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Assumptions to the Annual Energy Outlook 2007

Table 72. Overnight Capital Cost Characteristics for Renewable Energy Generating Technologies in Three Cases (2004$/kW)

Technology	Year	Reference	High Renewables[1]	Low Renewables
Geothermal[2]	2010	1,675	1,675	1,709
	2020	2,392	2,392	2,572
	2030	2,298	2,308	2,572
Hydroelectric[2,]	2010	1,485	1,441	1,500
	2020	1,426	1,344	1,485
	2030	1,396	1,235	1,485
Landfill Gas	2010	1,579	1,547	1,595
	2020	1,531	1,436	1,595
	2030	1,499	1,436	1,595
Photovoltaic[3]	2010	4,105	4,020	4,276
	2020	3,569	3,317	4,198
	2030	2,923	2,628	4,004
Solar Thermal[3]	2010	2,527	2,527	2,808
	2020	2,309	2,198	2,782
	2030	2,067	1,792	2,757
Biomass[4]	2010	1,833	1,729	1,852
	2020	1,721	1,516	1,777
	2030	1,534	1,304	1,646
Wind	2010	1,194	1,182	1,206
	2020	1,194	1,122	1,206
	2030	1,194	1,086	1,206

[1]Overnight capital cost (that is, excluding interest charges), plus contingency, learning, and technological optimism factors, excluding regional multipliers. A contingency allowance is defined by the American Association of Cost Engineers as the specific provision for unforeseeable elements of costs within a defined project scope. This is particularly important where previous experience has shown that unforeseeable events which will increase costs are likely to occur.

[2]Geothermal and Hydroelectric costs are specific for each site. The table entries represent the least cost unit available in the specified year in the Northwest Power Pool region. In the 2006 Renewables cases, costs vary as different sites continue to be developed.

[3]Costs decline slightly in the Low Renewable case for photovoltaic and solar thermal technologies as technological optimism is factored into initial costs (see pg. 72 in the chapter discussing the EMM). However, there is no learning-by-doing assumed once the optimism factor has been removed.

[4]Biomass plants share significant components with similar coal-fired plants, these components continue to decline in cost in the Low Renewables case, although biomass-specific components (especially fuel handling components) do not see cost declines beyond 2005.

Source: AEO2006 National Energy Modeling System runs AEO2006.D111905A, LOREN06.D120505A, and HIREN06.D120605A.

Table 73. Capacity Factors[1] for Renewable Energy Generating Technologies in Three Cases

Technology	Year	Reference	High Renewables	2006 Renewables
Geothermal[2]	2010	0.95	0.95	0.95
	2020	0.95	0.95	0.95
	2030	0.95	0.89	0.95
Hydrolectric[2]	2010	0.64	0.64	0.64
	2020	0.64	0.64	0.57
	2030	0.57	0.51	0.57
Landfill Gas	2010	0.90	0.90	0.90
	2020	0.90	0.90	0.90
	2030	0.90	0.90	0.90
Photovoltaic	2010	0.21	0.21	0.21
	2020	0.21	0.21	0.21
	2030	0.21	0.21	0.21
Solar Thermal	2010	0.31	0.31	0.31
	2020	0.31	0.31	0.31
	2030	0.31	0.31	0.31
Biomass	2010	0.83	0.83	0.83
	2020	0.83	0.83	0.83
	2030	0.83	0.83	0.83
Wind[3]	2010	0.44	0.46	0.37
	2020	0.45	0.46	0.37
	2030	0.41	0.43	0.37

[1]Capacity factor for units available to be built in specified year. Capacity factor represents maximum expected annual power output as a fraction of theoretical output if plant were operated at rated capacity for a full year.

[2]Geothermal and Hydroelectric capacity factors are specific for each site. The table entries represent the least-cost unit available in the specified year in the Northwest Power Pool region.

[3]Wind capacity factors are based on regional resource availability and generation characteristics. The table entries represent the least-cost resource available in the specified year in the Northwest Power Pool region.

Source: AEO2006 National Energy Modeling System runs: AEO2006.D111905A, LOREN06.D120505A, and HIREN06.D120605A.

Table 74. Maximum U.S. Biomass Resources, by Coal Demand Region and Type
(Trillion Btu)

Coal Demand Region	States	Agricultural Residue	Energy Crops	Forestry Residue	Urban Wood Waste/Mill Residue	Total
1. NE	CT, MA, ME, NH, RI, VT	1	29	131	15	176
2..YP	NY, PA, NJ	29	73	89	59	250
3. SA	WV, MD, DC, DE, VA, NC, SC	63	116	408	56	643
4. GF	GA, FL	57	66	246	47	416
5. OH	OH	71	119	27	17	234
6. EN	IN, IL, MI, WI	409	307	404	47	1,167
7. KT	KY, TN	27	210	92	30	359
8. AM	AL, MS	18	211	149	19	397
9. CW	MN, IA, ND, SD, NE, MO, KS	900	1,004	523	28	2,455
10. WS	TX, LA, OK, AR	191	473	247	57	968
11. MT	MT, WY, ID	70	56	229	25	380
12. CU	CO, UT, NV	6	0	23	7	36
13. ZN	AZ, NM	6	0	23	7	36
14. PC	AK, HI, WA, OR, CA	104	0	195	83	382
Total U.S.		1,952	2,664	2,786	497	7,899

Sources: Urban Wood Wastes/Mill Residues: Antares Group Inc., *Biomass Residue Supply Curves for the U.S (updated),* prepared for the National Renewable Energy Laboratory, June 1999; Agricultural residues: James Easterly, "Biomass Suppy Curve Enhancement Regarding Agricultural Residues" prepared for EIA, September, 2004. All other biomass resources: Oak Ridge National Laboratory, personal communication with Marie Walsh, August 20, 1999.

Table 75. Aggregate Regional RPS Requirements

Region[1]	2015	2025	2030
ECAR	0%	0%	0%
ERCOT	5%	5%	5%
MAAC	9%	13%	13%
MAIN	0%	0%	0%
MAPP	7%	7%	7%
NY	22%	22%	22%
NE	10%	10%	10%
FL	0%	0%	0%
STV	0%	0%	0%
SPP	0%	0%	0%
NWP	3%	3%	3%
RA	3%	3%	3%
CNV[2]	12%	10%	10%

[1] See chapter on the electricity Market Module for a map of the electricity regions

[2]Funding authorization for the California RPS program expires in 2011, but EIA estimates that the accumulated account can support increasing renewable generation through 2014 (assumes expiration of the Federal PTC in 2007). Target shown reflects EIA estimate of achievable target given limitations on program funding, not nominal target.

Table 76. Planned U.S. Central Station Generating Capacity Using Renewable Resources for 2004 and Beyond[1]

Technology	Plant Identification	State	Net Summer Capability (Megawatts)	On-Line Years
Biomass				
	APS Biomass I	Arizona	2.9	2006
	Central Minnesota Ethanol Corp	Minnesota	0.95	2006
	Fibrominn Biomass Power Plant	Minnesota	55	2006
	Okeelanta Cogeneration	Florida	30	2006
	Schiller Biomass Conversion	New Hampshire	47.5	2006
	Sierra Pacific Burlington Facility	Washington	25	2006
	Ware Cogeneration	Massachusetts	4.1	2006
	Plant Carl Project	Georgia	20	2007
Landfill Gas (including mass-burn waste)	American Canyon SLF	California	0.4	2006
	Anderson Regional Landffill	South Carolina	10.8	2006
	Burlington County SLF	New Jersey	14.4	2006
	Cedar Hills Landfill	Washington	34	2006
	Central Disposal Landfill	Iowa	8	2006
	Chittenden County Landfill	Vermont	0.2	2006
	Clinton landfill Two	Illinois	6.4	2006
	Colonie LFG Facility	New York	4.8	2006
	Deer Track ParkLandfill	Wisconsin	6.4	2006
	Forth Worth Regional Landfill	Texas	3.2	2006
	Frey Farm Landfill	Pennsylvania	3.2	2006
	Glendale Road Landfill	Massachusetts	1.6	2006
	Hardin County LFG	Kentucky	2.4	2006
	Harrisburg Facility	Pennsylvania	21	2006
	Kiefer Landfill	California	6	2006
	Los Angeles Landfill	New Mexico	0.1	2006
	Los RealesLFG	Arizona	1.9	2006
	Modern Innovative Energy, LLC	New York	6.4	2006
	Orange County Landfill	California	4.2	2006
	Puente Hills Energy Recovery	California	9.9	2006
	Richmondf Couunty Landfill	South Carolina	5.3	2006
	Salt Lake Valley Landfill	Utah	6	2006
	Seminole Road Landfill Gas	Georgia	3.2	2006
	Seven Mile Creek LFG	Wisconsin	0.8	2006
	Timberline Trail Recycling Facility	Wisconsin	6.4	2006
	Warren County Landfill	New Jersey	7.6	2006
	Waste Disposal EngineeringSLF	Minnesota	0.4	2006
	Horry Landfill Gas Site	South Carolina	1.1	2007
	Lee County Landfill	South Carolina	1.9	2007
	Lee County Solid Waste Energy	Florida	16	2007

Table 76. Planned U.S. Central Station Generating Capacity Using Renewable Resources for 2004 and Beyond[1] (cont)

Technology	Plant Identification	State	Net Summer Capability (Megawatts)	On-Line Years
Geothermal				
	Desert Peak	Nevada	36	2006
	East Mesa Expansion	California	9.5	2006
	Heber Geothermal	California	6	2006
	Stillwater Addition	Nevada	15	2007
	Galena I and II	Nevada	39	2006-2007
	Raft River Expansions	Idaho	22.1	2006-2007
	Salt Wells	Nevada	20.5	2006-2007
Coventional Hydroelectric				
	Atka Hydro	Alaska	0.3	2006
	Wanapum	Washington	235.2	2006
	Abiquiu Dam	New Mexico	3	2007
	Indian River Hydro I	Alaska	0.1	2007
	Lower St. Anthony Falls	Minnesota	9	2008
Central StationPhotovoltaics(PV)				
	Arizona RPS Solar PV	Arizona	2	2007
	Springerville Extension	Arizona	3	2008-2010
	Arizona Commercial Solar PV	Arizona	58.5	2008-2030
	California RPS Solar PV	California	38	2007-2017
	California Commercial Solar PV	California	76	2018-2030
	Nevada RPS Solar PV	Nevada	30	2007-2015
	Nevada Commercial Solar	Nevada	67.5	2016-2030
	Southern Great Plains Solar PV	Southern Plains	51	2007-2030
	Texas Mandate Solar	Texas	7.5	2007-2015
	Texas Commercial Solar PV	Texas	28.5	2016-2030
Solar Thermal				
	APS Solar Trough Plant	Arizona	1	2006
	Arizona RPS Solar Thermal	Arizona	1	2007
	Eldorado Solar Thermal	Nevada	70	2007
	Solargenix Solar Thermal	Nevada	64	2007
	California RPS Solar Thermal	California	13.5	2007-2017
	Nevada RPS Solar Thermal	Nevada	36.5	2007-2030
	AZ Commercial Solar Thermal	Arizona	23	2008-2030
	CA Commercial Solar Thermal	California	19.5	2018-2030
Wind				
	Allegheny Ridge Wind Farm	Pennsylvania	80	2006
	Aragonne Wind, LLC.	New Mexico	90	2006
	Atlantic City Wind Farm	New Jersey	7.5	2006
	AVECF Wind Phase IB	Alaska	0.3	2006
	Big Horn Wind Project	Washington	200	2006
	Bluegrass Ridge Project Phase I	Missouri	33.4	2006

Table 76. Planned U.S. Central Station Generating Capacity Using Renewable Resources for 2004 and Beyond[1] (Cont.)

Technology	Plant Identification	State	Net Summer Capability (Megawatts)	On-Line Years
	Buena Vista	California	38	2006
	Buffalo Gap Wind Farm	Texas	120.6	2006
	Centennial Wind energy Project	Oklahoma	120	2006
	FPL Energy Burleigh County Wind	North Dakota	18	2006
	Hawaiian Renewable wind Farm	Hawaii	10.6	2006
	Horse Hollow Wind Center II and III	Texas	287.9	2006
	Huyll Municipal Light Plant	Massachusetts	1.8	2006
	Kaheawa Pastures	Hawaii	30	2006
	Kotzebue	Alaska	2.6	2006
	Leaning Juniper wind	Oregon	100.5	2006
	Lone Star Wind Farm	Texas	200	2006
	MA Maritime Academy	Massachusetts	1.3	2006
	Maple Ridge Wind Expansion	New York	94	2006
	Oliver Wind Energy	North Dakota	50.6	2006
	Portsmith Abbey School Turbine	Rhode Island	0.66	2006
	Shiloh I Wind Project	California	150	2006
	Solano Wiind	California	24	2006
	Spearville	Kansas	100	2006
	Spring Canyon	Colorado	60	2006
	Twin Buttes Wind Farm	Colorado	75	2006
	Twin Groves Wind Farm Phase I	Illinois	200	2006
	Victory Wind Energy Project	Iowa	99	2006
	Wild Horse Project	Washington	232	2006
	Wind Park Bear Creek	Pennsylvania	24	2006
	Wolverine Creek	Idaho	64.5	2006
	California RPS Wind	California	1954	2007
	Minnesota Mandate Wind	Minnesota	142	2007
	New England Wind	New England	442	2007
	Sandbluff Wind Project	Texas	90	2007
	Southeastern US Wind	Southeat Region	111	2007
	Forest Crerek Wind Farm	Texas	214.2	2006-2007
	Texas RPS Wind	Texas	1176	2008-2015
	Minnesota Small Wind	Minnesota	85	2006-2010
	Nevada RPS Wind	Nevada	114	2007-2008
	Consent Decree Wind	Ohio	23	2007-2009
	Tehachapi Windf Resource	California	15.9	2008-2009

1Includes reported information and EIA estimates for goals, mandates, renewable portfolio standards (RPS), and California Assembly Bill 1890 required renewables.

[2]Regional estimates developed by EIA.

Source: Energy Information Administration, Office of Integrated Analysis and Forecasting, based on publicly available information about specific projects, state renewable portfolio standards, mandates, goals, and commercial and other plans.