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Assumptions to the Annual Energy Outlook 2009

Table 8.2. Cost and Performance Characteristics of New Central Station Electricity Generating Technologies

Technology	Online Year[1]	Size (mW)	Leadtime (Years)	Base Overnight Cost in 2008 ($2007/kW)	Contingency Factors		Total Overnight Cost in 2008[4] (2007 $/kW)	Variable O&M[5] ($2007 mills/kWh)	Fixed O&M[5] ($2007/kW)	Heatrate[6] in 2008 (Btu/kWhr)	Heatrate nth-of-a-kind (Btu/kWr)
					Project Contingency Factor[2]	Technological Optimism Factor[3]					
Scrubbed Coal New[7]	2012	600	4	1,923	1.07	1.00	2,058	4.59	27.53	9,200	8,740
Integrated Coal-Gasification Combined Cycle (IGCC)[7]	2012	550	4	2,223	1.07	1.00	2,378	2.92	38.67	8,765	7,450
IGCC with Carbon Sequestration	2016	380	4	3,172	1.07	1.03	3,496	4.44	46.12	10,781	8,307
Conv Gas/Oil Comb Cycle	2011	250	3	917	1.05	1.00	962	2.07	12.48	7,196	6,800
Adv Gas/Oil Comb Cycle (CC)	2011	400	3	877	1.08	1.00	948	2.00	11.70	6,752	6,333
ADV CC with Carbon Sequestration	2016	400	3	1,683	1.08	1.04	1,890	2.94	19.90	8,613	7,493
Conv Combustion Turbine[8]	2010	160	2	638	1.05	1.00	670	3.57	12.11	10,810	10,450
Adv Combustion Turbine	2010	230	2	604	1.05	1.00	634	3.17	10.53	9,289	8,550
Fuel Cells	2011	10	3	4,640	1.05	1.10	5,360	47.92	5.65	7,930	6,960
Advanced Nuclear	2016	1350	6	2,873	1.10	1.05	3,318	0.49	90.02	10,434	10,434
Distributed Generation -Base	2011	2	3	1,305	1.05	1.00	1,370	7.12	16.03	9,050	8,900
Distributed Generation -Peak	2010	1	2	1,566	1.05	1.00	1,645	7.12	16.03	10,069	9,880
Biomass	2012	80	4	3,339	1.07	1.05	3,766	6.71	64.45	9,646	7,765
MSW - Landfill Gas	2010	30	3	2,377	1.07	1.00	2,543	0.01	114.25	13,648	13,648
Geothermal [7,9]	2010	50	4	1,630	1.05	1.00	1,711	0.00	164.64	34,633	30,301
Conventional Hydropower[9]	2012	500	4	2,038	1.10	1.00	2,242	2.43	13.63	9,919	9,919
Wind	2009	50	3	1,797	1.07	1.00	1,923	0.00	30.30	9,919	9,919
Wind Offshore	2012	100	4	3,416	1.10	1.03	3,851	0.00	89.48	9,919	9,919
Solar Thermal[7]	2012	100	3	4,693	1.07	1.00	5,021	0.00	56.78	9,919	9,919
Photovoltaic[7]	2011	5	2	5,750	1.05	1.00	6,038	0.00	11.68	9,919	9,919

[1]Online year represents the first year that a new unit could be completed, given an order date of 2008. For wind, geothermal and landfill gas, the online year was moved earlier to acknowledge the significant market activity already occuring in anticipation of the expiration of the Production Tax Credit in 2009 for wind and 2010 for the others.

[2]A contingency allowance is defined by the American Association of Cost Engineers as the "specific provision for unforeseeable elements if costs within a defined project scope; particularly important where previous experience has shown that unforeseeable events which will increase costs are likely to occur."

[3]The 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.

[4]Overnight capital cost including contingency factors, excluding regional multipliers and learning effects. Interest charges are also excluded. These represent costs of new projects initiated in 2008.

[5]O&M = Operations and maintenance.

[6]For hydro, wind, and solar technologies, the heatrate shown represents the average heatrate for conventional thermal generation as of 2007. 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.

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

[8]Combustion turbine units can be built by the model prior to 2010 if necessary to meet a given region's reserve margin.

[9]Because 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.

Sources: The values shown in this table are developed by the Energy Information Administration, Office of Integrated Analysis and Forecasting, from analysis of reports and discussions with various sources from industry, government, and the Department of Energy Fuel Offices and National Laboratories. They are not based on any specific technology model, but rather, are meant to represent the cost and performance of typical plants under normal operating conditions for each plant type. Key sources reviewed are listed in the 'Notes and Sources' section at the end of the chapter.