

Annual Energy Outlook 2006 with Projections to 2030

Release Date: December 2005

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**Table 16. Renewable Energy Generating Capacity and Generation
(gigawatts, unless otherwise noted)**

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Electric Power Sector 1/										
Net Summer Capacity										
Conventional Hydropower	77.69	77.64	77.64	77.65	77.66	77.67	77.67	77.67	77.67	77.67
Geothermal 2/	2.11	2.11	2.15	2.23	2.26	2.28	2.42	2.56	2.67	2.79
Municipal Solid Waste 3/	3.19	3.22	3.25	3.29	3.31	3.50	3.51	3.52	3.52	3.53
Wood and Other Biomass 4/, 5/	2.00	2.00	2.04	2.09	2.15	2.15	2.15	2.15	2.15	2.15
Solar Thermal	0.39	0.39	0.39	0.39	0.46	0.46	0.46	0.47	0.47	0.47
Solar Photovoltaic 6/	0.03	0.03	0.03	0.03	0.04	0.05	0.06	0.07	0.09	0.10
Wind	6.39	6.87	9.65	11.56	15.68	15.87	16.08	16.27	16.44	16.61
Total	91.80	92.26	95.14	97.24	101.55	101.98	102.34	102.69	103.00	103.31
Generation (billion kilowatthours)										
Conventional Hydropower	270.26	264.50	262.93	288.71	296.85	296.91	296.95	296.98	297.02	297.05
Geothermal 2/	14.42	14.36	14.40	14.91	15.34	15.53	16.45	17.51	18.56	19.58
Municipal Solid Waste 3/	20.84	19.86	22.96	23.05	23.25	24.79	24.84	24.89	24.94	24.98
Wood and Other Biomass 5/	9.53	9.49	16.87	18.87	27.09	28.01	31.13	44.67	41.81	36.90
Dedicated Plants	9.53	8.00	10.26	9.88	9.43	8.91	7.87	10.39	10.10	10.49
Cofiring	0.00	1.49	6.61	8.99	17.66	19.10	23.26	34.29	31.71	26.40
Solar Thermal	0.53	0.58	0.59	0.59	0.76	0.82	0.83	0.84	0.85	0.86
Solar Photovoltaic 6/	0.00	0.00	0.07	0.07	0.10	0.12	0.15	0.18	0.21	0.23
Wind	11.19	14.15	23.22	35.25	48.82	49.50	50.20	50.87	51.49	52.09
Total	326.78	322.93	341.04	381.45	412.20	415.68	420.55	435.94	434.86	431.68
Commercial and Industrial Generators 7/										
Net Summer Capacity										
Conventional Hydropower 9/	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal Solid Waste	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Biomass	4.32	4.33	4.33	4.50	4.67	4.78	4.90	5.01	5.13	5.23
Solar Photovoltaic 6/	0.08	0.12	0.17	0.25	0.35	0.42	0.50	0.63	0.64	0.65
Total	5.32	5.38	5.43	5.68	5.94	6.13	6.33	6.57	6.70	6.81
Generation (billion kilowatthours)										
Conventional Hydropower 9/	4.29	4.45	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal Solid Waste	2.22	2.12	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24
Biomass	28.00	27.81	27.81	28.82	29.78	30.46	31.13	31.81	32.50	33.08
Solar Photovoltaic 6/	0.17	0.26	0.37	0.53	0.74	0.89	1.07	1.34	1.36	1.38
Total	34.69	34.63	34.82	36.00	37.17	38.01	38.85	39.80	40.51	41.12

**Table 16. Renewable Energy Generating Capacity and Generation
(gigawatts, unless otherwise noted)**

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Electric Power Sector 1/										
Net Summer Capacity										
Conventional Hydropower	77.67	77.72	77.72	77.72	77.72	77.72	77.72	77.87	77.87	77.87
Geothermal 2/	2.88	3.04	3.19	3.34	3.48	3.84	4.16	4.61	4.90	5.16
Municipal Solid Waste 3/	3.53	3.62	3.65	3.65	3.65	3.72	3.76	3.76	3.76	3.76
Wood and Other Biomass 4/, 5/	2.15	2.15	2.15	2.24	2.29	2.29	2.35	2.46	2.52	2.69
Solar Thermal	0.48	0.48	0.48	0.49	0.49	0.50	0.50	0.50	0.51	0.51
Solar Photovoltaic 6/	0.11	0.12	0.14	0.15	0.17	0.18	0.20	0.22	0.24	0.25
Wind	16.78	16.95	17.71	17.81	18.53	18.58	18.67	18.81	18.97	19.50
Total	103.59	104.08	105.03	105.39	106.34	106.83	107.35	108.23	108.76	109.75
Generation (billion kilowatthours)										
Conventional Hydropower	297.09	297.37	297.40	297.44	297.48	297.51	297.55	298.46	298.49	298.53
Geothermal 2/	20.41	21.66	22.84	24.12	25.37	27.89	30.44	34.01	36.77	39.25
Municipal Solid Waste 3/	25.02	25.68	25.96	25.97	25.99	26.56	26.82	26.83	26.84	26.85
Wood and Other Biomass 5/	40.03	42.15	44.80	50.30	50.36	47.67	48.13	48.59	48.03	49.60
Dedicated Plants	10.72	10.79	9.98	10.80	11.12	11.34	12.10	13.03	13.73	14.98
Cofiring	29.32	31.36	34.82	39.51	39.24	36.33	36.03	35.55	34.30	34.63
Solar Thermal	0.87	0.88	0.89	0.91	0.92	0.93	0.95	0.96	0.98	0.99
Solar Photovoltaic 6/	0.27	0.30	0.34	0.38	0.41	0.45	0.49	0.54	0.58	0.63
Wind	52.70	53.30	55.98	56.33	58.84	58.99	59.30	59.82	60.40	62.46
Total	436.39	441.35	448.23	455.45	459.37	460.01	463.68	469.21	472.08	478.31
Commercial and Industrial Generators 7/										
Net Summer Capacity										
Conventional Hydropower 9/	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal Solid Waste	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Biomass	5.31	5.39	5.48	5.57	5.69	5.82	5.92	6.02	6.13	6.24
Solar Photovoltaic 6/	0.66	0.67	0.68	0.70	0.71	0.72	0.74	0.75	0.77	0.78
Total	6.90	6.99	7.09	7.19	7.32	7.46	7.58	7.70	7.82	7.95
Generation (billion kilowatthours)										
Conventional Hydropower 9/	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal Solid Waste	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24
Biomass	33.56	34.01	34.52	35.06	35.75	36.48	37.09	37.69	38.33	38.98
Solar Photovoltaic 6/	1.41	1.43	1.46	1.48	1.51	1.54	1.57	1.60	1.63	1.67
Total	41.62	42.09	42.63	43.20	43.92	44.68	45.31	45.94	46.62	47.30

**Table 16. Renewable Energy Generating Capacity and Generation
(gigawatts, unless otherwise noted)**

	2023	2024	2025	2026	2027	2028	2029	2030	2004- 2030
Electric Power Sector 1/									
Net Summer Capacity									
Conventional Hydropower	77.87	77.87	77.87	77.87	77.87	77.87	77.87	77.87	0.0%
Geothermal 2/	5.49	5.82	6.02	6.28	6.45	6.56	6.60	6.64	4.5%
Municipal Solid Waste 3/	3.76	3.76	3.84	3.84	3.85	3.86	3.86	3.87	0.7%
Wood and Other Biomass 4/, 5/	2.91	3.21	3.45	3.77	3.92	4.14	4.22	4.63	3.3%
Solar Thermal	0.52	0.52	0.53	0.53	0.54	0.54	0.54	0.55	1.3%
Solar Photovoltaic 6/	0.27	0.29	0.31	0.32	0.34	0.36	0.38	0.39	10.5%
Wind	19.58	19.71	19.80	19.89	19.98	20.02	20.09	20.10	4.2%
Total	110.40	111.17	111.81	112.51	112.95	113.35	113.56	114.06	0.8%
Generation (billion kilowatthours)									
Conventional Hydropower	298.56	298.60	298.64	298.68	298.72	298.77	298.81	298.85	0.5%
Geothermal 2/	41.95	44.67	46.74	48.96	50.56	51.74	52.31	52.70	5.1%
Municipal Solid Waste 3/	26.87	26.89	27.52	27.56	27.60	27.67	27.73	27.79	1.3%
Wood and Other Biomass 5/	49.84	52.62	51.30	54.07	53.85	55.16	54.92	57.83	7.2%
Dedicated Plants	16.62	19.60	22.05	24.71	25.76	27.52	27.78	31.67	5.4%
Cofiring	33.22	33.02	29.25	29.36	28.09	27.64	27.14	26.16	11.7%
Solar Thermal	1.00	1.02	1.03	1.05	1.06	1.08	1.09	1.11	2.5%
Solar Photovoltaic 6/	0.67	0.72	0.76	0.80	0.85	0.89	0.94	0.98	26.9%
Wind	62.73	63.17	63.48	63.78	64.09	64.23	64.45	64.51	6.0%
Total	481.63	487.69	489.47	494.90	496.74	499.53	500.25	503.77	1.7%
Commercial and Industrial Generators 7/									
Net Summer Capacity									
Conventional Hydropower 9/	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.0%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Municipal Solid Waste	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.0%
Biomass	6.36	6.47	6.60	6.73	6.87	7.01	7.15	7.29	2.0%
Solar Photovoltaic 6/	0.80	0.83	0.87	0.93	1.06	1.25	1.45	1.68	10.6%
Total	8.08	8.23	8.40	8.59	8.86	9.18	9.52	9.89	2.4%
Generation (billion kilowatthours)									
Conventional Hydropower 9/	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	0.0%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Municipal Solid Waste	2.24	2.24	2.24	2.24	2.24	2.24	2.24	2.24	0.2%
Biomass	39.65	40.33	41.05	41.83	42.65	43.44	44.26	45.09	1.9%
Solar Photovoltaic 6/	1.70	1.79	1.89	2.02	2.29	2.70	3.14	3.62	10.7%
Total	48.00	48.77	49.59	50.51	51.60	52.79	54.05	55.37	1.8%

**Table 16. Renewable Energy Generating Capacity and Generation
(gigawatts, unless otherwise noted)**

1/ Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.

2/ Includes hydrothermal resources only (hot water and steam).

3/ Includes landfill gas.

4/ Facilities co-firing biomass and coal are classified as coal.

5/ Includes projections for energy crops after 2010.

6/ Does not include off-grid photovoltaics (PV). Based on annual PV shipments from 1989 through 2003, EIA estimates that as much as 149 megawatts of remote electricity generation PV applications (i.e., off-grid power systems) were in service in 2003, plus an additional 414 megawatts in communications, transportation, and assorted other non-grid-connected, specialized applications. See Annual Energy Review 2004, Table 10.6 (annual PV shipments, 1989-2003). The approach used to develop the estimate, based on shipment data, provides an upper estimate of the size of the PV stock, including both grid-based and off-grid PV. It will overestimate the size of the stock, because shipments include a substantial number of units that are exported, and each year some of the PV units installed earlier will be retired from service or abandoned.

7/ Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors; and small on-site generating systems in the residential, commercial, and industrial sectors used primarily for own-use generation, but which may also sell some power to the grid.

9/ Represents own-use industrial hydroelectric power.

N/A = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2003 and 2004 are model results and may differ slightly from official EIA data reports.

Sources: 2003 and 2004 capacity: Energy Information Administration (EIA), Form EIA-860, "Annual Electric Generator Report" (preliminary). 2003 and 2004 generation: EIA, Annual Energy Review 2004, DOE/EIA-0384(2004) (Washington, DC, August 2005). Projections: EIA, AEO2006 National Energy Modeling System run aeo2006.d111905a.