

Table 13.2. Capacity Factors¹ for Renewable Energy Generating Technologies in Three Cases

Technology	Year	Reference	High Renewable Cost	Low Renewable Cost
Geothermal ²	2012	0.90	0.90	0.90
	2020	0.90	0.90	0.90
	2030	0.90	0.90	0.90
Hydroelectric ²	2012	0.65	0.65	0.65
	2020	0.56	0.53	0.56
	2030	0.55	0.55	0.26
Landfill Gas	2012	0.90	0.90	0.90
	2020	0.90	0.90	0.90
	2030	0.90	0.90	0.90
Photovoltaic	2012	0.21	0.21	0.21
	2020	0.21	0.21	0.21
	2030	0.21	0.21	0.21
Solar Thermal	2012	0.31	0.31	0.31
	2020	0.31	0.31	0.31
	2030	0.31	0.31	0.31
Biomass	2012	0.83	0.83	0.83
	2020	0.83	0.83	0.83
	2030	0.83	0.83	0.83
Offshore Wind ³	2012	0.40	0.40	0.40
	2020	0.40	0.40	0.40
	2030	0.40	0.40	0.40
Onshore Wind ³	2012	0.38	0.38	0.38
	2020	0.38	0.38	0.38
	2030	0.46	0.45	0.39

¹Capacity 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.

²Hydroelectric 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.

³Wind capacity factors are based on regional resource availability and generation characteristics. The table entries represent the highest quality resource available in the specified year.

Source: AEO2009 National Energy Modeling System runs: AEO2009.D120908A, HIRENCST09.D011309B, and LORENCST09.D011509B.

Capital Costs

Capital costs for renewable technologies are affected by several factors. Capital costs for technology to exploit some resources, especially geothermal, hydroelectric, and wind power resources, are assumed to be dependent on the quality, accessibility, and/or other site-specific factors in the areas with exploitable resources. These factors can include additional costs associated with reduced resource quality; need to build or upgrade transmission capacity from remote resource areas to load centers; or local impediments to permitting, equipment transport, and construction in good resource areas due to siting issues, inadequate infrastructure, or rough terrain.

Short-term cost adjustment factors increase technology capital costs as a result of a rapid U.S. buildup in a single year, reflecting limitations on the infrastructure (for example, limits on manufacturing, resource assessment, and construction expertise) to accommodate unexpected demand growth. These factors, which are applied to all new electric generation capacity, are a function of past production rates and are further described in *The Electricity Market Module of the National Energy Modeling System: Model Documentation Report*, available at <http://www.eia.doe.gov/bookshelf/docs.html>.

Also assumed to affect all new capacity types are costs associated with construction commodities. Through the middle of this decade, the installed cost for most new plants was observed to increase. Although several factors contributed to this cost escalation, some of which may be more or less important to specific types of new capacity, much of the overall cost increase was correlated with increases in the cost of construction materials, such as bulk metals, specialty metals, and concrete. Capital costs in *AEO2009* are specifically linked to the projections for the metals producer price index found in the Macroeconomic Module of NEMS.