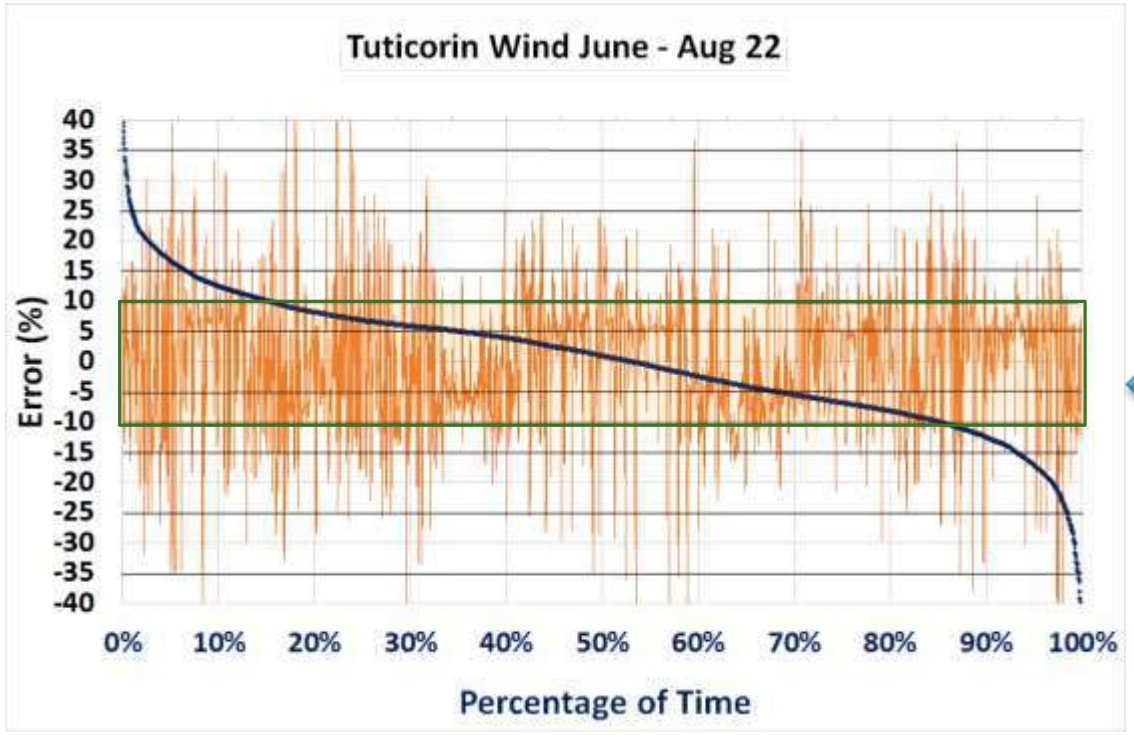
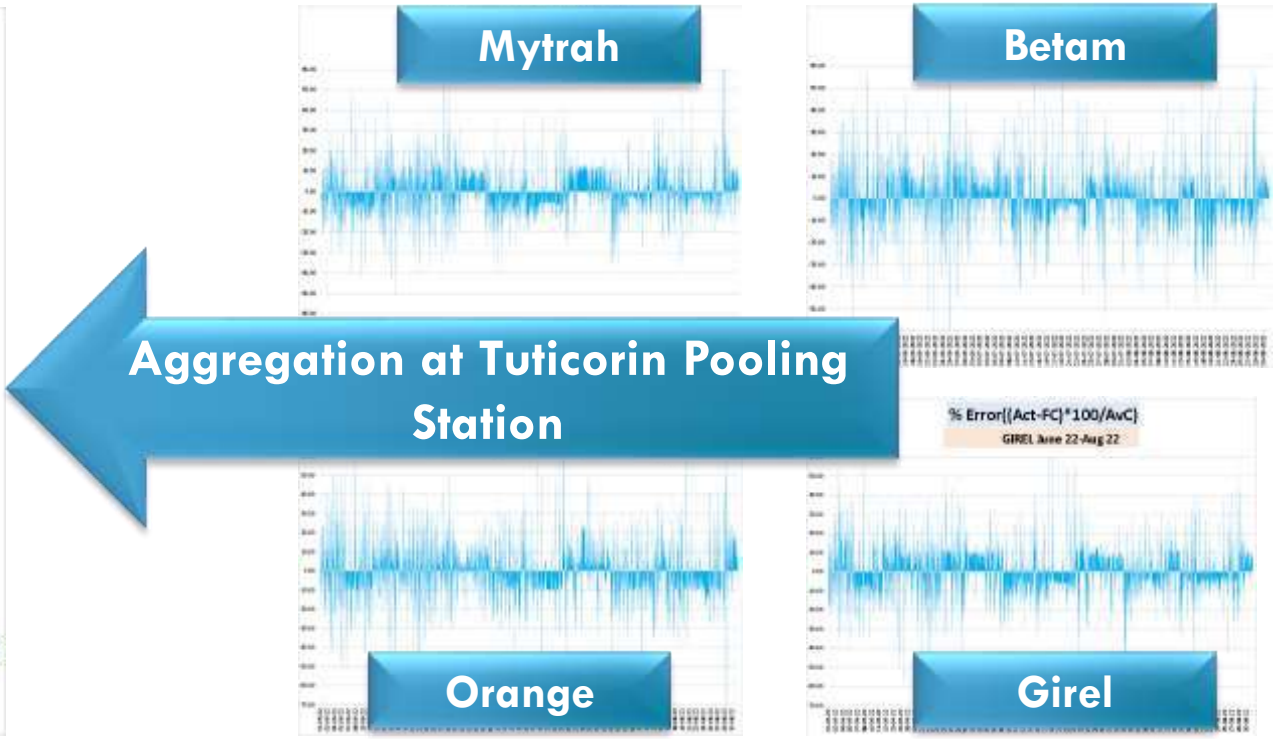
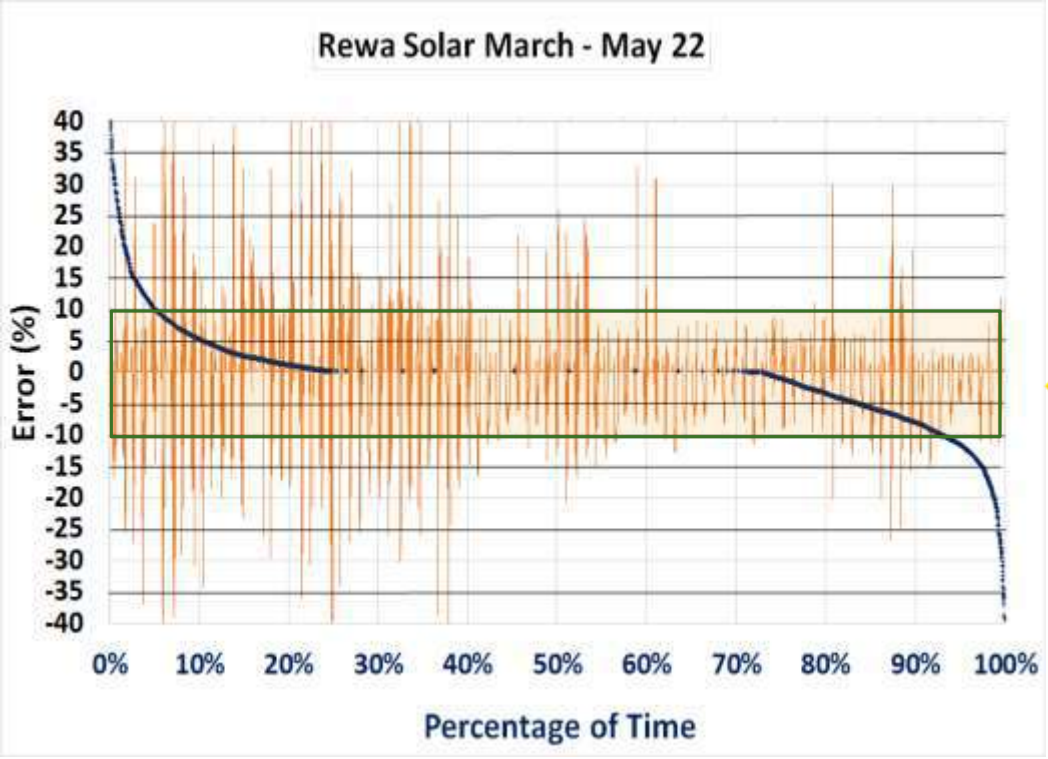
AGGREGATION OF WIND PLANTS (SAMPLE)



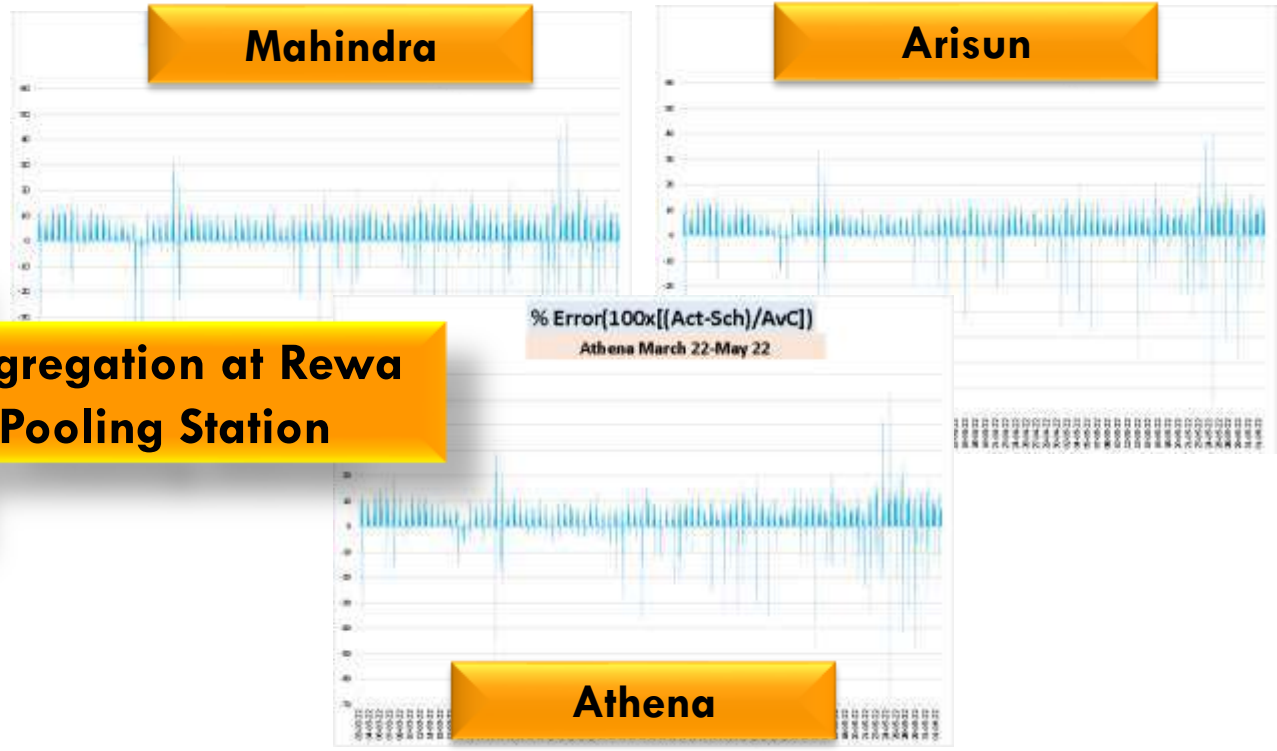


Total No of Samples	8832	Error in Percentage (%) of Time Between				
Wind Plant	Installed Capacity (MW)	± 5%	± 10%	± 15%	± 25%	± 35%
Orange	200	28.76	60.09	74.78	91.39	97.26
Betam	220	34.73	62.34	79.99	93.12	97.37
Girel	250	29.02	65.91	84.53	95.34	98.66
Mytrah	250	34.44	68.25	87.41	96.78	99.08
Aggregated at Tuticorin Pooling	920	33.06	70.24	86.57	97.50	99.37

AGGREGATION OF SOLAR PLANTS (SAMPLE)



Aggregation at Rewa Pooling Station



Total No of Samples	8832	Error in Percentage (%) of Time Between				
Solar Plant	Installed Capacity (MW)	± 5%	± 10%	± 15%	± 25%	± 35%
Mahindra	250	71.03	90.74	97.40	99.18	99.54
Athena	250	74.69	92.12	97.89	99.35	99.74
Arinsun	250	73.55	92.56	98.03	99.47	99.75
Aggregated at Rewa Pooling Station	750	73.45	92.63	98.03	99.49	99.74

SAMPLE COMPARISON OF DSM CHARGES OLD VERSUS NEW DSM MECHANISM (SOLAR)

Sample Case: Solar plant (250 MW) in Southern Region with PPA Rate of ₹ 2.73/kWh)

High solar period (February, 2022)

- Liability in range of 0 – 0.58 paisa/kWh in case of old/extant DSM methodology
- Liability in range of 0.8 – 9.0 paisa/kWh in case of new/upcoming DSM methodology

Low solar period (August, 2022)

- Liability in range of 0.1 – 4.0 paisa/kWh in case of old/extant DSM methodology
- Liability in range of 5.5 – 27.5 paisa/kWh in case of new/upcoming DSM methodology

DSM Comparison of Solar Plant (PPA rate: 2.73 ₹/KWh) in Southern Region (250 MW capacity) for High solar period

Date	Schedule (MWh) (A)	Actual (MWh) (B)	Deviation (MWh) (B-A)	Effective liability (as per Old **DSM regulations**) (+)less realization then PPA rate/(-)more realization then PPA rate (in paise/KWh)	DSM Amount (**as per Old DSM regulations**) Net Receivable (+)from pool/ (-)Payable to Pool (in ₹ Lakhs)	Effective liability (as per New **DSM regulations**) (+)less realization then PPA rate/(-)more realization then PPA rate (in paise/KWh)	DSM Amount (**as per New DSM regulations**) Net Receivable (+)from pool/ (-)Payable to Pool (in ₹ Lakhs)
14-02-2022	1680.8	1722.1	41.3	0.23	1.1	4.7	0.3
15-02-2022	1720.0	1757.8	37.8	0.07	1.0	1.3	0.8
16-02-2022	1704.3	1692.1	-12.2	0.03	-0.3	1.7	-0.6
17-02-2022	1632.0	1801.6	169.6	0.58	4.5	9.0	3.0
18-02-2022	1716.0	1873.9	157.9	0.00	4.3	1.9	3.9
19-02-2022	1770.5	1929.0	158.6	0.00	4.3	2.1	3.9
20-02-2022	1785.1	1930.5	145.5	0.00	4.0	0.8	3.8
Total	**12008.7**	**12707.1**	**698.4**		**18.90**		**15.20**

DSM Comparison of Solar Plant (PPA rate: 2.73 ₹/KWh) in Southern Region (250 MW capacity) for Low Solar period

Date	Schedule (MWh) (A)	Actual (MWh) (B)	Deviation (MWh) (B-A)	Effective liability (as per Old **DSM regulations**) (+)less realization then PPA rate/(-)more realization then PPA rate (in paise/KWh)	DSM Amount(**as per Old DSM regulations**) Net Receivable (+)from pool/ (-)Payable to Pool (in ₹ Lakhs)	Effective liability (as per New **DSM regulations**) (+)less realization then PPA rate/(-)more realization then PPA rate (in paise/KWh)	DSM Amount (**as per New DSM regulations**) Net Receivable (+)from pool/ (-)Payable to Pool (in ₹ Lakhs)
08-08-2022	1159.7	1224.7	65.0	2.6	1.5	22.1	-0.9
09-08-2022	1428.5	1422.6	-5.9	4.0	-0.7	20.3	-3.1
10-08-2022	1468.0	1534.9	66.9	3.9	1.2	27.5	-2.4
11-08-2022	1441.4	1590.1	148.7	1.3	3.8	16.0	1.5
12-08-2022	1437.3	1314.3	-122.9	2.3	-3.7	11.1	-4.8
13-08-2022	1579.6	1752.5	172.9	0.1	4.7	9.5	3.1
14-08-2022	1317.2	1235.4	-81.8	0.2	-2.3	5.5	-2.9
Total	**9831.6**	**10074.5**	**242.9**		**4.59**		**-9.52**

New DSM: The normal rate of charges for deviation for a time block is considered as highest of DAM or RTM price.

SAMPLE COMPARISON OF DSM CHARGES OLD VERSUS NEW DSM MECHANISM (WIND)

Sample Case: Wind plant (250 MW) in Southern Region with PPA Rate of ₹ 3.46/kWh)

High wind period (August, 2022)

- Liability in range of 0.0 – 4.0 paisa/kWh in case of old/extant DSM methodology
- Liability in range of 0.9 – 12.6 paisa/kWh in case of new/upcoming DSM methodology

Low wind period (February, 2022)

- Liability in range of 0.0 – 10.4 paisa/kWh in case of old/extant DSM methodology
- Liability in range of 1.4 – 28.6 paisa/kWh in case of new/upcoming DSM methodology

DSM Comparison of Wind Plant (PPA rate: 3.46 ₹/KWh) in Southern Region (250 MW capacity) for Low Wind period

Date	Schedule (MWh) (A)	Actual (MWh) (B)	Deviation (MWh) (B-A)	Effective liability (as per Old **DSM regulations**) (+)less realization then PPA rate/(-)more realization then PPA rate (in paise/KWh)	DSM Amount(**as per Old DSM regulations**) Net Receivable (+)from pool/ (-)Payable to Pool (in ₹ Lakhs)	Effective liability (as per New **DSM regulations**) (+)less realization then PPA rate/(-)more realization then PPA rate (in paise/KWh)	DSM Amount (**as per New DSM regulations**) Net Receivable (+)from pool/ (-)Payable to Pool (in ₹ Lakhs)
14-02-2022	1912.9	2005.1	92.2	0.6	3.1	17.0	-0.2
15-02-2022	826.7	777.4	-49.3	10.4	-2.5	28.6	-3.9
16-02-2022	705.4	704.5	-1.0	0.8	-0.1	15.5	-1.1
17-02-2022	1051.1	1110.9	59.8	0.5	2.0	16.0	0.3
18-02-2022	1682.8	1686.4	3.7	0.0	0.1	4.3	-0.6
19-02-2022	1989.0	2147.4	158.4	0.0	5.5	4.5	4.5
20-02-2022	1061.3	837.4	-223.9	0.2	-7.8	1.4	-7.9
Total	**9229.0**	**9269.1**	**40.0**		**0.34**		**-8.94**

DSM Comparison of Wind Plant (PPA rate: 3.46 ₹/KWh) in Southern Region (250 MW capacity) for High Wind period

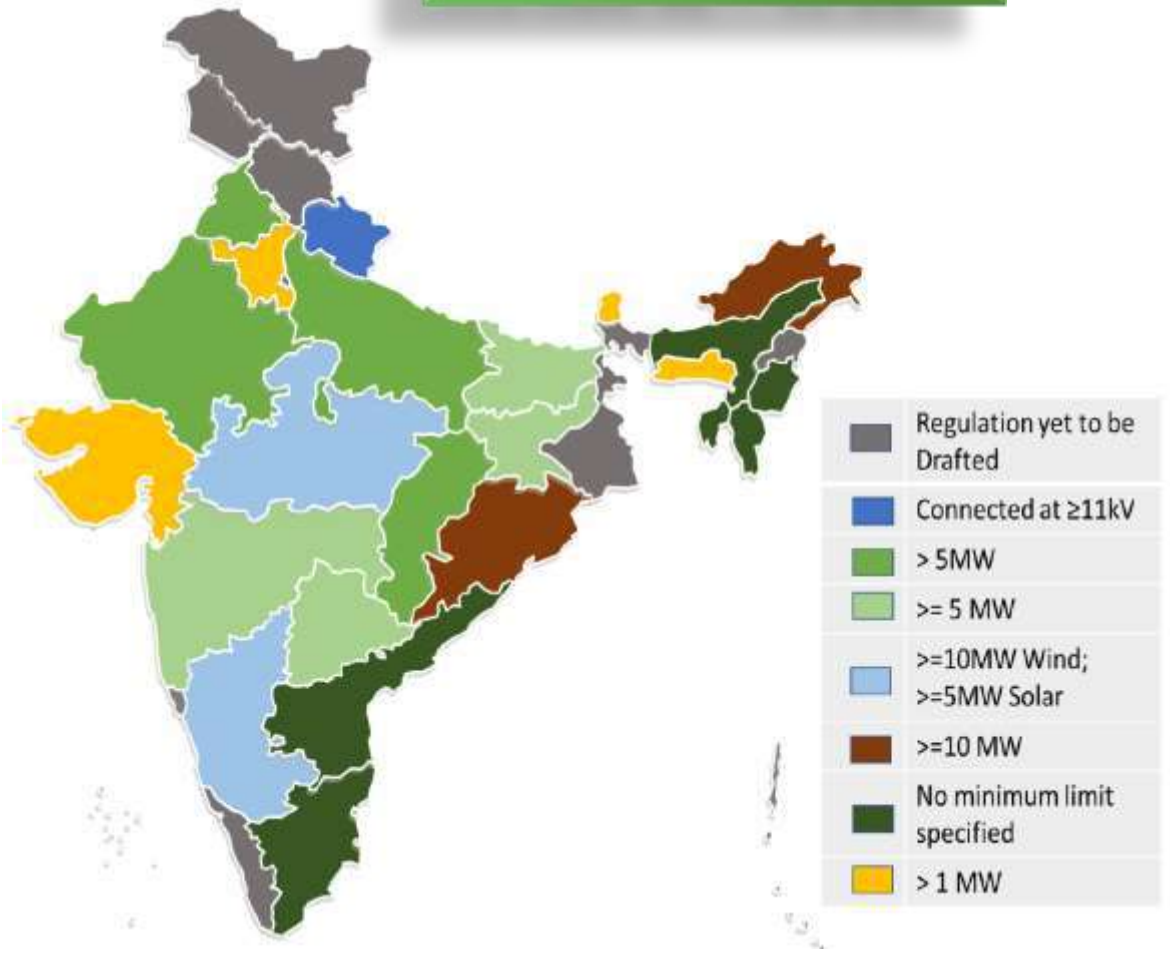
Date	Schedule (MWh) (A)	Actual (MWh) (B)	Deviation (MWh) (B-A)	Effective liability (as per Old **DSM regulations**) (+)less realization then PPA rate/(-)more realization then PPA rate (in paise/KWh)	DSM Amount (**as per Old DSM regulations**) Net Receivable (+)from pool/ (-)Payable to Pool (in ₹ Lakhs)	Effective liability (as per New **DSM regulations**) (+)less realization then PPA rate/(-)more realization then PPA rate (in paise/KWh)	DSM Amount (**as per New DSM regulations**) Net Receivable (+)from pool/ (-)Payable to Pool (in ₹ Lakhs)
08-08-2022	5239.1	5471.9	232.8	0.0	8.1	1.3	7.4
09-08-2022	4965.0	4991.8	26.8	0.6	0.6	3.6	-0.9
10-08-2022	5075.0	5185.4	110.4	0.0	3.8	0.9	3.4
11-08-2022	5027.9	5387.5	359.5	0.1	12.4	2.8	11.0
12-08-2022	3648.0	3000.1	-647.9	4.0	-23.6	12.6	-26.2
13-08-2022	2213.3	1973.3	-239.9	1.6	-8.6	11.2	-10.5
14-08-2022	1520.7	1251.9	-268.8	0.2	-9.3	3.6	-9.7
Total	**27689.0**	**27261.8**	**-427.1**		**-16.64**		**-25.67**

New DSM: The normal rate of charges for deviation for a time block is considered as highest of DAM or RTM price.

IMBALANCE HANDLING FOR RE AT INTRA-STATE LEVEL

- DSM for RE plants are Implemented in 23 states (Some states embedded in Grid Code / DSM Regulations)
- State level aggregation viz virtual pool through Qualified Coordinating Agency is allowed in Karnataka, Andhra Pradesh, Bihar, Jharkhand, Assam, Tripura, Mizoram and Manipur
  - All other states implemented Pooling station wise aggregation.
- Majority of states implemented ± 15% band
  - Tamilnadu, Haryana, Assam, Tripura, Mizoram & Manipur have implemented ±10%
  - Gujarat has allowed ± 7% for Solar and ± 12% for wind.

Inter-state RE ~ 21 GW
Intra-state RE ~ 98 GW



THANK YOU !

GRID CONTROLLER OF INDIA LIMITED
(GRID-INDIA)

Formerly POSOCO

ग्रिड-इंडिया
GRID-INDIA