

Table A16. Renewable energy generating capacity and generation
(gigawatts, unless otherwise noted)

Capacity and generation	Reference case							Annual growth 2010-2035 (percent)
	2009	2010	2015	2020	2025	2030	2035	
Electric power sector¹								
Net summer capacity								
Conventional hydropower	78.01	78.03	78.41	78.95	79.62	80.48	81.67	0.2%
Geothermal ²	2.37	2.37	2.80	3.65	4.40	5.48	6.41	4.1%
Municipal waste ³	3.20	3.30	3.36	3.36	3.36	3.36	3.36	0.1%
Wood and other biomass ⁴	2.43	2.45	2.72	2.72	2.72	2.72	2.73	0.4%
Solar thermal	0.47	0.55	1.44	1.44	1.44	1.44	1.44	3.9%
Solar photovoltaic ⁵	0.15	0.38	2.02	2.02	2.33	3.80	8.17	13.0%
Wind	34.52	39.05	51.39	51.42	54.35	57.28	65.23	2.1%
Offshore wind	0.00	0.00	0.20	0.20	0.20	0.20	0.20	--
Total	121.16	126.13	142.35	143.76	148.42	154.76	169.20	1.2%
Generation (billion kilowatthours)								
Conventional hydropower	271.50	255.32	294.98	299.72	302.38	306.57	311.50	0.8%
Geothermal ²	15.01	15.67	18.22	25.02	31.14	39.85	47.40	4.5%
Biogenic municipal waste ⁶	16.10	16.56	14.66	14.67	14.67	14.67	14.67	-0.5%
Wood and other biomass	10.74	11.51	22.47	62.22	85.93	78.09	73.09	7.7%
Dedicated plants	9.68	10.15	9.15	12.97	12.43	11.60	10.06	-0.0%
Cofiring	1.06	1.36	13.32	49.25	73.49	66.49	63.03	16.6%
Solar thermal	0.74	0.82	2.99	2.99	2.99	2.99	2.99	5.3%
Solar photovoltaic ⁵	0.16	0.46	3.61	3.61	4.44	8.46	20.27	16.4%
Wind	73.88	94.49	140.50	140.57	149.33	158.68	185.76	2.7%
Offshore wind	0.00	0.00	0.75	0.75	0.75	0.75	0.75	--
Total	388.11	394.82	498.19	549.56	591.62	610.08	656.44	2.1%
End-use generators⁷								
Net summer capacity								
Conventional hydropower ⁸	0.34	0.33	0.33	0.33	0.33	0.33	0.33	0.0%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Municipal waste ⁹	0.36	0.35	0.35	0.35	0.35	0.35	0.35	0.0%
Biomass	4.56	4.56	5.55	6.87	9.23	13.39	14.92	4.9%
Solar photovoltaic ⁵	1.55	2.96	9.86	12.02	12.46	13.05	13.81	6.4%
Wind	0.18	0.36	1.99	2.29	2.32	2.36	2.43	8.0%
Total	6.99	8.56	18.08	21.86	24.69	29.49	31.85	5.4%
Generation (billion kilowatthours)								
Conventional hydropower ⁸	1.94	1.76	1.75	1.75	1.75	1.75	1.75	-0.0%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
Municipal waste ⁹	2.07	2.02	2.79	2.79	2.79	2.79	2.79	1.3%
Biomass	25.31	26.10	32.34	41.48	59.83	93.51	105.03	5.7%
Solar photovoltaic ⁵	2.42	4.58	15.18	18.62	19.36	20.34	21.58	6.4%
Wind	0.24	0.47	2.58	2.98	3.02	3.09	3.18	8.0%
Total	31.98	34.93	54.64	67.61	86.74	121.47	134.33	5.5%

Table A16. Renewable energy generating capacity and generation (continued)
(gigawatts, unless otherwise noted)

Capacity and generation	Reference case							Annual growth 2010-2035 (percent)
	2009	2010	2015	2020	2025	2030	2035	
Total, all sectors								
Net summer capacity								
Conventional hydropower	78.35	78.36	78.74	79.28	79.96	80.81	82.00	0.2%
Geothermal	2.37	2.37	2.80	3.65	4.40	5.48	6.41	4.1%
Municipal waste	3.57	3.65	3.71	3.71	3.71	3.71	3.71	0.1%
Wood and other biomass ⁴	6.99	7.00	8.26	9.59	11.95	16.11	17.65	3.8%
Solar ⁵	2.17	3.89	13.32	15.48	16.22	18.30	23.43	7.4%
Wind	34.70	39.41	53.59	53.91	56.87	59.84	67.86	2.2%
Total	128.15	134.69	160.43	165.62	173.12	184.25	201.05	1.6%
Generation (billion kilowatthours)								
Conventional hydropower	273.44	257.08	296.73	301.47	304.13	308.32	313.24	0.8%
Geothermal	15.01	15.67	18.22	25.02	31.14	39.85	47.40	4.5%
Municipal waste	18.16	18.59	17.45	17.46	17.46	17.46	17.46	-0.3%
Wood and other biomass	36.05	37.61	54.82	103.70	145.76	171.60	178.12	6.4%
Solar ⁵	3.31	5.85	21.78	25.22	26.79	31.79	44.85	8.5%
Wind	74.12	94.95	143.84	144.30	153.10	162.53	189.70	2.8%
Total	420.08	429.75	552.82	617.17	678.37	731.55	790.77	2.5%

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

²Includes both hydrothermal resources (hot water and steam) and near-field enhanced geothermal systems (EGS). Near-field EGS potential occurs on known hydrothermal sites, however this potential requires the addition of external fluids for electricity generation and is only available after 2025.

³Includes municipal waste, landfill gas, and municipal sewage sludge. Incremental growth is assumed to be for landfill gas facilities. All municipal waste is included, although a portion of the municipal waste stream contains petroleum-derived plastics and other non-renewable sources.

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

⁵Does not include off-grid photovoltaics (PV). Based on annual PV shipments from 1989 through 2009, EIA estimates that as much as 245 megawatts of remote electricity generation PV applications (i.e., off-grid power systems) were in service in 2009, plus an additional 558 megawatts in communications, transportation, and assorted other non-grid-connected, specialized applications. See U.S. Energy Information Administration, *Annual Energy Review 2010*, DOE/EIA-0384(2010) (Washington, DC, October 2011), Table 10.9 (annual PV shipments, 1989-2009). 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.

⁶Includes biogenic municipal waste, landfill gas, and municipal sewage sludge. Incremental growth is assumed to be for landfill gas facilities. Only biogenic municipal waste is included. The U.S. Energy Information Administration estimates that in 2007 approximately 6 billion kilowatthours of electricity were generated from a municipal waste stream containing petroleum-derived plastics and other non-renewable sources. See U.S. Energy Information Administration, *Methodology for Allocating Municipal Solid Waste to Biogenic and Non-Biogenic Energy* (Washington, DC, May 2007).

⁷Includes 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.

⁸Represents own-use industrial hydroelectric power.

⁹Includes municipal waste, landfill gas, and municipal sewage sludge. All municipal waste is included, although a portion of the municipal waste stream contains petroleum-derived plastics and other non-renewable sources.

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2009 and 2010 are model results and may differ slightly from official EIA data reports.

Sources: 2009 and 2010 capacity: U.S. Energy Information Administration (EIA), Form EIA-860, "Annual Electric Generator Report" (preliminary). 2009 and 2010 generation: EIA, *Annual Energy Review 2010*, DOE/EIA-0384(2010) (Washington, DC, October 2011). Projections: EIA, AEO2012 National Energy Modeling System run REF2012.D121011B.