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Reliability Analysis –R Infra

08.09.2015



Comparison of Reliability Parameters



	Tata Power#	R Infra#	MSEDCL*	Torrent#	BEST*
SAIFI (Nos)	1.10	1.69	12.05	5.63	3.60
SAIDI (Min)	17.83	53.94	82.36	4.58	151.11
CAIDI (Min)	16.16	31.91	6.84	0.81	41.51

* - MSEDCL and BEST data is for FY 2013-14

- Tata Power, R-Infra and Torrent Data for FY 2014-15

The Reliability Indices for Tata Power are better as compared to R-Infra. Also in comparison to the Reliability Indices of other Utilities, except Torrent, Tata Power Reliability Indices are better than the other Utilities considered.

Comparison of Distribution Transformer Loading



Division	Tata Power				R Infra			
	<= 50 %	50 – 80 %	80 – 100 %	> 100 %	<= 50 %	50 – 80 %	80 – 100 %	> 100 %
South	72%	23%	4%	0%	41%	56%	2%	0%
South Central	90%	10%	0%	0%	52%	47%	1%	0%
Central	91%	9%	1%	0%	36%	59%	5%	0%
North	94%	6%	0%	0%	33%	60%	6%	1%
East	93%	7%	0%	0%	48%	45%	6%	1%
Total	89%	10%	1%	0%	42%	53%	4%	0%

- CEA guidelines specify that Transformers in Urban Areas should operate at 65-75 % rated capacity.
- IPDS guidelines require installation of new DT where existing peak load of the DT exceeds 70 % of its rated capacity
- 89% of the Distribution Transformers of Tata Power are loaded less than 50% of their capacity i.e. they are currently under loaded.
- In the interest of consumers and to improve reliability, it may be prudent to ensure that all network assets are optimally loaded for effective utilisation of assets and investments.

Comparison of Power Transformer Loading -1/2



	R Infra						Tata Power					
	PT Capacity (MVA)	MD	% Loading	Capacity Addition (WIP)	Total Capacity Post	% Loading Post Capacity Addition	PT Capacity (MVA)	MD	% Loading	Capacity Addition (WIP)	Total Capacity Post	% Loading Post Capacity Addition
South	552	339	61	69	621	55	95	38.95	41	0	95	41
South Central	610	336	55	20	630	53	280	49	17.5	0	280	17.5
Central	760	476	62	80	840	57	220	46.2	21	0	220	21
North	515	355	69	60	575	62	150	19.5	13	0	150	13
East	860	490	57	26	886	55	250	32.5	16	0	250	16
	3297	1996	60.54	255	3552	56.19	995	186.15	18.71	0	995	18.71

- The loading of Power Transformers of Tata Power is 19 % of their capacity i.e. they are currently under loaded.
- In the interest of consumers and to improve reliability, it may be prudent to ensure that all network assets are optimally loaded for effective utilisation of assets and investments.

Comparison of Power Transformer Loading -2/2



- CEA guidelines specify that Transformers in Urban Areas should operate at 65-75 % rated capacity.
- An analysis of the loading of Power Transformers of R Infra reveals that 32 of its Transformers are loaded beyond 65 %.
- These transformers were mapped with the available Tata Power ,Power Transformers in the vicinity whose loading is in the range of 0-32 %.
- Utilisation of the under loaded transformers of Tata Power to ease the loading on the critically loaded substations of R-Infra & would help improve the reliability of the network without significant expenditure by either of the Distribution Utilities

Geographical mapping of Power Transformers in Common Areas



R-Infra							Tata Power					
	Name of 33-22/11kV SS	Total Installed Capacity (MVA)	Total Loading (MVA)	Overall Loading (%)	R-Infra Spare Capacity	N-1 Compliance	Name of 33-22/11kV SS	Total Installed Capacity (MVA)	Total Loading (MVA)	Overall Loading (%)	N-1 Compliance	Tata Power Spare Capacity
1	Siddharth Nagar	10	10	95.30%	0.47	No	Vrindavan DSS	30	4	13%	Yes	26
2	Gorai	50	42	83.40%	8.30	No	Essel World DSS	10	2	18%	Yes	8
3	Shanti Star Mira	45	35	78.19%	9.82	No	Mira Road DSS	40	3	8%	Yes	37
4	Palm Court	40	31	76.75%	9.30	No	Mindspace DSS	60	12	19%	Yes	49
5	RNA Royal Park	40	31	76.40%	9.44	No	Malad DSS	20	2	8%	Yes	19
6	Meghawadi	40	30	75.70%	9.72	No	Oberoi JVLR DSS	40	0	0%	Yes	40
7	Juhu	32	24	74.80%	8.06	No	Arogyanidhi DSS	40	3	6%	Yes	38
8	Goregaon	70	52	74.75%	17.68	No	Mindspace DSS	60	12	19%	Yes	49
9	Bhayander (W)	40	29	73.15%	10.74	No	Mira Road DSS	40	3	8%	Yes	37
10	Bombilwadi	40	29	72.40%	11.04	No	BMC Pumping Bandra	35	6	17%	Yes	29
11	Anik	30	22	72.10%	8.37	No	Vrindavan DSS	30	4	13%	Yes	26
12	Malad	40	29	71.90%	11.24	No	Malad DSS	20	2	8%	Yes	19
13	Kalina	30	22	71.87%	8.44	No	MIAL DSS-1	40	6	15%	Yes	34
14	Bandra	60	43	71.20%	17.28	No	BMC Pumping Bandra	35	6	17%	Yes	29
15	Bhayander	60	43	71.10%	17.34	No	Mira Road DSS	40	3	8%	Yes	37
16	Shimpoli	20	14	71.05%	5.79	No	Borivali RSS	70	23	32%	No	48
17	Seepz	60	42	70.60%	17.64	No	Reservoir Plot DSS Pocket 10 DSS	60	19	32%	Yes	41
18	Chandivali SRA	20	14	70.30%	5.94	No	Kilick Nixon DSS	40	5	11%	Yes	36
20	Bandra Terminus	10	7	70.10%	2.99	No	BKC DSS	60	30	50%	Yes	30
21	Ambivali	80	56	69.70%	24.24	No	Versova	40	8	20%	Yes	32
22	Cama	20	14	69.40%	6.12	No	NESCO	40	9	22%	Yes	31
23	Kandivali	20	14	69.35%	6.13	No	Malad DSS	20	2	8%	Yes	19
24	Chembur	50	34	68.02%	15.99	No	Vrindavan DSS	30	4	13%	Yes	26
25	Chunabhati	40	31	77.60%	8.96	No		No DSS				
26	Chakala	20	14	68.00%	6.40	No	DSS-3, Reservoir Plot DSS	90	22	24%	Yes	68
27	Saraswati Road	40	27	67.80%	12.88	No	Arogyanidhi DSS	40	5	13%	Yes	35
28	Hingwala Lane	20	13	67.25%	6.55	No	Address DSS	40	1	3%	Yes	39
29	Borrosil	10	7	65.90%	3.41	No	Reservoir Plot DSS	50	16	32%	Yes	34
30	Devidas Lane	60	39	65.80%	20.52	No	Sureshwari DSS (Proposed)	40	0	0%	Yes	40
31	Mira	50	33	65.80%	17.10	No	Mira Road DSS	40	3	8%	Yes	37
32	Vile Parle	50	33	65.46%	17.27	No	DSS-3,DSS-1	80	12	15%	Yes	68

As per CEA Guidelines ,Transformers in Urban areas should operate at 65 -75 % of their rated capacity

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N-1 Non Compliance



Sr. No	Division	Name of 33-22/11kV SS	Power Trf No	Installed Capacity	% Peak Loading	As per Case 03 of 2015	As per Case 182
						N-1 Status	Cluster (N-1)at peak (Y/N)
1	SD	Juhu	1	16	78.50%	N	Y
2	SD	Juhu	2	16	71.10%	N	
3	SD	Juhu North	1	20	53.10%	N	
4	SD	Juhu North	2	20	71.70%	N	
5	SD	Saraswati Road	1	20	67.10%		
6	SD	Saraswati Road	2	20	68.50%		
7	SD	24th Road	1	20	60.10%		Y
8	SD	Bandra	1	20	76.30%	N	
9	SD	Bandra	2	20	60.70%	N	
10	SD	Bandra	3	20	76.60%	N	
11	SD	Bombilwadi	1	10	57.10%	N	
12	SD	Bombilwadi	2	10	71.50%	N	
13	SD	Bombilwadi	3	20	80.50%	N	Y
14	SD	Bandra Terminus	1	10	70.10%		
15	SD	Santacruz	1	20	47.10%	Y	
16	SD	Santacruz	2	20	45.10%	Y	
17	SD	Santacruz	3	20	47.30%	Y	
18	SD	Kalanagar	1	20	52.00%	N	
19	SD	Kalanagar	2	20	56.00%	N	Y
20	SD	Kalanagar	3	20	61.80%	N	
21	SD	Kalina	1	10	68.60%	N	
22	SD	Kalina	2	20	73.50%	N	
23	SD	MMRDA	1	10	68.00%	N	
24	SD	MMRDA	2	20	62.50%	N	
25	SD	MMRDA	3	20	50.50%	N	
26	SD	MMRDA	4	20	44.60%	N	

N-1 Non Compliance



Sr. No	Division	Name of 33-22/11kV SS	Power Trf No	Installed Capacity	% Peak Loading	N-1 Status Case 3/2015	Cluster (N-1)at peak (Y/N) Case 182/2014
27	SD	Ville Parle	1	10	71.30%	Y	Y
28	SD	Ville Parle	2	20	64.30%	Y	
29	SD	Ville Parle	3	20	63.70%	Y	
30	SCD	Airport	1	10	46.10%	Y	
31	SCD	Airport	2	10	37.70%	Y	
32	SCD	Airport	3	20	57.40%	Y	
33	SCD	Airport	4	20	44.30%	Y	
34	SCD	Ambivali	1	20	67.10%	N	Y
35	SCD	Ambivali	2	20	72.30%	N	
36	SCD	Ambivali	3	20	67.40%	N	
37	SCD	Ambivali	4	20	72.00%	N	
38	SCD	Versova	1	20	63.60%	Y	
39	SCD	Versova	2	20	56.50%	Y	
40	SCD	Versova	3	20	53.70%	Y	
41	SCD	Versova	4	20	75.60%	Y	
42	SCD	Sambhaji Nagar	1	20	39.80%	Y	Y
43	SCD	Sambhaji Nagar	2	20	48.80%	Y	
44	SCD	Andheri	1	20	50.00%	N	
45	SCD	Andheri	2	20	60.00%	N	
46	SCD	Andheri	3	20	60.00%	N	Y
47	SCD	Chakala	1	10	74.30%	N	
48	SCD	Chakala	2	10	61.70%	N	
49	SCD	HUL	1	25	21.20%	Y	
50	SCD	HUL	2	25	29.70%	Y	
51	SCD	Meghawadi	1	20	77.10%	N	
52	SCD	Meghawadi	2	20	74.30%	N	

Comparison of Network Parameters



Network Component	Units	Tata Power	R Infra
33-22/11 kV Substations	Nos.	31	77
Power Transformer Installed Capacity	MVA	995	3297
Average Loading of Power Transformers	%	22%	61%
33 kV Network	km.	949	880
11 kV Feeders	Nos.	346	1047
11 kV Network	km.	856	3200
Average Loading of 11 kV Network	%	10%	47%
Consumer Substations	Nos.	643	6735
Distribution Transformer Installed Capacity	MVA	677	4606
Average Loading of Distribution Transformers	%	23%	51%
LT Network	km.	1113	5897

Zone/Division wise Reliability Indices



	Tata Power			R Infra		
Zone	SAIFI	SAIDI	CAIDI	SAIFI	SAIDI	CAIDI
South	0.72	15.16	20.02			
South Central	1.19	18.01	15.72			
Central	0.94	12.24	15.98			
North	0.79	12.80	17.30			
East	1.80	31.45	15.09			

Comparable Reliability Indices for R Infra at Zone /Division are not available for analysis.