Appendix: Tables for 2040

Table A5. Estimated levelized cost of electricity (LCOE) for new generation resources, 2040

	U.S. Average LCOE (2012 $/MWh) for Plants Entering Service in 2040							
Plant Type	**Capacity Factor (%)**	**Levelized Capital Cost**	**Fixed O&M**	**Variable O&M (including fuel)**	**Transmission Investment**	**Total System LCOE**	**Subsidy[1]**	**Total LCOE including Subsidy**
Dispatchable Technologies								
Conventional Coal	85	52.0	4.2	29.7	1.1	87.0		
Integrated Coal-Gasification Combined Cycle (IGCC)	85	62.8	6.9	28.9	1.1	99.7		
IGCC with CCS	85	77.2	9.8	33.1	1.2	121.2		
Natural Gas-fired								
Conventional Combined Cycle	87	12.5	1.7	65.8	1.2	81.2		
Advanced Combined Cycle	87	13.0	2.0	61.7	1.2	77.8		
Advanced CC with CCS	87	23.4	4.2	74.3	1.2	103.0		
Conventional Combustion Turbine	30	35.2	2.8	107.1	3.4	148.5		
Advanced Combustion Turbine	30	21.8	2.7	87.9	3.4	115.8		
Advanced Nuclear	90	56.7	11.8	13.3	1.1	83.0		
Geothermal	94	43.6	22.9	0.0	1.4	67.8	-4.4	63.5
Biomass	83	39.8	14.5	41.4	1.2	97.0		
Non-Dispatchable Technologies								
Wind	34	56.6	13.3	0.0	3.2	73.1		
Wind – Offshore	37	141.7	22.8	0.0	5.7	170.3		
Solar PV[2]	25	95.3	11.4	0.0	4.0	110.8	-9.5	101.3
Solar Thermal	20	156.2	42.1	0.0	5.9	204.3	-15.6	188.7
Hydroelectric[3]	51	71.2	4.5	7.0	2.1	84.6		

[1]The subsidy component is based on targeted tax credits such as the production or investment tax credit available for some technologies. It only reflects subsidies available in 2040, which includes a permanent 10% investment tax credit for geothermal and solar technologies, based on the Energy Policy Act of 1992. EIA models tax credit expiration as in current laws and regulations: new solar thermal and PV plants are eligible to receive a 30% investment tax credit on capital expenditures if placed in service before the end of 2016, and 10% thereafter. New wind, geothermal, biomass, hydroelectric, and landfill gas plants are eligible to receive either: (1) a $21.5/MWh ($10.7/MWh for technologies other than wind, geothermal and closed-loop biomass) inflation-adjusted production tax credit over the plant's first ten years of service or (2) a 30% investment tax credit, if they are under construction before the end of 2013.

[2] Costs are expressed in terms of net AC power available to the grid for the installed capacity.

[3]As modeled, hydroelectric is assumed to have seasonal storage so that it can be dispatched within a season, but overall operation is limited by resources available by site and season.

Source: U.S. Energy Information Administration, Annual Energy Outlook 2014 Early Release, December 2013, DOE/EIA-0383ER(2014).

Table A6. Regional variation in levelized cost of electricity (LCOE) for new generation resources, 2040

	Range for Total System LCOE (2012 $/MWh)			Range for Total LCOE with Subsidies[1] (2012 $/MWh)		
Plant Type	**Minimum**	**Average**	**Maximum**	**Minimum**	**Average**	**Maximum**
Dispatchable Technologies						
Conventional Coal	78.9	87.0	106.7			
IGCC	90.8	99.7	114.7			
IGCC with CCS	113.0	121.2	135.7			
Natural Gas-fired						
Conventional Combined Cycle	75.8	81.2	94.0			
Advanced Combined Cycle	73.4	77.8	89.4			
Advanced CC with CCS	97.8	103.0	114.8			
Conventional Combustion Turbine	118.8	148.5	172.3			
Advanced Combustion Turbine	108.9	115.8	132.3			
Advanced Nuclear	80.2	83.0	87.6			
Geothermal	54.4	67.8	81.3	50.7	63.5	76.3
Biomass	85.3	97.0	118.8			
Non-Dispatchable Technologies						
Wind	63.4	73.1	82.9			
Wind – Offshore	140.9	170.3	225.3			
Solar PV[2]	86.5	110.8	170.2	79.2	101.3	155.0
Solar Thermal	148.6	204.3	325.6	137.2	188.7	300.5
Hydroelectric[3]	63.6	84.6	122.4			

[1]Levelized cost with subsidies reflects subsidies available in 2040, which includes a permanent 10% investment tax credit for geothermal and solar technologies, based on the Energy Policy Act of 1992.

[2] Costs are expressed in terms of net AC power available to the grid for the installed capacity.

[3]As modeled, hydroelectric is assumed to have seasonal storage so that it can be dispatched within a season, but overall operation is limited by resources available by site and season.

Note: The levelized costs for non-dispatchable technologies are calculated based on the capacity factor for the marginal site modeled in each region, which can vary significantly by region. The capacity factor ranges for these technologies are as follows: Wind – 32% to 41%, Wind Offshore – 33% to 42%, Solar PV- 22% to 32%, Solar Thermal – 11% to 26%, and Hydroelectric – 35% to 65%. The levelized costs are also affected by regional variations in construction labor rates and capital costs as well as resource availability.

Source: U.S. Energy Information Administration, Annual Energy Outlook 2014 Early Release, December 2013, DOE/EIA-0383ER(2014).

Table A7: Regional variation in levelized avoided costs of electricity (LACE) for new generation resources, 2040

	Range for LACE (2012 $/MWh)		
Plant Type	**Minimum**	**Average**	**Maximum**
Dispatchable Technologies			
Coal-fired plant types without CCS	72.3	76.4	80.7
IGCC with CCS[1]	72.3	77.0	88.6
Natural Gas-fired Combined Cycle	72.2	77.7	88.4
Advanced Nuclear	72.2	76.1	80.6
Geothermal	75.0	78.7	88.0
Biomass	72.3	78.0	88.7
Non-Dispatchable Technologies			
Wind	65.8	70.8	84.1
Wind – Offshore	71.9	77.4	88.1
Solar PV	83.2	89.4	96.5
Solar Thermal	87.7	96.5	104.4
Hydroelectric	71.0	75.3	88.0

[1]Coal without CCS cannot be built in California, therefore the average LACE for coal technologies without CCS is computed over fewer regions than the LACE for IGCC with CCS. Otherwise, the LACE for any given region is the same across coal technologies, with or without CCS.