

4.4.3 Cost for Every System Configuration

Table 4.14 and Figure 4.15 show the result of economical estimate for the every system configuration in the previous section. And the calculation tables are shown like Table 4.15. The calculation premises are shown in Table 4.15 and the prime items are as follows.

- Section switch number is 2/feeder
- Construction period is 5 years, substation number 96 and feeder number 546
- Calculation premises are same as Table 4.8

From this result, it is clear that the methods, which need no new communication equipment, such as Fiber Optic Cable (Case 1), RF Mobile System and RF MARS are economical and those investment recovery period is estimated to be 9~10 years.

Table 4.14 Cost for every system configuration

		(Million Rs)		
Method	Equipment Cost	NPV (20 Year)	Recovery Period(Year)	
Idea1				
Fiber Optic Cable	Case 1 (Much infrastructure of fiber optic cable)	598	418	10
	Case 2 (A little infrastructure)	815	145	16
	Case 3 (Little infrastructure)	1,778	-1,070	Over 20
Metallic Wire	2,911	-2,497	Over 20	
RF Mobile System	530	503	9	
Idea2				
RF MARS	573	450	9	
Idea3				
PLC (Vo Carrier)	1,100	-216	Over 20	

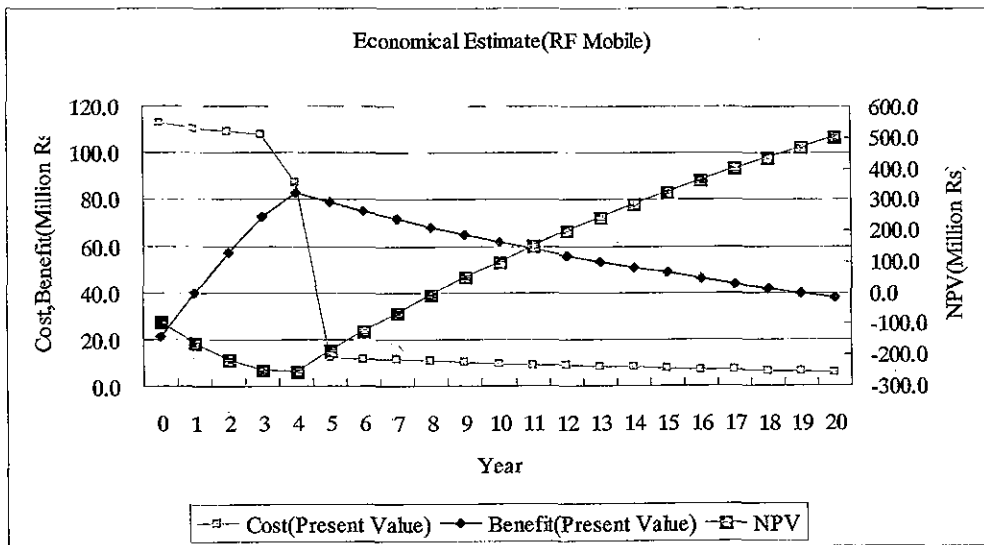


Figure 4.15 Example of economical estimate (RF mobile system)

Table 4.15 Cost calculation for every system

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Discount= $1/(1+i)^n$	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377	Total
Price= $(1+i)^n$	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220	Total
Amount of Construction Facilities																						
Substation Number	20	20	20	20	20	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96
Feeder Number	120	120	120	120	120	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	576
Feeder Length(km)	780	780	780	780	780	624	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,744
Cost																						
Pole Mount.	104.42	105.47	106.52	107.59	108.66	86.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	511
SW,RTU etc.	3.13	6.30	9.49	12.72	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	292
Maintenance Factor	2	2	2	2	2	3																
Fiber Optic Cable	4.92	4.97	5.02	5.07	5.12	4.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
Acquisition Cost	12.63	12.75	12.88	13.01	13.14	10.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62
Acquisition Cost	0.53	1.06	1.60	2.14	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	2.58	49
Maintenance Factor	1	1	1	1	1	3																
For Fiber at etc. at SS, DCC	9.804	9.804	9.804	9.804	9.804	9.804	0.98															1
DCC	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	1
Maintenance Factor	3	3	3	3	3	3																
Total Cost	126.6	130.6	135.5	140.6	145.6	119.5	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	940
Present Value	126.6	124.4	122.9	121.4	120.0	98.3	14.1	13.4	12.7	12.1	11.6	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.5	7.1	598
Benefit																						
Outage	19,729	17,8	26,6	35,5	42,6	42,6	42,6	42,6	42,6	42,6	42,6	42,6	42,6	42,6	42,6	42,6	42,6	42,6	42,6	42,6	42,6	813
Loss	97,096	9,7	19,4	29,1	38,8	46,6	46,6	46,6	46,6	46,6	46,6	46,6	46,6	46,6	46,6	46,6	46,6	46,6	46,6	46,6	46,6	889
Worker	0.12	4,8	7,2	9,6	11,5	11,5	11,5	11,5	11,5	11,5	11,5	11,5	11,5	11,5	11,5	11,5	11,5	11,5	11,5	11,5	11,5	220
Tariff Rate	5																					
Outage Reduction Rate	0.75																					
Total	21.0	42.0	63.0	84.0	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	1,922
Benefit	21.0	40.0	57.1	72.5	82.9	78.9	75.2	71.6	68.2	64.9	61.8	58.9	56.1	53.4	50.9	48.5	46.2	44.0	41.9	39.9	38.0	1,172
Return																						
Benefit - Total Cost	-105.7	-88.6	-72.6	-56.6	-41.7	-26.8	-18.7	-8.8	8.2	22.8	38.8	54.8	70.8	86.8	102.8	118.8	134.8	150.8	166.8	182.8	198.8	983
Present Value	-105.7	-84.4	-65.8	-48.9	-35.4	-25.4	-15.4	-6.4	8.4	23.4	39.4	55.4	71.4	87.4	103.4	119.4	135.4	151.4	167.4	183.4	199.4	418
Return Accumulation																						
Current Value	-105.7	-194.3	-266.8	-323.4	-342.2	-259.4	-176.6	-93.7	-10.9	71.9	154.7	237.5	320.3	403.1	485.9	568.7	651.5	734.3	817.1	899.9	982.8	
Present Value	-105.7	-190.0	-255.9	-304.8	-320.2	-255.3	-193.5	-134.6	-78.6	-25.2	25.6	74.0	120.1	164.1	205.9	245.7	283.6	319.8	354.2	387.0	418.2	

(Table 4.15 Continue)
Ideal: Fiber Optic Cable (Case 2) Cash Flow Analysis (Money unit: 10⁶ Rs)

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total Equip.	
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total	
Discount=1/(1+i) ⁿ	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377		
Price=(1+i) ⁿ	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220		
Amount of Construction Facilities																							
Substation Number	20	20	20	20	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96
Feeder Number	120	120	120	120	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	576
Feeder Length(km)	780	780	780	780	624	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,744
Cost																							
Pole Mount.	0.4351 (10 ⁶ Rs/Unit)	104.42	105.47	106.52	107.59	86.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	511
	2 (Nos/Feeder)	3.13	6.30	9.49	12.72	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	292
	3 (%)																						
Com. Line	0.6313 (10 ⁶ Rs/km)	49.24	49.73	50.23	50.73	40.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	241
	0.1 (km/Feeder km)	12.63	12.75	12.88	13.01	10.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62
	1 (km/ss)	1.86	3.73	5.62	7.54	9.08	9.08	9.08	9.08	9.08	9.08	9.08	9.08	9.08	9.08	9.08	9.08	9.08	9.08	9.08	9.08	9.08	173
	3 (%)																						
RTU etc. at SS, DCC	9,804 (10 ⁶ Rs/Unit)																						1
	0.1 (Nos/System)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	1
	3 (%)																						
Total Cost		172.3	178.0	184.8	191.6	162.9	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	1,281
		172.3	169.5	167.6	165.5	134.0	19.1	18.2	17.4	16.5	15.0	14.3	13.6	13.0	12.3	11.8	11.2	10.7	10.2	9.7	9.2	9.2	1,027
Benefit																							
Outage	19,729 (kWh/Feeder/Y)	8.9	17.8	26.6	35.5	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	813
Loss	97,096 (kWh/SS/Y)	9.7	19.4	29.1	38.8	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	889
Worker	0.12 (10 ⁶ Rs/SS/Y)	2.4	4.8	7.2	9.6	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	220
Tariff Rate	5 (Rs/kWh)																						
Outage Reduction Rate	0.75																						
Total		21.0	42.0	63.0	84.0	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	1,922
Benefit		21.0	40.0	57.1	72.5	82.9	78.9	75.2	71.6	68.2	64.9	61.8	58.9	56.1	53.4	50.9	48.5	46.2	44.0	41.9	39.9	38.0	1,172
Return																							
Benefit - Total Cost		-151.3	-136.0	-121.8	-107.7	-62.1	76.3	76.3	76.3	76.3	76.3	76.3	76.3	76.3	76.3	76.3	76.3	76.3	76.3	76.3	76.3	76.3	642
Return Accumulation		-151.3	-129.6	-110.5	-93.0	-51.1	59.8	56.9	54.2	51.6	49.2	46.8	44.6	42.5	40.5	38.5	36.7	35.0	33.3	31.7	30.2	28.8	145
Return Accumulation																							
Benefit - Total Cost		-151.3	-287.3	-409.1	-516.8	-578.9	-502.6	-426.3	-350.0	-273.7	-197.4	-121.1	-44.8	31.5	107.8	184.1	260.4	336.7	413.0	489.3	565.6	641.9	
Return Accumulation		-151.3	-280.8	-391.3	-484.3	-553.4	-473.7	-418.7	-364.5	-312.9	-263.7	-216.8	-172.2	-129.7	-89.3	-50.7	-14.0	20.9	54.2	85.9	116.1	144.9	

(Table 4.15 Continue)
 Idea1:Fiber Optic Cable (Case 3) Cash Flow Analysis (Money unit:10⁶ Rs)

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total Equip.
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Discount=1/(1+i) ⁿ	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377	
Price=(1+i) ⁿ	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220	

Amount of Construction Facilities

Substation Number	20	20	20	20	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96
Feeder Number	120	120	120	120	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	576
Feeder Length(km)	780	780	780	780	624	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,744

Pole Mount.	0.4351 (10 ⁶ Rs/Unit)	104.42	105.47	106.52	107.59	86.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	511
Maintenance Factor	2	3.13	6.30	9.49	12.72	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	292
Fiber Optic Cable	0.6313 (10 ⁶ Rs/km)	246.19	248.65	251.14	253.65	204.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,205
Maintenance Factor	1	12.63	12.75	12.88	13.01	10.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62
RTU etc. at SS, DCC	9.804 (10 ⁶ Rs/Unit)	7.76	15.61	23.53	31.53	37.99	37.99	37.99	37.99	37.99	37.99	37.99	37.99	37.99	37.99	37.99	37.99	37.99	37.99	37.99	37.99	37.99	724
Maintenance Factor	3	0.98	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	1
Total Cost		375.1	388.8	403.6	418.5	355.7	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	2,795
		375.1	370.3	366.1	361.5	292.7	41.8	39.8	37.9	36.1	34.4	32.8	31.2	29.7	28.3	26.9	25.7	24.4	23.3	22.2	21.1	20.1	1,778

Benefit

Outage	19,729 (kWh/Feeder/Y)	8.9	17.8	26.6	35.5	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	813
Loss	97,096 (kWh/SS/Y)	9.7	19.4	29.1	38.8	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	889
Worker Tariff Rate	0.12 (10 ⁶ Rs/SS/Y)	2.4	4.8	7.2	9.6	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	220
Outage Reduction Rate	5 (Rs/kWh)																						
Total		21.0	42.0	63.0	84.0	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	1,922
Benefit Return		21.0	40.0	57.1	72.5	82.9	78.9	75.2	71.6	68.2	64.9	61.8	58.9	56.1	53.4	50.9	48.5	46.2	44.0	41.9	39.9	38.0	1,172

Benefit - Total Cost

Benefit - Total Cost		-354.2	-346.8	-340.6	-334.6	-255.0	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	-873
Return Accumulation		-354.2	-330.3	-309.0	-289.0	-209.8	37.1	35.4	33.7	32.1	30.6	29.1	27.7	26.4	25.1	23.9	22.8	21.7	20.7	19.7	18.8	17.9	-1,070

Current Value	-354.2	-701.0	-1041.6	-1376.2	-1631.2	-1583.8	-1536.4	-1489.0	-1441.6	-1394.2	-1346.8	-1299.4	-1252.0	-1204.6	-1157.2	-1109.8	-1062.4	-1015.1	-967.7	-920.3	-872.9	
Present Value	-354.2	-684.5	-993.4	-1282.4	-1492.2	-1655.1	-1419.7	-1386.0	-1354.0	-1323.4	-1294.3	-1266.6	-1240.2	-1215.1	-1191.1	-1168.3	-1146.6	-1126.0	-1106.3	-1087.5	-1069.6	

(Table 4.15 Continue)

Idea I: Metallic Cable Cash Flow Analysis (Money unit: 10⁶ Rs)

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Discount=1/(1+i) ⁿ	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377	
Price=(1+i) ⁿ	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220	

Amount of Construction Facilities

Substation Number	20	20	20	20	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96
Feeder Number	120	120	120	120	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	576
Feeder Length(km)	780	780	780	780	624	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,744

Cost

Pole Mount.	0.4351 (10 ⁶ Rs/Unit)	Acquisition Cost	104.42	105.47	106.52	107.59	86.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	511
	2 (Nos/Feeder)	Maintenance	3.13	6.30	9.49	12.72	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	15.33	292	
	3 (%)																								
Com. Line	0.6128 (10 ⁶ Rs/km)	Acquisition Cost	478.01	482.79	487.62	492.49	397.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,339	
	1 (km/Feeder km)	Acquisition Cost	12.26	12.38	12.50	12.63	10.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60	
	1 (km/ss)	Maintenance	14.71	29.35	44.57	59.72	71.96	71.96	71.96	71.96	71.96	71.96	71.96	71.96	71.96	71.96	71.96	71.96	71.96	71.96	71.96	71.96	71.96	1,372	
	3 (%)																								
RTU etc. at DCC	9.804 (10 ⁶ Rs/Unit)	Acquisition Cost	0.98																					1	
SS, DCC	0.1 (Nos/System)	Maintenance	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	1	
	3 (%)																								
Total Cost		Current Value	613.5	636.5	660.7	685.2	582.4	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	4,576	
		Present Value	613.5	606.2	599.3	591.9	479.1	68.4	65.2	62.1	59.1	56.3	53.6	51.1	48.6	46.3	44.1	42.0	40.0	38.1	36.3	34.6	32.9	3,669	

Benefit

Outage	19,729 (kWh/Feeder/Y)	Current Value	8.9	17.8	26.6	35.5	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	813
Loss	97,096 (kWh/SS/Y)	Current Value	9.7	19.4	29.1	38.8	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	889
Worker	0.12 (10 ⁶ Rs/SS/Y)	Current Value	2.4	4.8	7.2	9.6	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	220
Tariff Rate	5 (Rs/kWh)																							
Outage Reduction Rate	0.75																							
Total		Current Value	21.0	42.0	63.0	84.0	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	1,922
Benefit		Present Value	21.0	40.0	57.1	72.5	82.9	78.9	75.2	71.6	68.2	64.9	61.8	58.9	56.1	53.4	50.9	48.5	46.2	44.0	41.9	39.9	38.0	1,172

Return

Benefit - Total Cost		Current Value	-592.6	-594.5	-597.8	-601.2	-481.6	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	-2,653
		Present Value	-592.6	-566.2	-542.2	-519.4	-396.3	10.5	10.0	9.5	9.1	8.7	8.2	7.8	7.5	7.1	6.8	6.5	6.1	5.9	5.6	5.3	5.1	-2,497

Return Accumulation

Benefit - Total Cost		Current Value	-592.6	-1187.1	-1784.9	-2386.1	-2867.7	-2854.3	-2840.9	-2827.5	-2814.1	-2800.7	-2787.2	-2773.8	-2760.4	-2747.0	-2733.6	-2720.1	-2706.7	-2693.3	-2679.9	-2666.5	-2653.0	
		Present Value	-592.6	-1158.8	-1701.0	-2220.3	-2616.6	-2606.1	-2596.1	-2586.5	-2577.5	-2568.8	-2560.6	-2552.7	-2545.2	-2538.1	-2531.4	-2524.9	-2518.8	-2512.9	-2507.3	-2502.0	-2497.0	

(Table 4.15 Continue)
Idea1:RF Using Mobile Communication Cash Flow Analysis (Money unit:10⁶ Rs)

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total	
Discount= $1/(1+i)^n$	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377	Total	
Price= $(1+i)^n$	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220	Total	
Amount of Construction Facilities																							
Substation Number	20	20	20	20	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96	
Feeder Number	120	120	120	120	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	576	
Feeder Length(km)	780	780	780	780	624	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,744	
Cost																							
Pole Mount.	108.02	109.10	110.19	111.30	89.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	529
SW,RTU etc.	3.24	6.51	9.82	13.16	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	302
Maintenance																							
Maintenance Factor	3																						
RTU etc. at DCC	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1
SS,DC	112.8	115.7	120.1	124.5	105.8	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	833
Maintenance Factor	3																						
Current Value	112.8	115.7	120.1	124.5	105.8	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	833
Present Value	112.8	110.2	108.9	107.5	87.1	12.5	11.9	11.3	10.8	10.2	9.8	9.3	8.9	8.4	8.0	7.6	7.3	6.9	6.6	6.3	6.0	6.0	668
Benefit																							
Outage	19,729	17.8	26.6	35.5	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	813
Loss	97,096	9.7	19.4	29.1	38.8	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	889
Worker	0.12	4.8	7.2	9.6	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	220
Tariff Rate	5																						
Outage Reduction Rate	0.75																						
Total	21.0	42.0	63.0	84.0	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	1,922
Benefit	21.0	40.0	57.1	72.5	82.9	78.9	75.2	71.6	68.2	64.9	61.8	58.9	56.1	53.4	50.9	48.5	46.2	44.0	41.9	39.9	38.0	38.0	1,172
Return																							
Benefit - Total Cost																							
Current Value	-91.8	-73.7	-57.1	-40.5	-5.1	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	1,089
Present Value	-91.8	-70.2	-51.8	-35.0	-4.2	66.5	63.3	60.3	57.4	54.7	52.1	49.6	47.2	45.0	42.8	40.8	38.9	37.0	35.3	33.6	32.0	32.0	503
Return Accumulation																							
Current Value	-91.8	-165.5	-222.6	-263.1	-268.2	-183.4	-98.5	-13.7	71.1	156.0	240.8	325.6	410.5	495.3	580.2	665.0	749.8	834.7	919.5	1004.4	1089.2	1089.2	
Present Value	-91.8	-162.0	-213.8	-248.8	-253.0	-186.5	-123.2	-62.9	-5.5	49.2	101.3	150.9	198.1	243.1	286.0	326.8	365.6	402.7	437.9	471.5	503.5	503.5	

(Table 4.15 Continue)
Idea2:RF MARS System (Increasing MARS Master) Cash Flow Analysis (Money unit:10⁶ Rs)

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total Equip.
Discount=1/(1+i) ⁿ	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377	
Price=(1+i) ⁿ	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220	
Amount of Construction Facilities																						
Substation Number	20	20	20	20	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96
Feeder Number	120	120	120	120	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	576
Feeder Length(km)	780	780	780	780	624	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,744
Cost																						
Pole Mount.	0.4501 (10 ⁶ Rs/Unit)	109.10	110.19	111.30	89.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	529
	2 (Nos/Feeder)	3.24	6.51	9.82	13.16	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	302
	3 (%)																					
RTU etc. at SS,	0.5401 (10 ⁶ Rs/Unit)	5.40	5.45	5.51	5.56	4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26
	0.5 (Nos/ss)	0.16	0.33	0.49	0.66	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	15
	MAR Master	3.30	3.34	3.37	3.40	2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16
	for RF at SS	0.5 (Nos/ss)	0.10	0.20	0.30	0.40	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	9
	RCS for RF at	2.976 (10 ⁶ Rs/Unit)	1.49																			1
	DCC	0.5 (Nos/System)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1
	Maintenance Factor	3 (%)																				
	Current Value	121.8	125.0	129.7	134.5	114.4	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	900
	Present Value	121.8	119.0	117.7	116.2	94.1	13.5	12.8	12.2	11.6	11.1	10.5	10.0	9.6	9.1	8.7	8.3	7.9	7.5	7.1	6.8	6.5
	Total Cost																					573
Benefit																						
Outage	19,729 (kWh/Feeder/Y)	8.9	17.8	26.6	35.5	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	813
Loss	97,096 (kWh/SS/Y)	9.7	19.4	29.1	38.8	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	889
Worker	0.12 (10 ⁶ Rs/SS/Y)	2.4	4.8	7.2	9.6	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	220
Tariff Rate	5 (Rs/kWh)																					
Outage Reduction Rate	0.75																					
Total	Current Value	21.0	42.0	63.0	84.0	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	1,922
Benefit	Present Value	21.0	40.0	57.1	72.5	82.9	78.9	75.2	71.6	68.2	64.9	61.8	58.9	56.1	53.4	50.9	48.5	46.2	44.0	41.9	39.9	38.0
Return	Current Value	-100.8	-83.0	-66.8	-50.6	-13.6	83.6	83.6	83.6	83.6	83.6	83.6	83.6	83.6	83.6	83.6	83.6	83.6	83.6	83.6	83.6	1,022
	Present Value	-100.8	-79.1	-60.6	-43.7	-11.2	65.5	62.4	59.4	56.6	53.9	51.3	48.9	46.5	44.3	42.2	40.2	38.3	36.5	34.7	33.1	450
Return Accumulation																						
	Current Value	-100.8	-183.8	-250.5	-301.1	-314.7	-231.2	-147.6	-64.1	19.5	103.1	186.6	270.2	353.8	437.3	520.9	604.4	688.0	771.6	855.1	938.7	1022.3
	Present Value	-100.8	-179.8	-240.4	-284.1	-295.3	-229.8	-167.4	-108.1	-51.5	2.4	53.7	102.5	149.0	193.4	235.6	275.8	314.0	350.5	385.2	418.3	449.8

(Table 4.15 Continue)
Idea3: PLC Cash Flow Analysis (Money unit: 10⁶ Rs)

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Discount=1/(1+i) ⁿ	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377	Total
Price=(1+i) ⁿ	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220	Total

Amount of Construction Facilities

Substation Number	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Feeder Number	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Feeder Length(km)	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780

Pole Mount.	SW, RTU etc.	0.5512 (10 ⁶ Rs/Unit)	132.29	133.61	134.95	136.30	110.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	647	
	(PLC)	Acquisition Cost	3.97	7.98	12.03	16.11	19.42	19.42	19.42	19.42	19.42	19.42	19.42	19.42	19.42	19.42	19.42	19.42	19.42	19.42	19.42	19.42	19.42	19.42	370
	Maintenance Factor	(%)																							
Com. Line	Fiber Optic Cable	0.631 (10 ⁶ Rs/km)	12.63	12.75	12.88	13.01	10.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62	
	Maintenance Factor	(%)	0.38	0.76	1.15	1.54	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	35
RTU etc. at SS, DCC	For PLC at SS	3.9138 (10 ⁶ Rs/Unit)	78.28	79.06	79.85	80.65	65.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	383	
	Maintenance Factor	(%)	2.35	4.72	7.12	9.53	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	219
	For PLC at SS, DCC	7.866 (10 ⁶ Rs/Unit)	7.87																						8
	Maintenance Factor	(%)	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	5
	Maintenance Factor	(%)																							
	Total Cost		238.0	239.1	248.2	257.4	218.8	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	1,729	
	Present Value		238.0	227.7	225.1	222.3	180.0	25.9	24.6	23.5	22.3	19.3	18.4	17.5	16.7	15.9	15.1	14.4	13.7	13.1	12.4	12.4	12.4	1,387	

Benefit

Outage	19,729 (kWh/Feeder/Y)	Current Value	8.9	17.8	26.6	35.5	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	813	
Loss	97,096 (kWh/SS/Y)	Current Value	9.7	19.4	29.1	38.8	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	46.6	889
Worker	0.12 (10 ⁶ Rs/SS/Y)	Current Value	2.4	4.8	7.2	9.6	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	220
Tariff Rate	5 (Rs/kWh)																								
Outage Reduction Rate	0.75																								
Total		Current Value	21.0	42.0	63.0	84.0	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	1,922	
Benefit		Present Value	21.0	40.0	57.1	72.5	82.9	78.9	75.2	71.6	68.2	64.9	61.8	58.9	56.1	53.4	50.9	48.5	46.2	44.0	41.9	39.9	38.0	1,172	

Return

	PLC(a+e+h)	Current Value	-217.0	-197.1	-185.2	-173.4	-118.1	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	193
		Present Value	-217.0	-187.8	-168.0	-149.8	-97.1	53.1	50.6	48.1	45.9	43.7	41.6	39.6	37.7	35.9	34.2	32.6	31.0	29.6	28.1	26.8	25.5	-216

Return Accumulation

	PLC(a+e+h)	Current Value	-217.0	-414.1	-599.4	-772.8	-890.9	-823.1	-755.4	-687.6	-619.9	-552.2	-484.4	-416.7	-348.9	-281.2	-213.4	-145.7	-77.9	-10.2	57.5	125.3	193.0	
		Present Value	-217.0	-404.8	-572.8	-722.6	-819.7	-766.6	-716.1	-667.9	-622.1	-578.4	-536.8	-497.2	-459.5	-423.6	-389.4	-356.8	-325.7	-296.2	-268.0	-241.2	-215.7	-215.7

4.4.4 Cost Estimate for Individual Substation

In this section, the possibility of loss recovery and outage energy is studied with respect to their amount. Figure 4.16~4.19 show the total of loss recovery and outage energy for every substation. And Table 4.16 shows the substation list with amount of energy that can be recovered, among those substations. Substations of over 100,000 kWh of recovery energy are listed up, and they are arranged on a recovery energy amount basis for Ranga Reddy and Hyderabad.

Here, the study team proposes starting to install the distribution SCADA in the order of more effective substations in Ranga Reddy and Hyderabad.

Cost and benefit estimate was made regarding to 4 substations in Table 4.13 from the viewpoint of recovery energy and 2 substations of which location is in the important area. The 4 substations consist of those of the largest amount and the least amount for Ranga Reddy and Hyderabad in Table 4.13. The 2 substations in the important area are selected from a view point that a long duration of outage should not happen.

System configuration method is the most promising RF Mobile.

The results are summarized as in Table 4.17 and the calculation is shown in Table 4.18.

Table 4.17 Result of cost benefit estimate

							(Million Rs)
Substation name	Reason for Select	No. of feeders	Length (km/F)	Loss Recovery + Outage Energy (kWh/Y)	Equipment Cost	NPV (20 Years)	Recovery Period (Year)
Vanastalipram (RR)	Most recovery energy	4	19.8	1,311,352	5	71	1
Asif Nagar (Hydera)		9	8.5	530,505	10	21	4
NGRI (RR)	Around 100,000 kWh of recovery energy	6	2.2	188,987	7	4	11
Air Port (Hydera)		6	2.6	101,096	7	-2	Over 20
Mytrivanam	Important area	6	9.7	161,794	7	1	15
Srinagar		5	14.4	59,124	6	-3	Over 20

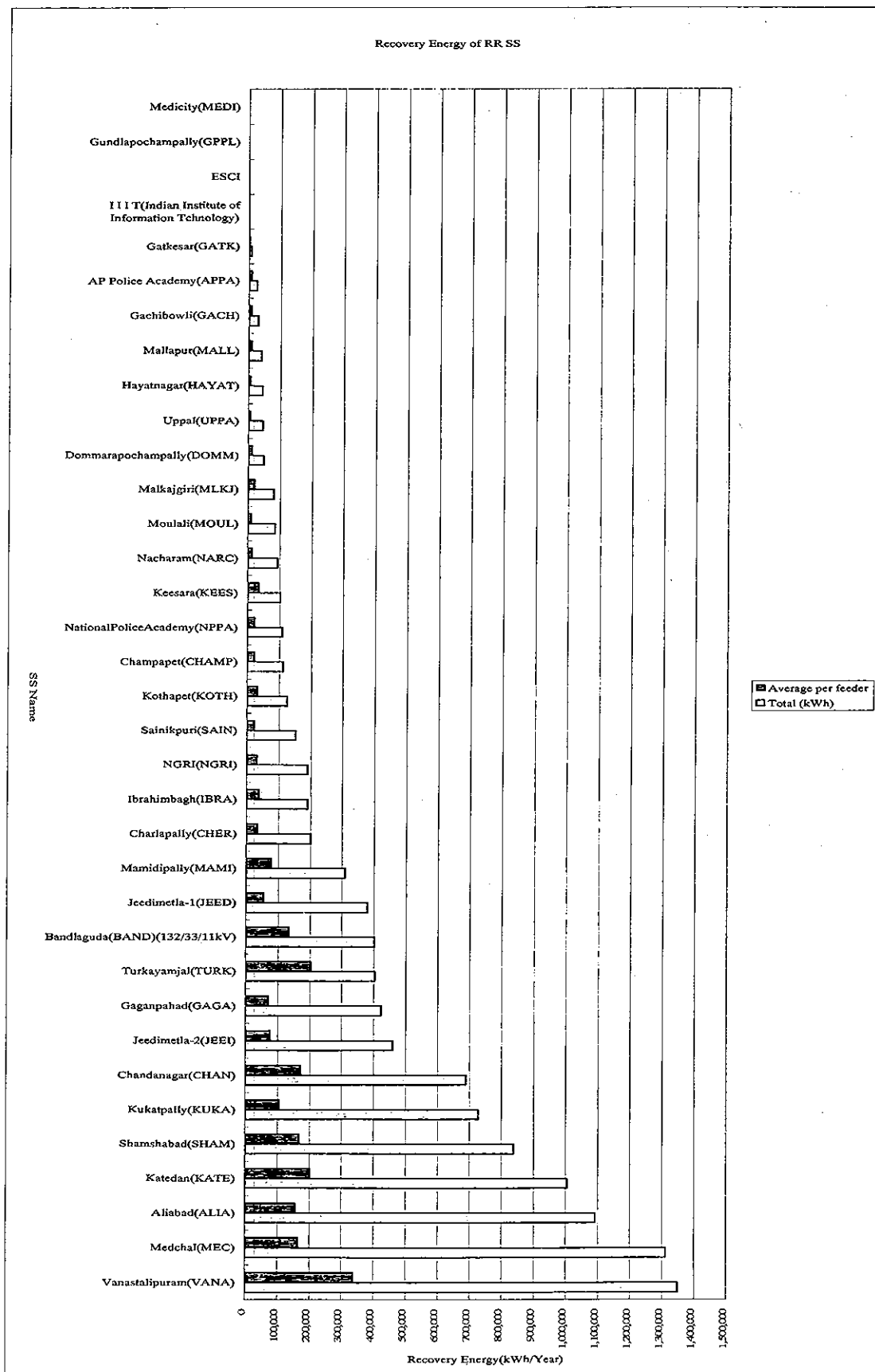


Figure 4.16 Recovery energy for every substation (Ranga Reddy)

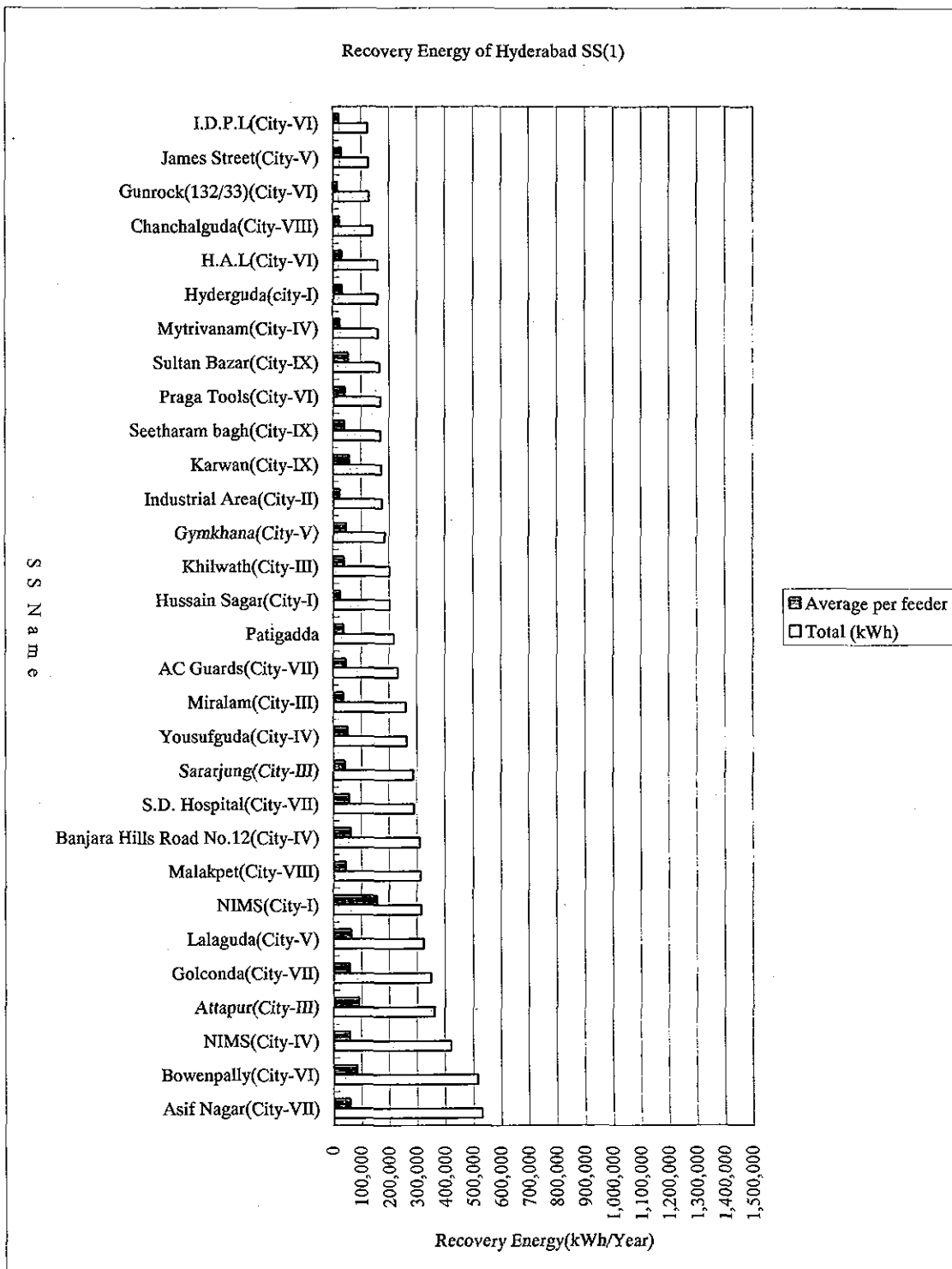


Figure 4.17 Recovery energy for every substation (Hyderabad -1)

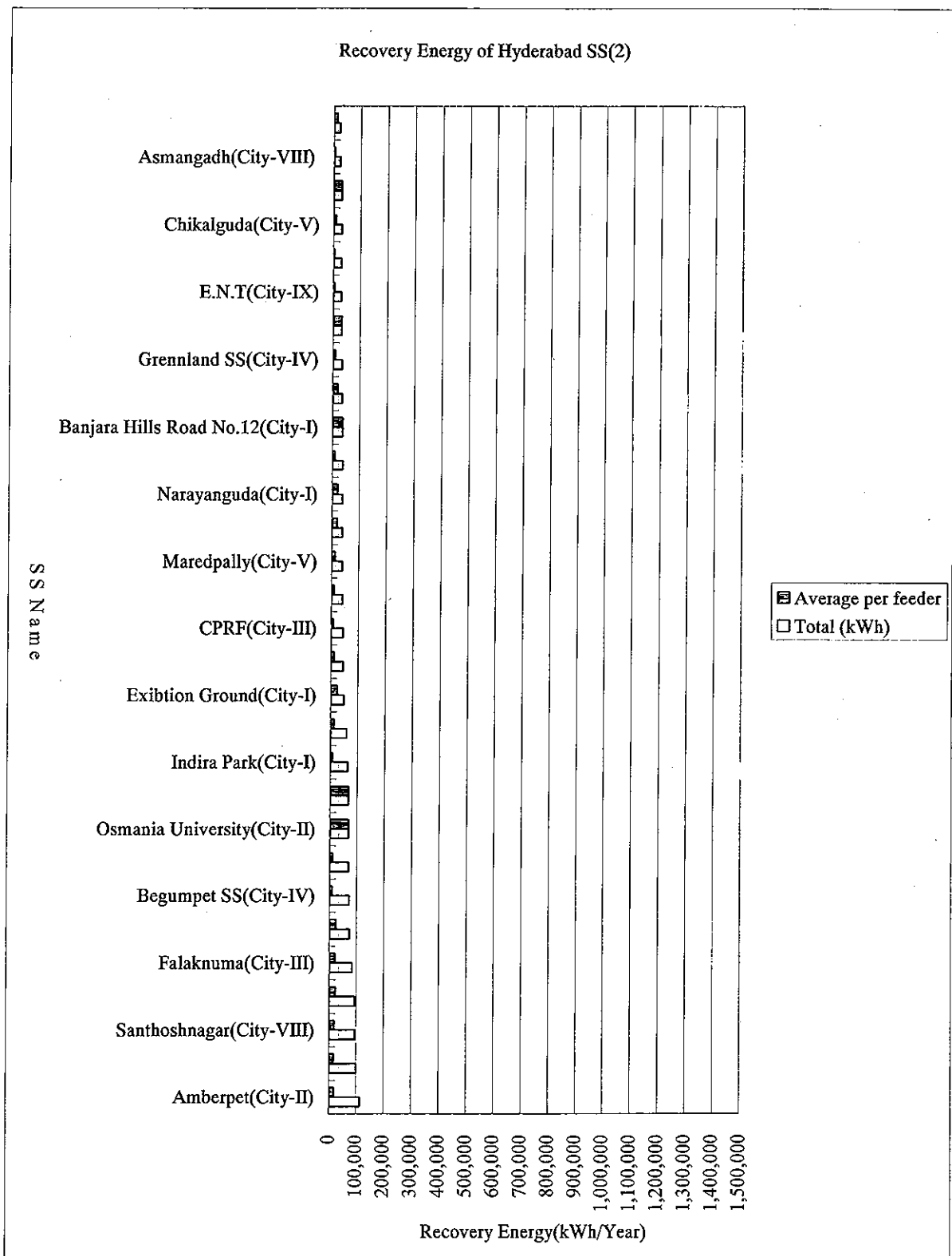


Figure 4.18 Recovery energy for every substation (Hyderabad -2)

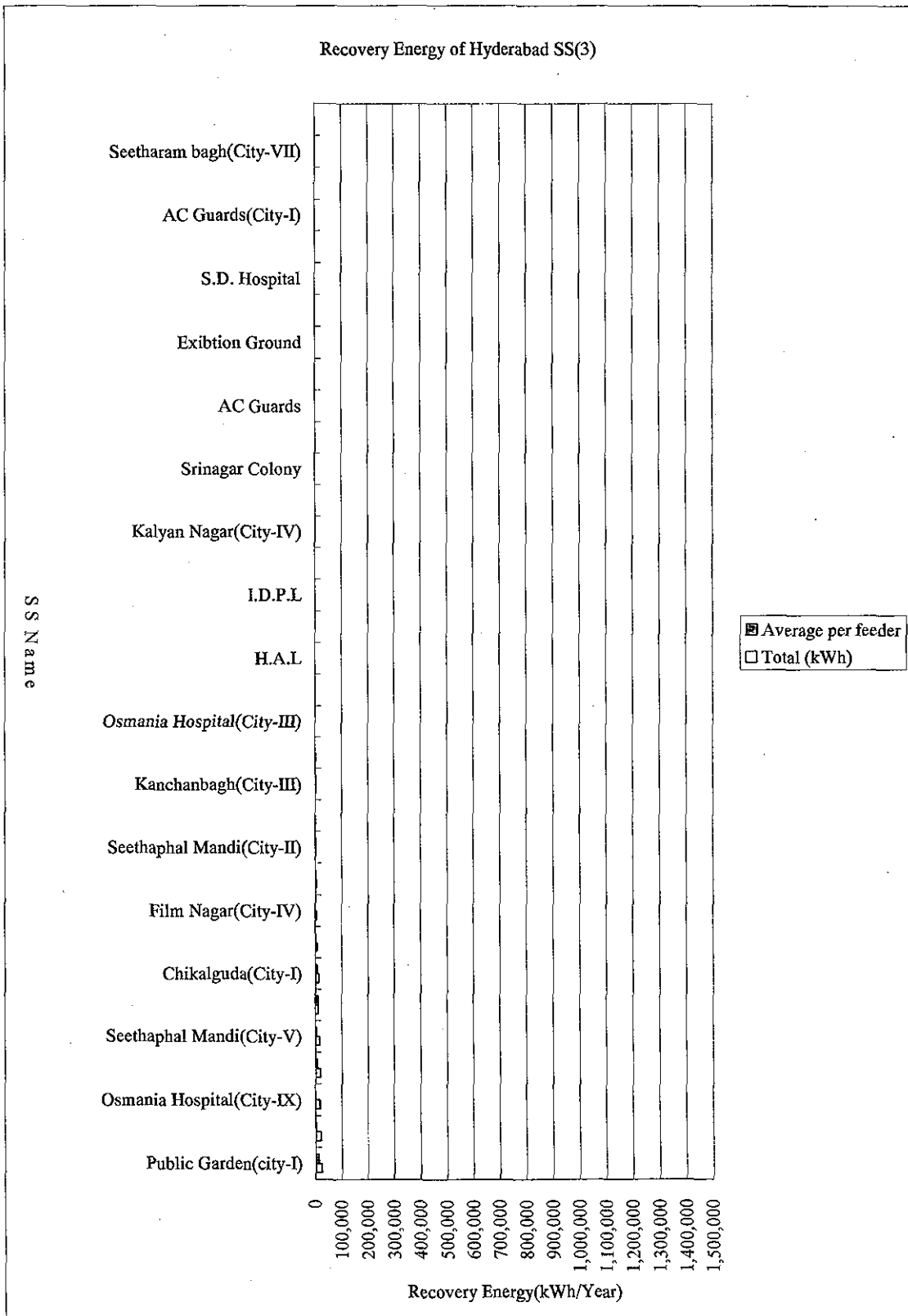


Figure 4.19 Recovery energy for every substation (Hyderabad -3)

Table 4.16 Loss recovery and outage energy of substation (Over 100,000kWh/year/substation)

No.	North South	Name	11kV feeder				Loss Data No	Loss Recovery	Recovery Rate (%)	Outage (m)	Outage Energy (kWh)	Total (kWh)	Average per feeder		
			No	Data No	Max Load(A)	Length (km)								Loss(kWh/Y)	L.L.Loss(kWh/Y)
1	S	Vanastalipuram(VANA)	4	4	590	79.2	4,651,842	4,131,842	4	520,001	11.2	2452.0	828,816	1,348,817	337,204
2	N	Medchal(MEC)	8	8	837	190	7,891,370	6,900,848	8	990,522	12.6	1035.0	320,830	1,311,352	163,919
3	N	Aliabad(ALIA)	7	7	570	111	4,071,906	3,050,392	6	1,021,513	25.1	260.0	70,736	1,092,250	156,036
4	S	Katedan(KATE)	5	5	880	39.8	3,481,466	2,956,261	5	525,205	15.1	1017.0	479,148	1,004,352	200,870
5	S	Shamshabad(SHAM)	5	5	600	69.2	3,045,884	2,585,814	5	460,071	15.1	1248.0	377,373	837,444	167,489
6	N	Kukatpally(KUKA)	7	7	765	72	3,252,417	2,650,719	6	601,698	18.5	395.0	125,489	727,187	103,884
7	N	Chandanagar(CHAN)	4	4	630	75	4,891,035	4,461,253	4	429,782	8.8	720.0	259,253	689,035	172,259
8	N	Jeedimetla-2(JEED)	6	6	730	23.2	1,063,045	823,955	6	239,090	22.5	761.0	219,985	459,075	76,513
9	S	Gaganpahad(GAGA)	6	6	620	52.16	1,630,836	1,526,059	6	104,777	6.4	1376.0	319,243	424,020	70,670
10	S	Turkayamjal(TURK)	2	2	240	12.3	424,719	424,719	2	0	0.0	1484.0	403,741	403,741	201,870
11	S	Banilguda(BAND)(132/33/11kV)	3	3	265	30	1,376,885	1,050,168	3	326,716	23.7	271.0	74,522	401,239	133,746
12	N	Jeedimetla-1(JEED)	7	7	985	30.5	1,637,419	1,447,846	7	189,572	11.6	635.0	189,990	379,563	54,223
13	S	Mamidipally(MAMI)	4	4	430	82	3,981,444	3,755,748	4	225,696	5.7	240.0	83,716	309,412	77,353
14	N	Charlapally(CHER)	6	6	770	36	1,824,576	1,729,289	6	95,287	5.2	345.0	105,878	201,165	33,527
15	S	Ibrahimbagh(IBRA)	5	5	500	118	4,111,471	4,056,799	5	54,673	1.3	556.0	136,326	190,999	38,200
16	N	NGRI(NGRI)	6	6	730	13	799,946	678,521	6	121,425	15.2	241.0	67,562	188,987	31,498
17	N	Sainikpuri(SAIN)	7	7	1080	58	3,140,074	3,140,074	7	0	0.0	485.0	151,788	151,788	21,684
18	S	Kothapet(KOTH)	4	4	370	36.31	1,407,531	1,407,531	4	0	0.0	359.0	124,355	124,355	31,089
19	S	Champapet(CHAMP)	5	5	510	41.9	1,480,331	1,480,331	5	0	0.0	421.0	110,661	110,661	22,132
20	S	NationalPoliceAcademy(NPPA)	5	5	433	35.5	1,246,000	1,181,285	5	64,716	5.2	180.0	43,428	108,144	21,629
21	N	Keesara(KEES)	3	3	360	41	1,859,346	1,757,734	3	101,612	5.5	0.0	0	101,612	33,871

(Table 4.16 Continue)

Hyderabad City		No	Name	11kV feeder						Loss Data No	Loss Recovery	Recovery Rate (%)	Outage (m)	Outage Energy (kWh)	Total (kWh)	Average per feeder
No.	Central South			Data No	Mix Load(A)	Length(km)	Loss(kWh/Y)	Loss(kWh/Y)	Loss Data No							
1	C	Asif Nagar(City-VII)	9	950	76.15	3,345,931	2,978,210	9	367,721	11.0	742.0	162,784	530,505	58,945		
2	N	Bowenpally(City-VI)	6	660	43.72	2,275,957	1,826,680	5	449,278	19.7	199.0	65,964	515,241	85,874		
3	N	NIMS(City-IV)	7	545	11.17	468,194	468,194	5	0	0.0	1100.0	422,286	422,286	60,327		
4	S	Attapur(City-III)	4	610	23.95	1,596,501	1,355,610	4	260,891	16.3	283.0	102,636	363,526	90,882		
5	C	Golconda(City-VII)	6	510	51.23	1,725,187	1,375,182	5	350,006	20.3	0.0	0	350,006	58,334		
6	N	Lalaguda(City-V)	5	540	21.3	994,249	917,276	5	76,973	7.7	675.0	247,169	324,142	64,828		
7	N	NIMS(City-I)	2	160	6.83	109,026	109,026	2	0	0.0	1658.0	316,318	316,318	158,159		
8	S	Malakpet(City-VIII)	7	810	21.1	1,041,174	991,398	7	49,775	4.8	3542.0	262,654	312,429	44,633		
9	N	Banjara Hills Road No.12(City-I)	5	3	245	9.24	330,434	245,581	3	84,853	25.7	943.0	225,619	310,473	62,095	
10	C	S.D. Hospital(City-VII)	5	525	35.63	1,267,447	1,267,447	5	0	0.0	1020.0	291,005	291,005	58,201		
11	S	Sarajung(City-III)	7	1040	24.59	1,553,475	1,371,589	6	181,886	11.7	332.0	105,968	287,855	41,122		
12	N	Yousufguda(City-IV)	5	385	18.91	530,635	478,936	5	51,699	9.7	773.0	211,959	263,659	52,732		
13	S	Miralam(City-III)	7	1020	39.14	2,590,584	2,447,206	7	143,378	5.5	307.0	117,078	260,455	37,208		
14	C	AC Guards(City-VII)	5	425	32.63	1,074,212	943,286	4	130,926	12.2	512.0	101,808	232,734	46,547		
15	N	Patigadda	6	6	659				0		558.0	217,002	217,002	36,167		
16	C	Hussain Sagar(City-I)	8	820	26.22	1,026,638	920,346	7	106,291	10.4	413.0	97,602	203,894	25,487		
17	S	Khilwath(City-III)	5	770	26.54	1,713,215	1,568,313	5	144,901	8.5	153.0	58,902	203,803	40,761		
18	N	Gymkhana(City-V)	4	620	22.4	1,537,881	1,477,859	4	60,022	3.9	321.0	125,500	185,523	46,381		
19	C	Industrial Area(City-II)	7	770	42.31	1,412,990	1,331,646	7	81,344	5.8	387.0	92,909	174,253	24,893		
20	S	Karwan(City-IX)	3	3	500	16.52	1,098,304	1,098,304	3	0	0.0	464.0	173,712	57,904		
21	S	Seetharam bagh(City-IX)	4	460	11.85	497,976	400,270	4	97,706	19.6	251.0	73,548	171,254	42,813		
22	N	Praga Tools(City-VI)	4	460	23.39	784,844	779,887	4	4,957	0.6	514.0	164,983	169,940	42,485		
23	S	Sultan Bazar(City-IX)	3	545	11.155	895,653	784,908	3	110,746	12.4	136.0	56,498	167,244	55,748		
24	N	Myrivanam(City-IV)	6	550	9.74	337,478	262,109	6	75,369	22.3	269.0	86,425	161,794	26,966		
25	C	Hyderguda(city-I)	5	780	9.76	619,720	569,552	5	50,168	8.1	308.0	110,820	160,989	32,198		
26	N	H.A.I(City-VI)	5	460	16.5	518,881	420,244	5	98,637	19.0	150.0	61,668	160,305	32,061		
27	S	Chanchalguda(City-VIII)	6	600	15.46	571,882	533,834	5	38,048	6.7	365.0	103,792	141,840	23,640		
28	N	Gunrock(132/33)(City-VI)	7	5	610	65.41	3,190,893	3,190,893	5	0	0.0	445.0	130,159	130,159	18,594	
29	N	James Street(City-V)	4	4	590	6.44	435,749	335,973	4	99,776	22.9	121.0	25,823	125,599	31,400	
30	N	I.D.P.I(City-VI)	6	6	730	57.9	2,279,294	2,207,908	6	71,386	3.1	186.0	52,848	124,234	20,706	
31	C	Amberpet(City-II)	6	6	610	27.46	875,745	875,745	6	0	0.0	388.0	114,062	114,062	19,010	
32	N	Air Port(City-IV)	6	6	700	15.46	989,350	933,439	6	55,911	5.7	127.0	45,185	101,096	16,849	

Table 4.18 Example of substation individual estimate

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total	
Discount= $1/(1+i)^n$	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377		
Price= $(1+i)^n$	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220		
Amount of Construction Facilities																							
Substation Number	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Feeder Number	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Feeder Length(km)	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cost																							
Pole Mount.	3.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4
SW,RTU etc	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	2
Maintenance	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	2
Acquisition Cost	1.49																						1
Maintenance Factor (%)	3																						
RTU etc. at DCC	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1
Acquisition Cost	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1
Maintenance Factor (%)	3																						
SS,DC	5.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	8
Current Value	5.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	7
Present Value	5.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	7
Benefit																							
Outage	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	65
Loss	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	55
Worker	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3
Tarif Rate	5																						
Outage Reduction Rate	0.75																						
Total	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	122
Benefit	5.8	5.6	5.3	5.0	4.8	4.6	4.3	4.1	3.9	3.8	3.6	3.4	3.2	3.1	2.9	2.8	2.7	2.5	2.4	2.3	2.2	2.1	78
Present Value	5.8	5.6	5.3	5.0	4.8	4.6	4.3	4.1	3.9	3.8	3.6	3.4	3.2	3.1	2.9	2.8	2.7	2.5	2.4	2.3	2.2	2.1	78
Return																							
Benefit - Total Cost	0.6	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	114
Present Value	0.6	5.4	5.1	4.9	4.7	4.4	4.2	4.0	3.8	3.7	3.5	3.3	3.2	3.0	2.9	2.7	2.6	2.5	2.4	2.2	2.1	2.1	71
Return Accumulation																							
Benefit - Total Cost	0.6	6.3	11.9	17.6	23.3	29.0	34.6	40.3	46.0	51.7	57.3	63.0	68.7	74.4	80.0	85.7	91.4	97.1	102.7	108.4	114.1	114.1	
Present Value	0.6	6.0	11.1	16.0	20.7	25.2	29.4	33.4	37.3	40.9	44.4	47.7	50.9	53.9	56.8	59.5	62.1	64.6	66.9	69.2	71.3	71.3	

(Table 4.18 Continue)

AsiNagar:RF Using Mobile Communication Cash Flow Analysis (Money unit:10⁶ Rs)

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total Equip
Discount=1/(1+i) ⁿ	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377	
Price=(1+i) ⁿ	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220	

Amount of Construction Facilities

Substation Number	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Feeder Number	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Feeder Length(km)	8.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76

Cost

Pole Mount.	0.4501 (10 ⁶ Rs/Unit)	8.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8
SW,RTU etc	Acquisition Cost	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	5
	Maintenance																						
	Maintenance Factor (%)																						
RTU etc. at	Acquisition Cost	1.49																					1
	DCC	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1
	Maintenance																						
	Maintenance factor (%)																						
SS,DC	Current Value	9.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	16	
	Present Value	9.9	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	13
	Total Cost																						10

Benefit

Outage	18,087 (kWh/Feeder/Y)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	13
Loss	367,721 (kWh/SS/Y)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	39
Worker	0.12 (10 ⁶ Rs/SS/Y)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3
	Tarif Rate (Rs/kWh)	5																					
	Outage Reduction Rate	0.75																					
Total	Current Value	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	54
	Present Value	2.6	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.4	1.3	1.2	1.2	1.1	1.1	1.0	1.0	1.0	35
Benefit	Current Value	-7.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	38
	Present Value	-7.3	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.0	1.0	0.9	0.9	0.9	0.9	21

Return

Benefit - Total Cost	Current Value	-7.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	38
	Present Value	-7.3	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.0	1.0	0.9	0.9	0.9	0.9	21
Return Accumulation	Current Value	-7.3	-5.0	-2.7	-0.5	1.8	4.1	6.4	8.7	10.9	13.2	15.5	17.8	20.1	22.3	24.6	26.9	29.2	31.5	33.8	36.0	38.3	
	Present Value	-7.3	-5.1	-3.1	-1.1	0.8	2.6	4.3	5.9	7.4	8.9	10.3	11.6	12.9	14.1	15.3	16.4	17.4	18.4	19.4	20.3	21.1	

(Table 4.18 Continue)
 NGRI:RF Using Mobile Communication Cash Flow Analysis (Money unit:10⁶ Rs)

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Discount= $1/(1+i)^n$	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377	
Price= $(1+i)^n$	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220	
Amount of Construction Facilities																						
Substation Number	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Feeder Number	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Feeder Length(km)	2.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
Cost																						
Pole SW,RTU etc.	5.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5
Maintenance Factor	2	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	3
RTU etc. at DCC	1.49																					1
SS,DC	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1
Maintenance Factor	3																					
Total Cost	71	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	7
Benefit	71	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	10
Outage	11,260	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	5
Loss	121,425	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	13
Worker	0.12	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3
Tariff Rate	5																					
Outage Reduction Rate	0.75																					
Total	10	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	21
Benefit	10	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	13
Return																						
Benefit - Total Cost	-61	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	9
Return Accumulation	-61	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	4
Benefit - Total Cost	-61	-53	-46	-38	-30	-22	-15	-07	01	08	16	24	32	39	47	55	63	70	78	86	94	
Return Accumulation	-61	-54	-47	-40	-34	-28	-22	-16	-11	-06	-01	03	07	12	15	19	23	26	29	32	35	

Table 4.18 Continue)

AirPort:RF Using Mobile Communication Cash Flow Analysis (Money unit:10⁶ Rs)

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total Equip	
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total	
Discount= $1/(1+i)^n$	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377		
Price= $(1+i)^n$	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220		
Amount of Construction Facilities																							
Substation Number	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Feeder Number	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
Feeder Length(km)	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	
Cost																							
Pole Mount.	0.4501 (10 ⁶ Rs/Unit)	5.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5
SW,RTU etc	2 (Nos/Feeder)	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	3
Maintenance Factor	(%)																						
RTU etc. at	RCS for RF at 2,976 (10 ⁶ Rs/Unit)	1.49																					1
DCC	0.5 (Nos/System)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1
Maintenance Factor	(%)																						
SS,DC																							
Total Cost																							
Current Value	7.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	11
Present Value	7.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	10
Benefit																							
Outage	7,531 (kWh/Feeder/Y)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	4
Loss	55,911 (kWh/SS/Y)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	6
Worker	0.12 (10 ⁶ Rs/SS/Y)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3
Tarif Rate	5 (Rs/kWh)																						
Outage Reduction Rate	0.75																						
Total		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	12
Benefit		0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	8
Return																							
Benefit - Total Cost																							
Current Value	-6.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1
Present Value	-6.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	-2
Return Accumulation																							
Benefit - Total Cost																							
Current Value	-6.5	-6.2	-5.8	-5.4	-5.1	-4.7	-4.4	-4.0	-3.6	-3.3	-2.9	-2.5	-2.2	-1.8	-1.5	-1.1	-0.7	-0.4	0.0	0.4	0.7		
Present Value	-6.5	-6.2	-5.9	-5.5	-5.2	-5.0	-4.7	-4.4	-4.2	-4.0	-3.7	-3.5	-3.3	-3.1	-2.9	-2.8	-2.6	-2.4	-2.3	-2.1	-2.0		

(Table 4.18 Continue)
Myrtivanam:RF Using Mobile Communication Cash Flow Analysis (Money unit:10⁶ Rs)

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Discount= $1/(1+i)^n$	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377	
Price=(1+i) ⁿ	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220	Equip
Amount of Construction Facilities																						
Substation Number	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Feeder Number	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Feeder Length(km)	1.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Cost																						
Pole Mount.	5.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5
SW,RTU etc	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	3
Maintenance Factor	3																					
RTU etc. at	1.49																					1
DCC	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1
SS,DC	3																					
Current Value	71	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	7
Present Value	71	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	10
Benefit																						
Outage	14,404	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	7
Loss	75,369	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	8
Worker	0.12	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3
Tariff Rate	5																					
Outage Reduction Rate	0.75																					
Total	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	17
Benefit	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	11
Return																						
Benefit - Total Cost																						
Current Value	-6.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	6
Present Value	-6.3	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	1
Return Accumulation																						
Benefit - Total Cost	-6.3	-5.7	-5.0	-4.4	-3.8	-3.2	-2.6	-2.0	-1.4	-0.7	-0.1	0.5	1.1	1.7	2.3	2.9	3.6	4.2	4.8	5.4	6.0	
Present Value	-6.3	-5.7	-5.1	-4.6	-4.1	-3.6	-3.2	-2.7	-2.3	-1.9	-1.5	-1.2	-0.8	-0.5	-0.2	0.1	0.4	0.7	0.9	1.1	1.4	

(Table 4.18 Continue)

Srinagar:RF Using Mobile Communication Cash Flow Analysis (Money unit:10⁶ Rs)

Relative Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Calendar Year(n)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total Equip.
Discount=1/(1+i) ⁿ	1.000	0.952	0.907	0.864	0.823	0.784	0.746	0.711	0.677	0.645	0.614	0.585	0.557	0.530	0.505	0.481	0.458	0.436	0.416	0.396	0.377	
Price=(1+i) ⁿ	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.072	1.083	1.094	1.105	1.116	1.127	1.138	1.149	1.161	1.173	1.184	1.196	1.208	1.220	

Amount of Construction Facilities

Substation Number	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Feeder Number	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Feeder Length(km)	2.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14

Cost	SW,RTU etc. Mount.	Acquisition Cost (10 ⁶ Rs/Unit)	Maintenance (Nos/Feeder)	Maintenance Factor (%)	RCS for RF at etc. at DCC	Acquisition Cost (10 ⁶ Rs/Unit)	Maintenance (Nos/System)	Maintenance Factor (%)	Current Value	Present Value	Total Cost
Pole	0.4501	0.00	0.00	0.00	2	0.00	0.00	0.00	0.00	0.00	4.50
RTU	2.976	0.04	0.04	0.04	0.5	0.04	0.04	0.04	0.04	0.04	1.49
SS,DC	3	0.04	0.04	0.04	3	0.04	0.04	0.04	0.04	0.04	0.04
		6.2	0.2	0.2		6.2	0.2	0.2	0.2	0.2	6.2
		6.2	0.2	0.2		6.2	0.1	0.1	0.1	0.1	6.2

Benefit

Outage	7,574	(kWh/Feeder/Y)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3
Loss	21,262	(kWh/SS/Y)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2
Worker	0.12	(10 ⁶ Rs/SS/Y)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3
Tariff Rate	5	(Rs/kWh)																					
Outage Reduction Rate	0.75																						
Total	0.4		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	8
Benefit	0.4		0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	5

Return

Benefit - Total Cost	Current Value	-5.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-2
	Present Value	-5.8	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-3

Return Accumulation

Benefit - Total Cost	Current Value	-5.8	-5.6	-5.4	-5.2	-5.0	-4.9	-4.7	-4.5	-4.3	-4.1	-3.9	-3.7	-3.5	-3.3	-3.2	-3.0	-2.8	-2.6	-2.4	-2.2	-2.0
	Present Value	-5.8	-5.6	-5.4	-5.3	-5.1	-5.0	-4.8	-4.7	-4.6	-4.5	-4.3	-4.2	-4.1	-4.0	-3.9	-3.8	-3.8	-3.7	-3.6	-3.5	-3.4

4.5 Recommendations

Based on this study, the following is recommended with respect to the introduction of the distribution SCADA system.

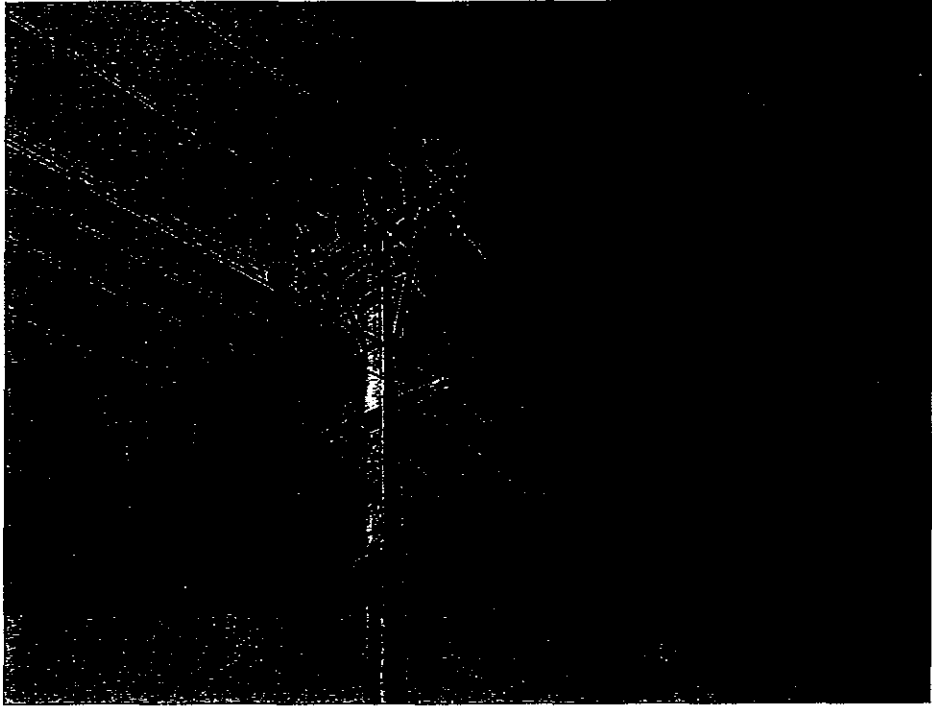
- Outage period is considerably long, so the fault location function should be introduced. It will result in reduction of outage energy (kWh) and recovery of tariff income.
- Unbalance of feeder load (ampere) is considerable and its improvement will produce many benefits. Hence the load balancing function should be introduced in the first stage of the introduction of the distribution SCADA system.
- The distribution SCADA system may be able to yield many other benefits because the operations on distribution feeder are almost manual.
- The number of isolated sections on feeder should be 2 or 3 from the economical viewpoint.
- As for the communication method, Fiber Optic Cable or Radio Frequency is recommendable. Especially, Fiber Optic Cable has been already laid widely in the study area. RF using mobile telephone line is also recommendable because its infrastructure has been already provided. This RF method should be used in place of Fiber Optic Cable when it is expensive, or this RF might be necessary to be preferred.
- In the introduction of the system to substations on a continuous basis, selection of substations and the order of introduction are very important because the benefits of the introduction vary from substation to substation. Potentially very profitable substations exist in the project area.

Period	Area	Total recovery energy	Number of substations
Phase I	Ranga Reddy	>500,000 kWh/Y	7
	Hyderabad	>200,000 kWh/Y	17
Phase II	Ranga Reddy	>200,000 kWh/Y	7
	Hyderabad	>100,000 kWh/Y	15
Phase III	Ranga Reddy	>100,000 kWh/Y	6
	Hyderabad	>50,000 kWh/Y	10
Phase IV	Ranga Reddy	Others	10
	Hyderabad	Others	10
Phase V	Ranga Reddy	Others	5
	Hyderabad	Others	9
Total			96

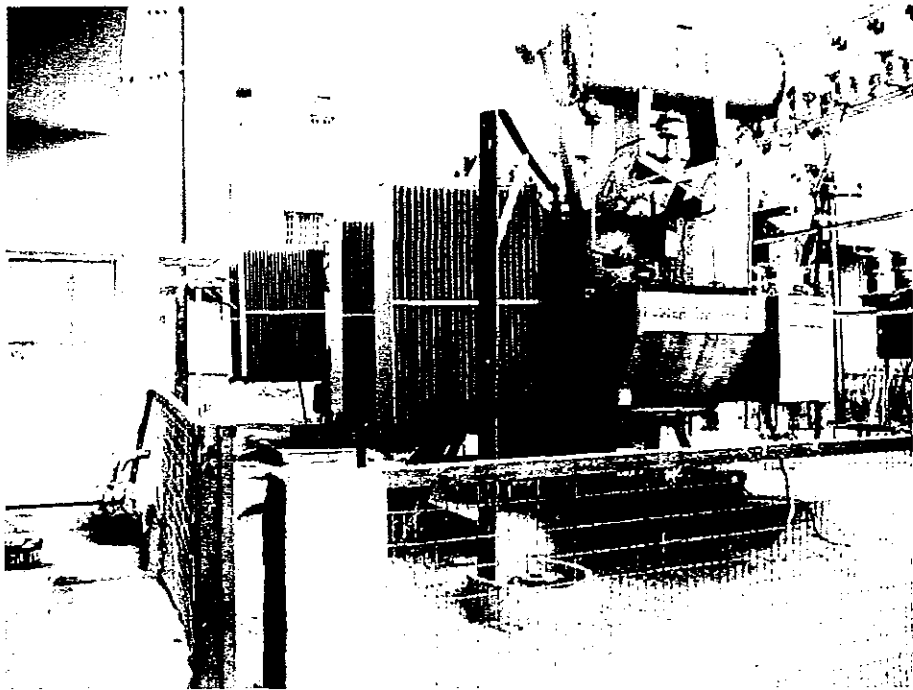
Annextures

- Annex 4.1 Pictures of Some Equipment
- Annex 4.2 Results of Substation and Feeders Survey
- Annex 4.3 Outage Data and Outage Energy
- Annex 4.4 Loss Recovery Energy and Outage Energy

Annex 4.1 Picture of Some Equipment



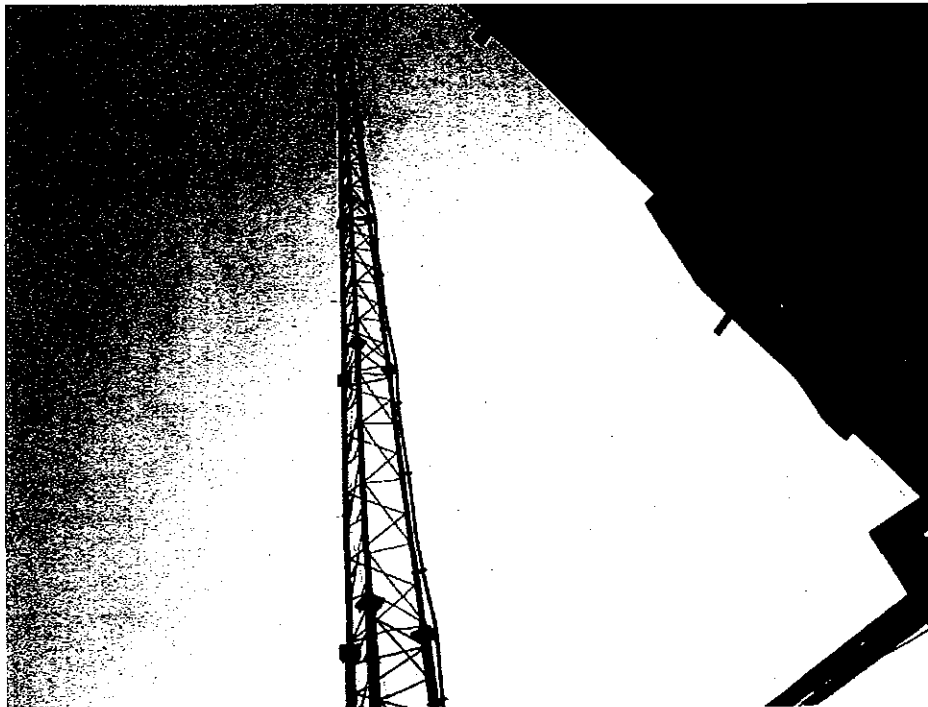
(Feeder AB SW for sectionalizing)



(SS Outlook at Kotapet)



(SS RTU)

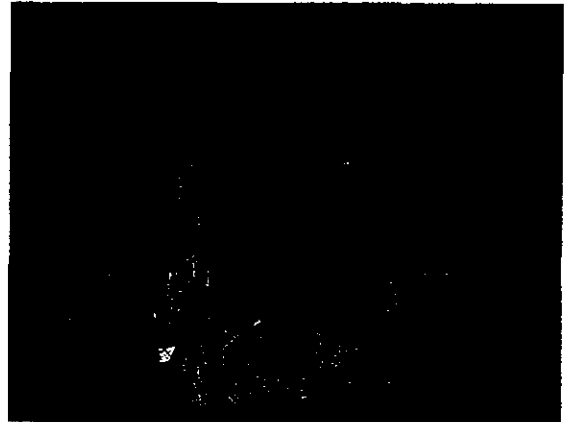


(SS Antenna for SCADA)

ANNEX Photograph



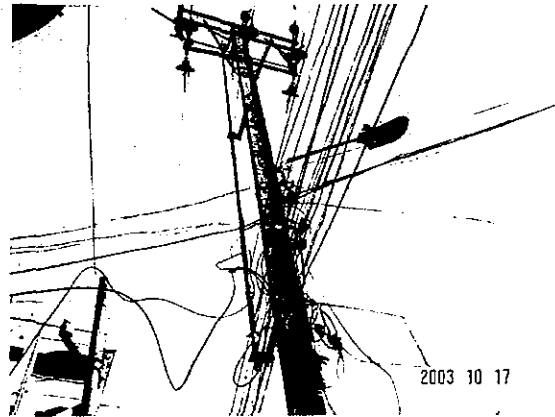
Asif Nagar Cut Point



Asif Nagar Double Feed Point



Asif Nagar Double Feed Point with AB Switch



Asif Nagar AB Switch in Line



Mytrivanam Cable Standing Point



Mytrivanam Double Feed Point



Mytrivanam AB Switch in Line



Mytrivanam Double Feed Point with AB Switch



Vanastlipuram Double Feed Point (Connect)



Vanastlipuram Fault Point by Tree Falling (22/10/2003)

Annex 4.2 Results of Substation and Feeders Survey

Annex 4.2 Results of Substation and Feeders Survey

List of Substations Covered by SCADA

Ranga Reddy

No.	Mark. Sdtd	Name	11kV feeder							Fault(per month)									Nos of customer	Remarks
			No	Data No	Max Load(A)	Length(km)	Sec. SW	spur L	Alter. L	(1) Interruption			(2) Break down			(1) + (2)				
										No	minute	Minuse/No	No	Minute	Minuse/No	No	Minute	Minuse/No		
1	N	Gachibowli(GACH)	4	4	120	36	22	22	4	12	123	10.3	0	0	0	12	123	10.3		
2	N	111T(Indian Institute of Information Tchoology)	4	3	32	14	6	6	4	1	5	5.0	0	0		1	5	5.0		
3	N	Aljabad(ALIA)	7	6	500	104	15	28	0	75	260	3.5	0	0		75	260	3.5		
4	N	Chandanagar(CHAN)	4	4	630	75	16	23	0	60	650	10.8	2	70	35.0	62	720	11.6		
5	N	Dommarapochampally(DOMM)	4	4	464	105	0	26	3	25	180	7.2	0	0		25	180	7.2		
6	N	ESCI	3	0		26	2	9	0	25	180	7.2	0	0		25	180	7.2		
7	N	Gundlapochampally(GPPL)	4	0		52	8	19	0	47	255	5.4	0	0		47	255	5.4		
8	N	Jeedimetla-1(JEED)	7	7	985	30.5	10	42	10	52	345	6.6	5	290	58.0	57	635	11.1		
9	N	Jeedimetla-2(JEED)	6	6	730	23.2	12	28	11	43	270	6.3	9	491	54.6	52	761	14.6		
10	N	Kukatpally(KUKA)	7	6	765	68	18	33	0	38	395	10.4	0	0		38	395	10.4		
11	N	Medchal(MEC)	8	8	837	190	33	58	0	157	850	5.4	4	185	46.3	161	1,035	6.4		
12	N	Medicity(MEDI)	3	0		40.05	8	12	0	25	135		1	70	70.0	26	205	7.9		
13	N	Charlapally(CHER)	6	6	770	36	9	22	0	4	20	5.0	3	325	108.3	7	345	49.3		
14	N	Gatkesar(GATK)	8	7	415	113	6	31	4	10	62	6.2	0	0		10	62	6.2		
15	N	Keesara(KEES)	3	3	360	41	6	14	0	0	0	0	0	0		0	0	0		
16	N	Malkaigiri(MLKJ)	4	4	590	15	6	18	4	0	0	0	2	90	45.0	2	90	45.0		
17	N	Mallapur(MALL)	4	4	315	20	2	3	1	3	15	5.0	2	165	82.5	5	180	36.0		
18	N	Moulali(MOUL)	8	8	940	33	8	7	0	3	15	5.0	3	125	41.7	6	140	23.3		
19	N	Nacharam(NARC)	7	7	705	22.5	5	16	5	3	15	5.0	1	65	65.0	4	80	20.0		
20	N	NGRI(NGRI)	6	6	730	13	11	13	6	22	176	8.0	1	65	65.0	23	241	10.5		
21	N	Sainikpuri(SAIN)	7	7	1,080	58	18	32	0	18	100	5.6	6	385	64.2	24	485	20.2		
22	N	Uppal(UPPA)	7	5	580	34	7	17	1	15	80	5.3	1	75	75.0	16	155	9.7		
23	S	Kothapet(KOTE)	4	4	370	36.31	2	50	1	25	119	4.8	3	240	80.0	28	359	12.8		
24	S	Katedan(KATE)	5	5	880	39.8	6	21	5	36	189	5.3	5	828	165.6	41	1,017	24.8		
25	S	AP Police Academy(APPA)	3	3	217	43.4	2	12	0	5	25	5.0	1	50	50.0	6	75	12.5		
26	S	Champapet(CHAMP)	5	5	510	41.9	7	19	5	65	204	3.1	4	217	54.3	69	421	6.1		

No.	Mark. Sdtd	Name	11kV feeder							Fault(per month)									Nos of customer	Remarks
			No	Data No	Max Load(A)	Length(km)	Sec. SW	spur L	Alter. L	(1) Interruption			(2) Break down			(1) + (2)				
										No	minute	Minuse/No	No	Minute	Minuse/No	No	Minute	Minuse/No		
27	S	Gaganpahad(GAGA)	6	6	620	52.16	8	15	7	62	739	11.9	4	637	159.3	66	1376	20.8		5,280
28	S	Hayatnagar(HAYAT)	7	7	550	72	9	74	1	34	134	3.9	2	85	42.5	36	219	6.1		
29	S	Ibrahimbagh(IBRA)	5	5	500	118	9	26	0	41	256	6.2	4	300	75.0	45	556	12.4		
30	S	Mamidipally(MAMI)	4	4	430	82	1	13	2	20	105	5.3	3	135	45.0	23	240	10.4		6,000
31	S	NationalPoliceAcademy(NPPA)	5	5	433	35.5	6	32	2	13	65	5.0	5	115	23.0	18	180	10.0		12,344
32	S	Shamshabad(SHAM)	5	5	600	69.2	9	19	4	29	795	27.4	8	453	56.6	37	1,248	33.7		11,200
33	S	Turkayamjal(TURK)	2	2	240	12.3	4	7	3	20	1439	72.0	1	45	45.0	21	1,484	70.7		6,475
34	S	Vanastalipuram(VANA)	4	4	590	79.2	19	16	18	81	2052	25.3	6	400	66.7	87	2,452	28.2		14,025
35	S	Bandlaguda(BAND)(132/33/11kV)	3	3	265	30	3	7	2	53	271	5.1	0	0		53	271	5.1		5,000

North Total	121	105	11,548	1,149	228	479	53	638	4,131	6.5	40	2,401	60.0	678	6,532	9.6				
South Total	58	58	6,205	712	85	311	50	484	6,393	13.2	46	3,505	76.2	530	9,898	18.7				
Gross Total	179	163	17,753	1,861	313	790	103	1,122	10,524	9.4	86	5,906	68.7	1,208	16,430	13.6				

Average per feeder

Area	No	Data No	11kV feeder					Fault(per month)									Nos of customer			
			Max Load(A)	Length(km)	Sec. SW	spur L	Alter. L	(1) Interruption			(2) Break down			(1) + (2)						
								No	minute	Minuse/No	No	Minute	Minuse/No	No	Minute	Minuse/No				
North			110.6	9.9	2.0	4.2	0.5	5.8	38.0	6.6	0.6	36.4	60.0	5.7	55.6	9.7				
South			107.0	12.3	1.5	5.5	0.9	8.5	112.2	13.2	1.0	79.7	76.2	9.1	170.7	18.7				
Gross			109.3	10.7	1.8	4.6	0.6	6.7	63.2	9.4	0.8	53.7	68.7	6.9	93.3	13.6				

Annex 4.2 Results of Substation and Feeders Survey

No.	North, Central, South	Name	11kV feeder							Fault(per month)						Nos of customer	Remarks		
			Data No	Max Load(A)	Length(km)	Sec. SW	spur L	Alter. L	(1) Interruption			(2) Break down			(1) + (2)				
									No	minute	Minute/No	No	Minute	Minute/No	No			Minute	Minute/No
49	S	Falaknuma(City-II)	4	4	500	20.8	8	23	12	27	219	8.1	0	0	0	27	219	8.1	
		Falaknuma	2	0															
50	S	Kanchanbagh(City-III)	1	1	55		2	7	5	3	19	6.3	0	0	0	3	19	6.3	
		Kanchanbagh(City-VIII)	5	4	205	7.41	3	10	2	5	29	5.8	0	0	0	5	29	5.8	
51	S	Karwan(City-VII)	1	1	140	10.15	1	7	0	4	35	8.8	3	177	59.0	7	212	30.3	
		Karwan(City-IX)	3	3	500	16.52	5	22	7	17	137	8.1	6	327	54.5	23	464	20.2	
52	S	Khiliwath(City-III)	5	5	770	26.54	5	25	12	28	153	5.5	0	0	28	153	5.5	14 Feeder origin	
		Malakpet(City-II)	1	1	150	4.13	2	7	1	6	147	24.5	0	0	6	147	24.5		
		Malakpet(City-VIII)	7	7	810	21.1	19	25	9	25	631	25.2	1	2,911	2,911	26	3,542	136.2	
54	S	Miralam(City-III)	7	7	1,020	39.14	6	33	13	45	307	6.8	0	0	45	307	6.8		
55	S	Moosarambagh(City-VIII)	6	6	430	20.21	6	34	7	10	55	5.5	4	385	96.3	14	440	31.4	
		Osmania Hospital(City-III)	1	1	20	2.49	0	2	0	1	5	5.0	0	0	1	5	5.0		
56	S	Osmania Hospital(City-IX)	7	5	490	11.93	6	25	10	9	34	3.8	2	85	42.5	11	119	10.8	ND(Greeter)
57	S	Sararjung(City-III)	7	7	1,040	24.59	5	22	9	34	327	9.6	1	5	5.0	35	332	9.5	*2
		Santhoshnagar(City-III)	2	2	210	11.59	3	15	5	14	163	11.6	0	0	14	163	11.6		
		Santhoshnagar(City-VIII)	5	5	660	15.72	7	22	7	24	238	9.9	0	0	24	238	9.9		
59	S	Seetharam bagh(City-VII)	2	2	180	9.42	2	11	1	3	14	4.7	0	0	3	14	4.7		
		Seetharam bagh(City-IX)	4	4	460	11.85	7	27	2	23	198	8.6	1	53	53.0	24	251	10.5	
60	S	Sultan Bazar(City-II)	1	1	140	2.91	1	5	1	1	8	8.0	0	0	1	8	8.0	Except UG	
		Sultan Bazar(City-IX)	3	3	545	11.155	18	19	12	17	136	8.0	0	0	17	136	8.0		
61	S	CPRF(City-III)	6	6	566	23.75				22	144	6.5	1	35	35.0	23	179	7.8	*2
Total			367																

North Total	178	146	15,494	655.3	219	692	239	522	4,154	8.0	81	6,911	85.3	588	10,925	18.6
Central Total	87	79	8,555	406.8	116	395	108	335	3,963	11.8	34	1,793	52.7	325	5,046	15.5
South Total	102	95	11,111	363.4	132	452	160	409	3,604	8.8	25	4,234	169.4	434	7,838	18.1
Gross Total	367	320	35,160	1425	467	1539	507	1,266	11,721	9.3	140	12,938	92.4	1,347	23,809	17.7

Average per feeder

Area	No	Data No	11kV feeder							Fault(per month)						Nos of customer
			Max Load(A)	Length(km)	Sec. SW	spur L	Alter. L	(1) Interruption			(2) Break down			(1) + (2)		
								No	minute	Minute/No	No	Minute	Minute/No	No	Minute	
North			100.3	4.7	1.6	4.9	1.7	3.6	27.3	7.6	0.5	49.1	91.2	4.2	78.1	18.7
Central			100.4	5.0	1.4	4.7	1.3	3.5	42.9	12.1	0.4	23.1	60.9	3.7	62.2	17.0
South			116.1	3.9	1.5	5.0	1.8	4.3	38.1	8.8	0.3	43.5	163.8	4.6	81.5	17.8
Gross			104.4	4.5	1.5	4.9	1.6	3.8	34.5	9.2	0.4	40.3	95.6	4.1	74.7	18.0

*1: Length data of 1 feeder is not available.

*2:Map data of feeder is not available.

Annex 4.2 Results of Substation and Feeders Survey

Ranga Reddy North

Substation Name	Name of Feeder	Nos of feeder	Max Load (A)	Length (km)	Nos of sect-ion SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
								(1) Interruption			(2) Break down			(1) + (2)			
								No	Minute	Miss/No	No	Minute	Miss/No	No	Minute	Miss/No	
Gachibowli (5MVA x2)	University, ALIND	4	30	1	2	2	1	3	15	5.0				3	15	5.0	
	LINGGAMPALLY		50	10	8	8	1	6	18	3.0				6	18	3.0	
	KOTTAGUDA		32	20	10	10	1	3	90	30.0				3	90	30.0	
	GACHIBOWLI(KALAGAYTHY)		8	5	2	2	1	nil	nil								
IIT(Indian Institute of Information Technology) (8MVA New)	STADIUM	4	11	3	1	1	2							0	0		
	WIZCRAFT		Open	2	0	0	0							0	0		
	SPORT VILLAGE		3	1	0	0	0							0	0		
	SPORTVILLAGE EXTERNAL LIGHTING		18	10	5	5	2	1	5	5.0				1	5	5.0	
Aliabad(ALIA) 8MVAX2 3.15MVA	Ravileela	7	20	4	0	0	0	0	0					0	0		May/03
	Thurkapally		160	35	5	7	0	25	75	3.0				25	75	3.0	May/03
	Bommarajpet		120	20	4	7	0	15	40	2.7				15	40	2.7	May/03
	Aliabad		80	20	3	7	0	15	75	5.0				15	75	5.0	May/03
	Jaganguda		120	25	3	7	0	20	70	3.5				20	70	3.5	May/03
	H.B.L		70	5	0	0	0	0	0					0	0		May/03
	Survanshi		2	0	0	0	0	0	0					0	0		May/03
Chandanagar(CHAN) 8MVA 3.15MVA	Taranagar	4	150	18	5	6	0	15	145	9.7				15	145	9.7	May/03
	Chandanagar		130	10	3	4	0	20	205	10.3				20	205	10.3	May/03
	Hifeezpet(S.B)		160	22	5	7	0	15	145	9.7				15	145	9.7	May/03
	Miyapur		190	25	3	6	0	10	155	15.5	2	70	35.0	12	225	18.8	May/03
Dommarapocham-pally (DOMM) 5MVAX2	Bowrapet	4	115	20	0	7	1	2	10	5.0				2	10	5.0	
	Satyam Computers(S.B)		115	50	0	6	0	2	70	35.0				2	70	35.0	
	Duridigal IDA		117	10	0	5	1	12	40	3.3				12	40	3.3	
	Gagillapur		117	25	0	8	1	9	60	6.7				9	60	6.7	
ESCI 3MVA	Gachibowli	3	10	0	4	0	0	10	80	8.0				10	80	8.0	
	Nanakramguda E.S.C.I		15	2	5	0	0	15	100	6.7				15	100	6.7	

Ranga Reddy North

Substation Name	Name of Feeder	Nos of feeder	Max Load(A)	Length (km)	Nos of sect-ion SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
								(1) Interruption			(2) Break down			(1) + (2)			
								No	Minute	Miss/No	No	Minute	Miss/No	No	Minute	Miss/No	
Gundlapochampally(GPPL) 8MVA	IDA	4	4	1	3	0	2	15	7.5					2	15	7.5	
	Gundla Pochampally(S.R)		25	3	5	0	10	45	4.5					10	45	4.5	
	Mysammaguda		8	2	7	0	15	75	5.0					15	75	5.0	
	Doollapally		15	2	4	0	20	120	6.0					20	120	6.0	
Jeedimetla-1(JEED) 8MVAX3	Phase V	7	130	3.2	1	6	2	5	25	5.0				5	25	5.0	
	Vicchow		180	6.3	2	3	2	12	75	6.3	1	30	30.0	13	105	8.1	May
	SudershanDrugs		165	3.1	1	5	1	2	10	5.0				2	10	5.0	
	Phase I		175	4.9	2	8	1	8	65	8.1				8	65	8.1	
	Subhashnagar		120	4.9	1	8	1	12	90	7.5	1	50	50.0	13	140	10.8	May
	Shapumagar		140	5.3	1	7	2	8	40	5.0	2	115	57.5	10	155	15.5	May
	Phase II		75	2.8	2	5	1	5	40	8.0	1	95	95.0	6	135	22.5	May
Jeedimetla-2 (JEED) 8MVAX2	Gajulararam	6	130	3.9	2	3	1	5	35	7.0	2	91	45.5	7	126	18.0	May
	Kompally		90	2.1	1	3	1	5	40	8.0				5	40	8.0	
	Surqaram		140	6.5	1	8	1	10	75	7.5	2	100	50.0	12	175	14.6	May
	Phase III		80	2.7	3	5	3	8	40	5.0	2	130	65.0	10	170	17.0	May
	Phase V		100	2.8	2	3	2	5	30	6.0	1	65	65.0	6	95	15.8	May
Kukatpally(KUKA)	Phase IV	7	190	5.2	3	6	3	10	50	5.0	2	105	52.5	12	155	12.9	May
	Travels Feeder		100	3	2	5	0	3	50	16.7				3	50	16.7	
	Hydernagar		140	8	3	6	0	5	70	14.0				5	70	14.0	
	Air Force		4	2	6	0	6	90	15.0					6	90	15.0	
	Venkateshwara		180	20	5	8	0	10	140	14.0				10	140	14.0	
	Bhagyanagar		120	10	3	5	0	6	45	7.5				6	45	7.5	
	JNTUCF		130	17	2	4	0	3	40	13.3				3	40	13.3	
Medchal(MEC) 5MVAX2	KPHB	8	95	10	3	5	0	11	50	4.5				11	50	4.5	
	Yellampet		83	30	3	7	0	15	70	4.7				15	70	4.7	
	Ravalkole		150	35	7	12	0	35	250	7.1				35	250	7.1	
	IDA Medchal II(S.B)		125	15	3	5	0	15	60	4.0	2	95	47.5	17	155	9.1	May
	Rural Medchal		70	25	3	7	0	25	75	3.0				25	75	3.0	
	IDA Medchal I		125	20	5	7	0	12	60	5.0	2	90	45.0	14	150	10.7	May
	kandlakoya		185	45	9	15	0	35	270	7.7				35	270	7.7	
Medchal Town	75	15	3	5	0	20	65	3.3				20	65	3.3			
Srinath Spinning Mills	24	5	0	0	0	0	0					0	0				

Annex 4.2 Results of Substation and Feeders Survey

Ranga Reddy North

Substation Name	Name of Feeder	Nos of feeder	Max Load(A)	Length (km)	Nos of sect-ion SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
								(1) Interruption			(2) Break down			(1) + (2)			
								No	Minute	Minu/No	No	Minute	Minu/No	No	Minute	Minu/No	
Medicity(MEDI) SMVA,1.6MVA	Pudur	3	25	5	7	0	15	75	5.0	1	70	70.0	16	145	9.1	May	
	Raj Bollaram		15	3	5	0	10	60	6.0				10	60	6.0		
	Mediticity		0.05	0	0	0	0	0					0	0			
Charlapally(CHER)	ECIL	6	50	6	2	2	0	0	0	1	115	115.0	1	115	115.0		
	IDA Phase-I		70	4	1	3	0	0	0	0	0	0	0	0			
	IDA Phase-II		160	5	1	4	0	2	10	5.0	0	0	0	2	10	5.0	
	Krupp		190	7	2	4	0	1	5	5.0	0	0	0	1	5	5.0	
	Rampally		180	8	2	5	0	0	0	0	2	210	105.0	2	210	105.0	
	Nagaram		120	6	1	4	0	1	5	5.0	0	0	0	1	5	5.0	
Gatkesar(GATK)	Ghatkesar	8	120	15	1	5	0	2	7	3.5	0	0	0	2	7	3.5	
	Keesara																
	Edulabad		80	25	1	8	1	2	10	5.0	0	0	0	2	10	5.0	
	Aushapur		110	30	2	10	1	1	5	5.0	0	0	0	1	5	5.0	
	Medipally		70	25	2	8	1	2	10	5.0	0	0	0	2	10	5.0	
	Syndicate		20					1	10	10.0	0	0	0	1	10	10.0	
	HPCL		10	10	0	0	0	2	20	10.0	0	0	0	2	20	10.0	
	NTPC		5	8	0	0	1				0	0	0	0	0		
Keesara(KEES)	Cheral	3	170	18	2	5	0	0	0	0	0	0	0	0			
	Ankireddipally		70	8	2	4	0	0	0	0	0	0	0	0			
	Keesara		120	15	2	5	0	0	0	0	0	0	0	0			
Malkajgiri(MLKJ)	Anandbagh	4	120	3	1	5	1	0	0	1	55	55.0	1	55	55.0		
	Durga Nagar		220	3	2	4	1	0	0	0	0	0	0	0			
	M.K. Nagar		110	2		3	1	0	0	1	35	35.0	1	35	35.0		
	Suryanagar		140	7	3	6	1	0	0	0	0	0	0	0			
Mallapur(MALL)	Mallapur Village	4	100	8	2	3	1	3	15	5.0	2	165	82.5	5	180	36.0	
	IDA Phase-II		80	4	0	0	0	0	0	0	0	0	0	0			
	BEL		105	3	0	0	0	0	0	0	0	0	0	0			
	A.P. Food		30	5	0	0	0	0	0	0	0	0	0	0			

Ranga Reddy North

Substation Name	Name of Feeder	Nos of feeder	Max Load(A)	Length (km)	Nos of sect-ion SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
								(1) Interruption			(2) Break down			(1) + (2)			
								No	Minute	Minu/No	No	Minute	Minu/No	No	Minute	Minu/No	
Moulali(MOUL)	FBP	8	10	2	0	0	0	1	5	5.0	1	45	45.0	2	50	25.0	
	HCL		180	3	0	0	0	0	0	0	0	0	0	0			
	HMT		40	3	0	0	0	0	0	0	0	0	0	0			
	Malkajgiri		180	7	2	3	0	1	5	5.0			1	5	5.0		
	Meerpet		130	4	2	0	0	0	0	0	0	0	0	0			
	Mirjalguda		130	7	2	2	0	1	5	5.0	2	80	40.0	3	85	28.3	
	Moula-Ali		140	4	2	2	0	0	0	0	0	0	0	0			
	Spectra		130	3	0	0	0	0	0	0	0	0	0	0			
Nacharam(NARC)	S.R. Feeder	7	130	3	0	5	2	0	0	0	0	0	0	0			
	Multisteel		30	4	0	1	1			1	65	65.0	1	65	65.0		
	Tungabhadra		220	4	3	4	1	0	0	0	0	0	0	0			
	IPM		120	3.5	1	2	1	0	0	0	0	0	0	0			
	Laxmi Starch		150	5	1	4	0	3	15	5.0	0	0	0	3	15	5.0	
	NILE		45	2	0	0	0	0	0	0	0	0	0	0			
	India Extruction		10	1	0	0	0	0	0	0	0	0	0	0			
NGRI(NGRI)	Habsiguda	6	170	3	2	5	1	2	10	5.0	0	0	2	10	5.0		
	HMT		210	4	3	5	1	3	13	4.3	1	65	65.0	4	78	19.5	
	Kalyanpuri		130	1	2	1	1	5	30	6.0	0	0	5	30	6.0		
	NGRI		40	1			1	4	23	5.8	0	0	4	23	5.8		
	Penguin		20	2	1		1	1	65	65.0	0	0	1	65	65.0		
	S.O.I		160	2	3	2	1	7	35	5.0	0	0	7	35	5.0		
Sainikpuri(SAIN)	ASRAO Nagar	7	200	5	3	4	0	0	0	0	0	0	0	0			
	Kamalanagar		100	3	1	2	0	0	0	1	80	80.0	1	80	80.0		
	Kapra		110	10	2	4	0	3	15	5.0			3	15	5.0		
	Kushajguda		170	5	2	5	0	4	20	5.0	1	30	30.0	5	50	10.0	
	Neredmet		180	5	3	4	0	6	30	5.0			6	30	5.0		
	Sainikpuri		180	5	3	5	0						0	0			
	Yapral		140	25	4	8	0	5	35	7.0	4	275	68.8	9	310	34.4	

Annex 4.2 Results of Substation and Feeders Survey

Ranga Reddy North

Substation Name	Name of Feeder	Nos of feeder	Max Load(A)	Length (km)	Nos of sect-ion SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
								(1) Interruption			(2) Break-down			(1) + (2)			
								No	Minute	Min/Avg%	No	Minute	Min/Avg%	No	Minute	Min/Avg%	
Uppal(UPPA)	Boduppall	7	120	6	2	4	1	7	35	5.0	0	0	7	35	5.0		
	Doordarshan												0	0			
	Indi Ghatkesar		130	18	3	4	0	3	15	5.0	1	75	75.0	4	90	22.5	
	Nav Bharath		180	4	1	3	0	2	15	7.5	0	0	2	15	7.5		
	Ramanthapur												0	0			
	Uppal		50	2	1	3	0	2	10	5.0	0	0	2	10	5.0		
	Gangappa		100	4	0	3	0	1	5	5.0	0	0	1	5	5.0		

Ranga Reddy South

Substation Name	Name of Feeder	Nos of feeder	Max Load(A)	Length (km)	Nos of sect-ion SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
								(1) Interruption			(2) Break-down			(1) + (2)			
								No	Minute	Min/Avg%	No	Minute	Min/Avg%	No	Minute	Min/Avg%	
Kothapet(Mixed)(8MVAx2)	Kamalagar	4	85	10.54	0	13	0	7	29	4.1			7	29	4.1	2ways	
	Sroornagar		170	16.56	1	12	0	16	52	3.3	3	240	80.0	19	292	15.4	
	Stadium(old Kothapet)		75	4.35	0	0	0	1	35	35.0			1	35	35.0	Kothapet to new SS	
	Huda Complex		40	4.86	1	25	1	1	3	3.0			1	3	3.0	2ways	
Katedan(Industry)(8MVAx2)	Katedan 1	5	170	6.2	0	5	1	5	30	6.0			5	30	6.0		
	Katedan 2		160	4.3	1	3	1	7	35	5.0	1	90	90.0	8	125	15.6	too many
	Balapur		220	17.5	4	4	1	12	62	5.2	4	738	184.5	16	800	50.0	too many
	Katedan 3		160	7.7	1	5	1	6	30	5.0			6	30	5.0		
	Katedan 4		170	4.1	0	4	1	6	32	5.3			6	32	5.3		
AP Police Academy(Himayar Sagar)(5MVAx1)	AP Police Academy	3	15	0.4									0	0			
	Himayar Sagar		22	12	1	3	0	3	15	5.0			3	15	5.0		
	Azz Nagar		180	31	1	9	0	2	10	5.0	1	50	50.0	3	60	20.0	
Champapet(8MVAx2)	Kharamanghat	5	130	4.8	1	5	1	13	60	4.6	0	0	13	60	4.6		
	Champapet		80	3.6	1	2	1	7	29	4.1	0	0	7	29	4.1		
	Sulthanvalla		40	3.3	0	1	1	2	14	7.0	1	67	67.0	3	81	27.0	
	Meerpat		150	13.7	3	5	1	17	91	5.4	2	105	52.5	19	196	10.3	
	Balapur		110	16.5	2	6	1	26	10	0.4	1	45	45.0	27	55	2.0	
Gaganpahad (GAGA) 8MVAx2	NPA(55mm2, 172A)	6	40	4.15	1	1	1	0	0		1	355	355.0	1	355	355.0	April data
	Gagan Pahad(ditto)		150	12.36	2	3	1	15	515	34.3	0	0	15	515	34.3	April data	
	Jai Bhawani(ditto)		120	5.2	0	2	1	4	25	6.3	0	0	4	25	6.3	April data	
	Manage(ditto)		140	8.35	1	3	2	18	90	5.0	1	38	38.0	19	128	6.7	April data
	Ralendra Nagar(ditto)		80	13.05	2	3	1	24	89	3.7	2	244	122.0	26	333	12.8	April data
	Shiva Shathi(ditto)		90	9.05	2	3	1	1	20	20.0	0	0	1	20	20.0	April data	
Hyath Nagar(8MVAx3)	L.B. Nagar	7	45	9	1	10	0	5	21	4.2			5	21	4.2		
	Mansurabad		115	7	3	12	0	6	22	3.7			6	22	3.7		
	Mothfr Dairy		120	17	1	15	0	5	19	3.8			5	19	3.8		
	AutoNagar,		120	10	1	12	0	7	27	3.9	1	45	45.0	8	72	9.0	
	High Court Colony																
	Hyat Nagar		80	12	2	16	1	3	13	4.3			3	13	4.3		
	A.I.R.		10	7	0	1	0	3	11	3.7			3	11	3.7		
SERIET	60	10	1	8	0	5	21	4.2	1	40	40.0	6	61	10.2			

Annex 4.2 Results of Substation and Feeders Survey

Ranga Reddy South

Substation Name	Name of Feeder	Nos of feeder	Max Load(A)	Length(km)	Nos of sect-ion SW	Nos of spur line	Nos of alternate line	Fault(per month)						Remarks			
								(1) Interruption			(2) Break down				(1) + (2)		
								No	Minute	Min/A	No	Minute	Min/A		No	Minute	Min/A
Ibrahimbagh(8M VAX2)	New Military	5	40	8	2	2	0	5	40	8.0			5	40	8.0		
	Osman Sagar		160	28	2	5	0	9	95	10.6	2	75	37.5	11	170	15.5	
	Military I		130	35	3	8	0	14	46	3.3	1	40	40.0	15	86	5.7	
	Military II		70	15	1	2	0	1	10	10.0	1	185	185.0	2	195	97.5	
	Pedda Mangalaran		100	32	1	9	0	12	65	5.4	0	0		12	65	5.4	
Mamidipally(MA MI) 5MVAX2	Errakunta(34mm2, 150A)	4	120	23	0	4	1	6	35	5.8	0	0	6	35	5.8	April data	
	Pahachisharey(ditto)		125	27	0	4	0	4	20	5.0	1	40	40.0	5	60	12.0	April data
	Thukkuguda(ditto)		180	28	1	5	1	9	45	5.0	2	95	47.5	11	140	12.7	April data
	Catalytic(ditto)		5	4	0	0	0	1	5	5.0	0	0	1	5	5.0	April data	
NationalPoliceAcademy(NPPA)5M VAX2	Sastri Puram(55mm2)	5	53	10	1	10	0	5	20	4.0	1	30	30.0	6	50	8.3	April data
	Uppar Pally(ditto)		175	11	2	11	1	4	25	6.3	1	20	20.0	5	45	9.0	April data
	Shivarampally(ditto)		134	8	3	6	1	2	10	5.0	2	45	22.5	4	55	13.8	April data
	NPA(ditto)		29	0.5	0	0	0	0	0	0	0	0	0	0	0	0	April data
Shamshabad (SHAM) 8MVAX2	Kattadan(ditto)	5	42	6	0	5	0	2	10	5.0	1	20	20.0	3	30	10.0	April data
	OmJaiBhavani(34mm2)		60	12.5	1	2	1	3	95	31.7	2	90	45.0	5	185	37.0	April data
	Shamshabad(ditto)		120	10	3	4	1	12	335	27.9	1	15	15.0	13	350	26.9	April data
	Narkuda(ditto)		200	18.5	2	5	0	4	175	43.8	2	213	106.5	6	388	64.7	April data
	Raikunta(ditto)		110	16.2	1	5	1	5	90	18.0	2	115	57.5	7	205	29.3	April data
Turkayamjal(TURK) (5+3.5)MVA	HameedullaNagar(ditto)	2	110	12	2	3	1	5	100	20.0	1	20	20.0	6	120	20.0	April data
	Turka Yanjal(55mm2)		120	5.8	2	3	2	8	864	108.0	1	45	45.0	9	909	101.0	April data
Vanastalipuram (VANA) 8MVAX2	Manneguda(55mm2)	4	120	6.5	2	4	1	12	575	47.9	0	0	12	575	47.9	April data	
	Vanasthalipuram(55mm2)		140	9.7	4	6	4	12	329	27.4	1	20	20.0	13	349	26.8	April data
	NGO's(55mm2)		170	15.5	4	2	3	11	203	18.5	0	0	11	203	18.5	April data	
	Injarpoor(55mm2)		170	38.6	7	3	5	41	945	23.0	3	275	91.7	44	###	27.7	April data
Bandlaguda(BAND) (132/33/11kV) 5MVAX1	Bairamlaguda(55mm2)	3	110	15.4	4	5	6	17	575	33.8	2	105	52.5	19	680	35.8	April data
	Nagole(55mm2)		150	23.5	3	5	1	22	146	6.6	0	0	22	146	6.6	mini75A, April data	
	Alkapuri(55mm2)		100	4.5	0	2	1	21	107	5.1	0	0	21	107	5.1	mini60A, April data	
	GSU(55mm2)		15	2	0	0	0	10	18	1.8	0	0	10	18	1.8	mini15A, April data	

Annex 4.2 Results of Substation and Feeders Survey

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of sectionalizing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
							(1) Interruption			(2) Break down			(1) + (2)			
							No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No	
1 ALLWYN (City-IV) 8MVAX2	1 Industrial Estate	80	2.1	0	1	1	2	9	4.5	0	0	2	9	4.5	May/03	
	2 Crown Carting	10	3.6	5	3	2	1	2	2	0	0	1	2	2	May/03	
	3 IOL	140	2.38	1	5	3	1	6	6	0	0	1	6	6	May/03	
	4 Motinagar	80	2.64	3	4	3	0	0	0	0	0	0	0	0	May/03	
	5 ESI	20	2.24	2	2	3	5	18	3.6	3	147	49	8	165	20.625	May/03
	6 Sanathnagar	130	3.18	2	6	6	1	5	5	1	60	60	2	65	32.5	May/03
	7 Tele Exchange	10	0.47	1	0	0	0	0	0	0	0	0	0	0	0	May/03
	8 Allwyn Compressor	10					0	0	0	0	0	0	0	0	0	May/03
2 AIRPORT (City-IV) 8MVAX2	1 Air port	80	1.4	1	2	0	2	10	5	0	0	2	10	5	May/03	
	2 International Airport	60	0.22	0	0	0	0	0	0	0	0	0	0	0	UG,May/03	
	3 Domestic Airport	60	0.21	0	0	0	0	0	0	0	0	0	0	0	May/03	
	4 Chikoti Garden	140	3.24	2	8	1	0	0	1	60	60	1	60	60	May/03	
	5 Prakash Nagar	190	5.32	2	7	0	3	52	17.3	0	0	3	52	17.333	May/03	
	6 Motilal Nagar	170	5.07	1	6	0	1	5	5	0	0	1	5	5	May/03	
3 ROAD NO: 2 8MVAX2	1 Sagar society	70	2.17	0	5	0	2	10	5	1	55	55	3	65	21.667	City-IV,May/03
	2 Road No.02	115	1.4	1	2	1	5	25	5	0	0	5	25	5	City-IV,May/03	
	3 Road No.10	85	5.61	4	9	2	9	17	1.89	0	0	9	17	1.8889	City-IV,May/03	
	4 Road No.14	145					2	10	5	0	0	2	10	5	May/03	
	5 L.V.Prasad Marg	65	6.25	4	7	4	1	5	5	0	0	1	5	5	City-IV,May/03	
	6 LV.Prasad film Lab	40													May/03	

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of sectionalizing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
							(1) Interruption			(2) Break down			(1) + (2)			
							No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No	
4 BEGUMPET (City-IV) 8MVAX2	1 S.R.Nagar	145	4.5	1	7	3	3	19	6.33	2	50	25	5	69	13.8	May/03
	2 Yellamma Temple	65	5.22	2	7	2	0	0	0	0	0	0	0	0	May/03	
	3 Shantibagh	145	4.17	2	8	2	4	30	7.5	1	20	20	5	50	10	May/03
	4 AMP	55	4.09	2	6	3	0	0	1	25	25	1	25	25	May/03	
	5 DKR	345	1.22	1	3	0	1	5	5	1	32	32	2	37	18.5	May/03
	6 Hyderabad Public School	120					8	43	5.38	1	20	20	9	63	7	April/03
	7 Maitrivanam	50	2.13	3	4	0	1	7	7	0	0	1	7	7	May/03	
	8 Vidyt Soudha						0	0	0	0	0	0	0	0	0	UG
5 BOWENPLLY (City-VI) 8MVAX2	1 Bapuji Nagar	195	12.48	3	8	1	9	53	5.89	0	0	9	53	5.8889	May/03	
	2 Bowenpally	100	6.6	1	8	3	2	25	12.5	0	0	2	25	12.5	May/03	
	3 Tadbund	100	9.97	3	8	4	5	53	10.6	0	0	5	53	10.6	May/03	
	4 IAF	25		0	3	3	1	20	20	0	0	1	20	20	May/03	
	5 Gputham Nagar	170	8.88	3	5	2	9	60	6.67	0	0	9	60	6.6667	May/03	
	6 Ferroj guda	95	5.79	1	3	1	1	8	8	0	0	1	8	8	May/03	
6 CLOCKTOWER (City-V) 8MVAX2 7.5MVA	1 Sangeeth	180	1	4	4	2	3	17	5.67	0	0	3	17	5.6667	May/03	
	2 Minerva	170	3	1	4	1	5	45	9	0	0	5	45	9	May/03	
	3 Natraj	185	1.5	3	5	1	0	0	0	0	0	0	0	0	May/03	
	4 St.Road	220	3	2	5	1	5	45	9	1	37	37	6	82	13.667	May/03
7 GREENLANDS (City-IV) 8MVAX2	1 Ameerpeth	195	1.61	0	0	0	1	8	8	0	0	1	8	8	UG,May/03	
	2 Kundan bagh	190	2.54	0	3	0	0	0	0	0	0	0	0	0	UG,May/03	
	3 Rajiv Gandhi	190	3.43	3	7	4	9	44	4.89	0	0	9	44	4.8889	May/03	
	4 Somajiguda	205	3.04	5	5	3	5	21		0	0	5	21	4.2	May/03	

Annex 4.2 Results of Substation and Feeders Survey

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of section-alizing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks				
							(1) Interruption			(2) Break down			(1) + (2)							
							No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No					
8	GYMKHANA (City-V) 8MVAX2	1	Paredgrounds	210	6	3	4	1	10	135	13.5	1	43	43	11	178	16.182	May/03		
		2	Sikh village	85	3.9	0	2	0	4	31	7.75	0	0	0	4	31	7.75	May/03		
		3	Vikram Puri	195	6.5	3	9	2	3	12	4	0	0	3	12	4	0	0	May/03	
		4	Marredpally	130	6	6	6	2	8	100	12.5	0	0	8	100	12.5	0	0	May/03	
9	HAKIMPET (City-VI) 5MVAX2	1	M.Bollaram	110	13.38	3	6	2	10	106	10.6	0	0	10	106	10.6	0	0	May/03	
		2	Hakimpet Airforce	65		3	3	1	6	38	6.33	0	0	6	38	6.3333	0	0	May/03	
		3	Allen by lines	60	14.42	3	5	3	6	41	6.83	0	0	6	41	6.8333	0	0	May/03	
		4	Risak Bazar	75	5.76	1	5	3	4	33	8.25	1	20	20	5	53	10.6	0	0	May/03
10	HAL 8MVAX2	1	Sowbhagya Nagar	60	4.94	2	3	1	2	10	5	0	0	2	10	5	0	0	City-VI,May/03	
		2	Sri Rama	50	2.08	2	3	0	0	0	0	0	0	0	0	0	0	0	0	City-VI,May/03
		3	NRSA	100	2.34	0	3	1	0	0	0	0	0	0	0	0	0	0	0	City-VI,May/03
		4	SAMRAT	190	4.44	2	5	1	1	10	10	2	130	65	3	140	46.667	0	0	City-VI,May/03
		5	HAL	30						0	0	0	0	0	0	0	0	0	0	May/03
		6	I.A.L	60	2.7	1	2	2	0	0	0	0	0	0	0	0	0	0	0	City-VI,May/03
11	HMT 8MVAX2	1	Chintal	150					13	60	4.62	1	75	75	14	135	9.6429	0	0	May/03
		2	HMT Road	40					0	0	0	0	0	0	0	0	0	0	0	City-VI,UG,May/03
		3	QBP	110					16	78	4.88	2	125	63	18	203	11.278	0	0	May/03
		4	G.N.R	60	2.8	1	4	0	9	60	6.67	4	149	37	13	209	16.077	0	0	City-VI,May/03
		5	A.O.L	130	5.94	3	8	2	10	83	8.3	3	70	23	13	153	11.769	0	0	City-VI,May/03

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of section-alizing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks					
							(1) Interruption			(2) Break down			(1) + (2)								
							No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No						
12	IDPL 3MVAX2(6.6KV) 5MVA 8MVAX3	1	6.6kV IDPL	60				0	0	0	0	0	0	0	0	0	0	0	0	May/03	
		2	SIFCO	80	5.5	1	10	0	2	8	4	0	0	2	8	4	0	0	0	City-VI,May/03	
		3	SVCIE	130	7.1	1	4	0	4	44	11	1	40	40	5	84	16.8	0	0	City-VI,May/03	
		4	Vijaya Electricals	130	13.5	1	2	1	12	41	3.42	0	0	12	41	3.4167	0	0	0	0	City-VI,May/03
		5	Oblum	150	13.1	2	6	1	0	0	0	0	0	0	0	0	0	0	0	City-VI,May/03	
		6	Balanagar	100	9.8	1	6	2	4	25	6.25	0	0	4	25	6.25	0	0	0	0	City-VI,May/03
		7	IE	140	8.9	2	8	0	4	28	7	0	0	4	28	7	0	0	0	0	City-VI,May/03
		8	Moosapet	170					10	47	4.7	0	0	10	47	4.7	0	0	0	0	May/03
		9	Bharath Nagar	80					3	8	2.67	0	0	3	8	2.6667	0	0	0	0	May/03
13	FILMNAGAR (City-IV) 8MVAX2	1	Ambedkar Nagar	20	1.1	0	2	1	1	5	5	0	0	1	5	5	0	0	0	May/03	
		2	MLA colony	85	1.86	0	1	1	2	14	7	0	0	2	14	7	0	0	0	May/03	
		3	Padmalaya Studio	35	3.08	2	4	3	2	13	6.5	0	0	2	13	6.5	0	0	0	May/03	
		4	Ramanaidu Studio	25	0.9	1	4	1	0	0	0	0	0	0	0	0	0	0	0	May/03	
		5	Appollo	40	2.49	2	5	2	0	0	0	0	0	0	0	0	0	0	0	May/03	
		6	Bharathiya Vidya Bhavan	55	3.45	0	4	2	3	17	5.67	0	0	3	17	5.6667	0	0	0	0	May/03
14	JAMES STREET 8MVAX2	1	Park Lane	185	0.69	2	3	2	0	0	0	0	0	0	0	0	0	0	0	City-V,May/03	
		2	P.G Road	190	3.62	1	10	1	1	5	5	0	0	1	5	5	0	0	0	City-V,May/03	
		3	M.G Road	125	1.37	0	3	0	0	0	0	0	0	0	0	0	0	0	0	City-V,UG+OH,May/03	
		4	Mahankali Temple	90	0.76	0	4	2	3	47	15.7	1	69	69	4	116	29	0	0	City-V,May/03	
		5	S.D Temple																		
		6	S.P Road																		

Annex 4.2 Results of Substation and Feeders Survey

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of sectionalizing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks	
							(1) Interruption			(2) Break down			(1) + (2)				
							No	Minute	Minutecost	No	Minute	Minutecost	No	Minute	Minute/No		
15 KALYANNAGAR (City-IV) 8MVAX3	1 Krishna Nagar	80	5.33	0	7	1	4	22	0	0						May/03	
	2 Yousuf Guda	200	2.64	1	5	1	1	5	0	0						May/03	
	3 Madhura Nagar	160	4.73	2	9	3	5	26	1	27						May/03	
	4 V.Road Nagar	40	1.72	1	6	2	0	0	1	42						May/03	
	5 A.G.Colony	80	3.77	2	8	2	1	6	0	0						May/03	
	6 Sri.Ram Nagar	40	2.3	1	2	1	2	12								May/03	
	7 CTI	5														Apr03	
	8 SCADA																
16 MADHAPUR 8MVAX2	1 Shilparamaam	50						0	0			0	0			May/03	
	2 APIIC-II	60	4.52	0	5	0	7	75	10.7	0	0	7	75	10.714		City-IV,May/03	
	3 APIIC I	100	1.44	1	0	1	4	20	5	0	0	4	20	5		City-IV,May/03	
	4 HUDA	60	9.12	3	7	1	4	20	5	2	151	76	6	171	28.5	City-IV,May/03	
	5 NAC GROUNDS		4.37	2	1	1										City-IV,May/03	
17 MAITRIVANAM (City-IV) 8MVAX2	1 Sarathi Studio	80	2.67	1	5	3	4	66	16.5	0	0	4	66	16.5		May/03	
	2 Srinivas Colony	30	1.38	0	5	0	2	10	5	0	0	2	10	5		May/03	
	3 Mathrivanam	110	0.48	3	2	1	4	20	5	0	0	4	20	5		May/03	
	4 Amberpet	180	3	3	8	2	6	38	6.33	3	125	42	9	163	18.111		May/03
	5 Anandbagh	100	1.85	0	5	4	2	10	5	0	0	2	10	5		May/03	
	6 Aditya	50	0.36	0	1	0	0	0	0	0	0	0	0	0		May/03	
18 MARREDPALLY 8MVAX2	1 AOC	10	3.88	0	2	2	0	0	0	0	0	0	0	0		City-VI,May/03	
	2 Mahindra Hills	130	6	1	5	2	5	21	4.2	1	14	14	6	35	5.8333		Cyty-V,May/03
	3 Nehru Nagar	170	6.2	1	5	2	3	17	5.67	0	0	3	17	5.6667		Cyty-V,May/03	
	4 Military Hospital	20	6.85	2	3	1	2	9	4.5	0	0	2	9	4.5		City-VI,May/03	
	5 Rly. Colony	135	7.2	1	5	1	1	4	4	1	41	41	2	45	22.5		Cyty-V,May/03
	6 R.K.Puram	85	12.7	3	6	1	3	11	3.67	0	0	3	11	3.6667		City-VI,May/03	

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of sectionalizing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
							(1) Interruption			(2) Break down			(1) + (2)			
							No	Minute	Minutecost	No	Minute	Minutecost	No	Minute	Minute/No	
19 NIMS 8MVAX3	1 GVK Hotel	90	4.59	2	5	3	0	0	0	0	0	0	0	0		City-IV, April/03
	2 Banjara Hills	70	3.08	2	6	3	4	75	18.8	1	410	410	5	485	97	City-I, April/03
	3 Panjagutta	80	1.64	0	7	0	1	25	25	2	162	81	3	187	62.333	City-IV, April/03
	4 NIMS	75					4	75	18.8	0	0	4	75	18.75		April/03
	5 Tata Rao	65	1.28	0	4	0	1	27	27	2	173	87	3	200	66.667	City-IV, April/03
	6 Sai baba temple	60	1.47	1	7	0	3	33	11	1	72	72	4	105	26.25	City-IV, April/03
	7 Road No,5	80					3	16	5.33	2	614	307	5	630	126	April/03
	8 Erramanzil	90	3.75	2	5	2	1	5	5	1	1,168	1,168	2	1,173	586.5	City-I, April/03
	9 Andhra Jyothi	250	2.19	4	6	4	11	71	6.45	3	537	179	14	608	43.429	City-IV, April/03
	10 BhaskaraPalace															
20 PATIGADDA 8MVAX3	1 Ranigunj	115					4	100	25	0	0	4	100	25		02/03, May/03
	2 Rasoolpura	130					2	15	7.5	0	0	2	15	7.5		May/03
	3 Budda Bhavan	14					1	6	6	0	0	1	6	6		May/03
	4 Zeera	190					8	56	7	1	150	150	9	206	22.889	May/03
	5 Minister Road	190					8	140	17.5	1	86	86	9	226	25.111	May/03
	6 Sangeevaiyah park	20					1	5	5	0	0	1	5	5		May/03
21 R.P.NILAYAM (City-VI) 7.5MVA 8MVA	1 Alwal	110	11.74	2	6	3	6	100	16.7	0	0	6	100	16.667		May/03
	2 EME	80	14.85	2	7	2	8	80	10	0	0	8	80	10		May/03
	3 V.Puram	120	12.81	2	8	3	1	5	5	0	0	1	5	5		May/03
	4 R.P.Nilayam	5					0	0	0	0	0	0	0	0		UG, May/03
22 SRINAGAR COLONY 8MVAX2	1 Udyog Nagar	80	2.08	1	5	2	3	15	5	1	20	20	4	35	8.75	City-IV, May/03
	2 Kamlapuri colony	120					6	30	5	2	95	48	8	125	15.625	May/03
	3 Srinagar colony	180	3.58	3	10	4	5	25	5	0	0	5	25	5		City-IV, May/03
	4 Yella reddy guda	170	3.66	1	10	5	4	20	5	0	0	4	20	5		City-IV, May/03
	5 Satya sai nigam	150	1.05	1	3	0	6	40	6.67	0	0	6	40	6.6667		City-IV, May/03
	6 Nagarjuna Nagar	140	4.05	2	11	2	0	0	0	0	0	0	0	0		City-IV, May/03

Annex 4.2 Results of Substation and Feeders Survey

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of sectionalizing SW	Nos of spur line	Nos of alternate line	Fault(per month)						Remarks			
							(1) Interruption			(2) Break down				(1) + (2)		
							No	Minute	Hours/No	No	Minute	Hours/No		No	Minute	Minute/No
23 YOUSUF GUDA 8MVAX2	1 Borabonda	85	6.3	2	7	1	3	25	8.33	0	0	3	25	8.3333	City-IV,May/03	
	2 Vinayak Nagar	110	2.73	2	5	0	8	62	7.75	3	390	130	11	452	41.091	City-IV,May/03
	3 Police Lines	150	6.19	3	5	5	10	75	7.5	3	202	67	13	277	21.308	City-IV,May/03
	4 Gayatri Hills	35	2.81	0	2	22	0	0	0	0	0	0	0	0	0	City-IV,May/03
	5 IOA	5	0.88	0	1	1	3	19	6.33	0	0	3	19	6.3333	City-IV,May/03	
	6 MLA colony	5					1	15	15	0	0	1	15	15		May/03
24 LALAGUDA (City-V) 5MVAX3	1 A.P.Dairy	40	0.8	1	0	1	2	32	16	0	0	2	32	16	May/03	
	2 Shanti Nagar	180	6	1	6	2	10	91	9.1	0	0	10	91	9.1	May/03	
	3 Lalapet	50	4	0	4	0	2	9	4.5	0	0	2	9	4.5	May/03	
	4 Tarnaka	100	5	2	9	1	1	20	20	0	0	1	20	20	May/03	
	5 Vijayapuri	170	5.5	1	3	0	21	227	10.8	3	296	99	24	523	21.792	May/03
25 OSMANIA UNIVERSITY 5MVA,7.5MV A	1 Osmania University	55	3	1	2	2	2	9	4.5	0	0	2	9	4.5	City-V,May/03	
	2 Boudhanagar	140	6.5	2	7	3	7	116	16.6	0	0	7	116	16.571	City-II,May/03	
	3 RTC Hospita;	125	5	1	3	2	1	5	5	2	135	68	3	140	46.667	City-V,May/03
	4 Ravindra Nagar	50	3	0	3	0	1	10	10	0	0	1	10	10	City-V,May/03	
26 PRAGA TOOLS (City-VI) 8MVAX2	1 Indoswing	120	4.62	1	6	3	3	30	10	0	0	3	30	10	May/03	
	2 T.C Balnagar	160	4.95	3	6	0	5	95	19	3	172	57	8	267	33.375	May/03
	3 Asbestos Hills	50	6.91	1	4	1	3	22	7.33	0	0	3	22	7.3333	May/03	
	4 Nagarjuna signode	130	6.91	2	11	2	6	55	9.17	3	140	47	9	195	21.667	May/03

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of sectionalizing SW	Nos of spur line	Nos of alternate line	Fault(per month)						Remarks			
							(1) Interruption			(2) Break down				(1) + (2)		
							No	Minute	Hours/No	No	Minute	Hours/No		No	Minute	Minute/No
27 ROAD NO :12 8MVAX2	1 CRPF	190					6	33	5.5	2	460	230	8	493	61.625	April/03
	2 C.Palace	55	4.06	2	5	1	8	57	7.13	2	464	232	10	521	52.1	City-IV,April/03
	3 M.Quarters	10	1.31	1	2	1	3	30	10	0	0	3	30	10	City-IV,April/03	
	4 I.T.Colony	10					1	1	1	0	0	1	1	1	March,April/03	
	5 Road No,12	125	4.45	1	5	1	8	50	6.25	3	371	124	11	421	38.273	City-I,April/03
	6 Road No,10	180	3.87	3	5	1	6	41	6.83	6	351	59	12	392	32.667	City-IV,April/03
28 SEETHA PALMANDI 8MVA,5MVA	1 Gandhi Statue	80	4	0	4	2	3	13	4.33	0	0	3	13	4.3333	City-V,April/03	
	2 Namalagundu	130	5	1	5	0	6	45	7.5	0	0	6	45	7.5	City-V,April/03	
	3 Warasiguda	70	4	0	1	0	1	3	3	0	0	1	3	3	City-V,April/03	
	4 Medibavi	155	3.51	1	5	2	2	9	4.5	0	0	2	9	4.5	City-II,April/03	
	5 Seethapahlmandi	80	3	0	3	0	1	3	3	0	0	1	3	3	City-V,April/03	
29 132/33/11KV GUNROCK 8MVAX2	1 M.Hospital	160	8.31	1	9	4										City-VI,May/03
	2 MDF	160	13.85	4	7	2	21	106	5.05	3	134	45	24	240	10	City-VI,May/03
	3 GPH	130	12.45	6	9	4	2	8	4	1	13	13	3	21	7	City-VI,May/03
	4 Medchal	140	28.16	5	8	6	13	72	5.54	1	33	33	14	105	7.5	City-VI,May/03
	5 Bowenpally	130	7.7	2	8	2	5	42	8.4	0	0	5	42	8.4	City-V,May/03	
	6 Gymkhana	120					2	14	7	0	0	2	14	7	May/03	
	7 AWHO	20	2.64	0	4	0	5	54	10.8	1	25	25	6	79	13.167	City-VI,April,May/03
	8 SPH US Cable		2.23													City-VI,May/03
30 132/33/11KV JUBLEE HILLS 8MVAX2	1 IOA	80	3.5	0	3	1	7	7	1	0	0	7	7	1	City-VI,May/03	
	2 MLA Colony	15	4.94	0	3	1	0	0	0	0	0	0	0	0	City-VI,May/03	
	3 Jublihills	80	6.5	3	10	3	4	5	1.25	0	0	4	5	1.25	City-VI,May/03	
	4 PEI (OH)	20	2.06	0	3	0	0	0	0	0	0	0	0	0	City-VI,May/03	
	5 PEI (UG)	5	0.76	0	0	0	0	0	0	0	0	0	0	0	City-VI,May/03	
	6 Film nagar	15					0	0	0	0	0	0	0	0	May/03	
	7 AOU	20					5	5	1	0	0	5	5	1	May/03	
	8 Prasasan Nagar	20					1	1	1	0	0	1	1	1	May/03	

Annex 4.2 Results of Substation and Feeders Survey

Hyderabad Central

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of section-izing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
							(1) Interruption			(2) Break down			(1) + (2)			
							No	Minute	Min/No	No	Minute	Min/No	No	Minute	Minute/No	
1 A C GUARDS 8MVAX2, 5MVA	1 Mahaveer Hospital	115	3.94	2	6	1	3	51	17	1	24	24	4	75	18.75	City-I, April/03
	2 Bazar ghat	155	10.6	2	5	1	5	41	8.2	0	0	0	5	41	8.2	City-VII, April/03
	3 Shanthi Nagar	120	8.37	1	7	1	1	16	16	2	85	43	3	101	33.667	City-VII, April/03
	4 N.M.D.C	80	3.9	0	7	0	2	53	26.5	0	0	0	2	53	26.5	City-VII, April/03
	5 Mahaveer Hospital cable	135						0	0	0	0	0	0	0		City-I, UG, April/03
	6 Mahaveer			2	5	1										City-VII, April/03
	7 Niloper Hospital															
	8 Niloufer	70	9.76	1	8	1	7	55	7.86	3	262	87	10	317	31.7	City-VII, April/03
2 AMBERPET (City-II) 8MVAX2	1 CPL feeder	35	2.14	0	4	0	0	0	0	0	0	0	0	0		April/03
	2 Patel Nagar	145	4.8	2	9	1	12	82	6.83	0	0	0	12	82	6.8333	April/03
	3 Amberpet Feeder	145	4.72	1	7	2	8	72	9	3	154	51	11	226	20.545	April/03
	4 Zinda thilamat	145	5.32	3	8	0	1	5	5	0	0	1	5	5		April/03
	5 Tilaknagar	65	5.98	2	5	3	6	70	11.7	0	0	6	70	11.667	April/03	
	6 Golnaka	75	4.5	2	6	1	1	5	5	0	0	1	5	5		April/03
3 ASIF NAGAR 8MVAX3, 5MVA	1 Gudimalkapur	210	12.82	2	9	2	16	174	10.9	0	0	16	174	10.875	City-VII, April/03	
	2 Jyothi Nagar	110	6.05	1	2	0	2	5	2.5	0	0	2	5	2.5	City-VII, April/03	
	3 Padmanabha Nagar	60	6.83	1	6	1	3	27	9	0	0	3	27	9	City-VII, April/03	
	4 Alapatnagar	120	8.73	1	11	2	1	7	7	0	0	1	7	7	City-VII, April/03	
	5 Mehdiapatnam	180	8.84	4	11	4	2	53	26.5	0	0	2	53	26.5	City-VII, April/03	
	6 Military	30	5.69	0	2	1	21	164	7.81	0	0	21	164	7.8095	City-VII, April/03	
	7 JCO Quarters	10	3.27	0	0	2	1	70	70	1	105	105	2	175	87.5	City-VII, March, April/03
	8 Hakimpet	120	10.95	1	8	1	11	97	8.82	0	0	11	97	8.8182	City-VII	
	9 Water works	10					1	125	125	0	0	1	125	125		April/03
	10 Kakatiyanagar	110	12.97	2	6	2	4	40	10	0	0	4	40	10		City-VII, April/03

Hyderabad Central

Substation Name	Name of Feeder	Max Load(A)	Length (km)	Nos of section-izing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks	
							(1) Interruption			(2) Break down			(1) + (2)				
							No	Minute	Min/No	No	Minute	Min/No	No	Minute	Minute/No		
4 HYDERGUD A (City-I) 8MVAX2	1 King kothi	160	1.88	0	4	0	5	65	13	0	0	5	65	13		May/03/03	
	2 Hyderguda	185	3.35	2	7	1	1	10	10	1	60	60	2	70	35	May/03/03	
	3 Hi May/03/03ath Nagar	140	2.34	0	6	1	4	40	10	1	30	30	5	70	14	May/03/03	
	4 Boggukunta	160	1.34	0	5	1	3	23	7.67	1	50	50	4	73	18.25	May/03	
	5 Abids	135	0.85	0	0	1	2	30	15	0	0	2	30	15		May/03/03	
	6 MLA Quarters	20	1.47	0	0	0	0	0	0	0	0	0	0	0		UG long	
5 HUSSAINSAGAR (City-I, VII) 5MVAX4, 7.5MVAX3	1 Maruthi Nagar	80	2.44	1	3	1	1	15	15	0	0	1	15	15		May/03	
	2 BRK Bhavan	100				1	8	8	3	507	169	4	515	128.75		UG, May/03	
	3 Lakdi-Ka-Pool	60					0	0	0	0	0	0	0			UG, May/03	
	4 AG feeder	100	1.92	0	3	0	1	6	6	0	0	1	6	6		May/03	
	5 Gunfoundry Key SS	90					1	6	6	0	0	1	6	6		UG, May/03	
	6 Nampally Key SS	100						0	0	0	0	0	0			UG, May/03	
	7 Khairatabad	170	5.47	3	2	2	1	15	15	0	0	1	15	15		May/03	
	8 L Block	60						0	0	0	0	0	0			UG, May/03	
	9 MGV																UG
	10 Anand Nagar	160	4.98	1	3	3	2	18	9	1	50	50	3	68	22.667		May/03
	11 Inst of Engineers	20						0	0	0	0	0	0	0			UG, May/03
	12 HACA	200						2	8	4	0	0	2	8	4		UG, May/03
	13 Telephone Bhavan+Secretariat Press	110						0	0	0	0	0	0	0			UG, May/03
	14 RBI	90						1	3	3	0	0	1	3	3		UG, May/03
	15 Secretariat	60						0	0	0	0	0	0	0			UG, May/03
	16 Adarsh Nagar	40	3.69	1	3	0	1	24	24	2	129	65	3	153	51		May/03
	17 Lumbini Park	30						3	41	13.7	0	0	3	41	13.667		UG, May/03
	18 I.G.Mint	10						1	5	5	0	0	1	5	5		UG, May/03
19 Andhra Bank+ECR(Mint Compound)	60															UG	
20 TankBund	130	4.02	1	6	2	2	14	7	0	0	2	14	7			May/03	
21 Basheer Bakh	140	1.73	0	2	0	12	41	3.42	1	101	101	13	142	10.923		May/03	
22 LIC	160	4.04	3	3	2	0	0	0	0	0	0	0	0			UG, May/03	
23 Multi purpose	1.97		1	1	0												
24 ECR																	UG New
25 Secretariat Press																	UG New
26 Multi purpose	130	6.75	2	2	1	5	26	5.2	0	0	5	26	5.2			City-VII, April/03	

Annex 4.2 Results of Substation and Feeders Survey

Hyderabad Central

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of sectionalizing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
							(1) Interruption			(2) Break down			(1) + (2)			
							No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No	
6 CHILKAL-GUDA 8MVAX2	1 Dandu pentaiah	75	2.8	1	3	1	4	29	7.25	1	32	32	5	61	12.2	City-V, April/03
	2 Pragatools	75	3.95	2	3	1	2	24	12	0	0	0	2	24	12	City-I, April/03
	3 New Boiguda	90	4	0	1	0	2	27	13.5	1	13	13	3	40	13.333	City-V, April/03
	4 P.R.Nagar	85	3	1	5	1	7	58	8.29	0	0	0	7	58	8.2857	City-V, April/03
	5 Parsigutta	110	6.63	4	6	2	1	4	4	0	0	1	4	4	City-II, April/03	
	6 Musheerabad	120	2.29	2	4	1	5	30	6	0	0	5	30	6	City-I, April/03	
	7 Golconda X Road	150	3.15	3	4	2	1	7	7	0	0	1	7	7	City-II, April/03	
7 EXHIBITION GROUNDS 8MVAX3	1 Jawaharlal Nehru	175	3.25	3	4	2	5	116	23.2	0	0	5	116	23.2	City-I, April/03	
	2 Nampally Hospital	150	5.74	1	5	2	6	93	15.5	0	0	6	93	15.5	City-VII, April/03	
	3 Collection Office	110				3	40	13.3	0	0	3	40	13.333	April/03		
	4 Exhibition Gandhi Bhavan															
	5 Seetharampet	140				8	123	15.4	0	0	8	123	15.375	April/03		
	6 Exhibition - Ajantha Gate	2				0	0				0	0			April/03	
	7 Ware House	70	1.32	0	1	1	2	20	10	0	0	2	20	10	City-I, New, April/03	
	8 Exhibition														City-I, UG, New	
8 GOLCONDA 8MVAX2	1 Golconda	100	5.32	0	2	0	7	45		0	0				City-VII, April/03	
	2 Motimahal	180	14.7	0	7	2	9	75		3	90				City-VII, April/03	
	3 Adityanagar	100	10.3	1	4	2	8	60		2	60				City-VII, April/03	
	4 Darga	70	13.7	2	10	1	9	155		2	150				City-VII, April/03	
	5 Waterworks	5	0.86	0	0	0	3	20		1	55				City-VII, April/03	
	6 O.Q.Tombs	20					4	20		1	37				April/03	
	7 Colconda AB Cable	55	6.36	1	3	2									City-VII	

Hyderabad Central

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of sectionalizing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
							(1) Interruption			(2) Break down			(1) + (2)			
							No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No	
9 INDUSTRIAL AREA (City-II) 8MVAX3	1 Shankermutt	90	7.98	4	5	3	1	13	13	0	0	1	13	13	April/03	
	2 Ram Nagar	160	4.67	2	4	2	4	29	7.25	0	0	4	29	7.25	April/03	
	3 R.O.M	50	3.48	0	4	1	2	62	31	0	0	2	62	31	April/03	
	4 11 KV DDH	80	8.97	6	7	2	10	82	8.2	0	0	10	82	8.2	April/03	
	5 11 KV RTC X road	110	4.79	5	4	3	5	69	13.8	0	0	5	69	13.8	April/03	
	6 Azamabad	100	5.42	5	4	1	6	73	12.2	0	0	6	73	12.167	April/03	
	7 Barkatpura	180	7	3	8	3	7	59	8.43	0	0	7	59	8.4286	April/03	
	8 11 KV VST	80	1.35	0	3	0	0	0		0	0	0	0		UG, April/03	
	9 11 KV Azamabad Key SS	60	2.95	0	3	1	4	51	12.8	1	63	63	5	114	22.8	UG, April/03
	10 11kV DDH UG		1.48	1	1	0										UG
10 NARAYAN-GUDA 8MVAX2	1 Lingampally	145	4.38	4	7	2	7	61	8.71	0	0	7	61	8.7143	City-I, II, April/03	
	2 Chikkadpally	55	3.48	2	4	2	2	20	10	0	0	2	20	10	City-II, April/03	
	3 Narayanaguda	85	3.58	2	5	1	5	55	11	1	45	45	6	100	16.667	City-I, II, April/03
	4 Preventive medicine	95	4.77	1	5	1	2	13	6.5	3	144	48	5	157	31.4	City-II, April/03
	5 Preventive medicine (UG)		3.4	0	1	0										City-II, UG
	6 Lingampally		4.6	0	2	0										City-I, II, UG
11 INDIRA PARK (City-I) 8MVAX3	1 Vivek Nagar	150	2.98	1	4	2	4	38	9.5	0	0	4	38	9.5	May/03	
	2 Gandhi Nagar		6.74	3	11	3	2	25	12.5	0	0	2	25	12.5	May/03	
	3 Bakaram->Talla Bshi	60	5.11	1	7	1	1	9	9	0	0	1	9	9	May/03	
	4 Jawahar Nagar	50	2.27	0	6	2	1	2	2	0	0	1	2	2	May/03	
	5 Ashok Nagar	175	3.85	1	7	1	4	31	7.75	0	0	4	31	7.75	May/03	
	6 R.K.Mutt	120	4.47	0	8	2	2	20	10	1	60	60	3	80	26.667	May/03
	7 Lower Tank Bund	150	3.34	3	7	2	6	44	7.33	0	0	6	44	7.3333	May/03	
	8 Kawadiguda	150	2.75	0	4	2	0	0		0	0	0	0		May/03	
	9 Indian Express	40														UG
	10 Vaartha															UG

Annex 4.2 Results of Substation and Feeders Survey

Hyderabad Central

Substation Name	Name of Feeder	Max Load(A)	Length (km)	Nos of sectionizing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
							(1) Interruption			(2) Break down			(1) + (2)			
							No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No	
12 LAKE VIEW(City-I) 8MVAX2	1 Vidyut Soudha	60					0	0		0	0	0	0	0	0	UG,may/03
	2 Dilkusha	105	3.46	1	6	1	5	29	5.8	1	49	49	6	78	13	May/03
	3 Raj Bhavan															UG
	4 Lake View	25					0	0		0	0		0	0		no data on Cityl map
	5 Medinova	140	2.79	0	5	1	2	17	8.5	0	0		2	17	8.5	May/03
	6 Eenadu	100					1	6	6	0	0		1	6	6	UG,may/03
13 PUBLIC GARDEN (City-I) 8MVAX2	1 Parshiram Bhavan	160	0.71	1	2	2	1	5	5	1	45	45	2	50	25	May/03
	2 Nampally OH	180	3.87	1	3	1	2	10	5	0	0		2	10	5	May/03
	3 Ravindra Bharathi	120					1	5	5	0	0		1	5	5	UG,May/03
	4 Assembly	10					0	0		0	0		0	0		UG,May/03
	5 Nampally															UG
	6 LB Stadium															UG
14 S.D. HOSPITAL 8MVAX2	1 Police Mess	75	5.55	1	4	1	6	174	29	0	0		6	174	29	City-VII, April/03
	2 Crsnt Hospital	85	6.84	1	7	3	9	209	23.2	0	0		9	209	23.222	City-VII, April/03
	3 Hu May/03un Nagar	170	8.72	1	5	1	8	392	49	0	0		8	392	49	City-VI, April/03
	4 Ahmednagar	140	9.17	3	8	2	9	205	22.8	0	0		9	205	22.778	City-VII, April/03
	5 Chacha Nehru Nagar	55	5.35	1	3	0	4	40	10	0	0		4	40	10	City-VII, April/03
	6 S.D.Hospital	10					2	61	30.5	0	0		2	61	30.5	April/03

Hyderabad South

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of sectionizing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks
							(1) Interruption			(2) Break down			(1) + (2)			
							No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No	
1 ASMANGADH (City-VIII) 8MVAX2	1 SAIBABA	140	4.1	2	9	5	1	2	2	0	0		1	2	2	City-VIII, May/03
	2 KODANDARAM NGR	130	4.32	2	7	2	5	17	3.4	1	52	52	6	69	11.5	City-VIII, May/03
	3 VIDYUTH NGR	55	1.82	1	1	1	3	8	2.67	0	0		3	8	2.6667	City-VIII, May/03
	4 SHANKESH BZR	120	5.25	2	8	3	3	7	2.33	0	0		3	7	2.3333	City-VIII, May/03
	5 ASMANGADH	140	5.45	1	12	5	1	2	2	0	0		1	2	2	City-VIII, May/03
	6 TV STATION	10	0.84	0	0	0	0	0		0	0		0	0		City-VIII, May/03
2 ATTAPUR (City-III) 8MVAX2	1 NM GUDA	140	6.27	1	6	1	16	127	7.94	0	0		16	127	7.9375	May/03
	2 DEVIGAUGH	150	4.62	2	4	4	7	39	5.57	0	0		7	39	5.5714	May/03
	3 BHADURPURA	200	9.8	1	5	3	14	95	6.79	0	0		14	95	6.7857	May/03
	4 KISHAN BAUGH	120	3.26	0	6	0	4	22	5.5	0	0		4	22	5.5	May/03
3 CHANCHALGUDA (City-VIII) 8MVAX3	1 CHANCHALGUDA	90	3.36	1	4	1	1	30	30	0	0		1	30	30	May/03
	2 ARAYA SAMAJ	150	3.9	2	7	3	6	43	7.17	2	75	38	8	118	14.75	May/03
	3 CHOWNI	180	2.35	0	3	1	9	65	7.22	0	0		9	65	7.2222	May/03
	4 MADANNAPET	90	2.26	0	4	1	3	20	6.67	1	72	72	4	92	23	May/03
	5 SAIDABAD	90	3.59	5	10	5	3	15	5	1	45	45	4	60	15	May/03
	6 GOVT. PRESS															
4 ENT (City-IX) 8MVA 5MVA	1 TROOP BAZAR	55	1.56	0	5	0	1	5	5	0	0		1	5	5	UG, May/03
	2 CENTRAL BANK OF INDIA	115	2.55	3	6	5	2	14	7	0	0		2	14	7	May/03
	3 RANGA MAHAL ROAD	45	1.47	1	5	2	0	0		0	0		0	0		May/03
	4 ENT HOSPITAL		0.07	0	0	0										UG
	5 JAM BAGH	105	2.7	1	5	1	11	89	8.09	1	12	12	12	101	8.4167	May/03
	6 GURUDWARA	95	2.54	1	6	2	1	5	5	0	0		1	5	5	May/03

Annex 4.2 Results of Substation and Feeders Survey

Hyderabad South

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of section-alizing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks		
							(1) Interruption			(2) Break down			(1) + (2)					
							No	Minute	Min/No	No	Minute	Min/No	No	Minute	Min/No			
5 FALAKNUMA 8MVAX3	1 CRPF																	
	2 C'GUTTA	140	5.15	4	5	2	7	84	12	0	0		7	84	12		City-III,May/03	
	3 BARKAS																	
	4 FALAKNAMA	80	3.64	1	7	3	4	50	12.5	0	0		4	50	12.5		City-III, 03/04pre.mon. May/03	
	5 J'METT	100	6.41	2	5	4	10	57	5.7	0	0		10	57	5.7		City-III,May/03	
	6 CHATRINAKA	180	5.6	1	6	3	6	28	4.67	0	0		6	28	4.6667		City-III,May/03	
6 KARWAN 8MVAX2	1 ZIAGUDA	160	5.88	2	7	1	7	79	11.3	3	147	49	10	226	22.6		City-IX, April/03	
	2 KARWAN	170	5.12	2	6	2	6	30	5	2	140	70	8	170	21.25		City-IX, April/03	
	3 TALLAGADDA	170	5.52	1	9	4	4	28	7	1	40	40	5	68	13.6		City-IX, April/03	
	4 LANGER HOUSE	140	10.15	1	7	0	4	35	8.75	3	177	59	7	212	30.286		City-VII, April/03	
7 KHILWATH (City-III) 8MVAX2	1 TELEPHONE EXCHANGE	80	5.81	0	4	0	4	21	5.25	0	0		4	21	5.25		UG, May/03	
	2 KHILWATH	150	4.31	1	5	2	6	30	5	0	0		6	30	5		May/03	
	3 CHARMINAR	140	3.75	0	3	2	2	10	5	0	0		2	10	5		May/03	
	4 MOGHALPURA	200	6.72	2	6	3	6	30	5	0	0		6	30	5		May/03	
	5 LALDARWAZA	200	5.95	2	7	5	10	62	6.2	0	0		10	62	6.2		May/03	
	6 IQ BAL-UD-DOULA			0	1	0												
8 KANCHANBAG H 8MVAX2	1 OWASI HOSPITAL	20	0.35	0	0	0	0	0	0	0	0		0	0	0		City-VIII,UG,May/03	
	2 VINAY NGR	70	2.76	2	4	1	2	10	5	0	0		2	10	5		City-VIII,May/03	
	3 IS SDAN	110	2.73	0	4	0	3	19	6.33	0	0		3	19	6.3333		City-VIII,May/03	
	4 DARGA	140					5	90	18	0	0		5	90	18		May/03	
	5 RAKSHAPURAM	55		2	7	5	3	19	6.33	0	0		3	19	6.3333		City-III,May/03	
	6 KANCHAN BAUGH	5	1.57	1	2	1	0	0		0	0		0	0	0		City-VIII,May/03	

Hyderabad South

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of section-alizing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks	
							(1) Interruption			(2) Break down			(1) + (2)				
							No	Minute	Min/No	No	Minute	Min/No	No	Minute	Min/No		
9 MALAKPET 8MVAX3	1 DABEERPURA	160	1.41	2	2	0	3	47	15.7	0	0		3	47	15.667		City-VIII, April/03
	2 MALAKPET (EM)	150	4.76	3	6	0	1	65	65	0	0		1	65	65		City-VIII, April/03
	3 AKBERBAUGH	130	2.63	2	4	2	3	85	28.3	0	0		3	85	28.333		City-VIII, April/03
	4 AIR	10	1.32	5	0	0	1	107	107	1	2,911	2,911	2	3,018	1509		City-VIII, April/03
	5 CHADERGHAT (EM)	170	3.92	3	6	2	7	100	14.3	0	0		7	100	14.286		City-VIII, April/03
	6 AZAMPURA	180	4.1	4	6	2	9	224	24.9	0	0		9	224	24.889		City-VIII, April/03
	7 MM HOSPITAL	10	2.96	0	1	3	1	3	3	0	0		1	3	3		UG, City-VIII, April/03
	8 KACHIGUDA	150	4.13	2	7	1	6	147	24.5	0	0		6	147	24.5		City-II, April/03
10 MIRALAM (City-III) 8MVAX3	1 ZOOPARK	180	8.89	2	5	1	10	99	9.9	0	0		10	99	9.9		May/03
	2 INDUSTRIAL	180	5.99	1	7	1	7	29	4.14	0	0		7	29	4.1429		May/03
	3 TADBAN	170	6.83	0	7	4	15	109	7.27	0	0		15	109	7.2667		May/03
	4 FATHE DARWAZA	140	3.85	1	5	2	4	23	5.75	0	0		4	23	5.75		May/03
	5 SHAMSHER GUNJ	190	6.44	0	5	3	3	15	5	0	0		3	15	5		May/03
	6 WATER WORKS (ETM) (M.F.B)	20	2.45	1	1	0	1	4	4	0	0		1	4	4		May/03
	7 JAHNUMA (EM)	140	4.69	1	3	2	5	28	5.6	0	0		5	28	5.6		May/03
11 MOOSARAMBA GH (City-VIII) 8MVAX2	1 SBI COLONY	30	2.18	1	4	1	1	5	5	0	0		1	5	5		May/03
	2 SRIPURAM CLY	65	3.08	1	3	0	2	15	7.5	0	0		2	15	7.5		May/03
	3 SALEEM NGR	70	3.58	2	6	2	2	10	5	0	0		2	10	5		May/03
	4 SV NAGAR	70	2.83	0	5	0	5	25	5	4	385	96	9	410	45.556		May/03
	5 AB COLONY	130	5.5	1	9	3	0	0		0	0		0	0	0		May/03
	6 DILSUKH NGR	65	3.03	1	7	1	0	0		0	0		0	0	0		May/03

Annex 4.2 Results of Substation and Feeders Survey

Hyderabad South

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of section-izing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks				
							(1) Interruption			(2) Break down			(1) + (2)							
							No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No					
12	OSMANIA HOSPITAL 8MVAX3	1	BEGUM BAZAR	140	3.19	3	8	3	0	0	0	0	0	0	0	0	0	City-IX,May/03		
		2	PURANA PHOOL	130	2.72	0	5	4	3	14	4.67	0	0	3	14	4.6667	0	0	City-IX,May/03	
		3	HIGH COURT	20	2.49	0	2	0	1	5	5	0	0	1	5	5	0	0	City-III,UG,May/03	
		4	PUTHLI BOWLI	80	1.76	1	2	2	4	15	3.75	1	43	43	5	58	11.6	0	0	City-IX,May/03
		5	GOWLIGUDA	10	1.18	1	4	1	0	0	1	42	42	1	42	42	0	0	City-IX,May/03	
		6	OSMAN GUNJ	130	3.08	1	6	0	2	5	2.5	0	0	2	5	2.5	0	0	City-IX,May/03	
		7	OSMANIA HOSPITAL	10					1	2	2	0	0	1	2	2	0	0	May/03	
		8	GOWLIGUDA TEL EXCHA						7	33	4.71	1	25	25	8	58	7.25	0	0	May/03
13	SALARJUNG 8MVAX3	1	SALARJUNG	60	1.96	0	0	0	3	110	36.7	1	5	5	4	115	28.75	UG:02/03		
		2	MADINA	180	5.43	2	7	2	9	32	3.56	0	0	9	32	3.5556	0	0	May/03	
		3	HUSSAINILALAM	130	5.67	2	4	3	4	27	6.75	0	0	4	27	6.75	0	0	May/03	
		4	PATHARGATTI	180	3.68	0	4	0	1	10	10	0	0	1	10	10	0	0	May/03	
		5	YAKUTPURA	190					8	83	10.4	0	0	8	83	10.375	0	0	May/03	
		6	PURANIHAVELI	200	5.71	1	5	3	9	65	7.22	0	0	9	65	7.2222	0	0	May/03	
		7	DARULSHAFI	100	2.14	0	2	1	0	0	0	0	0	0	0	0	0	0	May/03	
14	SANTOSH NAGAR 8MVAX3	1	SANTOSH NAGAR	50	0.95	0	1	0	0	0	0	0	0	0	0	0	0	City-VII, April, May/03		
		2	REIN BAZAR	140	1.86	0	3	2	1	10	10	0	0	1	10	10	0	0	City-VIII, May/03	
		3	DRYLAND	90	1.95	0	3	1	3	40	13.3	0	0	3	40	13.333	0	0	City-VIII, May/03	
		4	BHAVANI NAGAR	170	5.76	2	8	3	6	53	8.83	0	0	6	53	8.8333	0	0	City-VIII, May/03	
		5	EDI BAZAR	210	5.2	5	7	1	14	135	9.64	0	0	14	135	9.6429	0	0	City-VIII, May/03	
		6	RIYASATH NAGAR	100	4.97	2	6	2	6	53	8.83	0	0	6	53	8.8333	0	0	City-III, 02/03, May/03	
		7	MOINBAGH	110	6.62	1	7	3	8	110	13.8	0	0	8	110	13.75	0	0	City-III, 02/03, May/03	

Hyderabad South

Substation Name	Name of Feeder	Max Load (A)	Length (km)	Nos of section-izing SW	Nos of spur line	Nos of alternate line	Fault(per month)									Remarks				
							(1) Interruption			(2) Break down			(1) + (2)							
							No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No					
15	SEETARAMBA GH 8MVAX2, 5MVA	1	SEETHARAMBAGH	90	2.12	2	3	2	4	14	3.5	0	0	4	14	3.5	0	0	City-IX, April/03	
		2	DHOOLPET	160	4.13	3	7	0	4	50	12.5	1	53	53	5	103	20.6	0	0	City-IX, April/03
		3	ASIFNAGAR	70	2.49	1	5	0	1	4	4	0	0	1	4	4	0	0	City-VII, April/03	
		4	AGAPURA	70	1.7	1	6	0	4	58	14.5	0	0	4	58	14.5	0	0	City-IX, April/03	
		5	ZINCHICOWRAHA	140	3.9	1	11	0	11	76	6.91	0	0	11	76	6.9091	0	0	City-IX, April/03	
		6	DATTATREYA	110	6.93	1	6	1	2	10	5	0	0	2	10	5	0	0	City-VII, April/03	
16	SULTAN BAZAR 8MVAX2	1	SULTAN BAZAR	165	3.48	3	8	8	7	50	7.14	0	0	7	50	7.1429	0	0	City-IX, April/03	
		2	KOTI FEEDER	185	3.44	3	4	1	2	10	5	0	0	2	10	5	0	0	City-IX, April/03	
		3	KENDRIYA SADAN	140	2.91	1	5	1	1	8	8	0	0	1	8	8	0	0	City-II, April/03	
		4	TARAKARAMA	195	4.24	12	7	3	8	76	9.5	0	0	8	76	9.5	0	0	City-IX, April/03	
		5	IMA UG		3.24	0	3	1											City-II, UG	
17	CRPF (City-III) 7.5MVAX2	1	JAMAL BANDA	80	1.37				0	0			0	0				0	0	May/03
		2	BARKAS	50	1.33	2	5	1	2	15	7.5	0	0	2	15	7.5	0	0	May/03	
		3	SALAL	130	4.17				6	30	5	0	0	6	30	5	0	0	May/03	
		4	CRPF BAZAR	36	4.2				3	36	12	0	0	3	36	12	0	0	May/03	
		5	BALAPUR	125	7.88				4	18	4.5	0	0	4	18	4.5	0	0	May/03	
		6	KESHAVAGIRI	145	4.8				7	45	6.43	1	35	35	8	80	10	0	0	May/03

Annex 4.3 Outage Data and Outage Energy

Annex 4.3 Outage Data and Outage Energy

List of Substations Covered by SCADA(Outage Energy Study)

Ranga Reddy

No.	Hv, Sv	Name	11kV feeder			Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			No	Data No	Max Load(A)	(1) Interruption			(2) Break down			(1) + (2)					
						No	minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
1	N	Gachibowli(GACH)	4	4	120	12	123	10.3	0	0		12	123	10.3	9,590	0	9,590
2	N	111 T(Indian Institute of Information Tehaology)	4	3	32	1	5	5.0	0	0		1	5	5.0	204	0	204
3	N	Aliabad(ALIA)	7	6	500	75	260	3.5	0	0		75	260	3.5	70,736	0	70,736
		(rural 2)															
4	N	Chandanagar(CHAN)	4	4	630	60	650	10.8	2	70	35.0	62	720	11.6	229,099	30,154	259,253
5	N	Dommarapochampally(DOMM)	4	4	464	25	180	7.2	0	0		25	180	7.2	47,384	0	47,384
6	N	ESCI	3	0		25	180	7.2	0	0		25	180	7.2			
7	N	Gundlapochampally(GPPL)	4	0		47	255	5.4	0	0		47	255	5.4			
8	N	Jeedimetla-1(JEED)	7	7	985	52	345	6.6	5	290	58.0	57	635	11.1	111,489	78,501	189,990
9	N	Jeedimetla-2(JEED)	6	6	730	43	270	6.3	9	491	54.6	52	761	14.6	77,878	142,107	219,985
10	N	Kukatpally(KUKA)	7	6	765	38	395	10.4	0	0		38	395	10.4	125,489	0	125,489
11	N	Medchal(MEC)	8	8	837	157	850	5.4	4	185	46.3	161	1035	6.4	268,401	52,429	320,830
		(rural 3)															
12	N	Medicity(MEDI)	3	0		25	135		1	70	70.0	26	205	7.9			
		(rural 3)															
13	N	Charlapally(CHER)	6	6	770	4	20	5.0	3	325	108.3	7	345	49.3	7,142	98,736	105,878
14	N	Gatekar(GATK)	8	7	415	10	62	6.2	0	0		10	62	6.2	7,459	0	7,459
15	N	Keesara(KEES)	3	3	360	0	0	0	0	0		0	0	0	0	0	0
16	N	Malkajgiri(MLKJ)	4	4	590	0	0	0	2	90	45.0	2	90	45.0	0	23,692	23,692
17	N	Mallapur(MALL)	4	4	315	3	15	5.0	2	165	82.5	5	180	36.0	3,401	37,409	40,809
18	N	Moulali(MOUL)	8	8	940	3	15	5.0	3	125	41.7	6	140	23.3	3,628	24,599	28,226
19	N	Nacharam(NARC)	7	7	705	3	15	5.0	1	65	65.0	4	80	20.0	5,101	4,421	9,522
20	N	NGRI(NGRI)	6	6	730	22	176	8.0	1	65	65.0	23	241	10.5	36,615	30,947	67,562
21	N	Sainikpuri(SAIN)	7	7	1080	18	100	5.6	6	385	64.2	24	485	20.2	34,801	116,987	151,788
22	N	Uppal(UPPA)	7	5	580	15	80	5.3	1	75	75.0	16	155	9.7	22,332	22,105	44,437
23	S	Kothapet(KOTH)	4	4	370	25	119	4.8	3	240	80.0	28	359	12.8	31,854	92,501	124,355
24	S	Katedan(KATE)	5	5	880	36	189	5.3	5	828	165.6	41	1017	24.8	78,399	400,748	479,148
25	S	AP Police Academy(APPA)	3	3	217	5	25	5.0	1	50	50.0	6	75	12.5	4,829	20,405	25,234
26	S	Champapet(CHAMP)	5	5	510	65	204	3.1	4	217	54.3	69	421	6.1	57,655	53,007	110,661

No.	Hv, Sv	Name	11kV feeder			Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			No	Data No	Max Load(A)	(1) Interruption			(2) Break down			(1) + (2)					
						No	minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
27	S	Gaganpahad(GAGA)	6	6	620	62	739	11.9	4	637	159.3	66	1376	20.8	230,732	88,511	319,243
28	S	Hayatnagar(HAYAT)	7	7	550	34	134	3.9	2	85	42.5	36	219	6.1	25,857	17,684	43,541
29	S	Ibrahimbagh(IBRA)	5	5	500	41	256	6.2	4	300	75.0	45	556	12.4	67,970	68,356	136,326
30	S	Mamidipally(MAMI)	4	4	430	20	105	5.3	3	135	45.0	23	240	10.4	33,611	50,105	83,716
		(rural 1)															
31	S	National Police Academy(NPPA)	5	5	433	13	65	5.0	5	115	23.0	18	180	10.0	16,312	27,116	43,428
		(rural 1)															
32	S	Shamshabad(SHAM)	5	5	600	29	795	27.4	8	453	56.6	37	1248	33.7	230,800	146,574	377,373
		(rural 3)															
33	S	Turkayamjal(TURK)	2	2	240	20	1439	72.0	1	45	45.0	21	1484	70.7	391,498	12,243	403,741
34	S	Vanastalipuram(VANA)	4	4	590	81	2052	25.3	6	400	66.7	87	2452	28.2	690,291	138,525	828,816
35	S	Bandlaguda(BAND)(13203/11kV)	3	3	265	53	271	5.1	0	0		53	271	5.1	74,522	0	74,522

North Total	121	105	11548	638	4131	6.5	40	2401	60.0	678	6532	9.6	1,060,749	662,087	1,722,836
South Total	58	58	6205	484	6393	13.2	46	3505	76.2	530	9898	18.7	1,934,331	1,115,774	3,050,105
Gross Total	179	163	17753	1122	10524	9.4	86	5906	68.7	1208	16430	13.6	2,995,080	1,777,861	4,772,941

Average per feeder

Area	11kV feeder			Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
	No	Data No	Max Load(A)	(1) Interruption			(2) Break down			(1) + (2)					
				No	minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
North			110.6	5.8	37.7	6.6	0.6	36.4	60.0	5.7	55.6	9.7	8,840	5,517	14,357
South			107.0	8.5	112.2	13.2	1.0	79.7	76.2	9.1	170.7	18.7	33,351	19,237	52,588
Gross			109.3	6.7	62.8	9.4	0.8	53.7	68.7	6.9	93.3	13.6	16,826	9,988	26,814

Annex 4.3 Outage Data and Outage Energy

Hyderabad City																	
No.	North, Central, South	Name	11kV feeder			Fault(per month)						Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)			
			No	Data No	Max Load(A)	(1) Interruption			(2) Break down						(1) + (2)		
						No	minute	Minute/No	No	Minute	Minute/No				No	Minute	Minute/No
1	N	Gunrock(132/33)(City-V)	1	3	130	5	42	8.4	0	0	5	42	8.4	12,379	0	12,379	
		Gunrock(132/33)(City-VI)	7	5	610	41	240	5.9	6	205	34.2	47	445	9.5	66,111	64,048	130,159
2	N	Jubilee Hills(132/33)(City-IV)	5	5	200	11	12	1.1	0	0	11	12	1.1	2,177	0	2,177	
		Jubilee Hills(132/33)	3														
3	N	Air Port(City-IV)	6	6	700	6	67	11.2	1	60	60.0	7	127	18.1	26,141	19,044	45,185
4	N	Allwyn SS(City-IV)	8	7	470	10	40	4.0	4	207	51.8	14	247	17.6	5,872	24,350	30,222
5	N	Banjara Hills Road No.12(City-I)	1	1	125	8	50	6.3	3	371	123.7	11	421	38.3	14,170	105,141	119,311
		Banjara Hills Road No.12(City-V)	5	3	245	17	128	7.5	8	815	101.9	25	943	37.7	24,520	201,100	225,619
6	N	Banjara Hills Road No.2(City-IV)	6	4	335	17	57	3.4	1	55	55.0	18	112	6.2	12,118	8,729	20,847
7	N	Begumpet SS(City-IV)	8	6	805	9	61	6.8	5	127	25.4	14	188	13.4	20,813	51,159	71,972
8	N	Bowenpally(City-VI)	6	5	660	26	199	7.7	0	#DIV/0!	26	199	7.7	65,964	0	65,964	
9	N	Clock Tower(City-V)	4	4	755	13	107	8.2	1	37	37.0	14	144	10.3	46,727	18,455	65,182
10	N	Film Nagar(City-IV)	6	6	260	8	49	6.1	0	0	8	49	6.1	6,076	0	6,076	
11	N	Greenland SS(City-IV)	4	4	780	15	73	4.9	0	0	15	73	4.9	32,251	0	32,251	
12	N	H.A.I.(City-VI)	5	5	460	3	20	6.7	2	130	65.0	5	150	30.0	5,668	56,000	61,668
		H.A.I.	1	0													
13	N	H.M.T(City-VI)	3	2	190	19	143	7.5	7	219	31.3	26	362	13.9	32,625	40,900	73,525
		H.M.T	2	0													
14	N	Hakimpet(City-VI)	4	3	245	20	188	9.0	1	20	20.0	21	200	9.5	37,624	3,401	41,025
15	N	I.D.P.L.(City-VI)	6	6	730	26	146	5.6	1	40	40.0	27	186	6.9	41,059	11,789	52,848
		I.D.P.L	3	0													
16	N	James Street(City-V)	4	4	590	4	52	13.0	1	69	69.0	5	121	24.2	11,744	14,079	25,823
		James Street	2	0													
17	N	Kalyan Nagar(City-IV)	8	6	600	13	71	5.5	2	69	34.5	0	0		17,865	13,603	0
18	N	Lalaguda(City-V)	5	5	540	36	379	10.5	3	296	98.7	39	675	17.3	133,084	114,085	247,169
19	N	Madhapur(City-IV)	4	3	220	15	115	7.7	2	151	75.5	17	266	15.6	17,457	20,541	37,998
		Madhapur	1	0													
20	N	Marepally(City-V)	3	3	435	9	42	4.7	2	55	27.5	11	97	8.8	13,966	16,675	30,641
		Marepally(City-VI)	3	3	115	5	20	4.0	0	0	5	20	4.0	2,528	0	2,528	
21	N	Myrivanam(City-IV)	6	6	550	18	144	8.0	3	125	41.7	21	269	12.8	35,413	51,012	86,425
22	N	NIMS(City-I)	2	2	160	5	80	16.0	2	1578	789.0	7	1658	236.9	12,923	303,395	316,318
		NIMS(City-IV)	7	5	545	16	156	9.8	8	944	118.0	24	1100	45.8	53,245	389,042	422,286
23	N	Osmania University(City-II)	1	1	140	7	116	16.6	0	0	7	116	16.6	36,819	0	36,819	
		Osmania University(City-V)	3	3	230	4	24	6.0	2	135	67.5	6	159	26.5	3,673	38,259	41,932
24	N	Patigadda	6	6	659	24	322	13.4	2	236	118.0	26	558	21.5	115,341	101,661	217,002
25	N	Praga Tools(City-VI)	4	4	460	17	202	11.9	6	312	52.0	23	514	22.3	61,327	103,656	164,983

Hyderabad City																	
No.	North, Central, South	Name	11kV feeder			Fault(per month)						Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)			
			No	Data No	Max Load(A)	(1) Interruption			(2) Break down						(1) + (2)		
						No	minute	Minute/No	No	Minute	Minute/No				No	Minute	Minute/No
26	N	R.P. Nilayam(City-VI)	4	3	310	15	185	12.3	0	0	15	185	12.3	40,809	0	40,809	
27	N	Seethapal Mandi(City-II)	1	1	155	2	9	4.5	0	0	2	9	4.5	3,163	0	3,163	
		Seethapal Mandi(City-V)	4	4	360	11	64	5.8	0	0	11	64	5.8	16,641	0	16,641	
28	N	Srinagar Colony(City-IV)	5	5	720	18	100	5.6	1	20	20.0	19	120	6.3	34,235	3,628	37,862
		Srinagar Colony	1	0													
29	N	Yousufguda(City-IV)	5	5	385	24	181	7.5	6	592	98.7	30	773	25.8	46,001	165,938	211,939
		Yousufguda	1	0													
30	N	Gymbana(City-V)	4	4	620	25	278	11.1	1	43	43.0	26	321	12.3	105,027	20,473	125,500
		AC Guards(City-I)	1	1	115	3	51	17.0	1	24	24.0	4	75	18.8	13,297	6,257	19,554
31	C	AC Guards(City-VII)	5	5	425	15	165	11.0	5	347	69.4	20	512	25.6	37,103	64,706	101,808
		AC Guards	1	0													
32	C	Amberpet(City-II)	6	6	610	28	234	8.4	3	154	51.3	31	388	12.5	63,436	50,626	114,062
33	C	Asif Nagar(City-VII)	9	9	950	61	637	10.4	1	105	105.0	62	742	12.0	160,404	2,381	162,784
		Asif Nagar	1	0													
34	C	Chikalguda(City-I)	2	2	195	7	54	7.7	0	0	7	54	7.7	12,243	0	12,243	
		Chikalguda(City-II)	2	2	260	2	11	5.5	0	0	2	11	5.5	3,378	0	3,378	
		Chikalguda(City-V)	3	3	250	13	114	8.8	2	45	22.5	15	159	10.6	21,618	8,094	29,711
		Exhibition Ground(City-I)	2	2	245	7	136	19.4	0	0	7	136	19.4	49,198	0	49,198	
35	C	Exhibition Ground(City-VII)	1	1	150	6	93	15.5	0	0	6	93	15.5	31,627	0	31,627	
		Exhibition Ground	4	0													
36	C	Golconda(City-VII)	6	6	510	36	355	9.9	8	355	44.4	0	0		79,238	74,761	0
		Golconda	1	0													
37	C	Hussain Sagar(City-I)	8	8	820	20	133	6.7	4	280	70.0	24	413	17.2	35,708	61,894	97,602
		Hussain Sagar(City-VII)	1	1	130	5	26	5.2	0	0	5	26	5.2	7,663	0	7,663	
38	C	Hyderguda(City-I)	5	5	780	15	168	11.2	3	140	46.7	18	308	17.1	57,995	52,825	110,820
39	C	Indira Park(City-I)	8	8	855	20	169	8.5	1	60	60.0	21	229	10.9	47,078	16,324	63,402
40	C	Industrial Area(City-II)	7	7	770	35	387	11.1	0	0	35	387	11.1	92,909	0	92,909	
41	C	Lakeview(City-I)	2	2	245	7	46	6.6	1	49	49.0	8	95	11.9	12,299	11,665	23,964
42	C	Narayanguda(City-I)	2	2	230	12	116	9.7	1	45	45.0	13	161	12.4	30,652	8,672	39,324
		Narayanguda(City-II)	2	2	150	4	33	8.3	3	144	48.0	7	177	25.3	5,294	31,015	36,309
43	C	Public Garden(City-I)	2	2	340	3	15	5.0	1	45	45.0	4	60	15.0	5,895	16,324	22,218
44	C	S.D. Hospital(City-VII)	5	5	525	36	1020	28.3	0	0	36	1020	28.3	291,005	0	291,005	
		S.D. Hospital	1	0													
45	S	Asmangadh(City-VIII)	6	6	595	13	36	2.8	1	52	52.0	14	88	6.3	9,182	15,326	24,508
46	S	Attapur(City-III)	4	4	610	41	283	6.9	0	0	41	283	6.9	102,636	0	102,636	
47	S	Charchalguda(City-VIII)	6	5	600	22	173	7.9	4	192	48.0	26	363	14.0	54,413	49,379	103,792
48	S	E.N.T(City-IX)	6	5	415	15	113	7.5	1	12	12.0	16	125	7.8	26,537	2,857	29,394

Annex 4.3 Outage Data and Outage Energy

No.	North, Central, South	Name	11kV feeder			Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			No	Data No	Max Load(A)	(1) Interruption			(2) Break down			(1) + (2)					
						No	minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
49	S	Falaknuma(City-III)	4	4	500	27	219	8.1	0	0	0	27	219	8.1	60,080	0	60,080
		Falaknuma	2	0													
50	S	Kanchanbagh(City-III)	1	1	55	3	19	6.3	0	0	3	19	6.3	2,369	0	2,369	
		Kanchanbagh(City-VIII)	5	4	205	5	29	5.8	0	0	5	29	5.8	6,325	0	6,325	
51	S	Karwan(City-VII)	1	1	140	4	35	8.8	3	177	59.0	7	212	30.3	11,109	56,181	67,290
		Karwan(City-IX)	3	3	500	17	137	8.1	6	327	54.5	23	464	20.2	51,012	122,700	173,712
52	S	Khiltwaih(City-III)	5	3	770	28	153	5.5	0	0	28	153	5.5	58,902	0	58,902	
		Malakpet(City-II)	1	1	150	6	147	24.5	0	0	6	147	24.5	49,991	0	49,991	
53	S	Malakpet(City-VIII)	7	7	810	25	631	25.2	1	2911	2911.0	26	3542	136.2	196,656	65,998	262,654
54	S	Mirajam(City-III)	7	7	1020	45	307	6.8	0	0	45	307	6.8	117,078	0	117,078	
55	S	Moosarambagh(City-VIII)	6	6	430	10	55	5.5	4	385	96.3	14	440	31.4	8,105	61,101	69,206
		Osmania Hospital(City-III)	1	1	20	1	5	5.0	0	0	1	5	5.0	227	0	227	
		Osmania Hospital(City-IX)	7	5	490	9	34	3.8	2	85	42.5	11	119	10.8	8,321	8,751	17,072
57	S	Sarajlung(City-III)	7	7	1040	34	327	9.6	1	5	5.0	35	332	9.5	105,288	680	105,968
		Santhoshnagar(City-III)	2	2	210	14	163	11.6	0	0	14	163	11.6	39,449	0	39,449	
58	S	Santhoshnagar(City-VIII)	5	5	660	24	238	9.9	0	0	24	238	9.9	96,038	0	96,038	
		Seetharam bagh(City-VII)	2	2	180	3	14	4.7	0	0	3	14	4.7	3,129	0	3,129	
59	S	Seetharam bagh(City-IX)	4	4	460	23	198	8.6	1	53	53.0	24	251	10.5	54,322	19,226	73,548
		Sultan Bazar(City-II)	7	1	140	1	8	8.0	0	0	1	8	8.0	2,539	0	2,539	
60	S	Sultan Bazar(City-IX)	3	3	545	17	136	8.0	0	0	17	136	8.0	56,498	0	56,498	
61	S	CPRF(City-III)	6	6	566	22	144	6.5	1	35	35.0	23	179	7.8	33,375	11,506	44,881
Total			367														

North Total	178	146	15494	522	4154	8.0	81	6911	85.3	588	10925	18.6	1,213,555	1,940,180	3,122,267
Central Total	87	79	8555	335	3963	11.8	34	1793	52.7	325	5046	15.5	1,058,040	405,543	1,309,584
South Total	102	95	11111	409	3604	8.8	25	4234	169.4	434	7838	18.1	1,153,582	413,705	1,567,287
Gross Total	367	320	35160	1266	11721	9.3	140	12938	92.4	1347	23809	17.7	3,425,177	2,759,429	5,999,138

Average per feeder

Area	11kV feeder			Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
	No	Data No	Max Load(A)	(1) Interruption			(2) Break down			(1) + (2)					
				No	minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
North			100.3	3.6	27.3	7.6	0.5	49.1	91.2	4.2	78.1	18.7	7,511	13,133	20,467
Central			100.4	3.5	42.9	12.1	0.4	23.1	61.5	3.7	62.2	17.0	9,279	4,350	12,346
South			116.1	4.3	38.1	8.8	0.3	43.5	163.8	4.6	81.5	17.8	11,590	4,056	15,646
Gross			104.4	3.8	34.5	9.2	0.4	40.3	95.9	4.1	74.7	18.0	9,083	8,164	16,779

*1: Length data of 1 feeder is not available.

*2:Map data of feeder is not available.

Annex 4.3 Outage Data and Outage Energy

PF 0.85 LF 0.7

Substation Name	Name of Feeder	Nos of feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)	
				(1) Interruption			(2) Break down			(1) + (2)						
				No	Minute	Min/No	No	Minute	Min/No	No	Minute	Min/No				
Gachibowli (5MVA x2)	University, ALIND	4	30	3	15	5.0					3	15	5.0	1,020	0	1,020
	LINGGAMPALLY		50	6	18	3.0					6	18	3.0	2,040	0	2,040
	KOTTAGUDA		32	3	90	30.0					3	90	30.0	6,530	0	6,530
	GACHIBOWLI(KALAGAYTHY)		8	0	0									0	0	0
IIT (Indian Institute of Information Technology) (8MVA New)	STADIUM	4	11								0	0		0	0	0
	WIZCRAFT		Open								0	0				
	SPORT VILLAGE		3								0	0		0	0	0
	SPORTVILLAGE EXTERNAL LIGHTING		18	1	5	5.0					1	5	5.0	204	0	204
Aliabad (ALIA) 8MVAX2 3.15MVA	Ravileela	7	20	0	0						0	0		0	0	0
	Thurkapally		160	25	75	3.0				25	75	3.0	27,206	0	27,206	
	Bommarajpet		120	15	40	2.7				15	40	2.7	10,883	0	10,883	
	Aliabad		80	15	75	5.0				15	75	5.0	13,603	0	13,603	
	Jaganuguda		120	20	70	3.5				20	70	3.5	19,044	0	19,044	
	H.B.L		70	0	0						0	0		0	0	0
Chandanagar (CHAN) 8MVA 3.15MVA	Survanshi	4		0	0						0	0		0	0	0
	Taranagar		150	15	145	9.7				15	145	9.7	49,311	0	49,311	
	Chandanagar		130	20	205	10.3				20	205	10.3	60,421	0	60,421	
	Hifeezpet (S.B)		160	15	145	9.7				15	145	9.7	52,599	0	52,599	
Dommarapocham - pally (DOMM) 5MVAX2	Miyapur	4	190	10	155	15.5	2	70	35.0	12	225	18.8	66,769	30,154	96,922	
	Bowrampet		115	2	10	5.0				2	10	5.0	2,607	0	2,607	
	Satyam Computers (S.B)		115	2	70	35.0				2	70	35.0	18,251	0	18,251	
	Duridigal IDA		117	12	40	3.3				12	40	3.3	10,610	0	10,610	
ESCI 3MVA	Gagillapur	3	117	9	60	6.7				9	60	6.7	15,916	0	15,916	
	Gachibowli			10	80	8.0				10	80	8.0	0	0	0	
	Nanakramguda			15	100	6.7				15	100	6.7	0	0	0	
	E.S.C.I		0	0					0	0		0	0	0		

Ranga Reddy North

Substation Name	Name of Feeder	Nos of feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
				(1) Interruption			(2) Break down			(1) + (2)					
				No	Minute	Min/No	No	Minute	Min/No	No	Minute	Min/No			
Gundlapocham-pally (GPPL) 8MVA	IDA	4	2	15	7.5					2	15	7.5	0	0	0
	Gundla Pochampally (S.B)		10	45	4.5					10	45	4.5	0	0	0
	Mysammaguda		15	75	5.0					15	75	5.0	0	0	0
	Doollapally		20	120	6.0					20	120	6.0	0	0	0
Jeedimetla-1 (JEED) 8MVAX3	Phase V	7	130	5	25	5.0				5	25	5.0	7,368	0	7,368
	Vicchow		180	12	75	6.3	1	30	30.0	13	105	8.1	30,607	12,243	42,850
	Sudershan Drugs		165	2	10	5.0				2	10	5.0	3,741	0	3,741
	Phase I		175	8	65	8.1				8	65	8.1	25,789	0	25,789
	Subhashnagar		120	12	90	7.5	1	50	50.0	13	140	10.8	24,486	13,603	38,089
	Shapumagar		140	8	40	5.0	2	115	57.5	10	155	15.5	12,696	36,502	49,198
Jeedimetla-2 (JEEI) 8MVAX2	Phase II	6	75	5	40	8.0	1	95	95.0	6	135	22.5	6,802	16,154	22,955
	Gajularamaram		130	5	35	7.0	2	91	45.5	7	126	18.0	10,316	26,821	37,137
	Kompally		90	5	40	8.0				5	40	8.0	8,162	0	8,162
	Surqaram		140	10	75	7.5	2	100	50.0	12	175	14.6	23,805	31,741	55,546
	Phase III		80	8	40	5.0	2	130	65.0	10	170	17.0	7,255	23,579	30,834
	Phase V		100	5	30	6.0	1	65	65.0	6	95	15.8	6,802	14,737	21,538
Kukatpally (KUKA)	Phase IV	7	190	10	50	5.0	2	105	52.5	12	155	12.9	21,538	45,230	66,769
	Travels Feeder		100	3	50	16.7				3	50	16.7	11,336	0	11,336
	Hydernagar		140	5	70	14.0				5	70	14.0	22,218	0	22,218
	Air Force		6	90	15.0					6	90	15.0	0	0	0
	Venkateshwara		180	10	140	14.0				10	140	14.0	57,133	0	57,133
	Bhagyanagar		120	6	45	7.5				6	45	7.5	12,243	0	12,243
	JNTUCF		130	3	40	13.3				3	40	13.3	11,789	0	11,789
	KPHB		95	11	50	4.5				11	50	4.5	10,769	0	10,769
Medchal (MEC) 5MVAX2	Yellampet	8	83	15	70	4.7				15	70	4.7	13,172	0	13,172
	Ravalkole		150	35	250	7.1				35	250	7.1	85,020	0	85,020
	IDA Medchal II (S.B)		125	15	60	4.0	2	95	47.5	17	155	9.1	17,004	26,923	43,927
	Rural Medchal		70	25	75	3.0				25	75	3.0	11,903	0	11,903
	IDA Medchal I		125	12	60	5.0	2	90	45.0	14	150	10.7	17,004	25,506	42,510
	kandlakoya		185	35	270	7.7				35	270	7.7	113,246	0	113,246
	Medchal Town		75	20	65	3.3				20	65	3.3	11,053	0	11,053
	Srinath Spinning Mills		24	0	0					0	0		0	0	0

Annex 4.3 Outage Data and Outage Energy

Ranga Reddy North

Substation Name	Name of Feeder	Nos of feeder	Max Load(A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)	
				(1) Interruption			(2) Break down			(1) + (2)						
				No	Minute	Min/hrs%	No	Minute	Min/hrs%	No	Minute	Min/hrs%				
Medicity(MEDI) 5MVA,1.6MVA	Pudur	3		15	75	5.0	1	70	70.0	16	145	9.1	0	0	0	
	Raj Bollaram			10	60	6.0				10	60	6.0	0	0	0	
	Medicity			0	0					0	0	0.0	0	0	0	
Charlapally(CHER)	ECIL	6	50	0	0		1	115	115.0	1	115	115.0	0	13,036	13,036	
	IDA Phase-I			70	0	0		0	0		0	0	0	0	0	
	IDA Phase-II			160	2	10	5.0	0	0		2	10	5.0	3,628	0	3,628
	Krupp			190	1	5	5.0	0	0		1	5	5.0	2,154	0	2,154
	Rampally			180	0	0		2	210	105.0	2	210	105.0	0	85,700	85,700
	Nagaram			120	1	5	5.0	0	0		1	5	5.0	1,360	0	1,360
Gatkesar(GATK)	Ghatkesar	8	120	2	7	3.5	0	0		2	7	3.5	1,904	0	1,904	
	Keesara												0	0	0	
	Eduleabad			80	2	10	5.0	0	0		2	10	5.0	1,814	0	1,814
	Aushapur			110	1	5	5.0	0	0		1	5	5.0	1,247	0	1,247
	Medipally			70	2	10	5.0	0	0		2	10	5.0	1,587	0	1,587
	Syndicate			20	1	10	10.0	0	0		1	10	10.0	453	0	453
	HPCL			10	2	20	10.0	0	0		2	20	10.0	453	0	453
	NTPC			5				0	0		0	0		0	0	0
Keesara(KEES)	Cheral	3	170	0	0		0	0		0	0		0	0	0	
	Ankireddipally			70	0	0		0	0		0	0		0	0	0
	Keesara			120	0	0		0	0		0	0		0	0	0
Malkajgiri(MLKJ)	Anandbagh	4	120	0	0		1	55	55.0	1	55	55.0	0	14,963	14,963	
	Durga Nagar			220	0	0		0	0		0	0		0	0	
	M.K. Nagar			110	0	0		1	35	35.0	1	35	35.0	0	8,729	8,729
	Suryanagar			140	0	0		0	0		0	0		0	0	0
Mallapur(MALL)	Mallapur Village	4	100	3	15	5.0	2	165	82.5	5	180	36.0	3,401	37,409	40,809	
	IDA Phase-II			80	0	0		0	0		0	0		0	0	
	BEL			105	0	0		0	0		0	0		0	0	0
	A.P. Food			30	0	0		0	0		0	0		0	0	0

Ranga Reddy North

Substation Name	Name of Feeder	Nos of feeder	Max Load(A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)	
				(1) Interruption			(2) Break down			(1) + (2)						
				No	Minute	Min/hrs%	No	Minute	Min/hrs%	No	Minute	Min/hrs%				
Moulali(MOUL)	FBP	8	10	1	5	5.0	1	45	45.0	2	50	25.0	113	1,020	1,134	
	HCL			180	0	0		0	0		0	0		0	0	0
	HMT			40	0	0		0	0		0	0		0	0	0
	Malkajgiri			180	1	5	5.0				1	5	5.0	2,040	0	2,040
	Meerpet			130	0	0		0	0		0	0		0	0	0
	Mirjalguda			130	1	5	5.0	2	80	40.0	3	85	28.3	1,474	23,579	25,052
	Moula-Abi			140	0	0		0	0		0	0		0	0	0
	Spectra			130	0	0		0	0		0	0		0	0	0
Nacharam(NARC)	S.R. Feeder	7	130	0	0		0	0		0	0		0	0	0	
	Multisteel			30			1	65	65.0	1	65	65.0	0	4,421	4,421	
	Tungabhadra			220	0	0		0	0		0	0		0	0	0
	JPM			120	0	0		0	0		0	0		0	0	0
	Laxmi Starch			150	3	15	5.0	0	0		3	15	5.0	5,101	0	5,101
	NILE			45	0	0		0	0		0	0		0	0	0
	India Extruction			10	0	0		0	0		0	0		0	0	0
NGRI(NGRI)	Habsiguda	6	170	2	10	5.0	0	0		2	10	5.0	3,854	0	3,854	
	HMT			210	3	13	4.3	1	65	65.0	4	78	19.5	6,189	30,947	37,137
	Kalyanpuri			130	5	30	6.0	0	0		5	30	6.0	8,842	0	8,842
	NGRI			40	4	23	5.8	0	0		4	23	5.8	2,086	0	2,086
	Penguin			20	1	65	65.0	0	0		1	65	65.0	2,947	0	2,947
	S.O.I			160	7	35	5.0	0	0		7	35	5.0	12,696	0	12,696
Sainikpuri(SAIN)	ASRAO Nagar	7	200	0	0		0	0		0	0		0	0	0	
	Kamalanagar			100	0	0		1	80	80.0	1	80	80.0	0	18,138	18,138
	Kapra			110	3	15	5.0				3	15	5.0	3,741	0	3,741
	Kushaiguda			170	4	20	5.0	1	30	30.0	5	50	10.0	7,708	11,563	19,271
	Neredmet			180	6	30	5.0				6	30	5.0	12,243	0	12,243
	Sainikpuri			180							0	0		0	0	0
	Yapral			140	5	35	7.0	4	275	68.8	9	310	34.4	11,109	87,287	98,396

Annex 4.3 Outage Data and Outage Energy

Ranga Reddy North

Substation Name	Name of Feeder	Nos of feeder	Max Load(A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
				(1) Interruption			(2) Break down			(1) + (2)					
				No	Minute	Min/No	No	Minute	Min/No	No	Minute	Min/No			
Uppal(UPPA)	Boduppall	7	120	7	35	5.0	0	0		7	35	5.0	9,522	0	9,522
	Doordarshan									0	0		0	0	0
	Indi Ghatkesar		130	3	15	5.0	1	75	75.0	4	90	22.5	4,421	22,105	26,526
	Nav Bharath		180	2	15	7.5	0	0		2	15	7.5	6,121	0	6,121
	Ramanthapur									0	0		0	0	0
	Uppal		50	2	10	5.0	0	0		2	10	5.0	1,134	0	1,134
	Gangappa		100	1	5	5.0	0	0		1	5	5.0	1,134	0	1,134

Ranga Reddy South

Substation Name	Name of Feeder	Nos of feeder	Max Load(A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
				(1) Interruption			(2) Break down			(1) + (2)					
				No	Minute	Min/No	No	Minute	Min/No	No	Minute	Min/No			
Kothapet(Mixed)(8MVAx2)	Kamalagar	4	85	7	29	4.1				7	29	4.1	5,589	0	5,589
	Sroornagar		170	16	52	3.3	3	240	80.0	19	292	15.4	20,042	92,501	112,543
	Stadium(old Kothapet)		75	1	35	35.0				1	35	35.0	5,951	0	5,951
	Huda Complex		40	1	3	3.0				1	3	3.0	272	0	272
Katedan(Industry)(8MVAx2)	Katedan 1	5	170	5	30	6.0				5	30	6.0	11,563	0	11,563
	Katedan 2		160	7	35	5.0	1	90	90.0	8	125	15.6	12,696	32,648	45,344
	Balapur		220	12	62	5.2	4	738	184.5	16	800	50.0	30,924	368,101	399,025
	Katedan 3		160	6	30	5.0				6	30	5.0	10,883	0	10,883
AP Police Academy(Himayar Sagar)(5MVAx1)	Katedan 4	3	170	6	32	5.3				6	32	5.3	12,334	0	12,334
	AP Police Academy		15							0	0		0	0	
	Himayar Sagar		22	3	15	5.0				3	15	5.0	748	0	748
Champapet(8MV Ax2)	Azz Nagar	5	180	2	10	5.0	1	50	50.0	3	60	20.0	4,081	20,405	24,486
	Kharmanghat		130	13	60	4.6	0	0		13	60	4.6	17,684	0	17,684
	Champapet		80	7	29	4.1	0	0		7	29	4.1	5,260	0	5,260
	Sulthanvalua		40	2	14	7.0	1	67	67.0	3	81	27.0	1,270	6,076	7,346
	Meerpat		150	17	91	5.4	2	105	52.5	19	196	10.3	30,947	35,708	66,655
	Balapur		110	26	10	0.4	1	45	45.0	27	55	2.0	2,494	11,223	13,716
Gaganpahad (GAGA) 8MVAX2	NPA(55mm2, 172A)	6	40	0	0		1	355	355.0	1	355	355.0	0	32,194	32,194
	Gagan Pahad(ditto)		150	15	515	34.3	0	0		15	515	34.3	175,140	0	175,140
	Jai Bhawani(ditto)		120	4	25	6.3	0	0		4	25	6.3	6,802	0	6,802
	Manage(ditto)		140	18	90	5.0	1	38	38.0	19	128	6.7	28,567	12,061	40,628
	Ralendra Nagar(ditto)		80	24	89	3.7	2	244	122.0	26	333	12.8	16,142	44,256	60,398
	Shiva Shathi(ditto)		90	1	20	20.0	0	0		1	20	20.0	4,081	0	4,081
Hyath Nagar(8MVAx3)	L.B. Nagar	7	45	5	21	4.2				5	21	4.2	2,142	0	2,142
	Mansurabad		115	6	22	3.7				6	22	3.7	5,736	0	5,736
	Mothfr Dairy		120	5	19	3.8				5	19	3.8	5,169	0	5,169
	AutoNagar, HighCourtColony		120	7	27	3.9	1	45	45.0	8	72	9.0	7,346	12,243	19,589
	Hyat Nagar		80	3	13	4.3				3	13	4.3	2,358	0	2,358
	A.I.R.		10	3	11	3.7				3	11	3.7	249	0	249
	SERIER		60	5	21	4.2	1	40	40.0	6	61	10.2	2,857	5,441	8,298

Annex 4.3 Outage Data and Outage Energy

Ranga Reddy South

Substation Name	Name of Feeder	Nos of feeder	Max Load(A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)	
				(1) Interruption			(2) Break down			(1) + (2)						
				No	Minute	Min/100%	No	Minute	Min/100%	No	Minute	Min/100%				
Ibrahimbagh(8MVAx2)	New Military	5	40	5	40	8.0					5	40	8.0	3,628	0	3,628
	Osman Sagar		160	9	95	10.6	2	75	37.5	11	170	15.5	34,461	27,206	61,668	
	Military I		130	14	46	3.3	1	40	40.0	15	86	5.7	13,558	11,789	25,347	
	Military II		70	1	10	10.0	1	185	185.0	2	195	97.5	1,587	29,360	30,947	
	Pedda Mangalagan		100	12	65	5.4	0	0			12	65	5.4	14,737	0	14,737
Mamidipally(MA MI) 5MVAx2	Errakunta(34mm2, 150A)	4	120	6	35	5.8	0	0		6	35	5.8	9,522	0	9,522	
	Pahachisharey(ditto)		125	4	20	5.0	1	40	40.0	5	60	12.0	5,668	11,336	17,004	
	Thukkuguda(ditto)		180	9	45	5.0	2	95	47.5	11	140	12.7	18,364	38,769	57,133	
	Catalytic(ditto)		5	1	5	5.0	0	0		1	5	5.0	57	0	57	
NationalPoliceAcademy(NPPA)5MVAx2	Sastri Puram(55mm2)	5	53	5	20	4.0	1	30	30.0	6	50	8.3	2,403	3,605	6,008	
	Uppar Pally(ditto)		175	4	25	6.3	1	20	20.0	5	45	9.0	9,919	7,935	17,854	
	Shivarampally(ditto)		134	2	10	5.0	2	45	22.5	4	55	13.8	3,038	13,671	16,709	
	NPA(ditto)		29	0	0		0	0		0	0		0	0	0	
	Kattadan(ditto)		42	2	10	5.0	1	20	20.0	3	30	10.0	952	1,904	2,857	
Shamshabad (SHAM) 8MVAx2	OmJaiBhavani(34mm2)	5	60	3	95	31.7	2	90	45.0	5	185	37.0	12,923	12,243	25,166	
	Shamshabad(ditto)		120	12	335	27.9	1	15	15.0	13	350	26.9	91,141	4,081	95,222	
	Narkuda(ditto)		200	4	175	43.8	2	213	106.5	6	388	64.7	79,352	96,582	175,934	
	Raikunta(ditto)		110	5	90	18.0	2	115	57.5	7	205	29.3	22,445	28,680	51,125	
	HameedullaNagar(ditto)		110	5	100	20.0	1	20	20.0	6	120	20.0	24,939	4,988	29,927	
Turkayamjal(TURK)(5+3.5)MVA	Turka Yanjal(55mm2)	2	120	8	864	108.0	1	45	45.0	9	909	101.0	235,062	12,243	247,305	
	Manneguda(55mm2)		120	12	575	47.9	0	0		12	575	47.9	156,436	0	156,436	
Vanastalipuram (VANA) 8MVAx2	Vanasthalipuram(55mm2)	4	140	12	329	27.4	1	20	20.0	13	349	26.8	104,427	6,348	110,775	
	NGO's(55mm2)		170	11	203	18.5	0	0		11	203	18.5	78,241	0	78,241	
	Injarpoor(55mm2)		170	41	945	23.0	3	275	91.7	44	1220	27.7	364,224	105,991	470,215	
	Bairamlaguda(55mm2)		110	17	575	33.8	2	105	52.5	19	680	35.8	143,400	26,186	169,586	
Bandlaguda(BAND)(132/33/11kV) 5MVAx1	Nagole(55mm2)	3	150	22	146	6.6	0	0		22	146	6.6	49,651	0	49,651	
	Alkapuri(55mm2)		100	21	107	5.1	0	0		21	107	5.1	24,259	0	24,259	
	GSI(55mm2)		15	10	18	1.8	0	0		10	18	1.8	612	0	612	

Annex 4.3 Outage Data and Outage Energy

Hyderabad North PF 0.85 LF 0.7

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	Min/No	No	Minute	Min/No	No	Minute	Minute/No			
1 ALLWYN (City-IV) 8MVAX2	1 Industrial Estate	80	2	9	4.5	0	0	2	9	4.5	1,632.4	0.0	1,632.4	
	2 Crown Carting	10	1	2	2	0	0	1	2	2	45.3	0.0	45.3	
	3 IOL	140	1	6	6	0	0	1	6	6	1,904.4	0.0	1,904.4	
	4 Motinagar	80	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
	5 ESI	20	5	18	3.6	3	147	49	8	165	20,625	816.2	6,665.5	7,481.7
	6 Sanathnagar	130	1	5	5	1	60	60	2	65	32.5	1,473.7	17,684.1	19,157.7
	7 Tele Exchange	10	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
	8 Allwyn Compressor	10	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
2 AIRPORT (City-IV) 8MVAX2	1 Air port	80	2	10	5	0	0	2	10	5	1,813.8	0.0	1,813.8	
	2 International Airport	60	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
	3 Domestic Airport	60	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
	4 Chikoti Garden	140	0	0	0	1	60	60	1	60	60	0.0	19,044.4	19,044.4
	5 Prakash Nagar	190	3	52	17.3	0	0	3	52	17.333	22,399.8	0.0	22,399.8	
	6 Motilal Nagar	170	1	5	5	0	0	1	5	5	1,927.1	0.0	1,927.1	
3 ROAD NO: 2 8MVAX2	1 Sagar society	70	2	10	5	1	55	55	3	65	21.667	1,587.0	8,728.7	10,315.7
	2 Road No.02	115	5	25	5	0	0	5	25	5	6,518.2	0.0	6,518.2	
	3 Road No.10	85	9	17	1.89	0	0	9	17	1.8889	3,276.1	0.0	3,276.1	
	4 Road No.14	145	2	10	5	0	0	2	10	5	3,287.4	0.0	3,287.4	
	5 L.V.Prasad Marg	65	1	5	5	0	0	1	5	5	736.8	0.0	736.8	
	6 LV.Prasad film Lab	40												

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	Min/No	No	Minute	Min/No	No	Minute	Minute/No			
4 BEGUMPET (City-IV) 8MVAX2	1 S.R.Nagar	145	3	19	6.33	2	50	25	5	69	13.8	6,246.1	16,437.1	22,683.2
	2 Yellamma Temple	65	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
	3 Shantibagh	145	4	30	7.5	1	20	20	5	50	10	9,862.3	6,574.8	16,437.1
	4 AMP	55	0	0	0	1	25	25	1	25	25	0.0	3,117.4	3,117.4
	5 DKR	345	1	5	5	1	32	32	2	37	18.5	3,910.9	25,029.8	28,940.7
	6 Hyderabad Public School	120	8	43	5.38	1	20	20	9	63	7	11,698.7	5,441.3	17,139.9
	7 Maitrivanam	50	1	7	7	0	0	0	1	7	7	793.5	0.0	793.5
	8 Vidvut Soudha	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
5 BOWENPLLY (City-VI) 8MVAX2	1 Bapuji Nagar	195	9	53	5.89	0	0	9	53	5.8889	23,431.4	0.0	23,431.4	
	2 Bowenpally	100	2	25	12.5	0	0	2	25	12.5	5,668.0	0.0	5,668.0	
	3 Tadbund	100	5	53	10.6	0	0	5	53	10.6	12,016.1	0.0	12,016.1	
	4 IAF	25	1	20	20	0	0	1	20	20	1,133.6	0.0	1,133.6	
	5 Gputham Nagar	170	9	60	6.67	0	0	9	60	6.6667	23,125.3	0.0	23,125.3	
	6 Ferroj guda	95	1	8	8	0	0	1	8	8	1,723.1	0.0	1,723.1	
6 CLOCKTOWER (City-V) 8MVAX2 7.5MVA	1 Sangeeth	180	3	17	5.67	0	0	3	17	5.6667	6,937.6	0.0	6,937.6	
	2 Minerva	170	5	45	9	0	0	5	45	9	17,344.0	0.0	17,344.0	
	3 Natraj	185	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
	4 St.Road	220	5	45	9	1	37	37	6	82	13.667	22,445.2	18,454.9	40,900.1
7 GREENLANDS (City-IV) 8MVAX2	1 Ameerpeth	195	1	8	8	0	0	1	8	8	3,536.8	0.0	3,536.8	
	2 Kundan bagh	190	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
	3 Rajiv Gandhi	190	9	44	4.89	0	0	9	44	4.8889	18,953.7	0.0	18,953.7	
	4 Somajiguda	205	5	21	4.2	0	0	5	21	4.2	9,760.2	0.0	9,760.2	

Annex 4.3 Outage Data and Outage Energy

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	kwh/No	No	Minute	kwh/No	No	Minute	kwh/No			
8 GYMKHANA (City-V) 8MVAX2	1 Paredgrounds	210	10	135	13.5	1	43	43	11	178	16.182	64,274.8	20,472.7	84,747.5
	2 Sikh village	85	4	31	7.75	0	0	0	4	31	7.75	5,974.0	0.0	5,974.0
	3 Vikram Puri	195	3	12	4	0	0	0	3	12	4	5,305.2	0.0	5,305.2
	4 Marredpally	130	8	100	12.5	0	0	0	8	100	12.5	29,473.4	0.0	29,473.4
9 HAKIMPET (City-VI) 5MVAX2	1 M.Bollaram	110	10	106	10.6	0	0	0	10	106	10.6	26,435.4	0.0	26,435.4
	2 Hakimpet Airforce	65	6	38	6.33	0	0	0	6	38	6.3333	5,600.0	0.0	5,600.0
	3 Allen by lines	60	6	41	6.83	0	0	0	6	41	6.8333	5,577.3	0.0	5,577.3
	4 Risak Bazar	75	4	33	8.25	1	20	20	5	53	10.6	5,611.3	3,400.8	9,012.1
10 HAL 8MVAX2	1 Sowbhagya Nagar	60	2	10	5	0	0	0	2	10	5	1,360.3	0.0	1,360.3
	2 Sri Rama	50	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	3 NRSA	100	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	4 SAMRAT	190	1	10	10	2	130	65	3	140	46.667	4,307.7	55,999.5	60,307.2
	5 HAL	30	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	6 I.A.L	60	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
11 HMT 8MVAX2	1 Chintal	150	13	60	4.62	1	75	75	14	135	9.6429	20,404.7	25,505.9	45,910.6
	2 HMT Road	40	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	3 QBP	110	16	78	4.88	2	125	63	18	203	11.278	19,452.5	31,173.8	50,626.3
	4 G.N.R	60	9	60	6.67	4	149	37	13	209	16.077	8,161.9	20,268.7	28,430.5
	5 A.O.L	130	10	83	8.3	3	70	23	13	153	11.769	24,463.0	20,631.4	45,094.4

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	kwh/No	No	Minute	kwh/No	No	Minute	kwh/No			
12 IDPL 3MVAX2(6.6KV) 5MVA 8MVAX3	1 6.6kV IDPL	60	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	2 SIFCO	80	2	8	4	0	0	0	2	8	4	1,451.0	0.0	1,451.0
	3 SVCIE	130	4	44	11	1	40	40	5	84	16.8	12,968.3	11,789.4	24,757.7
	4 Vijaya Electricals	130	12	41	3.42	0	0	0	12	41	3.4167	12,084.1	0.0	12,084.1
	5 Obium	150	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	6 Balanagar	100	4	25	6.25	0	0	0	4	25	6.25	5,668.0	0.0	5,668.0
	7 I.E	140	4	28	7	0	0	0	4	28	7	8,887.4	0.0	8,887.4
	8 Moosapet	170	10	47	4.7	0	0	0	10	47	4.7	18,114.8	0.0	18,114.8
	9 Bharath Nagar	80	3	8	2.67	0	0	0	3	8	2.6667	1,451.0	0.0	1,451.0
13 FILMNAGAR (City-IV) 8MVAX2	1 Ambedkar Nagar	20	1	5	5	0	0	0	1	5	5	226.7	0.0	226.7
	2 MLA colony	85	2	14	7	0	0	0	2	14	7	2,698.0	0.0	2,698.0
	3 Padmalaya Studio	35	2	13	6.5	0	0	0	2	13	6.5	1,031.6	0.0	1,031.6
	4 Ramanaidu Studio	25	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	5 Appollo	40	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	6 Bharathiya Vidya Bhavan	55	3	17	5.67	0	0	0	3	17	5.6667	2,119.8	0.0	2,119.8
14 JAMES STREET 8MVAX2	1 Park Lane	185	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	2 P.G Road	190	1	5	5	0	0	0	1	5	5	2,153.8	0.0	2,153.8
	3 M.G Road	125	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	4 Mahankali Temple	90	3	47	15.7	1	69	69	4	116	29	9,590.2	14,079.2	23,669.4
	5 S.D Temple											0.0	0.0	0.0
	6 S.P Road											0.0	0.0	0.0

Annex 4.3 Outage Data and Outage Energy

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
15 KALYANNAGAR (City-IV) 8MVAX3	1 Krishna Nagar	80	4	22		0	0					3,990.3	0.0	0.0
	2 Yousuf Guda	200	1	5		0	0					2,267.2	0.0	0.0
	3 Madhura Nagar	160	5	26		1	27					9,431.5	9,794.3	0.0
	4 V.Road Nagar	40	0	0		1	42					0.0	3,808.9	0.0
	5 A.G.Colony	80	1	6		0	0					1,088.3	0.0	0.0
	6 Sri.Ram Nagar	40	2	12								1,088.3	0.0	0.0
	7 CTI	5										0.0	0.0	0.0
	8 SCADA											0.0	0.0	0.0
16 MADHAPUR 8MVAX2	1 Shilparamaam	50	0	0		0	0		0	0		0.0	0.0	0.0
	2 APIIC-II	60	7	75	10.7	0	0		7	75	10.714	10,202.3	0.0	10,202.3
	3 APIIC I	100	4	20	5	0	0		4	20	5	4,534.4	0.0	4,534.4
	4 HUDA	60	4	20	5	2	151	76	6	171	28.5	2,720.6	20,540.7	23,261.3
	5 NAC GROUNDS											0.0	0.0	0.0
17 MAITRIVANAM (City-IV) 8MVAX2	1 Sarathi Studio	80	4	66	16.5	0	0		4	66	16.5	11,970.8	0.0	11,970.8
	2 Srinivas Colony	30	2	10	5	0	0		2	10	5	680.2	0.0	680.2
	3 Mathrivanam	110	4	20	5	0	0		4	20	5	4,987.8	0.0	4,987.8
	4 Amberpet	180	6	38	6.33	3	125	42	9	163	18.111	15,507.6	51,011.7	66,519.3
	5 Anandbagh	100	2	10	5	0	0		2	10	5	2,267.2	0.0	2,267.2
	6 Aditya	50	0	0		0	0		0	0		0.0	0.0	0.0
18 MARREDPALLY 8MVAX2	1 AOC	10	0	0		0	0		0	0		0.0	0.0	0.0
	2 Mahindra Hills	130	5	21	4.2	1	14	14	6	35	5.8333	6,189.4	4,126.3	10,315.7
	3 Nehru Nagar	170	3	17	5.67	0	0		3	17	5.6667	6,552.2	0.0	6,552.2
	4 Military Hospital	20	2	9	4.5	0	0		2	9	4.5	408.1	0.0	408.1
	5 Rly. Colony	135	1	4	4	1	41	41	2	45	22.5	1,224.3	12,548.9	13,773.2
	6 R.K.Puram	85	3	11	3.67	0	0		3	11	3.6667	2,119.8	0.0	2,119.8

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
19 NIMS 8MVAX3	1 GVK Hotel	90	0	0		0	0		0	0		0.0	0.0	0.0
	2 Banjara Hills	70	4	75	18.8	1	410	410	5	485	97	11,902.7	65,068.3	76,971.0
	3 Panjagutta	80	1	25	25	2	162	81	3	187	62.333	4,534.4	29,382.8	33,917.1
	4 NIMS	75	4	75	18.8	0	0		4	75	18.75	12,752.9	0.0	12,752.9
	5 Tata Rao	65	1	27	27	2	173	87	3	200	66.667	3,978.9	25,494.5	29,473.4
	6 Sai baba temple	60	3	33	11	1	72	72	4	105	26.25	4,489.0	9,794.3	14,283.3
	7 Road No.5	80	3	16	5.33	2	614	307	5	630	126	2,902.0	111,364.3	114,266.3
	8 Erramanzil	90	1	5	5	1	1168	1168	2	1173	586.5	1,020.2	238,326.8	239,347.0
	9 Andhra Jyothi	250	11	71	6.45	3	537	179	14	608	43.429	40,242.6	304,370.0	344,612.6
	10 BhaskaraPalace											0.0	0.0	0.0
20 PATIGADDA 8MVAX3	1 Ranigunj	115	4	100	25	0	0		4	100	25	26,072.7	0.0	26,072.7
	2 Rasoolpura	130	2	15	7.5	0	0		2	15	7.5	4,421.0	0.0	4,421.0
	3 Budda Bhavan	14	1	6	6	0	0		1	6	6	190.4	0.0	190.4
	4 Zeera	190	8	56	7	1	150	150	9	206	22.889	24,122.9	64,614.9	88,737.7
	5 Minister Road	190	8	140	17.5	1	86	86	9	226	25.111	60,307.2	37,045.9	97,353.1
	6 Sangeevaiah park	20	1	5	5	0	0		1	5	5	226.7	0.0	226.7
21 R.P.NILAYAM (City-VI) 7.5MVA 8MVA	1 Alwal	110	6	100	16.7	0	0		6	100	16.667	24,939.1	0.0	24,939.1
	2 EME	80	8	80	10	0	0		8	80	10	14,510.0	0.0	14,510.0
	3 V.Puram	120	1	5	5	0	0		1	5	5	1,360.3	0.0	1,360.3
	4 R.P.Nilayam	5	0	0		0	0		0	0		0.0	0.0	0.0
22 SRINAGAR COLONY 8MVAX2	1 Udyog Nagar	80	3	15	5	1	20	20	4	35	8.75	2,720.6	3,627.5	6,348.1
	2 Kamlapuri colony	120	6	30	5	2	95	48	8	125	15.625	8,161.9	25,845.9	34,007.8
	3 Srinagar colony	180	5	25	5	0	0		5	25	5	10,202.3	0.0	10,202.3
	4 Yella reddy guda	170	4	20	5	0	0		4	20	5	7,708.4	0.0	7,708.4
	5 Satya sai nigam	150	6	40	6.67	0	0		6	40	6.6667	13,603.1	0.0	13,603.1
	6 Nagarjuna Nagar	140	0	0		0	0		0	0		0.0	0.0	0.0

Annex 4.3 Outage Data and Outage Energy

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	Min/No	No	Minute	Min/No	No	Minute	Min/No			
23 YOUSUF GUDA 8MVAX2	1 Borabonda	85	3	25	8.33	0	0	3	25	8.3333	4,817.8	0.0	4,817.8	
	2 Vinayak Nagar	110	8	62	7.75	3	390	130	11	452	41.091	15,462.2	97,262.4	112,724.6
	3 Police Lines	150	10	75	7.5	3	202	67	13	277	21.308	25,505.9	68,695.8	94,201.7
	4 Gayatri Hills	35	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	5 IOA	5	3	19	6.33	0	0	3	19	6.3333	215.4	0.0	215.4	
	6 MLA colony	5	1	15	15	0	0	1	15	15	170.0	0.0	170.0	
24 LALAGUDA (City-V) 5MVAX3	1 A.P.Dairy	40	2	32	16	0	0	2	32	16	2,902.0	0.0	2,902.0	
	2 Shanti Nagar	180	10	91	9.1	0	0	10	91	9.1	37,136.5	0.0	37,136.5	
	3 Lalapet	50	2	9	4.5	0	0	2	9	4.5	1,020.2	0.0	1,020.2	
	4 Tarnaka	100	1	20	20	0	0	1	20	20	4,534.4	0.0	4,534.4	
	5 Vijayapuri	170	21	227	10.8	3	296	99	24	523	21.792	87,490.8	114,084.9	201,575.7
25 OSMANIA UNIVERSITY 5MVA,7.5MV A	1 Osmania University	55	2	9	4.5	0	0	2	9	4.5	1,122.3	0.0	1,122.3	
	2 Boudhanagar	140	7	116	16.6	0	0	7	116	16.571	36,819.1	0.0	36,819.1	
	3 RTC Hospita;	125	1	5	5	2	135	68	3	140	46.667	1,417.0	38,258.8	39,675.8
	4 Ravindra Nagar	50	1	10	10	0	0	1	10	10	1,133.6	0.0	1,133.6	
26 PRAGA TOOLS (City-VI) 8MVAX2	1 Indoswing	120	3	30	10	0	0	3	30	10	8,161.9	0.0	8,161.9	
	2 T.C Balnagar	160	5	95	19	3	172	57	8	267	33.375	34,461.3	62,393.0	96,854.3
	3 Asbestos Hills	50	3	22	7.33	0	0	3	22	7.3333	2,493.9	0.0	2,493.9	
	4 Nagarjuna signode	130	6	55	9.17	3	140	47	9	195	21.667	16,210.4	41,262.8	57,473.2

Hyderabad North

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	Min/No	No	Minute	Min/No	No	Minute	Min/No			
27 ROAD NO :12 8MVAX2	1 CRPF	190	6	33	5.5	2	460	230	8	493	61.625	14,215.3	198,152.2	212,367.5
	2 C.Palace	55	8	57	7.13	2	464	232	10	521	52.1	7,107.6	57,858.6	64,966.3
	3 M.Quarters	10	3	30	10	0	0	3	30	10	680.2	0.0	680.2	
	4 I.T.Colony	10	1	1	1	0	0	1	1	1	22.7	0.0	22.7	
	5 Road No.12	125	8	50	6.25	3	371	124	11	421	38.273	14,169.9	105,140.8	119,310.8
	6 Road No.10	180	6	41	6.83	6	351	59	12	392	32.667	16,731.8	143,240.9	159,972.8
28 SEETHA PALMANDI 8MVA,5MVA	1 Gandhi Statue	80	3	13	4.33	0	0	3	13	4.3333	2,357.9	0.0	2,357.9	
	2 Namalagundu	130	6	45	7.5	0	0	6	45	7.5	13,263.0	0.0	13,263.0	
	3 Warasiguda	70	1	3	3	0	0	1	3	3	476.1	0.0	476.1	
	4 Medibavi	155	2	9	4.5	0	0	2	9	4.5	3,162.7	0.0	3,162.7	
	5 Seethapahmandi	80	1	3	3	0	0	1	3	3	544.1	0.0	544.1	
29 132/33/11KV GUNROCK 8MVAX2	1 M.Hospital	160									0.0	0.0	0.0	
	2 MDF	160	21	106	5.05	3	134	45	24	240	10	38,451.5	48,608.5	87,060.0
	3 GPH	130	2	8	4	1	13	13	3	21	7	2,357.9	3,831.5	6,189.4
	4 Medchal	140	13	72	5.54	1	33	33	14	105	7.5	22,853.3	10,474.4	33,327.7
	5 Bowenpally	130	5	42	8.4	0	0	5	42	8.4	12,378.8	0.0	12,378.8	
	6 Gymkhana	120	2	14	7	0	0	2	14	7	3,808.9	0.0	3,808.9	
	7 AWHO	20	5	54	10.8	1	25	25	6	79	13.167	2,448.6	1,133.6	3,582.2
	8 SPH US Cable											0.0	0.0	0.0
30 132/33/11KV JUBLEE HILLS 8MVAX2	1 IOA	80	7	7	1	0	0	7	7	1	1,269.6	0.0	1,269.6	
	2 MLA Colony	15	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
	3 Jublihills	80	4	5	1.25	0	0	4	5	1.25	906.9	0.0	906.9	
	4 PEI (OH)	20	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
	5 PEI (UG)	5	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
	6 Film nagar	15	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
	7 AOU	20	5	5	1	0	0	5	5	1	226.7	0.0	226.7	
	8 Prasasan Nagar	20	1	1	1	0	0	1	1	1	45.3	0.0	45.3	

Annex 4.3 Outage Data and Outage Energy

Hyderabad Central

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
1 A C GUARDS 8MVAX2, 5MVA	1 Mahaveer Hospital	115	3	51	17	1	24	24	4	75	18.75	13,297.1	6,257.4	19,554.5
	2 Bazar ghat	155	5	41	8.2	0	0	0	5	41	8.2	14,408.0	0.0	14,408.0
	3 Shanthy Nagar	120	1	16	16	2	85	43	3	101	33.667	4,353.0	23,125.3	27,478.3
	4 N.M.D.C	80	2	53	26.5	0	0	0	2	53	26.5	9,612.9	0.0	9,612.9
	5 Mahaveer Hospital cable	135	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	6 Mahaveer											0.0	0.0	0.0
	7 Niloper Hospital											0.0	0.0	0.0
	8 Niloufer	70	7	55	7.86	3	262	87	10	317	31.7	8,728.7	41,580.2	50,308.9
2 AMBERPET (City-II) 8MVAX2	1 CPL feeder	35	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	2 Patel Nagar	145	12	82	6.83	0	0	0	12	82	6.8333	26,956.9	0.0	26,956.9
	3 Amberpet Feeder	145	8	72	9	3	154	51	11	226	20.545	23,669.4	50,626.3	74,295.8
	4 Zinda thilamat	145	1	5	5	0	0	0	1	5	5	1,643.7	0.0	1,643.7
	5 Tilaknagar	65	6	70	11.7	0	0	0	6	70	11.667	10,315.7	0.0	10,315.7
	6 Golnaka	75	1	5	5	0	0	0	1	5	5	850.2	0.0	850.2
3 ASIF NAGAR 8MVAX3, 5MVA	1 Gudimalkapur	210	16	174	10.9	0	0	0	16	174	10.875	82,843.0	0.0	82,843.0
	2 Jyothi Nagar	110	2	5	2.5	0	0	0	2	5	2.5	1,247.0	0.0	1,247.0
	3 Padmanabha Nagar	60	3	27	9	0	0	0	3	27	9	3,672.8	0.0	3,672.8
	4 Alapatnagar	120	1	7	7	0	0	0	1	7	7	1,904.4	0.0	1,904.4
	5 Mehdiptnam	180	2	53	26.5	0	0	0	2	53	26.5	21,629.0	0.0	21,629.0
	6 Military	30	21	164	7.81	0	0	0	21	164	7.8095	11,154.6	0.0	11,154.6
	7 JCO Quarters	10	1	70	70	1	105	105	2	175	87.5	1,587.0	2,380.5	3,967.6
	8 Hakimpet	120	11	97	8.82	0	0	0	11	97	8.8182	26,390.1	0.0	26,390.1
	9 Water works	10	1	125	125	0	0	0	1	125	125	2,834.0	0.0	2,834.0
	10 Kakatiyanagar	110	4	40	10	0	0	0	4	40	10	9,975.6	0.0	9,975.6

Hyderabad Central

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
4 HYDERGUD A (City-I) 8MVAX2	1 King kothi	160	5	65	13	0	0	0	5	65	13	23578.8	0.0	23,578.8
	2 Hyderguda	185	1	10	10	1	60	60	2	70	35	4194.3	25,165.8	29,360.1
	3 Hi May/03/03ath Nagar	140	4	40	10	1	30	30	5	70	14	12696.3	9,522.2	22,218.4
	4 Boggukunta	160	3	23	7.67	1	50	50	4	73	18.25	8343.3	18,137.5	26,480.8
	5 Abids	135	2	30	15	0	0	0	2	30	15	9182.1	0.0	9,182.1
	6 MLA Quarters	20	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
5 HUSSAINSAGAR (City-I,VII) 5MVAX4, 7.5MVAX3	1 Maruthi Nagar	80	1	15	15	0	0	0	1	15	15	2720.6	0.0	2,720.6
	2 BRK Bhavan	100	1	8	8	3	507	169	4	515	128.75	1813.8	114,946.4	116,760.2
	3 Lakdi-Ka-Pool	60	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	4 AG feeder	100	1	6	6	0	0	0	1	6	6	1360.3	0.0	1,360.3
	5 Gunfoundry Kev SS	90	1	6	6	0	0	0	1	6	6	1224.3	0.0	1,224.3
	6 Nampally Kev SS	100	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	7 Kharirabad	170	1	15	15	0	0	0	1	15	15	5781.3	0.0	5,781.3
	8 J Block	60	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	9 MGV											0.0	0.0	0.0
	10 Anand Nagar	160	2	18	9	1	50	50	3	68	22.667	6529.5	18,137.5	24,667.0
	11 Inst of Engineers	20	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	12 HACA	200	2	8	4	0	0	0	2	8	4	3627.5	0.0	3,627.5
	13 Telephone Bhavan+Secretariat Press	110	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	14 RBI	90	1	3	3	0	0	0	1	3	3	612.1	0.0	612.1
	15 Secretariat	60	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	16 Adarsh Nagar	40	1	24	24	2	129	65	3	153	51	2176.5	11,698.7	13,875.2
17 Lumbini Park	30	3	41	13.7	0	0	0	3	41	13.667	2788.6	0.0	2,788.6	
18 I.G. Mini	10	1	5	5	0	0	0	1	5	5	113.4	0.0	113.4	
19 Andhra Bank+ECR(Min Compound)	60										0.0	0.0	0.0	
20 Tank Bund	130	2	14	7	0	0	0	2	14	7	4126.3	0.0	4,126.3	
21 Basheer Bagh	140	12	41	3.42	1	101	101	13	142	10.923	13013.7	32,058.0	45,071.7	
22 LIC	160	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
23 Multi purpose											0.0	0.0	0.0	
24 ECR											0.0	0.0	0.0	
25 Secretariat Press											0.0	0.0	0.0	
26 Multi purpose	130	5	26	5.2	0	0	0	5	26	5.2	7663.1	0.0	7,663.1	

Annex 4.3 Outage Data and Outage Energy

Hyderabad Central

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)	
			(1) Interruption			(2) Break down			(1) + (2)						
			No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No				
6	CHILKAL-GUDA 8MVAX2	1 Dandu pentaiah	75	4	29	7.25	1	32	32	5	61	12.2	4,931.1	5,441.3	10,372.4
		2 Pragatools	75	2	24	12	0	0	0	2	24	12	4,080.9	0.0	4,080.9
		3 New Boiguda	90	2	27	13.5	1	13	13	3	40	13.333	5,509.3	2,652.6	8,161.9
		4 P.R.Nagar	85	7	58	8.29	0	0	0	7	58	8.2857	11,177.2	0.0	11,177.2
		5 Parsigutta	110	1	4	4	0	0	0	1	4	4	997.6	0.0	997.6
		6 Musheerabad	120	5	30	6	0	0	0	5	30	6	8,161.9	0.0	8,161.9
		7 GolcondaX Road	150	1	7	7	0	0	0	1	7	7	2,380.5	0.0	2,380.5
7	EXHIBITION GROUNDS 8MVAX3	1 Jawaharlal Nehru	175	5	116	23.2	0	0	0	5	116	23.2	46,023.9	0.0	46,023.9
		2 Nampally Hospital	150	6	93	15.5	0	0	0	6	93	15.5	31,627.3	0.0	31,627.3
		3 Collection Office	110	3	40	13.3	0	0	0	3	40	13.333	9,975.6	0.0	9,975.6
		4 Exhibition Gandhi Bhavan											0.0	0.0	0.0
		5 Seetharampet	140	8	123	15.4	0	0	0	8	123	15.375	39,041.0	0.0	39,041.0
		6 Exhibition - Ajantha Gate	2	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
		7 Ware House	70	2	20	10	0	0	0	2	20	10	3,174.1	0.0	3,174.1
		8 Exhibition											0.0	0.0	0.0
8	GOLCONDA 8MVAX2	1 Golconda	100	7	45		0	0				10,202.3	0.0	0.0	
		2 Motimahall	180	9	75		3	90				30,607.0	36,728.4	0.0	
		3 Adityanagar	100	8	60		2	60				13,603.1	13,603.1	0.0	
		4 Darga	70	9	155		2	150				24,599.0	23,805.5	0.0	
		5 Waterworks	5	3	20		1	55				226.7	623.5	0.0	
		6 Q.Q.Tombs	20	4	20		1	37				906.9	1,677.7	0.0	
		7 Colconda AB Cable	55										0.0	0.0	0.0

Hyderabad Central

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)	
			(1) Interruption			(2) Break down			(1) + (2)						
			No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No				
9	INDUSTRIAL AREA(City-II) 8MVAX3	1 Shankermutt	90	1	13	13	0	0	0	1	13	13	2,652.6	0.0	2,652.6
		2 Ram Nagar	160	4	29	7.25	0	0	0	4	29	7.25	10,519.8	0.0	10,519.8
		3 R.O.M	50	2	62	31	0	0	0	2	62	31	7,028.3	0.0	7,028.3
		4 11 KV DDH	80	10	82	8.2	0	0	0	10	82	8.2	14,872.8	0.0	14,872.8
		5 11 KV RTC X road	110	5	69	13.8	0	0	0	5	69	13.8	17,208.0	0.0	17,208.0
		6 Azamabad	100	6	73	12.2	0	0	0	6	73	12.167	16,550.5	0.0	16,550.5
		7 Barkatpura	180	7	59	8.43	0	0	0	7	59	8.4286	24,077.5	0.0	24,077.5
		8 11 KV VST	80	0	0		0	0	0	0	0		0.0	0.0	0.0
		9 11 KV Azamabad Key SS	60	4	51	12.8	1	63	63	5	114	22.8	6,937.6	8,570.0	15,507.6
		10 11KV DDH UG											0.0	0.0	0.0
10	NARAYAN-GUDA 8MVAX2	1 Lingampally	145	7	61	8.71	0	0	0	7	61	8.7143	20,053.3	0.0	20,053.3
		2 Chikkadpally	55	2	20	10	0	0	0	2	20	10	2,493.9	0.0	2,493.9
		3 Narayanaguda	85	5	55	11	1	45	45	6	100	16.667	10,599.1	8,672.0	19,271.1
		4 Preventive medicine	95	2	13	6.5	3	144	48	5	157	31.4	2,800.0	31,015.1	33,815.1
		5 Preventive medicine(UG)											0.0	0.0	0.0
		6 Lingampally											0.0	0.0	0.0
11	INDIRA PARK (City-I) 8MVAX3	1 Vivek Nagar	150	4	38	9.5	0	0	0	4	38	9.5	12,923.0	0.0	12,923.0
		2 Gandhi Nagar		2	25	12.5	0	0	0	2	25	12.5	0.0	0.0	0.0
		3 Bakaram->TallaBshi	60	1	9	9	0	0	0	1	9	9	1,224.3	0.0	1,224.3
		4 Jawahar Nagar	50	1	2	2	0	0	0	1	2	2	226.7	0.0	226.7
		5 Ashok Nagar	175	4	31	7.75	0	0	0	4	31	7.75	12,299.5	0.0	12,299.5
		6 R.K.Mutt	120	2	20	10	1	60	60	3	80	26.667	5,441.3	16,323.8	21,765.0
		7 Lower Tank Bund	150	6	44	7.33	0	0	0	6	44	7.3333	14,963.4	0.0	14,963.4
		8 Kawadiguda	150	0	0		0	0	0	0	0		0.0	0.0	0.0
		9 Indian Express	40										0.0	0.0	0.0
		10 Vaartha											0.0	0.0	0.0

Annex 4.3 Outage Data and Outage Energy

Hyderabad Central

Substation Name	Name of Feeder	Max Load(A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
12 LAKE VIEW(City-I) 8MVAX2	1 Vidyt Soudha	60	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
	2 Dilkusha	105	5	29	5.8	1	49	49	6	78	13	6,903.6	11,664.7	18,568.3
	3 Raj Bhavan											0.0	0.0	0.0
	4 Lake View	25	0	0		0	0		0	0		0.0	0.0	0.0
	5 Medinova	140	2	17	8.5	0	0		2	17	8.5	5,395.9	0.0	5,395.9
	6 Eenadu	100	1	6	6	0	0		1	6	6	1,360.3	0.0	1,360.3
13 PUBLIC GARDEN (City-I) 8MVAX2	1 Parshiram Bhavan	160	1	5	5	1	45	45	2	50	25	1,813.8	16,323.8	18,137.5
	2 Nampally OH	180	2	10	5	0	0		2	10	5	4,080.9	0.0	4,080.9
	3 Ravindra Bharathi	120	1	5	5	0	0		1	5	5	1,360.3	0.0	1,360.3
	4 Assembly	10	0	0		0	0		0	0		0.0	0.0	0.0
	5 Nampally											0.0	0.0	0.0
	6 LB Stadium											0.0	0.0	0.0
14 S.D. HOSPITAL 8MVAX2	1 Police Mess	75	6	174	29	0	0		6	174	29	29,586.8	0.0	29,586.8
	2 Crsent Hospital	85	9	209	23.2	0	0		9	209	23.222	40,276.6	0.0	40,276.6
	3 Hu May/03un Nagar	170	8	392	49	0	0		8	392	49	151,085.4	0.0	151,085.4
	4 Ahmednagar	140	9	205	22.8	0	0		9	205	22.778	65,068.3	0.0	65,068.3
	5 Chacha Nehru Nagar	55	4	40	10	0	0		4	40	10	4,987.8	0.0	4,987.8
	6 S.D.Hospital	10	2	61	30.5	0	0		2	61	30.5	1,383.0	0.0	1,383.0

Hyderabad South

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
1 ASMANGADH (City-VIII) 8MVAX2	1 SAIBABA	140	1	2	2	0	0		1	2	2	634.8	0.0	634.8
	2 KODANDARAM NGR	130	5	17	3.4	1	52	52	6	69	11.5	5,010.5	15,326.2	20,336.7
	3 VIDYUTH NGR	55	3	8	2.67	0	0		3	8	2.6667	997.6	0.0	997.6
	4 SHANKESH BZR	120	3	7	2.33	0	0		3	7	2.3333	1,904.4	0.0	1,904.4
	5 ASMANGADH	140	1	2	2	0	0		1	2	2	634.8	0.0	634.8
	6 TV STATION	10	0	0		0	0		0	0		0.0	0.0	0.0
2 ATTAPUR (City-III) 8MVAX2	1 NM GUDA	140	16	127	7.94	0	0		16	127	7.9375	40,310.6	0.0	40,310.6
	2 DEVIGAUGH	150	7	39	5.57	0	0		7	39	5.5714	13,263.0	0.0	13,263.0
	3 BHADURPURA	200	14	95	6.79	0	0		14	95	6.7857	43,076.6	0.0	43,076.6
	4 KISHAN BAUGH	120	4	22	5.5	0	0		4	22	5.5	5,985.4	0.0	5,985.4
3 CHANCHALGUDA (City-VIII) 8MVAX3	1 CHANCHALGUDA	90	1	30	30	0	0		1	30	30	6,121.4	0.0	6,121.4
	2 ARAYA SAMAJ	150	6	43	7.17	2	75	38	8	118	14.75	14,623.4	25,505.9	40,129.2
	3 CHOWNI	180	9	65	7.22	0	0		9	65	7.2222	26,526.1	0.0	26,526.1
	4 MADANNAPET	90	3	20	6.67	1	72	72	4	92	23	4,080.9	14,691.4	18,772.3
	5 SAIDABAD	90	3	15	5	1	45	45	4	60	15	3,060.7	9,182.1	12,242.8
	6 GOVT. PRESS											0.0	0.0	0.0
4 ENT (City-IX) 8MVA 5MVA	1 TROOP BAZAR	55	1	5	5	0	0		1	5	5	623.5	0.0	623.5
	2 CENTRAL BANK OF INDIA	115	2	14	7	0	0		2	14	7	3,650.2	0.0	3,650.2
	3 RANGA MAHAL ROAD	45	0	0		0	0		0	0		0.0	0.0	0.0
	4 ENT HOSPITAL											0.0	0.0	0.0
	5 JAM BAGH	105	11	89	8.09	1	12	12	12	101	8.4167	21,186.9	2,856.7	24,043.5
	6 GURUDWARA	95	1	5	5	0	0		1	5	5	1,076.9	0.0	1,076.9

Annex 4.3 Outage Data and Outage Energy

Hyderabad South

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
5 FALAKNUMA 8MVAX3	1 CRPF											0.0	0.0	0.0
	2 C'GUTTA	140	7	84	12	0	0	7	84	12	26,662.1	0.0	26,662.1	
	3 BARKAS										0.0	0.0	0.0	
	4 FALAKNAMA	80	4	50	12.5	0	0	4	50	12.5	9,068.8	0.0	9,068.8	
	5 J'METT	100	10	57	5.7	0	0	10	57	5.7	12,923.0	0.0	12,923.0	
	6 CHATRINAKA	180	6	28	4.67	0	0	6	28	4.6667	11,426.6	0.0	11,426.6	
6 KARWAN 8MVAX2	1 ZIAGUDA	160	7	79	11.3	3	147	49	10	226	22.6	28,657.3	53,324.3	81,981.5
	2 KARWAN	170	6	30	5	2	140	70	8	170	21.25	11,562.7	53,959.1	65,521.7
	3 TALLAGADDA	170	4	28	7	1	40	40	5	68	13.6	10,791.8	15,416.9	26,208.7
	4 LANGER HOUSE	140	4	35	8.75	3	177	59	7	212	30.286	11,109.2	56,180.9	67,290.1
7 KHLWATH (City-III) 8MVAX2	1 TELEPHONE EXCHANGE	80	4	21	5.25	0	0	4	21	5.25	3,808.9	0.0	3,808.9	
	2 KHLWATH	150	6	30	5	0	0	6	30	5	10,202.3	0.0	10,202.3	
	3 CHARMINAR	140	2	10	5	0	0	2	10	5	3,174.1	0.0	3,174.1	
	4 MOGHALPURA	200	6	30	5	0	0	6	30	5	13,603.1	0.0	13,603.1	
	5 LALDARWAZA	200	10	62	6.2	0	0	10	62	6.2	28,113.1	0.0	28,113.1	
	6 IO BAL UD-DOULA													
8 KANCHANBAG H 8MVAX2	1 OWASI HOSPITAL	20	0	0		0	0	0	0		0.0	0.0	0.0	
	2 VINAY NGR	70	2	10	5	0	0	2	10	5	1,587.0	0.0	1,587.0	
	3 IS SDAN	110	3	19	6.33	0	0	3	19	6.3333	4,738.4	0.0	4,738.4	
	4 DARGA	140	5	90	18	0	0	5	90	18	28,566.6	0.0	28,566.6	
	5 RAKSHAPURAM	55	3	19	6.33	0	0	3	19	6.3333	2,369.2	0.0	2,369.2	
	6 KANCHAN BAUGH	5	0	0		0	0	0	0		0.0	0.0	0.0	

Hyderabad South

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)
			(1) Interruption			(2) Break down			(1) + (2)					
			No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No			
9 MALAKPET 8MVAX3	1 DABEERPURA	160	3	47	15.7	0	0	3	47	15.667	17,049.3	0.0	17,049.3	
	2 MALAKPET (EM)	150	1	65	65	0	0	1	65	65	22,105.1	0.0	22,105.1	
	3 AKBERBAUGH	130	3	85	28.3	0	0	3	85	28.333	25,052.4	0.0	25,052.4	
	4 AIR	10	1	107	107	1	2911	2911	2	3018	1509	2,425.9	65,997.8	68,423.7
	5 CHADERGHAT (EM)	170	7	100	14.3	0	0	7	100	14.286	38,542.2	0.0	38,542.2	
	6 AZAMPURA	180	9	224	24.9	0	0	9	224	24.889	91,413.0	0.0	91,413.0	
	7 MM HOSPITAL	10	1	3	3	0	0	1	3	3	68.0	0.0	68.0	
	8 KACHIGUDA	150	6	147	24.5	0	0	6	147	24.5	49,991.5	0.0	49,991.5	
10 MIRALAM (City-III) 8MVAX3	1 ZOOPARK	180	10	99	9.9	0	0	10	99	9.9	40,401.3	0.0	40,401.3	
	2 INDUSTRIAL	180	7	29	4.14	0	0	7	29	4.1429	11,834.7	0.0	11,834.7	
	3 TADBAN	170	15	109	7.27	0	0	15	109	7.2667	42,011.0	0.0	42,011.0	
	4 FATHE DARWAZA	140	4	23	5.75	0	0	4	23	5.75	7,300.3	0.0	7,300.3	
	5 SHAMSHER GUNJ	190	3	15	5	0	0	3	15	5	6,461.5	0.0	6,461.5	
	6 WATER WORKS (ETM) (M.F.B)	20	1	4	4	0	0	1	4	4	181.4	0.0	181.4	
	7 JAHNUMA (EM)	140	5	28	5.6	0	0	5	28	5.6	8,887.4	0.0	8,887.4	
11 MOOSARAMBA GH (City-VIII) 8MVAX2	1 SBI COLONY	30	1	5	5	0	0	1	5	5	340.1	0.0	340.1	
	2 SRIPURAM CLY	65	2	15	7.5	0	0	2	15	7.5	2,210.5	0.0	2,210.5	
	3 SALEEM NGR	70	2	10	5	0	0	2	10	5	1,587.0	0.0	1,587.0	
	4 SV NAGAR	70	5	25	5	4	385	96	9	410	45,556	3,967.6	61,100.7	65,068.3
	5 AB COLONY	130	0	0		0	0	0	0		0.0	0.0	0.0	
	6 DILSUKH NGR	65	0	0		0	0	0	0		0.0	0.0	0.0	

Annex 4.3 Outage Data and Outage Energy

Hyderabad South

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)	
			(1) Interruption			(2) Break down			(1) + (2)						
			No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No				
12	OSMANIA HOSPITAL 8MVAX3														
	1 BEGUM BAZAR	140	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	
	2 PURANA PHOOL	130	3	14	4.67	0	0	3	14	4.6667	4,126.3	0.0	4,126.3		
	3 HIGH COURT	20	1	5	5	0	0	1	5	5	226.7	0.0	226.7		
	4 PUTHLI BOWLI	80	4	15	3.75	1	43	43	5	58	11.6	2,720.6	7,799.1	10,519.8	
	5 GOWLIGUDA	10	0	0		1	42	42	1	42	42	0.0	952.2	952.2	
	6 OSMAN GUNJ	130	2	5	2.5	0	0	2	5	2.5	1,473.7	0.0	1,473.7		
	7 OSMANIA HOSPITAL	10	1	2	2	0	0	1	2	2	45.3	0.0	45.3		
8 GOWLIGUDA TEL EXCHA		7	33	4.71	1	25	25	8	58	7.25	0.0	0.0	0.0		
13	SALARJUNG 8MVAX3														
	1 SALARJUNG	60	3	110	36.7	1	5	5	4	115	28.75	14,963.4	680.2	15,643.6	
	2 MADINA	180	9	32	3.56	0	0	9	32	3.5556	13,059.0	0.0	13,059.0		
	3 HUSSAINILALAM	130	4	27	6.75	0	0	4	27	6.75	7,957.8	0.0	7,957.8		
	4 PATHARGATTI	180	1	10	10	0	0	1	10	10	4,080.9	0.0	4,080.9		
	5 YAKUTPURA	190	8	83	10.4	0	0	8	83	10.375	35,753.6	0.0	35,753.6		
	6 PURANIHAVELI	200	9	65	7.22	0	0	9	65	7.2222	29,473.4	0.0	29,473.4		
7 DARULSHAFI	100	0	0		0	0	0	0		0.0	0.0	0.0			
14	SANTOSH NAGAR 8MVAX3														
	1 SANTOSH NAGAR	50	0	0		0	0	0	0		0.0	0.0	0.0		
	2 REIN BAZAR	140	1	10	10	0	0	1	10	10	3,174.1	0.0	3,174.1		
	3 DRYLAND	90	3	40	13.3	0	0	3	40	13.333	8,161.9	0.0	8,161.9		
	4 BHAVANI NAGAR	170	6	53	8.83	0	0	6	53	8.8333	20,427.4	0.0	20,427.4		
	5 EDI BAZAR	210	14	135	9.64	0	0	14	135	9.6429	64,274.8	0.0	64,274.8		
	6 RIYASATH NAGAR	100	6	53	8.83	0	0	6	53	8.8333	12,016.1	0.0	12,016.1		
7 MOINBAGH	110	8	110	13.8	0	0	8	110	13.75	27,433.0	0.0	27,433.0			

Hyderabad South

Substation Name	Name of Feeder	Max Load (A)	Fault(per month)									Interrupt Outage Energy (kWh)	B.D. Outage Energy (kWh)	Int.+B.D. Outage Energy (kWh)	
			(1) Interruption			(2) Break down			(1) + (2)						
			No	Minute	Minute/No	No	Minute	Minute/No	No	Minute	Minute/No				
15	SEETARAMBA GH 8MVAX2,5MVA														
	1 SEETHARAMBAGH	90	4	14	3.5	0	0	4	14	3.5	2,856.7	0.0	2,856.7		
	2 DHOOLPET	160	4	50	12.5	1	53	53	5	103	20.6	18,137.5	19,225.8	37,363.3	
	3 ASIFNAGAR	70	1	4	4	0	0	1	4	4	634.8	0.0	634.8		
	4 AGAPURA	70	4	58	14.5	0	0	4	58	14.5	9,204.8	0.0	9,204.8		
	5 ZINCHICHOWRAHA	140	11	76	6.91	0	0	11	76	6.9091	24,122.9	0.0	24,122.9		
6 DATTATREYA	110	2	10	5	0	0	2	10	5	2,493.9	0.0	2,493.9			
16	SULTAN BAZAR 8MVAX2														
	1 SULTAN BAZAR	165	7	50	7.14	0	0	7	50	7.1429	18,704.3	0.0	18,704.3		
	2 KOTI FEEDER	185	2	10	5	0	0	2	10	5	4,194.3	0.0	4,194.3		
	3 KENDRIYA SADAN	140	1	8	8	0	0	1	8	8	2,539.3	0.0	2,539.3		
	4 TARAKARAMA	195	8	76	9.5	0	0	8	76	9.5	33,599.7	0.0	33,599.7		
5 IMA UG															
17	CRPF (City-III) 7.5MVAX2														
	1 JAMAL BANDA	80	0	0		0	0	0	0		0.0	0.0	0.0		
	2 BARKAS	50	2	15	7.5	0	0	2	15	7.5	1,700.4	0.0	1,700.4		
	3 SALAL	130	6	30	5	0	0	6	30	5	8,842.0	0.0	8,842.0		
	4 CRPF BAZAR	36	3	36	12	0	0	3	36	12	2,938.3	0.0	2,938.3		
	5 BALAPUR	125	4	18	4.5	0	0	4	18	4.5	5,101.2	0.0	5,101.2		
6 KESHAVAGIRI	145	7	45	6.43	1	35	35	8	80	10	14,793.4	11,506.0	26,299.4		