

Appendix: Tables for 2040

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

U.S. Average Levelized Costs (2013 \$/MWh) for Plants Entering Service in 2020¹

Plant Type	Capacity Factor (%)	Levelized Capital Cost	Fixed O&M	Variable O&M (including fuel)	Transmission Investment	Total System LCOE	Subsidy ²	Total LCOE including Subsidy
Dispatchable Technologies								
Conventional Coal	85	56.8	4.2	29.5	1.1	91.7		
Advanced Coal	85	69.1	6.9	28.4	1.1	105.5		
Advanced Coal with CCS	85	84.9	9.8	31.8	1.2	127.6		
Natural Gas-fired								
Conventional Combined Cycle	87	13.7	1.7	66.0	1.2	82.6		
Advanced Combined Cycle	87	14.3	2.0	61.9	1.2	79.3		
Advanced CC with CCS	87	25.8	4.2	75.2	1.2	106.3		
Conventional Combustion Turbine	30	38.4	2.8	110.3	3.4	154.9		
Advanced Combustion Turbine	30	24.1	2.7	88.4	3.4	118.6		
Advanced Nuclear	90	62.5	11.8	13.5	1.1	88.9		
Geothermal	94	38.2	21.2	0.0	1.4	60.8	-3.8	56.9
Biomass	83	43.0	14.5	34.8	1.2	93.5		
Non-Dispatchable Technologies								
Wind	35	58.9	13.0	0.0	3.1	75.1		
Wind – Offshore	38	147.4	22.5	0.0	5.7	175.6		
Solar PV ³	25	101.8	11.4	0.0	4.1	117.3	-10.2	107.1
Solar Thermal	20	165.6	42.1	0.0	5.9	213.6	-16.6	197.1
Hydroelectric ⁴	52	76.1	4.4	7.3	2.0	89.9		

¹The 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 2020, which include a permanent 10% investment tax credit for geothermal and solar technologies. EIA models tax credit expiration as follows: 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 \$23.0/MWh (\$11.0/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. Up to 6 GW of new nuclear plants are eligible to receive an \$18/MWh production tax credit if in service by 2020; nuclear plants shown in this table have an in-service date of 2022.

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

³As 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 2015*, April 2015, DOE/EIA-0383(2015).

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

Plant Type	Range for Total System LCOE (2013 \$/MWh)			Range for Total LCOE with Subsidies ¹ (2013 \$/MWh)		
	Minimum	Average	Maximum	Minimum	Average	Maximum
Dispatchable Technologies						
Conventional Coal	83.2	91.7	114.8			
Advanced Coal	96.4	105.5	123.6			
Advanced Coal with CCS	117.1	127.6	141.6			
Natural Gas-fired						
Conventional Combined Cycle	76.8	82.6	93.2			
Advanced Combined Cycle	74.0	79.3	88.4			
Advanced CC with CCS	97.5	106.3	117.5			
Conventional Combustion Turbine	143.0	154.9	168.5			
Advanced Combustion Turbine	111.1	118.6	129.8			
Advanced Nuclear	85.9	88.9	94.1			
Geothermal	36.6	60.8	85.0	34.4	56.9	79.4
Biomass	82.9	93.5	116.2			
Non-Dispatchable Technologies						
Wind	61.1	75.1	122.8			
Wind – Offshore	151.1	175.6	239.5			
Solar PV ²	91.5	117.3	180.5	83.7	107.1	164.2
Solar Thermal	155.4	213.6	340.6	143.3	197.1	314.0
Hydroelectric ³	78.0	89.9	107.7			

¹Levelized 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.

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

³As 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 2015*, April 2015, DOE/EIA-0383(2015).

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

Plant Type	Range for Levelized Avoided Costs (2013\$/MWh)		
	Minimum	Average	Maximum
Dispatchable Technologies			
Coal without CCS	72.8	78.9	86.4
IGCC with CCS ¹	72.8	79.2	86.4
Natural Gas-fired Combined Cycle	72.6	79.3	86.3
Advanced Nuclear	72.4	78.7	86.4
Geothermal	76.7	80.6	84.6
Biomass	72.9	79.6	86.4
Non-Dispatchable Technologies			
Wind	66.5	71.7	77.2
Wind – Offshore	71.1	79.3	85.2
Solar PV	70.4	91.0	99.4
Solar Thermal	66.3	95.6	114.7
Hydroelectric	71.5	77.7	85.5

¹Coal 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.