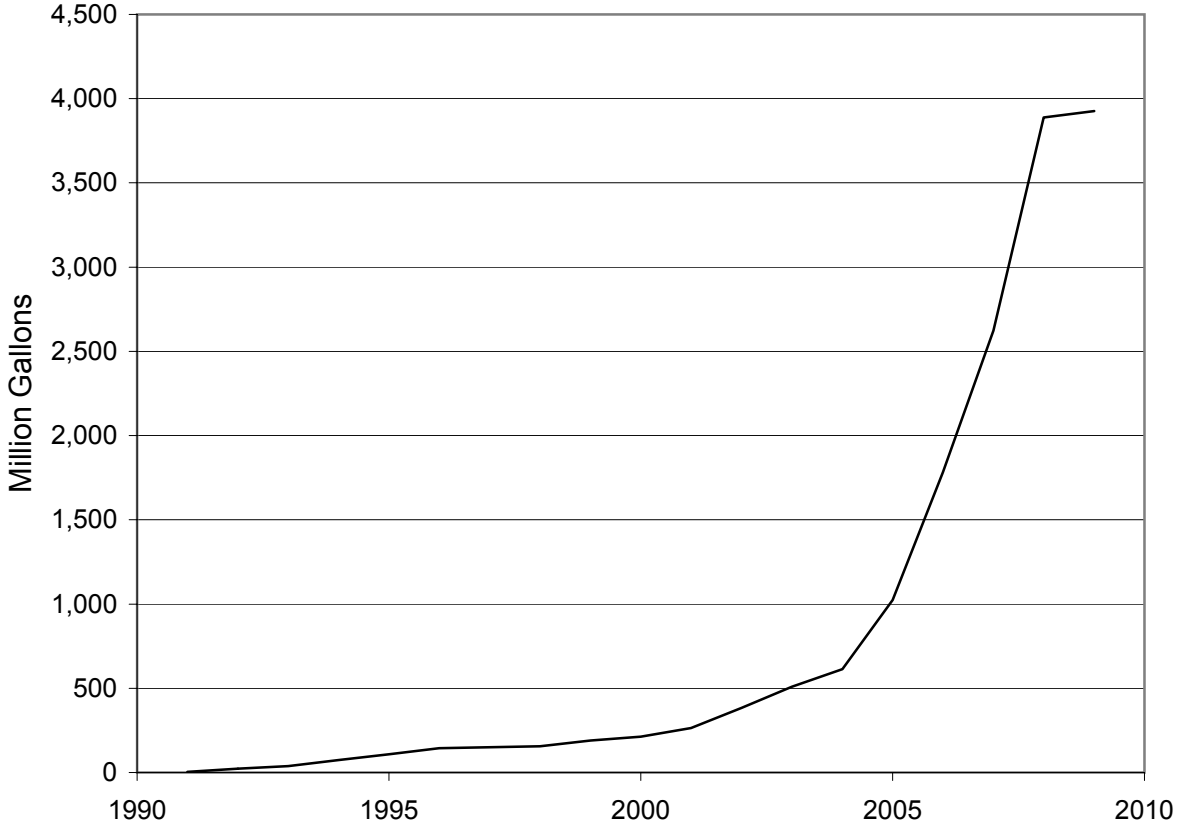
Year	Annual Production
	Million Gallons
1991	3
1992	23
1993	38
1994	75
1995	108
1996	144
1997	151
1998	155
1999	190
2000	213
2001	265
2002	383
2003	510
2004	614
2005	1,023
2006	1,782
2007	2,624
2008	3,888
2009 *	3,926

* Projection.

Source: Compiled by Earth Policy Institute with 1991-1999 data from F.O. Licht data, cited in Suzanne Hunt and Peter Stair, "Biofuels Hit a Gusher," *Vital Signs 2006-2007* (Washington, DC: Worldwatch Institute, 2006), pp. 40-41; 2000-2004 data from F.O. Licht, *World Ethanol and Biofuels Report*, vol. 7, no. 2 (23 September 2008), p. 29; 2005-2009 data from F.O. Licht, *World Ethanol and Biofuels Report*, vol. 7, no. 14, (26 March 2009), p. 288.

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 Biodiesel Production, 1991-2009



Source: F.O. Licht; Worldwatch

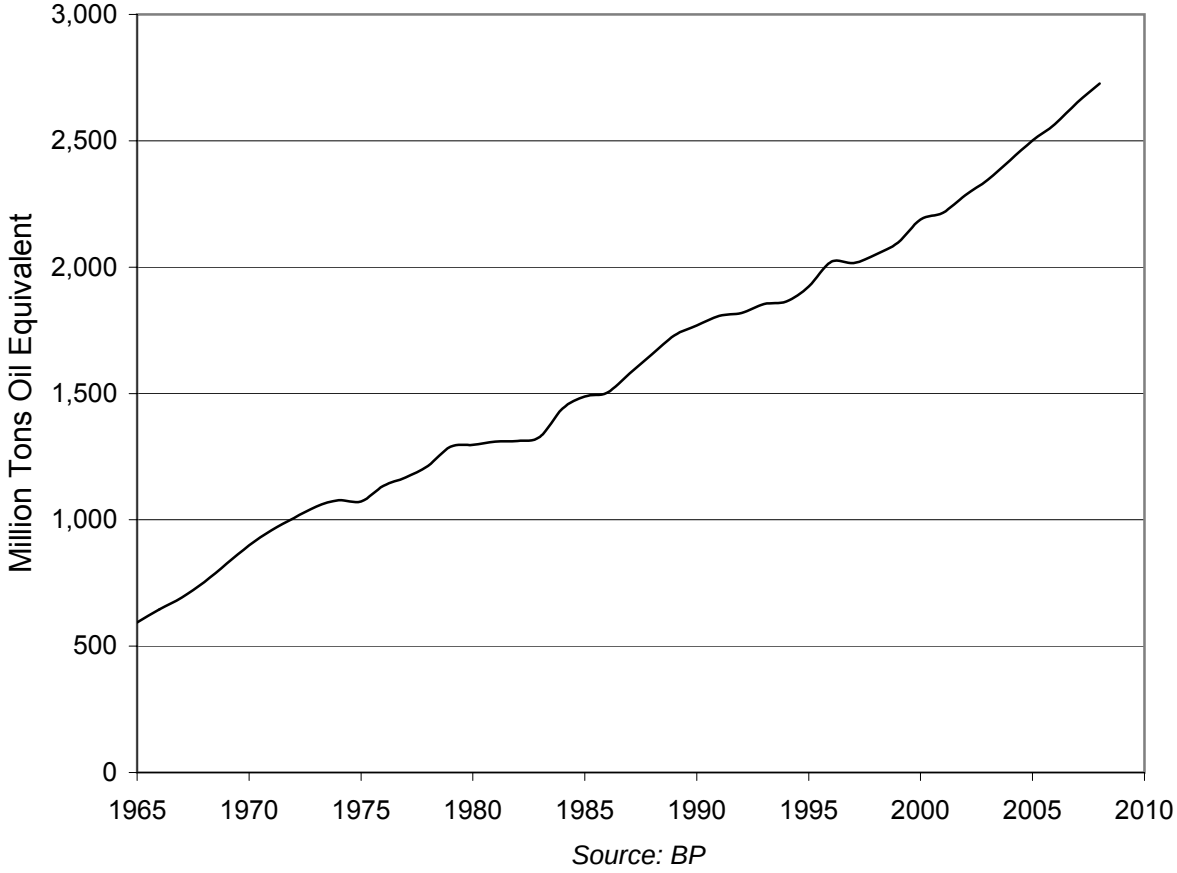
World Natural Gas Consumption, 1965-2008

Year	Consumption
	Million Tons Oil Equivalent
1965	594
1966	646
1967	692
1968	753
1969	827
1970	899
1971	959
1972	1,007
1973	1,052
1974	1,078
1975	1,072
1976	1,135
1977	1,168
1978	1,214
1979	1,289
1980	1,297
1981	1,309
1982	1,312
1983	1,329
1984	1,440
1985	1,488
1986	1,503
1987	1,580
1988	1,655
1989	1,729
1990	1,770
1991	1,807
1992	1,818
1993	1,853
1994	1,863
1995	1,924
1996	2,021
1997	2,016
1998	2,050
1999	2,097
2000	2,188
2001	2,215
2002	2,284
2003	2,345
2004	2,423
2005	2,501
2006	2,566
2007	2,652
2008	2,726

Source: BP, *Statistical Review of World Energy June 2009* (London: 2009).

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 Natural Gas Consumption, 1965-2008



Source: BP

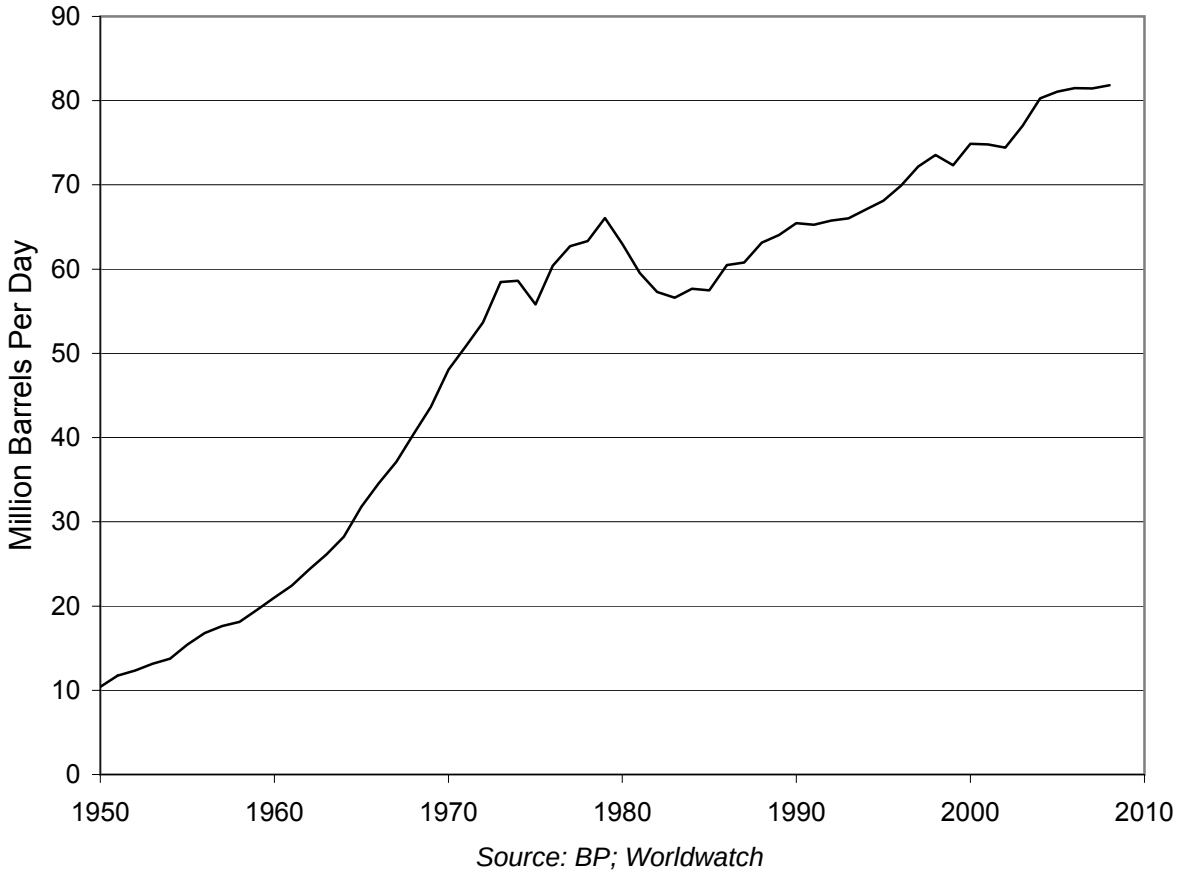
World Oil Production, 1950-2008

Year	Oil Production
	Million Barrels per Day
1950	10.42
1951	11.73
1952	12.34
1953	13.15
1954	13.74
1955	15.41
1956	16.78
1957	17.64
1958	18.10
1959	19.54
1960	21.03
1961	22.43
1962	24.33
1963	26.13
1964	28.25
1965	31.81
1966	34.57
1967	37.12
1968	40.44
1969	43.64
1970	48.06
1971	50.85
1972	53.67
1973	58.47
1974	58.62
1975	55.83
1976	60.41
1977	62.71
1978	63.33
1979	66.05
1980	62.95
1981	59.53
1982	57.30
1983	56.60
1984	57.69
1985	57.47
1986	60.46
1987	60.78
1988	63.15
1989	64.04
1990	65.46
1991	65.27
1992	65.77
1993	66.03
1994	67.10
1995	68.10
1996	69.90
1997	72.18
1998	73.54
1999	72.32
2000	74.86
2001	74.79
2002	74.43
2003	76.99
2004	80.26
2005	81.09
2006	81.50
2007	81.44
2008	81.82

Note: Oil production includes crude oil, shale oil, oil sands and natural gas liquids.

Source: 1950-1964 compiled by Worldwatch Institute from U.S. Department of Defense and U.S. Department of Energy data; 1965-2008 data from BP, *Statistical Review of World Energy June 2009* (London: 2009).

World Oil Production, 1950-2008



Source: BP; Worldwatch

World's 20 Largest Oil Discoveries

Field	Country	Discovery	Size of Field
			Billion Barrels
Bolivar Coastal	Venezuela	1917	14 - 30
Kirkuk	Iraq	1927	15 - 25
Gashsaran	Iran	1928	12 - 14
Greater Burgan	Kuwait	1938	32 - 75
Abqaiq	Saudi Arabia	1941	13 - 19
Ghawar	Saudi Arabia	1948	66 - 150
Romashkino	Russia	1948	17
Safaniya	Saudi Arabia	1951	21 - 55
Rumaila North & South	Iraq	1953	19 - 30
Manifa	Saudi Arabia	1957	11 - 23
Khurais	Saudi Arabia	1957	13 - 19
Ahwaz	Iran	1958	13 - 15
Daqing	China	1959	13 - 18
Samotlor	Russia	1961	28
Berri	Saudi Arabia	1964	10 - 25
Zakum	United Arab Emirates	1964	17 - 21
Zuluf	Saudi Arabia	1965	11 - 20
Shaybah	Saudi Arabia	1968	7 - 22
Cantarell	Mexico	1976	11 - 20
East Baghdad	Iraq	1979	11 - 19

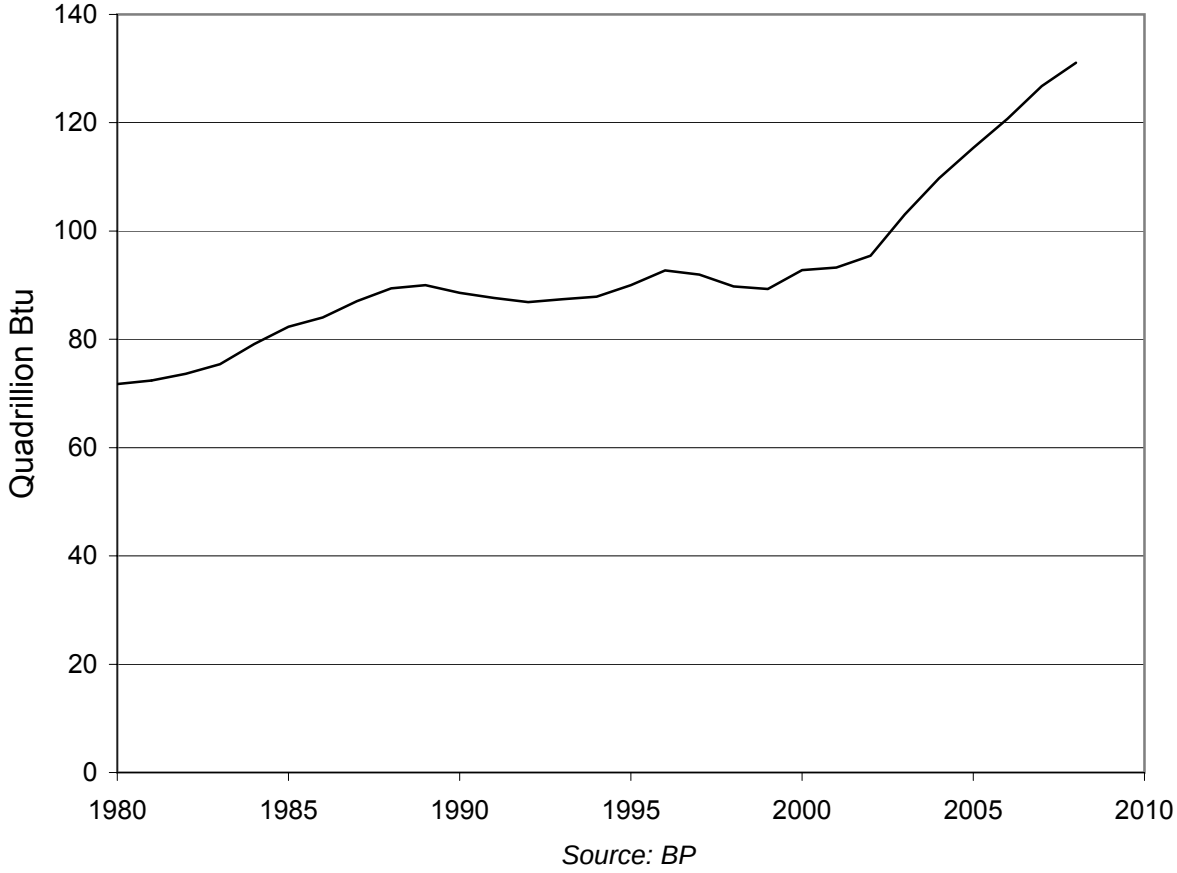
Source: Fredrik Robelius, *Giant Oil Fields - The Highway to Oil* (Uppsala, Sweden: Uppsala University Press, 2007), p. 79.

Coal Consumption in Selected Countries and the World, 1980-2008

Year	China	India	Japan	France	Germany	United Kingdom	United States	World Total
				Quadrillion Btu				
1980	12.1	2.3	2.3	1.1	5.5	2.8	15.4	71.7
1981	12.1	2.5	2.5	1.0	5.6	2.8	15.9	72.4
1982	12.8	2.5	2.5	1.1	5.6	2.6	15.3	73.6
1983	13.5	2.6	2.5	1.0	5.6	2.6	15.9	75.4
1984	15.0	2.8	2.8	1.0	5.8	1.9	17.1	79.1
1985	16.3	2.9	2.9	0.9	5.9	2.5	17.5	82.3
1986	17.4	3.1	2.8	0.8	5.7	2.7	17.3	84.0
1987	18.5	3.4	2.8	0.7	5.6	2.8	18.0	87.0
1988	19.8	3.6	3.0	0.7	5.6	2.7	18.8	89.4
1989	20.6	4.0	3.0	0.8	5.5	2.6	19.1	90.0
1990	21.0	3.8	3.0	0.8	5.1	2.6	19.2	88.6
1991	22.0	4.0	3.1	0.8	4.5	2.6	19.0	87.6
1992	22.8	4.3	3.1	0.7	4.1	2.4	19.1	86.9
1993	24.2	4.5	3.1	0.6	3.9	2.1	19.8	87.4
1994	25.7	4.6	3.3	0.5	3.8	2.0	19.9	87.9
1995	27.6	5.0	3.4	0.6	3.6	1.9	20.1	90.0
1996	28.9	5.3	3.5	0.6	3.6	1.8	21.0	92.8
1997	27.8	5.4	3.6	0.5	3.4	1.6	21.4	91.9
1998	25.9	5.4	3.5	0.6	3.4	1.5	21.7	89.8
1999	26.0	5.4	3.6	0.6	3.2	1.4	21.6	89.3
2000	26.5	5.7	3.9	0.6	3.4	1.5	22.6	92.8
2001	27.0	5.8	4.1	0.5	3.4	1.5	21.9	93.2
2002	28.3	6.0	4.2	0.5	3.4	1.4	21.9	95.4
2003	33.9	6.2	4.5	0.5	3.5	1.5	22.3	103.1
2004	39.0	6.8	4.8	0.5	3.4	1.5	22.5	109.8
2005	43.7	7.3	4.8	0.5	3.3	1.5	22.8	115.4
2006	48.2	7.8	4.7	0.5	3.3	1.6	22.4	120.7
2007	52.1	8.4	5.0	0.5	3.4	1.5	22.7	126.8
2008	55.8	9.2	5.1	0.5	3.2	1.4	22.4	131.1
Percent change, 1990-2008:	165.4	142.4	69.4	-37.5	-37.6	-45.5	16.9	48.0

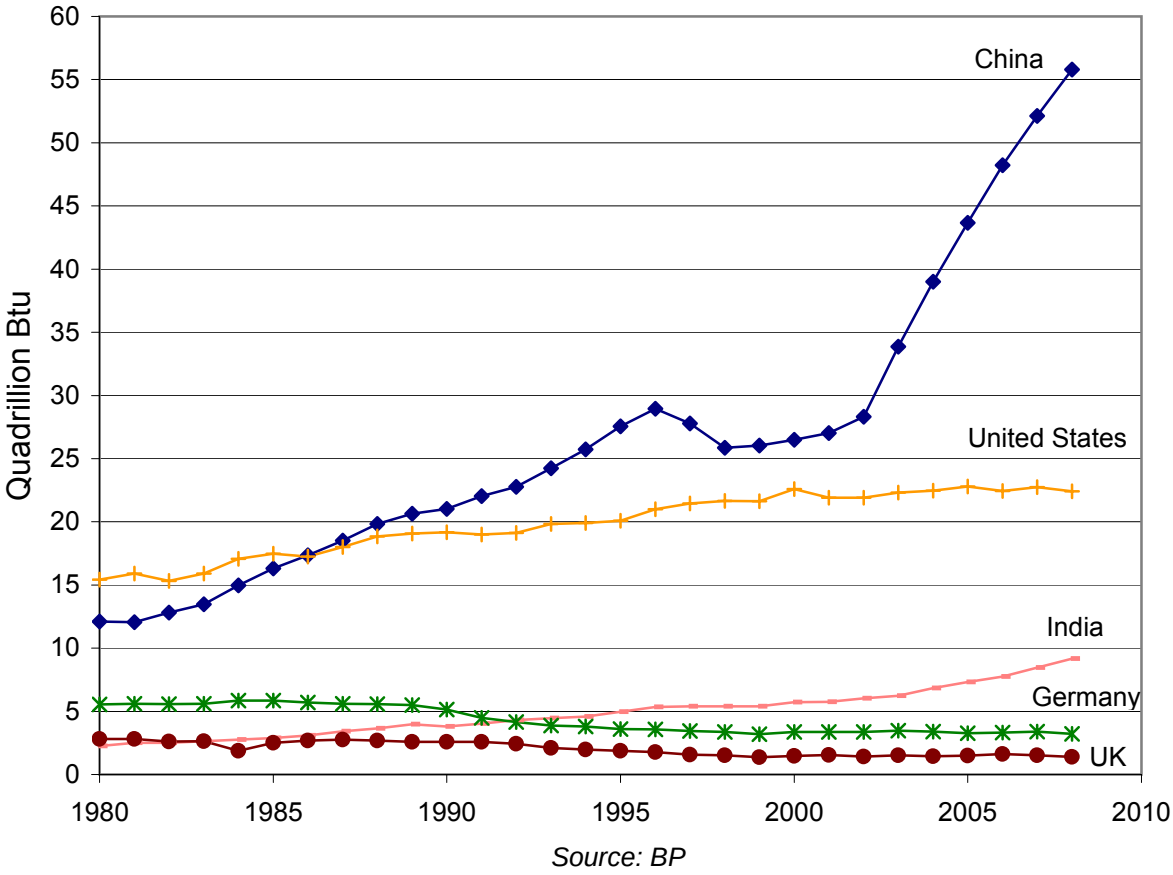
Source: Compiled by Earth Policy Institute from BP, *Statistical Review of World Energy June 2009* (London: 2009).

World Coal Consumption, 1980-2008



Source: BP

Coal Consumption in Selected Countries, 1980-2008



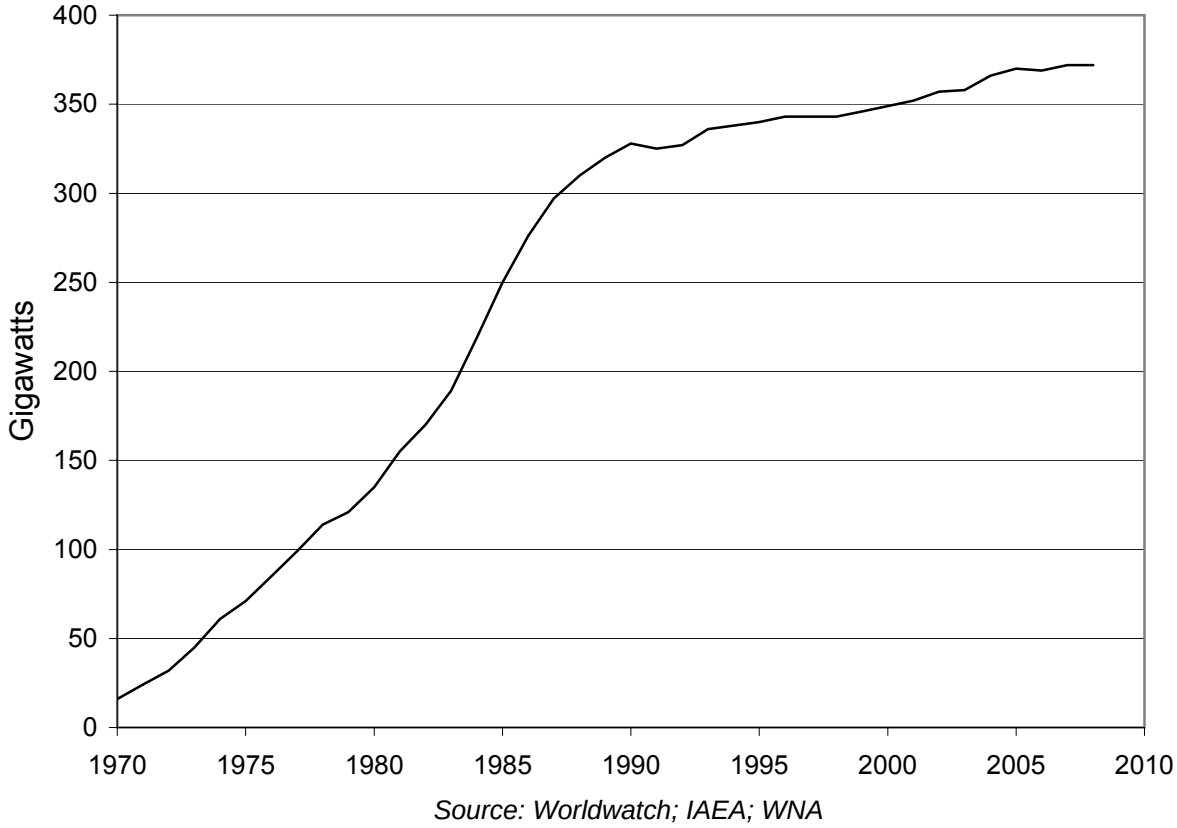
Source: BP

World Cumulative Installed Nuclear Electricity-Generating Capacity, 1970-2008

Year	Installed Capacity
	Gigawatts
1970	16
1971	24
1972	32
1973	45
1974	61
1975	71
1976	85
1977	99
1978	114
1979	121
1980	135
1981	155
1982	170
1983	189
1984	219
1985	250
1986	276
1987	297
1988	310
1989	320
1990	328
1991	325
1992	327
1993	336
1994	338
1995	340
1996	343
1997	343
1998	343
1999	346
2000	349
2001	352
2002	357
2003	358
2004	366
2005	370
2006	369
2007	372
2008	372

Source: Compiled by Earth Policy Institute with 1970-2004 data from Worldwatch Institute, *Vital Signs 2005* (Washington, DC: 2005), p. 33; 2005 data from International Atomic Energy Agency, *Energy, Electricity and Nuclear Power Estimates for the Period up to 2030* (Vienna: July 2006), p. 17; 2006-2007 data from World Nuclear Association (WNA), "World Nuclear Power Reactors 2006-07 and Uranium Requirements," at www.world-nuclear.org/info/reactors-dec07.html, updated 31 December 2007; 2008 data from WNA, "World Nuclear Power Reactors 2007-09 and Uranium Requirements," at www.world-nuclear.org/info/reactors-dec2008.html, updated 5 January 2009.

World Cumulative Installed Nuclear Electricity-Generating Capacity, 1970-2008



Source: Worldwatch; IAEA; WNA