

Table 8.1. Cost and performance characteristics of new central station electricity generating technologies

Technology	Online Year ¹	Size (MW)	Lead time (years)	Contingency Factors							Heatrate ⁶ (Btu/kWh)	nth-of-a-kind Heatrate (Btu/kWh)
				Base Overnight	Project Contin-	Techno- logical	Total Overnight	Variable O&M ⁵	Fixed O&M	Heatrate ⁶		
				Cost in 2014 (2013 \$/kW)	gency Factor ²	Optimism Factor ³	Cost in 2014 ⁴ (2013 \$/kW)	\$/mWh	(2013 \$/kW/yr.)	in 2014 (Btu/kWh)		
Scrubbed Coal New	2018	1300	4	2,726	1.07	1.00	2,917	4.47	31.16	8,800	8,740	
Coal-Gasification Integrated Comb												
Cycle (IGCC)	2018	1200	4	3,483	1.07	1.00	3,727	7.22	51.37	8,700	7,450	
IGCC with Carbon sequestration	2018	520	4	5,891	1.07	1.03	6,492	8.44	72.80	10,700	8,307	
Conv Gas/Oil Comb Cycle	2017	620	3	869	1.05	1.00	912	3.60	13.16	7,050	6,800	
Adv Gas/Oil Comb Cycle (CC)	2017	400	3	942	1.08	1.00	1,017	3.27	15.36	6,430	6,333	
Adv CC with Carbon sequestration	2017	340	3	1,845	1.08	1.04	2,072	6.78	31.77	7,525	7,493	
Conv Comb Turbine ⁸	2016	85	2	922	1.05	1.00	968	15.44	7.34	10,783	10,450	
Adv Comb Turbine	2016	210	2	639	1.05	1.00	671	10.37	7.04	9,750	8,550	
Fuel Cells	2017	10	3	6,042	1.05	1.10	6,978	42.97	0.00	9,500	6,960	
Adv Nuclear	2022	2234	6	4,646	1.10	1.05	5,366	2.14	93.23	10,479	10,479	
Distributed Generation-Base	2017	2	3	1,407	1.05	1.00	1,477	7.75	17.44	9,015	8,900	
Distributed Generation - Peak	2016	1	2	1,689	1.05	1.00	1,774	7.75	17.44	10,015	9,880	
Biomass	2018	50	4	3,399	1.07	1.01	3,659	5.26	105.58	13,500	13,500	
Geothermal ^{7,9}	2018	50	4	2,331	1.05	1.00	2,448	0.00	112.85	9,516	9,516	
Municipal Solid Waste												
Conventional	2017	50	3	7,730	1.07	1.00	8,271	8.74	392.60	14,878	18,000	
Hydropower ⁹	2018	500	4	2,410	1.10	1.00	2,651	5.76	15.15	9,516	9,516	
Wind	2017	100	3	1,850	1.07	1.00	1,980	0.00	39.53	9,516	9,516	
Wind Offshore	2018	400	4	4,476	1.10	1.25	6,154	0.00	73.96	9,516	9,516	
Solar Thermal ⁷	2017	100	3	3,787	1.07	1.00	4,052	0.00	67.23	9,516	9,516	
Photovoltaic ^{7,10}	2016	150	2	3,123	1.05	1.00	3,279	0.00	24.68	9,516	9,516	

¹Online year represents the first year that a new unit could be completed, given an order date of 2014.

²A 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; particularly important where previous experience has shown that unforeseeable events which will increase costs are likely to occur.”

³The technological optimism factor is applied to the first four units of a new, unproven design; it reflects the demonstrated tendency to underestimate actual costs for a first-of-a-kind unit.

⁴Overnight capital cost including contingency factors, excluding regional multipliers and learning effects. Interest charges are also excluded. These represent costs of new projects initiated in 2014.

⁵O&M = Operations and maintenance.

⁶For hydro, wind, solar and geothermal technologies, the heat rate shown represents the average heat rate for conventional thermal generation as of 2013. This is used for purposes of calculating primary energy consumption displaced for these resources, and does not imply an estimate of their actual energy conversion efficiency.

⁷Capital costs are shown before investment tax credits are applied.

⁸Combustion turbine units can be built by the model prior to 2016 if necessary to meet a given region’s reserve margin.

⁹Because geothermal and hydro cost and performance characteristics are specific for each site, the table entries represent the cost of the least expensive plant that could be built in the Northwest Power Pool region, where most of the proposed sites are located.

¹⁰Costs and capacities are expressed in terms of net AC power available to the grid for the installed capacity.

Sources: For the AEO2015 cycle, EIA continues to use the previously developed cost estimates for utility-scale electric generating plants, updated by external consultants for AEO2013. This report can be found at <http://www.eia.gov/forecasts/capitalcost/>. The costs were assumed to be consistent with plants that would be ordered in 2012, and learning from capacity built in 2012 and 2013 has been applied in the initial costs above. Wind capital costs were updated for AEO2015 using recent reports from trade press and reports from Lawrence Berkeley National Laboratory. Site-specific costs for geothermal were provided by the National Renewable Energy Laboratory, "Updated U.S. Geothermal Supply Curve," February 2010.