

Annexure-IX

Details of calculation for Tamil Nadu

Item No.	Balancing Cost	Rs./Unit
1	Total balancing charge for CGs Coal and Gas based station (fixed +fuel charge)(Rs/kWh)-Spread over renewable generation	0.20
2	Total balancing charge for Tamilnadu Coal and Gas based station (fixed +fuel charge)(Rs/kWh)-Spread over renewable generation	0.03
3	Impact of DSM per unit (Rs/kWh)- Spread over renewable generation	0.35
4	Impact on tariff (Rs./Unit) for Tamilnadu discom for backing down Coal generation assuming solar and wind at Rs. 4/kWh and coal fuel charge at Rs. 2.0/kWh- Spread over renewable generation (Considering 25% on account of renewables)	0.50
5	Stand by charge (Rs/kWh)- Spread over renewable generation	0.23
6	Extra transmission charge (Rs/kWh)- Spread over renewable generation	0.26
	Total Impact- Spread over renewable generation (Rs/kWh)	1.57

TN-Item no. 1

CGs

Block No.	Time	CGS
1	00.30	2130
2	01.00	1973
3	01.30	1304
4	02.00	1332
5	02.30	1337
6	03.00	1337
7	03.30	1228
8	04.00	1229
9	04.30	1576
10	05.00	1244
11	05.30	2380
12	06.00	2480
13	06.30	2970
14	07.00	3070
15	07.30	3075
16	08.00	3421
17	08.30	3009
18	09.00	2961
19	09.30	3033
20	10.00	3034
21	10.30	2604
22	11.00	2604
23	11.30	2486
24	12.00	2386
25	12.30	2349
26	13.00	2326
27	13.30	2213
28	14.00	2132
29	14.30	2033
30	15.00	2134
31	15.30	2149
32	16.00	2249
33	16.30	3015
34	17.00	2620
35	17.30	2824
36	18.00	2765
37	18.30	3122
38	19.00	3189
39	19.30	3259
40	20.00	3274
41	20.30	3421
42	21.00	3414
43	21.30	3472
44	22.00	3376
45	22.30	3282
46	23.00	3186
47	23.30	3100
48	24.00	3100

Total (Wind+Solar)	
4300.70	
4120.90	
4150.20	
4194.30	
4046.00	
3963.40	
3909.10	
3847.80	
3514.80	
3484.00	
3376.20	
3426.70	
3519.80	
3689.60	
3378.10	
3504.90	
3625.10	
4205.90	
4388.70	
4301.10	
5102.70	
5086.70	
5162.60	
5278.70	
5132.30	
4966.80	
5139.50	
5139.20	
5142.80	
5256.90	
5162.00	
4843.70	
4651.80	
4433.20	
4142.00	
3999.60	
3744.00	
3668.00	
3573.40	
3591.80	
3412.50	
3284.70	
2797.20	
2572.00	
2326.50	
2294.70	
2037.20	
2027.10	
Total	95,458.45

Total generation MWh	61102.68	IC		
Max Capacity available MW	3471.5		3471.5	70.8186
Max generation MWh	83316			
PLF Achieved%	73.34			

Fixed cost (Rs/kWh)@85 % PLF		1.5
total fixed cost (Rs) in crores at 85% PLF		10.6
total fixed cost (Rs) in crores at 73.34% PLF		1.74
Difference in fixed cost (Rs/kWh)		0.24
Difference in fixed cost (Rs/kWh)spread over renewable generation		0.153
Loss of efficiency due to operation at 73.34% PLF	4% As per CERC Grid Code	
Fuel charge for coal based plants (Rs./kWh)		2
Total loss due to low PLF operation (Rs.)		4888214.4
Per Unit Loss spread over renewable generation (Rs./Unit)		0.05
Total balancing charge for CGs Coal and gas based station (fixed +fuel charge)(Rs/Kwh)- Spread over renewable generation		0.20

TN-Item no. 2

Block No.	Time	TN Thermal
1	00.30	2128
2	01.00	2128
3	01.30	2137
4	02.00	2137
5	02.30	2132
6	03.00	2132
7	03.30	2145
8	04.00	2145
9	04.30	2138
10	05.00	2138
11	05.30	2145
12	06.00	2145
13	06.30	2130
14	07.00	2130
15	07.30	2133
16	08.00	2133
17	08.30	2130
18	09.00	2130
19	09.30	2138
20	10.00	2138
21	10.30	2128
22	11.00	2128
23	11.30	2135
24	12.00	2135
25	12.30	2125
26	13.00	2125
27	13.30	2123
28	14.00	2123
29	14.30	2124
30	15.00	2124
31	15.30	2126
32	16.00	2126
33	16.30	2139
34	17.00	2139
35	17.30	2294
36	18.00	2324
37	18.30	2643
38	19.00	2643
39	19.30	2644
40	20.00	2644
41	20.30	2493
42	21.00	2493
43	21.30	2436
44	22.00	2436
45	22.30	2434
46	23.00	2434
47	23.30	2420
48	24.00	2420

Total (Wind+Solar)	
4300.70	
4120.90	
4150.20	
4194.30	
4046.00	
3963.40	
3909.10	
3847.80	
3514.80	
3484.00	
3376.20	
3426.70	
3519.80	
3689.60	
3378.10	
3504.90	
3625.10	
4205.90	
4388.70	
4301.10	
5102.70	
5086.70	
5162.60	
5278.70	
5132.30	
4966.80	
5139.50	
5139.20	
5142.80	
5256.90	
5162.00	
4843.70	
4651.80	
4433.20	
4142.00	
3999.60	
3744.00	
3668.00	
3573.40	
3591.80	
3412.50	
3284.70	
2797.20	
2572.00	
2326.50	
2294.70	
2037.20	
2027.10	
Total	95458.45

Total generation MWh	53635	IC	
Max Capacity available MW	2644		2644
Max generation MWh	63456		53.9376
PLF Achieved%	84.52		

Fixed cost (Rs/kWh)@85 % PLF	1.5
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total fixed cost (Rs) in crores at 85% PLF

8.1

total fixed cost (Rs) in crores at 84.52% PLF

1.51

Difference in fixed cost (Rs/kWh) 0.01

Difference in fixed cost (Rs/kWh) spread over renewable generation 0.005

Loss of efficiency due to operation at 84.52% PLF 2% As per CERC Grid Code

Fuel charge for coal based plants (Rs./kWh) 2

Total loss due to low PLF operation (Rs.) 2145400

Per Unit Loss spread over renewable generation (Rs./Unit) 0.02

Total balancing charge for Tamilnadu Coal based station (fixed +fuel charge)(Rs/kWh)- Spread over renewable generation	0.03
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TN-Item no. 3

Block No.	Time	Total (Wind+Solar)	deviation (15%)	Deviation beyond 250 MW	Charges (Rs.) due to DSM considering Rs. 4/Kwh
1	00.30	4300.7	645.11	395.11	1,580,420.00
2	01.00	4120.9	618.14	368.14	1,472,540.00
3	01.30	4150.2	622.53	372.53	1,490,120.00
4	02.00	4194.3	629.15	379.15	1,516,580.00
5	02.30	4046	606.90	356.90	1,427,600.00
6	03.00	3963.4	594.51	344.51	1,378,040.00
7	03.30	3909.1	586.37	336.37	1,345,460.00
8	04.00	3847.8	577.17	327.17	1,308,680.00
9	04.30	3514.8	527.22	277.22	1,108,880.00
10	05.00	3484	522.60	272.60	1,090,400.00
11	05.30	3376.2	506.43	256.43	1,025,720.00
12	06.00	3426.7	514.01	264.01	1,056,020.00
13	06.30	3519.8	527.97	277.97	1,111,880.00
14	07.00	3689.6	553.44	303.44	1,213,760.00
15	07.30	3378.1	506.72	256.72	1,026,860.00
16	08.00	3504.9	525.74	275.74	1,102,940.00
17	08.30	3625.1	543.77	293.77	1,175,060.00
18	09.00	4205.9	630.89	380.89	1,523,540.00
19	09.30	4388.7	658.31	408.31	1,633,220.00
20	10.00	4301.1	645.17	395.17	1,580,660.00
21	10.30	5102.7	765.41	515.41	2,061,620.00
22	11.00	5086.7	763.01	513.01	2,052,020.00
23	11.30	5162.6	774.39	524.39	2,097,560.00
24	12.00	5278.7	791.81	541.81	2,167,220.00
25	12.30	5132.3	769.85	519.85	2,079,380.00
26	13.00	4966.8	745.02	495.02	1,980,080.00
27	13.30	5139.5	770.93	520.93	2,083,700.00
28	14.00	5139.2	770.88	520.88	2,083,520.00
29	14.30	5142.8	771.42	521.42	2,085,680.00
30	15.00	5256.9	788.54	538.54	2,154,140.00
31	15.30	5162	774.30	524.30	2,097,200.00
32	16.00	4843.7	726.56	476.56	1,906,220.00
33	16.30	4651.8	697.77	447.77	1,791,080.00
34	17.00	4433.2	664.98	414.98	1,659,920.00
35	17.30	4142	621.30	371.30	1,485,200.00
36	18.00	3999.6	599.94	349.94	1,399,760.00
37	18.30	3744	561.60	311.60	1,246,400.00
38	19.00	3668	550.20	300.20	1,200,800.00
39	19.30	3573.4	536.01	286.01	1,144,040.00
40	20.00	3591.8	538.77	288.77	1,155,080.00
41	20.30	3412.5	511.88	261.88	1,047,500.00
42	21.00	3284.7	492.71	242.71	970,820.00
43	21.30	2797.2	419.58	169.58	678,320.00
44	22.00	2572	385.80	135.80	543,200.00
45	22.30	2326.5	348.98	98.98	395,900.00
46	23.00	2294.7	344.21	94.21	376,820.00
47	23.30	2037.2	305.58	55.58	222,320.00
48	24.00	2027.1	304.07	54.07	216,260.00
Total		95,458.45		Total	33,275,070.00

Impact of DSM per unit (Rs/Kwh)- Spread over renewable generation	0.35
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TN-Item no. 4

Block No.	Time	Total (Wind+Solar)
1	00.30	4300.7
2	01.00	4120.9
3	01.30	4150.2
4	02.00	4194.3
5	02.30	4046
6	03.00	3963.4
7	03.30	3909.1
8	04.00	3847.8
9	04.30	3514.8
10	05.00	3484
11	05.30	3376.2
12	06.00	3426.7
13	06.30	3519.8
14	07.00	3689.6
15	07.30	3378.1
16	08.00	3504.9
17	08.30	3625.1
18	09.00	4205.9
19	09.30	4388.7
20	10.00	4301.1
21	10.30	5102.7
22	11.00	5086.7
23	11.30	5162.6
24	12.00	5278.7
25	12.30	5132.3
26	13.00	4966.8
27	13.30	5139.5
28	14.00	5139.2
29	14.30	5142.8
30	15.00	5256.9
31	15.30	5162
32	16.00	4843.7
33	16.30	4651.8
34	17.00	4433.2
35	17.30	4142
36	18.00	3999.6
37	18.30	3744
38	19.00	3668
39	19.30	3573.4
40	20.00	3591.8
41	20.30	3412.5
42	21.00	3284.7
43	21.30	2797.2
44	22.00	2572
45	22.30	2326.5
46	23.00	2294.7
47	23.30	2037.2
48	24.00	2027.1

Total wind and solar (MWh)	95458.45
Money spent extra by backing down coal generation to take renewables (Rs)	190916900.00
Impact on tariff (Rs./Unit) for Tamilnadu discom for backing down Coal generation assuming solar and wind at Rs. 4/kWh and coal fuel charge at Rs. 2.0/kWh- Spread over renewable generation (Considering 25% on account of renewables)	0.50

TN-Item no. 5

Block No.	Time	Total (Wind+Solar)
1	00.30	4300.7
2	01.00	4120.9
3	01.30	4150.2
4	02.00	4194.3
5	02.30	4046
6	03.00	3963.4
7	03.30	3909.1
8	04.00	3847.8
9	04.30	3514.8
10	05.00	3484
11	05.30	3376.2
12	06.00	3426.7
13	06.30	3519.8
14	07.00	3689.6
15	07.30	3378.1
16	08.00	3504.9
17	08.30	3625.1
18	09.00	4205.9
19	09.30	4388.7
20	10.00	4301.1
21	10.30	5102.7
22	11.00	5086.7
23	11.30	5162.6
24	12.00	5278.7
25	12.30	5132.3
26	13.00	4966.8
27	13.30	5139.5
28	14.00	5139.2
29	14.30	5142.8
30	15.00	5256.9
31	15.30	5162
32	16.00	4843.7
33	16.30	4651.8
34	17.00	4433.2
35	17.30	4142
36	18.00	3999.6
37	18.30	3744
38	19.00	3668
39	19.30	3573.4
40	20.00	3591.8
41	20.30	3412.5
42	21.00	3284.7
43	21.30	2797.2
44	22.00	2572
45	22.30	2326.5
46	23.00	2294.7
47	23.30	2037.2
48	24.00	2027.1
	Total	95,458.45
	Max	5,278.70
	Min	2,037.20

Max wind+solar generation	5278.70
10% standby available capacity	527.87
10% standby gross capacity	621.02
MWH generated during day	14904.56
Total implication during the day (Rs.)	22356847.06
Stand by charge (Rs/kWh)- Spread over renewable generation	0.23

TN-Item no. 6

Extra transmission charge (Rs/kWh)- Spread over renewable generation	0.26
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