

Sheet2

Year n	actual Build cost	discounted Build cost	actual O&M cost	discounted O&M cost	discounted cumulative cost
\$0.00	\$1,020.00	\$1,020.00	\$37.50	\$37.50	\$1,057.50
\$1.00	0	\$0.00	\$37.50	\$35.71	\$1,093.21
\$2.00	0	\$0.00	\$37.50	\$34.01	\$1,127.23
\$3.00	0	\$0.00	\$37.50	\$32.39	\$1,159.62
\$4.00	0	\$0.00	\$37.50	\$30.85	\$1,190.47
\$5.00	0	\$0.00	\$37.50	\$29.38	\$1,219.86
\$6.00	0	\$0.00	\$37.50	\$27.98	\$1,247.84
\$7.00	0	\$0.00	\$37.50	\$26.65	\$1,274.49
\$8.00	0	\$0.00	\$37.50	\$25.38	\$1,299.87
\$9.00	0	\$0.00	\$37.50	\$24.17	\$1,324.04
\$10.00	0	\$0.00	\$37.50	\$23.02	\$1,347.07
\$11.00	0	\$0.00	\$37.50	\$21.93	\$1,368.99
\$12.00	0	\$0.00	\$37.50	\$20.88	\$1,389.87
\$13.00	0	\$0.00	\$37.50	\$19.89	\$1,409.76
\$14.00	0	\$0.00	\$37.50	\$18.94	\$1,428.70
\$15.00	235	\$113.04	\$37.50	\$18.04	\$1,559.78
\$16.00	0	\$0.00	\$37.50	\$17.18	\$1,576.96
\$17.00	0	\$0.00	\$37.50	\$16.36	\$1,593.32
\$18.00	0	\$0.00	\$37.50	\$15.58	\$1,608.90
\$19.00	0	\$0.00	\$37.50	\$14.84	\$1,623.74
\$20.00	0	\$0.00	\$37.50	\$14.13	\$1,637.87
\$21.00	0	\$0.00	\$37.50	\$13.46	\$1,651.33
\$22.00	0	\$0.00	\$37.50	\$12.82	\$1,664.15
\$23.00	0	\$0.00	\$37.50	\$12.21	\$1,676.36
\$24.00	0	\$0.00	\$37.50	\$11.63	\$1,687.99
\$25.00	0	\$0.00	\$37.50	\$11.07	\$1,699.06
\$26.00	0	\$0.00	\$37.50	\$10.55	\$1,709.61
\$27.00	0	\$0.00	\$37.50	\$10.04	\$1,719.65
\$28.00	0	\$0.00	\$37.50	\$9.57	\$1,729.22
\$29.00	0	\$0.00	\$37.50	\$9.11	\$1,738.33
\$30.00	480	\$111.06	\$37.50	\$8.68	\$1,858.07
\$31.00	0	\$0.00	\$37.50	\$8.26	\$1,866.33
\$32.00	0	\$0.00	\$37.50	\$7.87	\$1,874.20
\$33.00	0	\$0.00	\$37.50	\$7.50	\$1,881.70
\$34.00	0	\$0.00	\$37.50	\$7.14	\$1,888.83
\$35.00	0	\$0.00	\$37.50	\$6.80	\$1,895.63
\$36.00	0	\$0.00	\$37.50	\$6.47	\$1,902.11
\$37.00	0	\$0.00	\$37.50	\$6.17	\$1,908.27
\$38.00	0	\$0.00	\$37.50	\$5.87	\$1,914.15
\$39.00	0	\$0.00	\$37.50	\$5.59	\$1,919.74
\$40.00	0	\$0.00	\$37.50	\$5.33	\$1,925.07
\$41.00	0	\$0.00	\$37.50	\$5.07	\$1,930.14
\$42.00	0	\$0.00	\$37.50	\$4.83	\$1,934.97
\$43.00	0	\$0.00	\$37.50	\$4.60	\$1,939.57
\$44.00	0	\$0.00	\$37.50	\$4.38	\$1,943.95
\$45.00	235	\$26.15	\$37.50	\$4.17	\$1,974.28
\$46.00	0	\$0.00	\$37.50	\$3.97	\$1,978.26
\$47.00	0	\$0.00	\$37.50	\$3.79	\$1,982.04
\$48.00	0	\$0.00	\$37.50	\$3.61	\$1,985.65

Sheet2

\$49.00	0	\$0.00	\$37.50	\$3.43	\$1,989.08
\$50.00	0	\$0.00	\$37.50	\$3.27	\$1,992.35
Decommission = 1%	\$1,970.00	\$171.79			\$2,164.14

All values are in units of \$ /kW

Energy source is Onshore wind

Assumed discount rate is 5% /yr

Levelized cost of Power = \$2,164.14 \$ /kW

Capacity Factor = 37.9%

Levelized Cost of Energy – LCOE = $\$2164.14 \div 166.002$ \$13.04 /MWh

	Actual Build cost	Discounted Build cost	Actual O&M cost	Discounted O&M cost	Cumulative cost	Yearly energy
Year n	\$1,960 /kW					average
	\$1,960	\$1,960	\$80.00	\$80.00	\$2,040.00	2.505
1	0	0	\$80.00	\$75.47	\$2,115.47	2.505
2	0	0	\$80.00	\$71.20	\$2,186.67	2.505
3	0	0	\$80.00	\$67.17	\$2,253.84	2.505
4	0	0	\$80.00	\$63.37	\$2,317.21	2.505
5	0	0	\$80.00	\$59.78	\$2,376.99	2.505
6	0	0	\$80.00	\$56.40	\$2,433.39	2.505
7	0	0	\$80.00	\$53.20	\$2,486.59	2.505
8	0	0	\$80.00	\$50.19	\$2,536.78	2.505
9	0	0	\$80.00	\$47.35	\$2,584.14	2.505
10	0	0	\$80.00	\$44.67	\$2,628.81	2.505
11	0	0	\$80.00	\$42.14	\$2,670.95	2.505
12	176.40	\$87.67	\$80.00	\$39.76	\$2,798.37	2.505
13	0	0	\$80.00	\$37.51	\$2,835.88	2.505
14	0	0	\$80.00	\$35.38	\$2,871.26	2.505
15	0	0	\$80.00	\$33.38	\$2,904.65	2.505
16	0	0	\$80.00	\$31.49	\$2,936.14	2.505
17	0	0	\$80.00	\$29.71	\$2,965.85	2.505
18	0	0	\$80.00	\$28.03	\$2,993.87	2.505
19	0	0	\$80.00	\$26.44	\$3,020.31	2.505
20	\$607.60	\$189.45	\$80.00	\$24.94	\$3,234.71	2.505
21	0	0	\$80.00	\$23.53	\$3,258.24	2.505
22	0	0	\$80.00	\$22.20	\$3,280.44	2.505
23	0	0	\$80.00	\$20.94	\$3,301.39	2.505
24	\$176.40	\$43.57	\$80.00	\$19.76	\$3,364.71	2.505
25	0	0	\$80.00	\$18.64	\$3,383.35	2.505
26	0	0	\$80.00	\$17.58	\$3,400.94	2.505
27	0	0	\$80.00	\$16.59	\$3,417.53	2.505
28	0	0	\$80.00	\$15.65	\$3,433.18	2.505
29	0	0	\$80.00	\$14.76	\$3,447.94	2.505
30	\$1,254.40	\$218.40	\$80.00	\$13.93	\$3,680.28	2.505
31	0	0	\$80.00	\$13.14	\$3,693.42	2.505
32	0	0	\$80.00	\$12.40	\$3,705.81	2.505
33	0	0	\$80.00	\$11.69	\$3,717.51	2.505
34	0	0	\$80.00	\$11.03	\$3,728.54	2.505
35	0	0	\$80.00	\$10.41	\$3,738.95	2.505
36	0	0	\$80.00	\$9.82	\$3,748.77	2.505
37	0	0	\$80.00	\$9.26	\$3,758.03	2.505
38	0	0	\$80.00	\$8.74	\$3,766.77	2.505
39	0	0	\$80.00	\$8.24	\$3,775.01	2.505
40	0	0	\$80.00	\$7.78	\$3,782.79	2.505
41	0	0	\$80.00	\$7.34	\$3,790.13	2.505
42	\$176.40	\$15.26	\$80.00	\$6.92	\$3,812.32	2.505
43	0	0	\$80.00	\$6.53	\$3,818.85	2.505
44	0	0	\$80.00	\$6.16	\$3,825.01	2.505
45	0	0	\$80.00	\$5.81	\$3,830.82	2.505
46	0	0	\$80.00	\$5.48	\$3,836.30	2.505

Sheet1

47	0	0	\$80.00	\$5.17	\$3,841.47	2.505
48	0	0	\$80.00	\$4.88	\$3,846.35	2.505
49	0	0	\$80.00	\$4.60	\$3,850.96	2.505
50	\$607.60	\$32.99	\$80.00	\$4.34	\$3,888.29	2.505
51	0	0	\$80.00	\$4.10	\$3,892.38	2.505
52	0	0	\$80.00	\$3.87	\$3,896.25	2.505
53	0	0	\$80.00	\$3.65	\$3,899.90	2.505
54	\$176.40	\$7.59	\$80.00	\$3.44	\$3,910.92	2.505
55	0	0	\$80.00	\$3.25	\$3,914.17	2.505
56	0	0	\$80.00	\$3.06	\$3,917.23	2.505
57	0	0	\$80.00	\$2.89	\$3,920.12	2.505
58	0	0	\$80.00	\$2.72	\$3,922.84	2.505
59	0	0	\$80.00	\$2.57	\$3,925.41	2.505
60	0	0	\$80.00	\$2.43	\$3,927.84	2.505
Total BLDG cost	\$5,135.20	Replacements performed		Actual lifetime energy (MWh)		152.83
Decom = 2%	\$102.70					
			Levelized Cost of Power (\$/kW)		\$4,030.54	include decom
			All the above values are in units of \$ /kW			
			Levelized Cost of Energy – LCOE (\$/MWh)		\$93.74	← → Leve

Sheet1

			discoun
Source is Off Shore Wind w/ CF = 28.6%	0.286	2.505	average yearly energy
Assumed discount rate is 6% /year			
Levelized Cost of Power in \$ /kW units	\$4,030.54	from Column F above, after year 60	
Conversion factor from Power to Actual Energy	0.006652404	for CF = 0.286	Conversion = 1 ÷ (CF x 8760 h /yr x 60
Levelized Cost of Energy	\$93.74 /MWh	LCOE	

Discounted yearly energy	Remarks
in MWh	Off Shore Wind @6%
2.505	Construction
2.364	completed
2.230	In 1 year
2.104	
1.984	Total CAPEX = \$1,960 /kW
1.872	
1.766	Columns A through F
1.666	are nominal dollars
1.572	per kilowatt
1.483	of peak generating
1.399	capacity
1.320	
1.245	Replace AC converter 9%
1.175	
1.108	
1.045	
0.986	
0.930	
0.878	
0.828	
0.781	Replace blades 31%
0.737	
0.695	
0.656	
0.619	Replace AC converter 9%
0.584	
0.551	
0.520	
0.490	
0.462	
0.436	Replace all hardware = 64%
0.412	gearbox + generator + transformer,
0.388	converter & blades
0.366	24% + 9% + 31% = 64%
0.346	
0.326	
0.308	
0.290	
0.274	
0.258	
0.244	
0.230	
0.217	Replace AC converter 9%
0.205	
0.193	
0.182	
0.172	

0.162	
0.153	
0.144	
0.136	Replace blades 31%
0.128	
0.121	
0.114	
0.108	Replace AC converter 9%
0.102	
0.096	
0.090	
0.085	
0.081	
0.076	
43.00	Discounted lifetime energy (MWh)

mission from column A

Normalized cost of power

divided by
ted lifetime energy

yrs /1000 kW per MW)