

# ***OPTCL***



**(Approved by OERC vide Letter No. OERC-Engg-5/98 (Vol.XIV)/ 1034 dt. 30.09.2013)**

## **PERFORMANCE OF THE TRANSMISSION SYSTEM OF OPTCL FOR 2012-2013**

[This report is prepared in pursuance of Licence Condition 16.7 & Clause 13.7 of Appendix-4B of the OERC (Conduct of Business) Regulations, 2004]

## **COMMISSION'S OBSERVATION ON THE PERFORMANCE OF THE TRANSMISSION SYSTEM OF OPTCL FOR 2012-13**

The salient features of the performance of transmission system of OPTCL for the year 2012-13 is given below and the detail information in support to that is available in SLDC website i.e., [www.sldcorissa.org](http://www.sldcorissa.org)

### **A. Procurement of Power:**

The Commission had approved the purchase of power by GRIDCO from various sources in the ARR & Tariff order for 2012-13 against which the actual performance have been found to be deviating in the following manner:

Source	Commission's Approval ( MU)	Actual Drawl for the State Consumption (MU)	Remarks
OHPC	5881.74	4476.169	State's Maximum and Minimum Peak demand was 3580 MW and 2519 MW respectively
Thermal(TTPS+OPGC)	5848.14	6309.391	
CGP including Co-generation	1361.86	2096.603	
Renewable Generation	468	328.976	
IPP	3556.92	3100.147	
EREB	6980.22	7605.497	
<b>Total</b>	24096.88	23916.783	
Net Banking +IEX+STOA		-1071.538	
	24096.880	22845.245	

There is an import of 185.79 MU (153.5 MU through power banking and 32.29 MU through trading & IEX) and export of 1257.331MU (1042.201 through trading, STOA, banking & IEX export and 215.131MU EREB export) during the FY 2012-13. Hence, in the said financial year GRIDCO has an export of 1071.538 MU on this account.

2. During FY 2012-13 the daily peak demand touched at 3580 MW maximum on dt.29.03.2013 and a minimum of 2519 MW on dt.10.04.2012. The peak demand of 3580 MW in 2012-13 is about 70 MW above the peak demand experienced during the previous year 2011-12 (of 3511 MW). But the total energy drawl is 22845 MU in FY 2012-13 against 22267 MU in 2011-12, which indicates a growth in electricity consumption of around 578 MU in the state.

### **B. Line Interruption:**

3. OPTCL's system has faced aggregated Annual interruptions varying from 2 hour to 117 hours at different locations on account of conductor/jumper snapping, insulator failure,

bursting of Current Transformer/Potential Transformer, breaker problem, system disturbance, Lightning Arrester failures and others. However, OPTCL has claimed that it has arranged to maintain power supply (without resorting to total power failure due to non-availability of transmission capacity) from other nearby transmission facilities. The same effort has been made by OPTCL in maintaining uninterrupted power supply even in the event of generation failures. OPTCL claimed that there was no black out experienced in the State during the FY 2012-13.

**C. Frequency Profile:**

4. As per Regulations 3(1)(a) of Central Electricity Authority(Grid Standards) Regulations, 2010, the frequency should not be allowed to go beyond the range 49.2 to 50.3 Hz, except during the transient period following tripping. As per the provisions in Indian Electricity Grid Code Regulations, 2010, all users, SEBs, SLDCs, distribution licensee & bulk consumer shall take all possible measures to ensure that grid frequency always remains within 49.5 to 50.2 Hz band. Orissa Grid Code also provides that restriction of drawl should start at 49.5HZ and generators should back down after 50.5 HZ. OPTCL, in 2012-13, has experienced frequency as low as 48.02 Hz and as high as 50.98 Hz during 2nd quarter. However, OPTCL does not have much control over the frequency parameter since it is dependant upon the NEW Grid. OPTCL hopes that DISCOMs should adhere to their schedule drawl and for the interest of themselves as well as for state shall reduce their drawl during low frequency in the NEW grid.

**D. Voltage Profile:**

5. The EHT voltage, as per Regulations 3(1)(b) of Central Electricity Authority(Grid Standards) Regulations, 2010 should be in the range 122-145 kV for voltage at 132 kV, 198-245 kV for voltage at 220 KV and 380-420 kV for 400 kV level. OPTCL has however experienced 165 kV minimum and 270 kV maximum in its 220 KV system and 85 KV minimum and 142 KV maximum in its 132 KV system. OPTCL is advised to take suitable action like putting up capacitor banks and additional remedial measures like system up-gradation to improve the voltage profile. OPTCL should also monitor the reactive drawl of DISCOMs from its grid S/s and wherever DISCOM draw excessive reactive load at low voltage condition in grid S/S, it shall take up with them for remedial measure M/s. OPTCL should keep its on-line Tap Changer of the Power Transformers in healthy condition and all the field engineers should be trained to operate OLTC during peak and low load condition of the day.

**E. Load Restriction:**

6. M/s. OPTCL has claimed that the load restriction due to non-availability of the transmission and transformation capacity as 'NIL' which in turn indicates that during FY 2012-13, OPTCL system availability was 100%. This needs further verification by OPTCL to substantiate their statement as it is understood that DISCOMs are complaining that they are not able to draw their full requirement of power from some of the grid S/S due to low transformation capacity as well as upstream EHT line loading problem. OPTCL and DISCOM authorities should discuss and take action on augmentation of transformer and line capacity of the problematic area of the transmission system.

7. Due to non-availability of generation/failure of generating stations, OPTCL, however, has resorted of load restriction in 2012-13 totaling only 22 hours in the year. Further, during the said period load restriction was imposed on rotational basis in the state to curtail demand due to non-availability of generation/failure of generating stations. OPTCL is required to develop appropriate ring system so that power supply to the affected areas can be easily made available from the neighboring areas fed from other generating stations of the state and Orissa share from Inter State Generating Station of Eastern Region.

**F. Efficient Operation of Transmission System:**

OPTCL should complete the SCADA provision work in all 220 kV and above S/S for proper monitoring and efficient functioning of the power system. Energy Accounting and Settlement Service Centre (EASSC) should be fully functional under the control of SLDC.

OPTCL is advised to take action to comply the above directions.

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**PERFORMANCE OF TRANSMISSION SYSTEM OF OPTCL (AS REPORTED) DURING THE YEAR 2012-13.****1. Procurement of Power:**

Source	Commission's Approval (MU)	Actual Drawl for the State Consumption (MU)	Remarks
OHPC	5881.74	4476.169	State's Maximum and Minimum Peak demand was 3580 MW and 2519 MW respectively
Thermal(TTPS+OPGC)	5848.14	6309.391	
CGP including Co-generation	1361.86	2096.603	
Renewable Generation	468	328.976	
IPP	3556.92	3100.147	
EREB	6980.22	7605.497	
<b>Total</b>	<b>24096.88</b>	<b>23916.783</b>	
Net Banking + IEX+STOA		-1071.538	
	24096.880	22845.245	

**2. Voltages profile of Major Grid Sub-stations**

Allowable Range (245-198 KV)			
Sl. No.	Name of the 220/132 kV Grid Sub-station	Maximum Voltage in kV	Minimum Voltage in kV
1	Jaynagar	260	222
2	Duburi	245	212
3	Joda	245	205
4	Tarkera	240	222
5	Budhipadar	241	223
6	Balasore	245	205
7	Narendrapur	248	185
8	Chandaka	270	165
9	Bhanjanagar	268	180
10	Theruvali	253	210
11	Meramundali	235	210
12	Bidanasi	239	206
13	Katapalli	243	214
14	Bhadrak	242	190
15	Paradeep	250	200
16	Bolangir	246	200
17	Mendhasal	242	170

Allowable Range (145 -122 KV)			
Sl. No.	Name of the 132/33 kV Grid Sub-station	Maximum Voltage in kV	Minimum Voltage in kV
1	Cuttack	140	102
2	Puri	138	85
3	Khurda	140	85
4	Berhampur	142	102
Balance 132/33 kV S/S, the voltage profile is satisfactory i.e. within allowable limits			

**3. System Interruptions due to Major Incident:**

INTERRUPTION DUE TO MAJOR INCIDENT			
Incident	Duration of Interruption (Hrs:Min:Sec)	No. of Interruption	Remarks
Snapping of Jumper / Conductor / Earth wire	81:43:00	65	The duration of interruption indicated above is the sum total of interruptions occurred at different areas(S/s) during the year. However there was no total blackout experienced for the State during the year 2012-13.
Insulator Failure	29:56:00	43	
Bursting of CT / PT	18:49:00	22	
Breaker Problem	2:21:00	8	
System Disturbance	21:41:00	8	
Failure of LA	12:39:00	25	
Others	117:44:00	87	

**Note:** Issued in the Public interest. Detailed report on Performance of Transmission System of OPTCL is available in SLDC website i.e., [www.sldcorissa.org](http://www.sldcorissa.org).

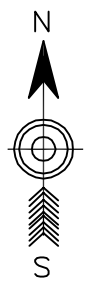
# JHARKHAND

# WEST BENGAL

# CHHATTISGARH

# BAY OF BENGAL

# ANDHRA PRADESH



SOUTH ZONE

WEST ZONE

NORTH ZONE

CENTRAL ZONE

## LEGEND

DETAILS OF LINE	Existing	Proposed / U/C
500KV TRANSMISSION LINE		
400KV TRANSMISSION LINE		
220KV TRANSMISSION LINE		
132KV TRANSMISSION LINE		
HYDRO POWER STATION		
THERMAL POWER STATION		
GRID S/S & TRACTION S/S		
SWITCHING STATION / CGP/IPP		
BULK CONSUMER		
STATE BOUNDARY		
DISTRICT BOUNDARY		
ZONE BOUNDARY		



ODISHA POWER TRANSMISSION CORPORATION LIMITED  
BHUBANESWAR

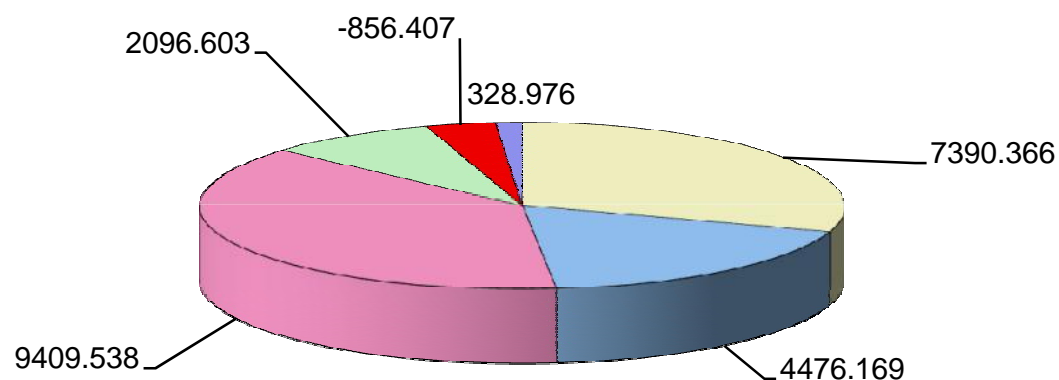
## SCHEMATIC TRANSMISSION MAP OF OPTCL

Length in kms.

NOT TO SCALE

## GRID DEMAND FOR THE YEAR 2012-13

**[Total Drawal 22845.245 MU ]**



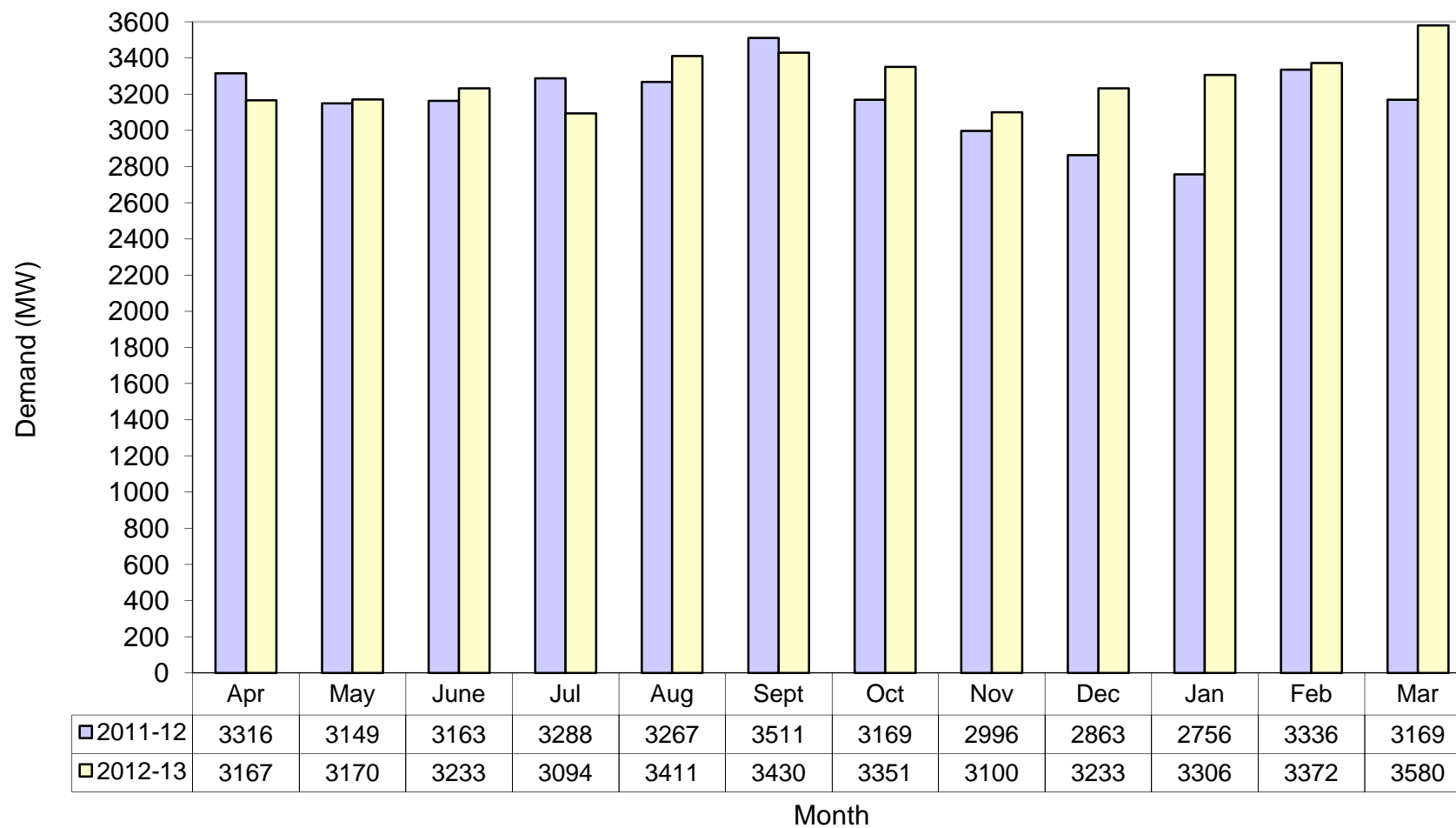
Net EREB   Total Hydro   Total Thermal (OPGC + TTPS+IPP)   CPP   Net BankingPower+IEX+STOA   Renewable Energy

# DAILY PEAK DEMAND (MW) EXCLUDING TRADING FOR THE YEAR 2012-13

Day	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Max	Min
1	2929	2982	2973	2714	3032	3170	3252	3050	2776	3042	3200	3292	3292	2714
2	2893	3015	3031	2700	3008	3233	3190	2794	2939	2939	3131	3468	3468	2700
3	2993	2892	2759	3013	2912	3191	3098	3055	2953	3029	3149	3300	3300	2759
4	2905	2667	3085	2818	2951	3315	2986	2991	2748	3122	3250	3264	3315	2667
5	2960	2916	3081	2790	2849	3236	3183	2977	2965	3102	3221	3534	3534	2790
6	2968	2904	2958	3069	3114	3264	3351	3065	2949	3189	2999	3369	3369	2904
7	2781	3043	2834	2924	3184	3278	3199	3022	2954	3165	3180	3358	3358	2781
8	2712	3071	3028	2836	3231	3239	3147	2998	2971	3042	3169	3285	3285	2712
9	2833	3052	2740	2975	3034	3296	3024	3065	2954	3160	3139	3413	3413	2740
10	2519	3079	2815	3088	3210	3430	3159	3089	3012	3061	3200	3198	3430	2519
11	2524	3102	2985	2976	3201	3429	3170	2927	2997	3040	3372	3404	3429	2524
12	2853	2955	3025	2947	3228	3160	3104	2990	3095	3087	3102	3398	3398	2853
13	2567	2933	2846	2926	3386	3301	3096	2953	3009	3283	3237	3364	3386	2567
14	3135	2944	2967	3034	3411	3223	2987	3092	3132	3257	3122	3215	3411	2944
15	2768	3091	2964	3025	3159	3312	3194	3038	3161	3137	3071	3431	3431	2768
16	2970	3106	2794	3011	3186	3319	3285	3016	3088	3215	3084	3410	3410	2794
17	2974	2808	2901	3094	2886	3161	3044	3016	3088	2920	3141	3505	3505	2808
18	2987	2994	2962	2912	2980	3182	3002	3019	3144	3136	3198	3524	3524	2912
19	3111	2965	2831	2770	3199	3388	3067	3100	3226	3121	3244	3427	3427	2770
20	3054	2863	2924	2762	3223	3229	2978	2837	3233	3056	3157	3451	3451	2762
21	3167	3119	2815	2821	3286	3397	3177	3100	3216	3143	3230	3485	3485	2815
22	2970	3066	2759	2832	3385	3315	3233	3040	3092	3285	3344	3462	3462	2759
23	2951	2780	3136	2843	3218	3044	3181	2994	3060	3257	3073	3447	3447	2780
24	2910	2824	3125	2920	3131	3190	3065	3025	3112	3212	3245	3355	3355	2824
25	3116	2906	3224	2988	3075	3117	3081	2912	3116	3122	3349	3468	3468	2906
26	3054	2989	3181	2839	3142	3345	3009	2989	3030	3206	3368	3370	3370	2839
27	3104	2923	3233	3073	3198	3147	3076	3088	3041	3143	3270	3430	3430	2923
28	2977	2997	3023	3016	3253	3315	2986	2927	3092	3154	3173	3028	3315	2927
29	2961	3084	2699	2886	3248	3119	3067	2875	3055	3108		3580	3580	2699
30	3012	3089	2835	2883	3360	3232	3046	3008	3058	3306		3529	3529	2835
31		3170		2724	3385		3088		3177	2993		3465	3465	2724
MAX	3167	3170	3233	3094	3411	3430	3351	3100	3233	3306	3372	3580	3580	2944
MIN	2519	2667	2699	2700	2849	3044	2978	2794	2748	2920	2999	3028	3285	2519



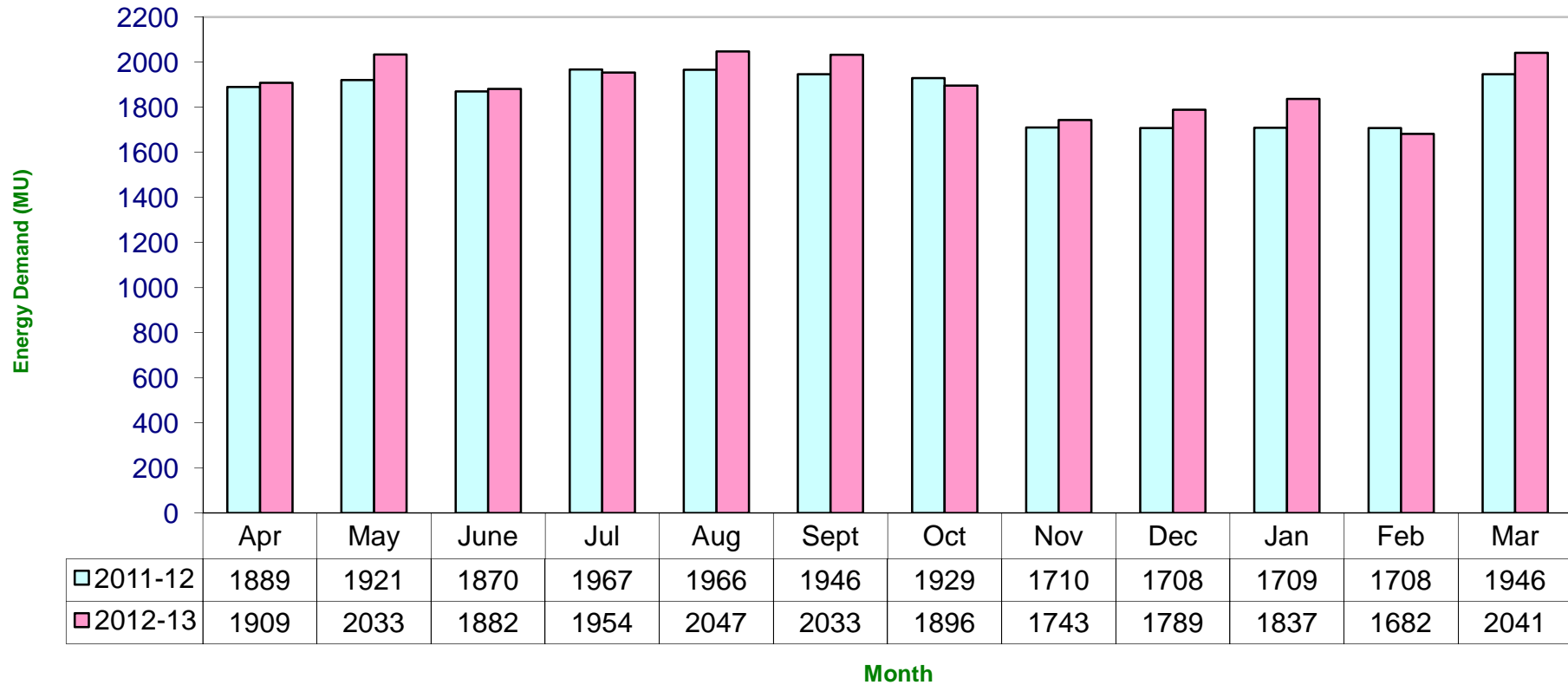
### COMPARISON OF MONTHLY PEAK DEMAND (MW) EXCLUDING TRADING FOR THE YEAR ENDING 2011-12 & 2012-13



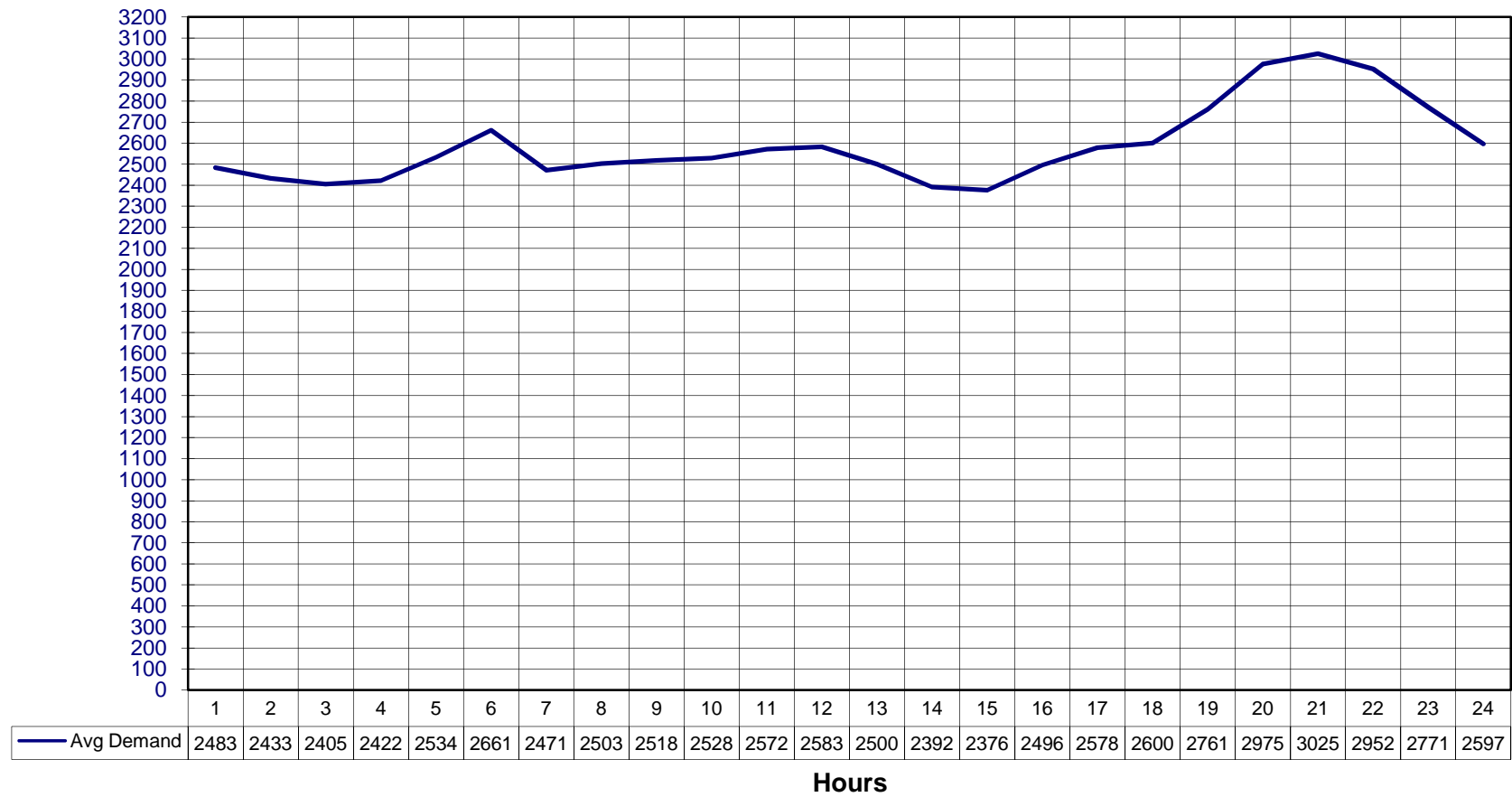
Annual Peak Demand :      2011-12 - 3511 MW      2012-13 - 3580 MW

■ 2011-12    ■ 2012-13

## COMPARISON OF MONTHLY ENERGY DEMAND (MU) EXCLUDING TRADING & RETURN BANKING POWER FOR THE YEAR ENDING 2011-12 & 2012-13



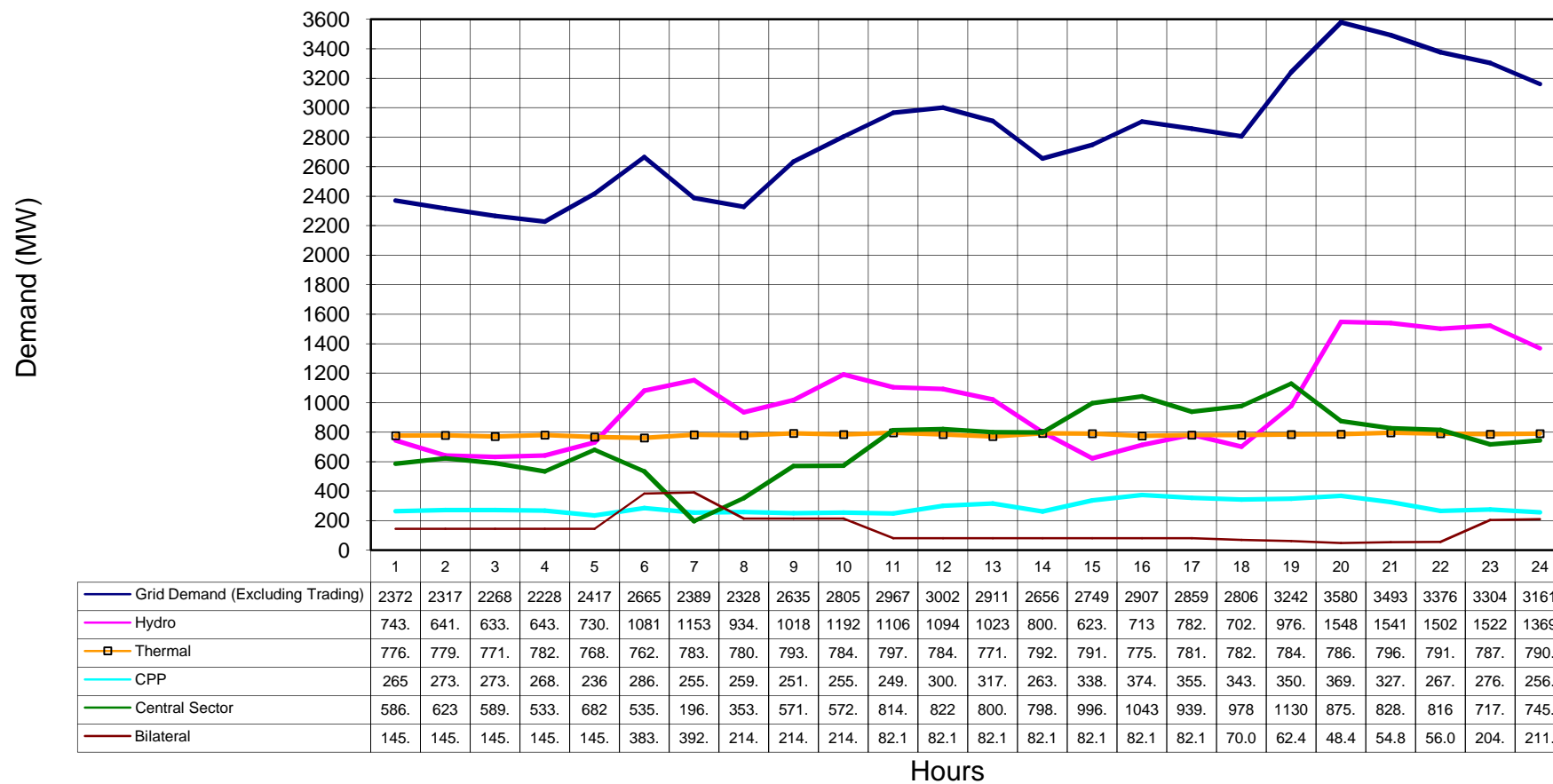
Annual Energy Demand :      **2011-12 - 22269 MU**      **2012-13 - 22845 MU**

**DEMAND CURVE FOR HOURLY AVERAGE DEMAND EXCLUDING TRADING FOR YEAR ENDING MARCH 2013**

## Hourly Average Demand (Month wise) in support of Page-6

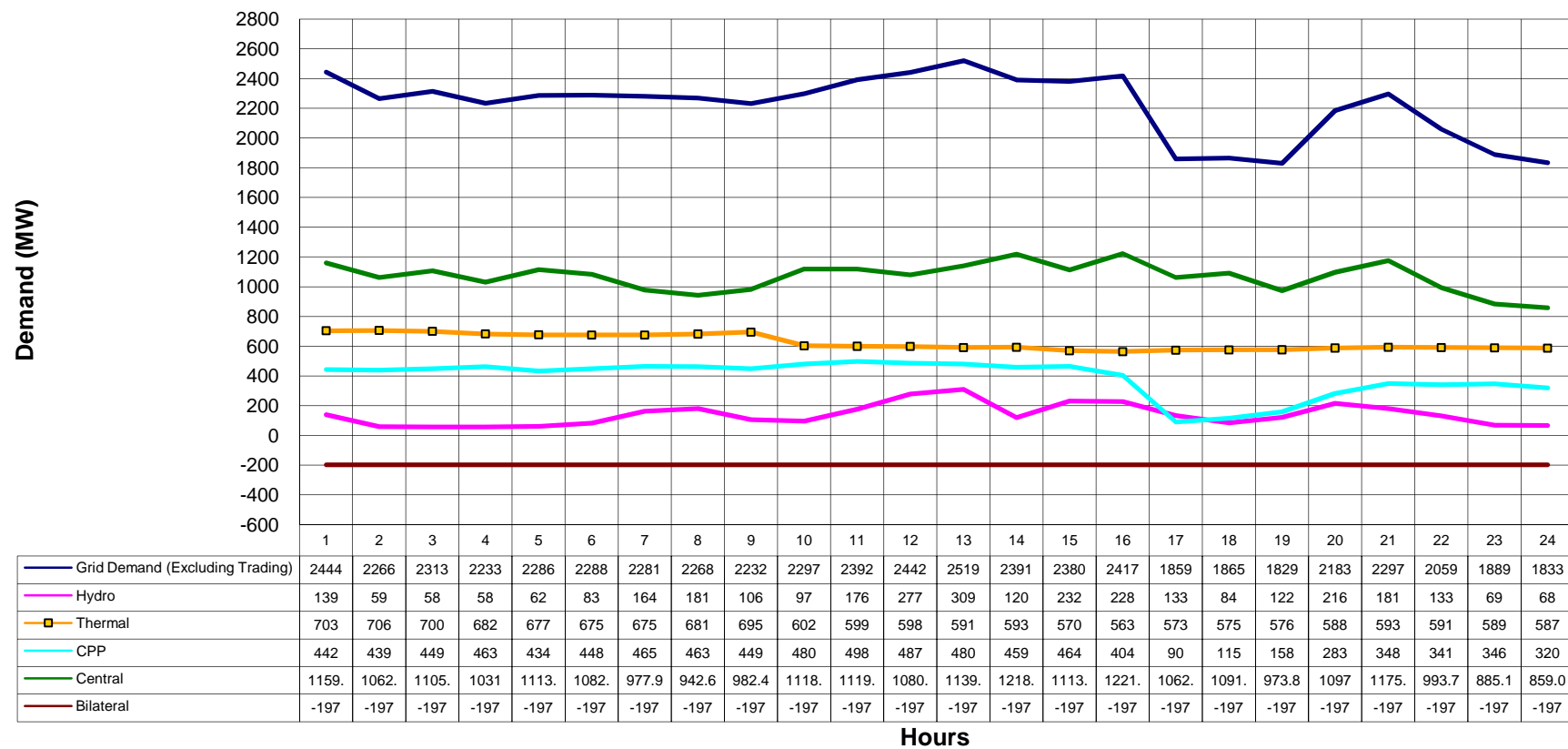
Hours---->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Apr-12	2623	2552	2513	2533	2601	2589	2460	2484	2484	2485	2462	2461	2515	2514	2527	2580	2549	2434	2451	2699	2851	2857	2790	2744
May-12	2754	2698	2664	2663	2745	2727	2489	2430	2390	2400	2628	2717	2712	2657	2671	2735	2701	2450	2408	2715	2828	2904	2881	2816
Jun-12	2605	2562	2523	2515	2582	2589	2384	2362	2357	2397	2647	2614	2569	2528	2517	2613	2668	2497	2494	2718	2779	2811	2760	2666
Jul-12	2589	2550	2490	2493	2550	2665	2518	2498	2431	2447	2490	2450	2382	2370	2350	2409	2445	2446	2585	2784	2802	2851	2804	2707
Aug-12	2742	2680	2661	2668	2758	2876	2717	2723	2651	2632	2741	2765	2693	2595	2583	2706	2743	2764	2849	3041	3098	3131	3070	2880
Sep-12	2766	2682	2654	2678	2774	2878	2694	2761	2723	2699	2735	2748	2664	2571	2555	2707	2828	2884	3021	3181	3231	3167	3032	2877
Oct-12	2479	2407	2375	2398	2513	2685	2383	2402	2263	2315	2338	2416	2321	2294	2309	2447	2602	2796	2868	3028	3099	2986	2795	2591
Nov-12	2109	2065	2062	2095	2313	2543	2328	2387	2442	2385	2378	2375	2213	2093	2055	2229	2415	2682	2787	2973	2968	2768	2451	2215
Dec-12	2026	2003	1985	2033	2223	2452	2265	2373	2487	2426	2413	2404	2249	2065	2022	2184	2364	2573	2779	3027	3001	2791	2424	2145
Jan-13	2141	2103	2088	2112	2231	2461	2388	2507	2646	2646	2578	2581	2477	2238	2185	2320	2481	2602	2881	3075	3108	2902	2512	2259
Feb-13	2275	2254	2238	2258	2396	2608	2482	2590	2705	2729	2656	2657	2512	2304	2223	2367	2506	2503	2923	3138	3178	2999	2669	2404
Mar-13	2690	2639	2612	2617	2717	2862	2544	2515	2638	2780	2793	2810	2686	2475	2521	2656	2637	2568	3087	3325	3356	3253	3061	2853
Avg. Annual	2483	2433	2405	2422	2534	2661	2471	2503	2518	2528	2572	2583	2500	2392	2376	2496	2578	2600	2761	2975	3025	2952	2771	2597

## HOURLY DEMAND CURVE FOR 29.03.2013 (MAX PEAK DEMAND OF THE YEAR (2012-13))



— Grid Demand (Excluding Trading)    
 — Hydro    
 —■— Thermal    
 — CPP    
 — Central Sector    
 — Bilateral

## HOURLY DEMAND CURVE FOR 10.04.2012 (MIN PEAK DEMAND OF THE YEAR 2012-13)



— Grid Demand (Excluding Trading)    
 — Hydro    
 —■— Thermal    
 — CPP    
 — Central    
 — Bilateral

# 1 INSTALLED CAPACITY (AS ON 31.3.2013) ENERGY GENERATION / ENERGY DRAWAL BY OPTCL

	Installed capacity (MW)	Energy Generation (incl. Aux) (MU)	Energy Drawal by GRIDCO (MU)
<b>A. STATE SECTOR</b>			
OHPC(Hydro)*	2084.875	4624.246	4476.169
OPGC (Thermal)	420	3172.573	2837.853
TTPS (Thermal)	460	3879.302	3451.946
TTPS (UI-OD)			19.592
IPPs			3100.147
CPP (Synchronised to OPTCL System)			2096.603
Renewable Energy Including Co-gen	-		328.976
<b>B. CENTRAL SECTOR</b>			
Orissa Share			
Hydro	<b>199.00</b>		
Thermal	<b>884.60</b>	-	7605.497
C. Banking Power			153.504
D. OA+Trading+IEX (Import)			32.290
<b>TOTAL DRAWAL</b>			<b>24102.577</b>
E. OA+Trading+IEX (Export)			809.811
F. Banking Power Export			232.390
G. Export to EREB			215.131
<b>Net GRIDCO demand</b>			<b>22845.245</b>

Export to ICCL 2.063  
Export to NALCO 196.220

\* Includes Orissa share from Machhkund.

## 2 TRANSMISSION LINES AND SUBSTATIONS

	As on 31.03.2012	Capacity Addition in 2012-2013	As on 1.4.2013
A. 400 kV line (ckt.km)	521.935	-3.701	518.234
B. 220kV line (ckt.km)	5486.325	99.663	5585.988
C. 132kV line (ckt.km)	5287.703	-5.847	5281.856

Note: 1.400Kv Indravati-Mukhiguda line is being excluded as it is maintained by PGCIL.

2. 220KV Balimela-U.sileru SC, Budhipadar-Basundhara SC, Budhipadar-Aditya Aluminium DC are being added

3. 132KV Jharsuguda-Action Ispat SC, Chandpur LILO DC, Bhawanipatna, SMC Power LILO DC, Arya Iron-BRPL SC are being added and 132kV Jayanagar-Meenakhi Power SC line is being excluded.

### D. Substations

400 / 220 /132kV (nos.)	2	0	2
220/132/33kV (nos.)	16	0	16
220/33kV (nos.)	4	0	4
132/33/11kV (nos.)	62	1	63
132kV Switching Stations (OPTCL)	3	0	3
132kV LILO Switching Stations of Industries	13	1	14
<b>Total</b>	<b>100</b>	<b>2</b>	<b>102</b>

Note: 1. 132/33kV Bhawanipatna Grid S/s is being newly added.

2. 132kV SMC switching station is being newly added.

Note: 1. (The above data in (2) are received from O & M branch of OPTCL system.)

### 3 **PERFORMANCE OF OPTCL DURING 2012 - 13**

#### 3 A. **POWER SUPPLY SECURITY**

3 A.1 Load Restriction due to non-availability of Generation / Failure of generating Stations.

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
(In Hrs)	0.00	22.00	0.00	0.00	22.00
Percentage(%)	0.00	1.00	0.00	0.00	0.25

\* —→ Load restriction imposed in the State on rotation basis to curtail the demand.

#### 3 B. **TRANSMISSION SECURITY**

3 B.1 Load Restriction due to non-availability of Transmission capacity

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
(In Hrs)	0	0	0.00	0	0
Percentage(%)	0.00	0.00	0.00	0.00	0.00

3 B.2 Rescheduling of Generation due to non- availability of Transmission capacity

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
(In Hrs)	0	0	0	0	0
Percentage(%)	0	0	0	0	0

#### 3 C **OVERALL PERFORMANCE**

##### 3 C-1 **FREQUENCY**

(i) **Above 50.2 Hz**

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
(In Hrs)	54.27	225.62	351.42	416.30	1047.60
Percentage(%)	2.48	10.22	15.92	19.27	11.96

(ii) **Maximum continous period beyond 50.2 Hz**

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
(In Hrs)	1.5	3.87	3.63	4.22	4.22
Percentage(%)	0.07	0.18	0.16	0.20	0.05

(iii) **Maximum Frequency occurrence**

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
Hz	50.76	50.98	50.69	50.80	50.98
Date/Time	<u>27.05.12</u> 18:04hr	<u>10.07.12</u> 12:32hr	<u>15.11.12</u> 14:02hr	<u>17.01.13</u> 23:22hr	<u>10.07.12</u> 12:32hr

(iv) **Below 49.5 Hz**

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
(In Hrs)	103.66	179.92	2.25	2.57	288.40
Percentage(%)	4.75	8.15	0.10	0.12	3.29

(v) **Maxm. Continous period below 49.5 Hz**

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
(In Hrs)	4.17	2.25	0.2	0.15	4.17
Percentage(%)	0.19	0.10	0.01	0.01	0.05

(vi) **Lowest Frequency Occurrence**

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
Hz	48.77	48.02	49.29	49.31	48.02
Date/Time	<u>12.06.12</u> 11:04 hr	<u>31.07.12</u> 13:02 hr	<u>25.12.12</u> 10:12hr	<u>05.01.13</u> 14:22hr	<u>31.07.12</u> 13:02 hr



### 3. C - 2 VOLTAGE PROFILE ( 2012-2013 )

#### MAXIMUM VOLTAGES OF MAJOR GRID SUB-STATIONS. ( 220kV )

Sl. No.	Name of the Sub-station	Quarter - 1			Quarter - 2			Quarter - 3			Quarter - 4			ANNUAL		
		Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.
1	Jaynagar	258	16.06.12	24:00	254	29.07.12	18:00	260	17.11.12	13:00	252	03.01.13	04:00	260	17.11.12	13:00
2	Duburi	240	19.06.12	01:00	240	01.07.12	01:00	245	03.11.12	01:00	240	01.01.13	01:00	245	03.11.12	01:00
3	Joda	245	19.06.12	11:00	238	07.09.12	14:00	245	03.11.12	09:00	240	14.01.13	06:00	245	19.06.12	11:00
4	Tarkera	232	01.04.12	09:00	237	03.08.12	05:00	240	27.10.12	10:00	240	01.01.13	14:00	240	27.10.12	10:00
5	Budhipadar	238	24.06.12	07:00	238	20.09.12	14:00	241	11.12.12	08:00	240	17.02.13	07:00	241	11.12.12	08:00
6	Balasore	238	10.04.12	19:00	240	18.08.12	02:00	245	12.11.12	01:00	242	06.01.13	01:00	245	12.11.12	01:00
7	Narendrapur	248	19.06.12	06:00	245	18.08.12	07:00	248	24.10.12	06:00	243	25.01.13	02:00	248	19.06.12	06:00
8	Chandaka	270	17.06.12	01:00	236	26.09.12	07:00	234	11.12.12	02:00	234	12.01.13	01:00	270	17.06.12	01:00
9	Bhanianagar	268	16.06.12	24:00	238	22.05.12	10:00	238	02.10.12	07:00	235	01.02.13	03:00	268	16.06.12	24:00
10	Theruvalli	252	09.05.12	20:00	251	17.08.12	07:00	253	04.11.12	06:00	246	04.01.13	03:00	253	04.11.12	06:00
11	Meramundali	230	10.04.12	23:00	232	03.08.12	09:00	235	17.11.12	01:00	235	23.01.13	03:00	235	17.11.12	01:00
12	Bidanasi	239	13.04.12	17:00	238	31.07.12	16:00	238	09.10.12	02:00	237	12.01.13	03:00	239	13.04.12	17:00
13	Katapalli	237	22.06.12	03:00	239	06.07.12	10:00	243	13.12.12	07:00	241	16.02.13	07:00	243	13.12.12	07:00
14	Bhadrak	236	08.04.12	17:00	240	20.08.12	07:00	241	31.12.12	02:00	242	10.01.13	02:00	242	10.01.13	02:00
15	Paradeep	240	17.06.12	09:00	235	04.08.12	08:00	250	11.12.12	18:00	245	17.03.13	15:00	250	11.12.12	18:00
16	Bolangir	241	05.04.12	23:00	239	06.07.12	09:00	246	13.12.12	07:00	244	03.01.13	07:00	246	13.12.12	07:00
17	Mendhasal	242	19.06.12	18:00	239	18.08.12	06:00	239	05.11.12	04:00	238	09.01.13	14:00	242	19.06.12	18:00

#### MINIMUM VOLTAGES OF MAJOR GRID SUB-STATIONS. ( 220kV )

Sl. No.	Name of the Sub-station	Quarter - 1			Quarter - 2			Quarter - 3			Quarter - 4			ANNUAL		
		Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.
1	Jaynagar	230	23.04.12	15:00	222	31.07.12	22:00	233	04.11.12	18:00	232	01.03.13	11:00	222	31.07.12	22:00
2	Duburi	212	16.05.12	23:00	212	05.08.11	20:00	225	01.10.12	20:00	218	28.02.13	19:00	212	16.05.12	23:00
3	Joda	205	12.06.12	13:00	210	31.07.12	20:00	222	09.10.12	17:00	220	26.03.13	21:00	205	12.06.12	13:00
4	Tarkera	222	18.04.12	21:00	227	02.08.12	18:00	227	12.10.12	17:00	230	21.03.13	21:00	222	18.04.12	21:00
5	Budhipadar	224	28.05.12	16:00	225	16.08.12	19:00	223	28.10.12	22:00	231	07.03.13	19:00	223	28.10.12	22:00
6	Balasore	205	25.05.12	23:00	215	11.07.12	21:00	215	02.10.12	20:00	215	12.03.13	20:00	205	25.05.12	23:00
7	Narendrapur	188	21.05.12	20:00	185	31.07.12	21:00	210	24.11.12	12:00	198	28.03.13	21:00	185	31.07.12	21:00
8	Chandaka	175	25.05.12	22:00	165	31.07.12	20:00	184	14.10.12	18:00	181	28.03.13	21:00	165	31.07.12	20:00
9	Bhanianagar	197	25.05.12	22:00	180	31.07.12	21:00	212	14.10.12	18:00	197	11.01.13	11:00	180	31.07.12	21:00
10	Theruvalli	220	25.05.12	24:00	215	31.07.12	21:00	210	01.12.12	19:00	226	15.03.13	20:00	210	01.12.12	19:00
11	Meramundali	210	10.06.12	19:00	220	06.07.12	19:00	220	28.12.12	19:00	221	05.01.13	20:00	210	10.06.12	19:00
12	Bidanasi	208	06.06.12	12:00	215	31.07.12	20:00	206	20.10.12	21:00	213	26.03.13	20:00	206	20.10.12	21:00
13	Katapalli	214	23.04.12	16:00	221	02.09.12	08:00	218	08.10.12	21:00	224	07.02.13	20:00	214	23.04.12	16:00
14	Bhadrak	190	26.05.12	12:00	202	18.07.12	20:00	205	09.10.12	18:00	205	09.03.13	19:00	190	26.05.12	12:00
15	Paradeep	200	20.04.12	01:00	210	12.07.12	19:00	210	28.10.12	14:00	205	30.01.13	20:00	200	20.04.12	01:00
16	Bolangir	200	20.04.12	01:00	220	23.08.12	07:00	215	16.10.12	18:00	206	17.01.13	20:00	200	20.04.12	01:00
17	Mendhasal	175	25.05.12	22:00	170	31.07.12	21:00	197	14.10.12	18:00	191	28.03.13	21:00	170	31.07.12	21:00

**MAXIMUM VOLTAGES OF MAJOR GRID SUB-STATIONS. ( 132kV )**

Sl. No.	Name of the Sub-station	Quarter - 1			Quarter - 2			Quarter - 3			Quarter - 4			ANNUAL		
		Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.
1	Cuttack	140	11.04.12	01:00	136	18.08.12	10:00	136	19.10.12	10:00	134	08.01.13	02:00	140	11.04.12	01:00
2	Puri	138	17.06.12	03:00	135	25.09.12	08:00	134	28.10.12	11:00	126	08.01.13	02:00	138	17.06.12	03:00
3	Khurda	140	09.05.12	20:00	132	03.07.12	15:00	140	08.12.12	17:00	134	08.01.13	17:00	140	09.05.12	20:00
4	Berhampur	142	02.06.12	20:00	140	12.07.12	09:00	140	02.11.12	07:00	140	28.03.13	07:00	142	02.06.12	20:00

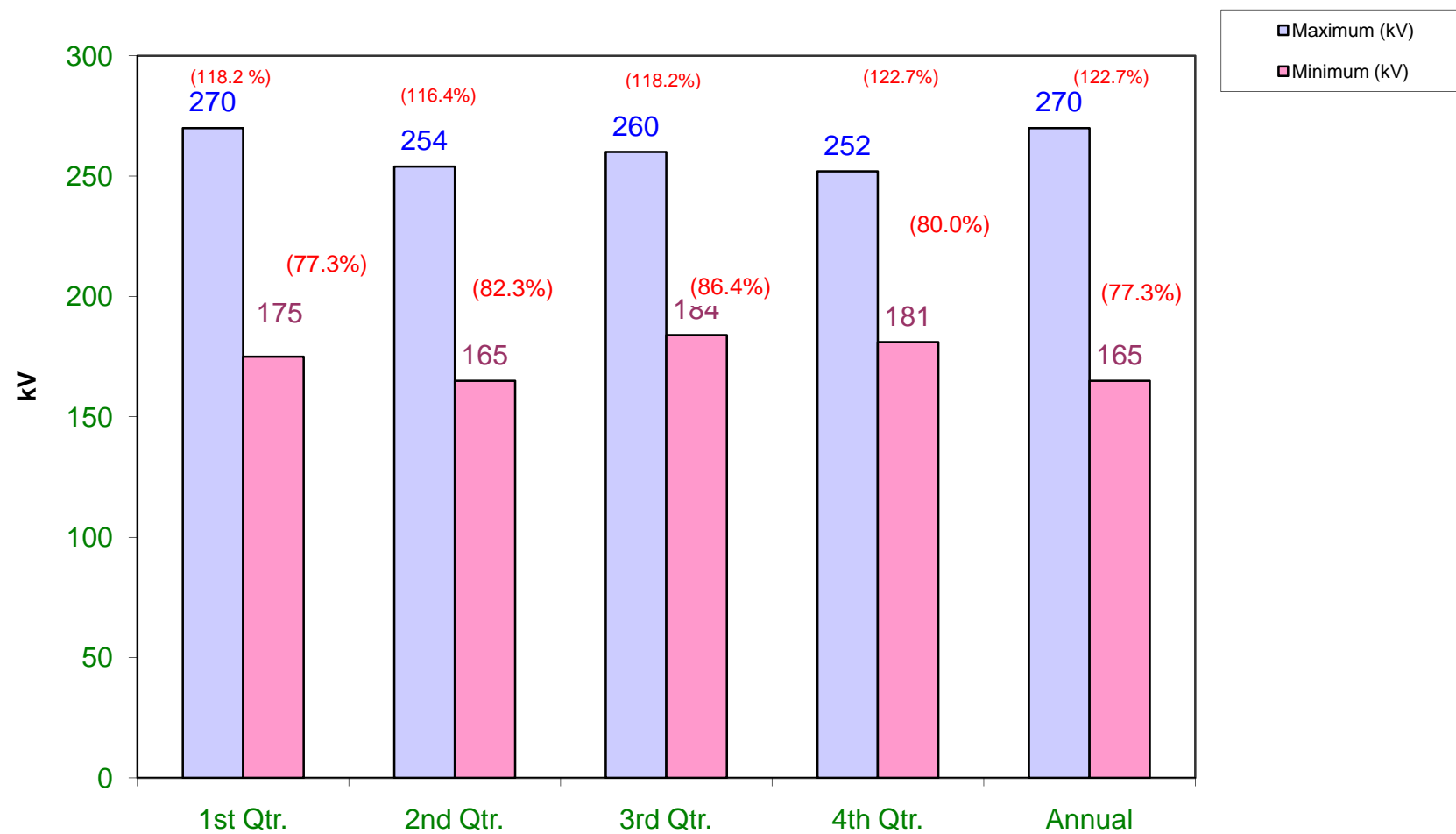
**MINIMUM VOLTAGES OF MAJOR GRID SUB-STATIONS. ( 132kV )**

Sl. No.	Name of the Sub-station	Quarter - 1			Quarter - 2			Quarter - 3			Quarter - 4			ANNUAL		
		Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.
1	Cuttack	102	17.05.12	23:00	104	13.07.12	22:00	110	28.12.12	19:00	102	15.03.13	19:00	102	17.05.12	23:00
2	Puri	85	25.05.12	22:00	86	31.07.12	21:00	104	26.12.12	18:00	96	28.03.13	21:00	85	25.05.12	22:00
3	Khurda	88	16.06.12	10:00	85	31.07.12	21:00	95	25.10.12	18:00	90	18.03.13	19:00	85	31.07.12	21:00
4	Berhampur	108	25.05.12	23:00	102	31.07.12	20:00	116	03.12.12	08:00	114	06.02.13	09:00	102	31.07.12	20:00

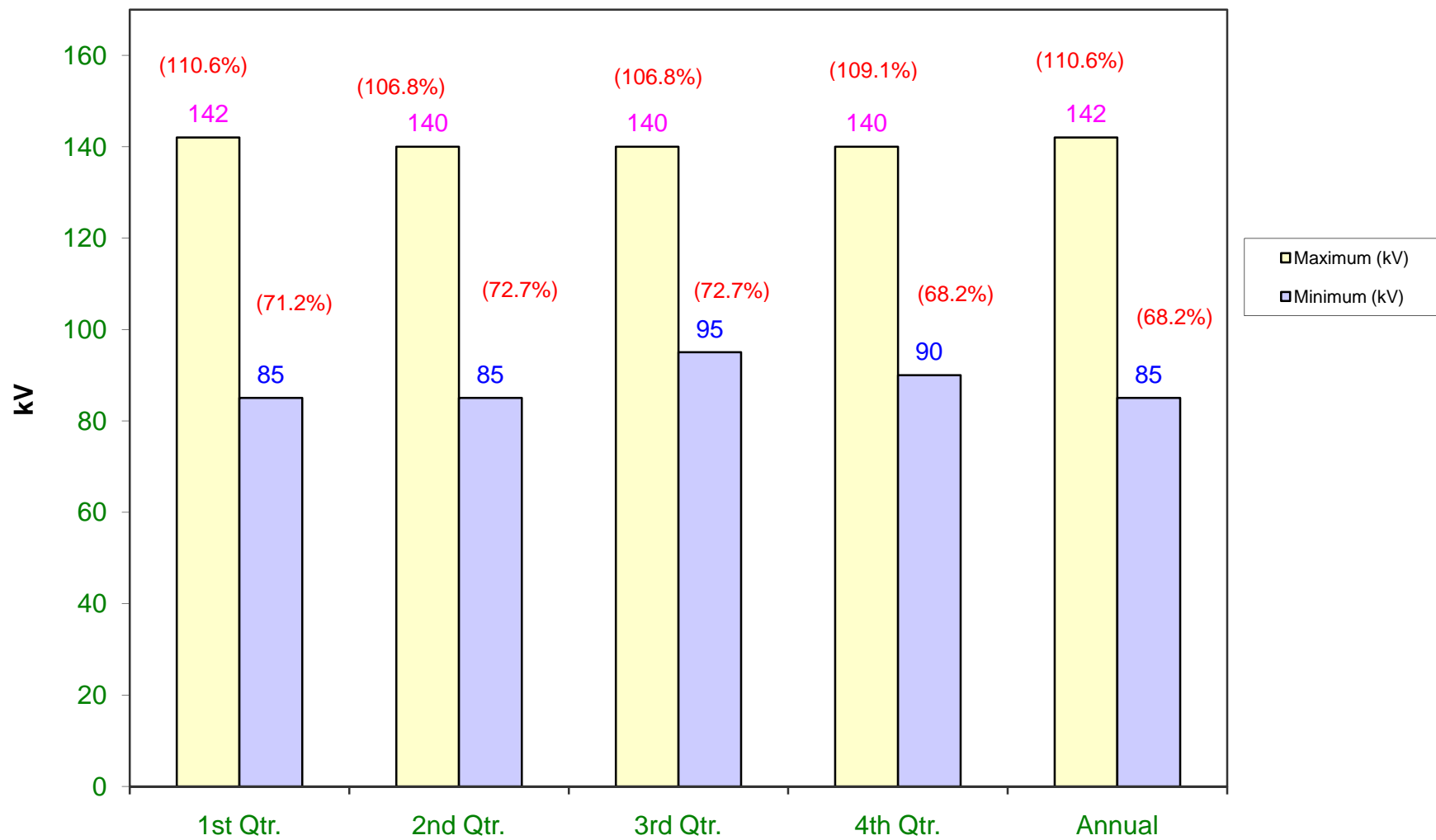
Note:

1. The minimum bus voltages are based on the instantaneous log book readings and hence do not reflect the voltage profile of the concerned Grid S/s. Further, low voltages during contingency conditions are also recorded as minimum voltages.

## OVERALL PERFORMANCE VOLTAGE AT 220kV

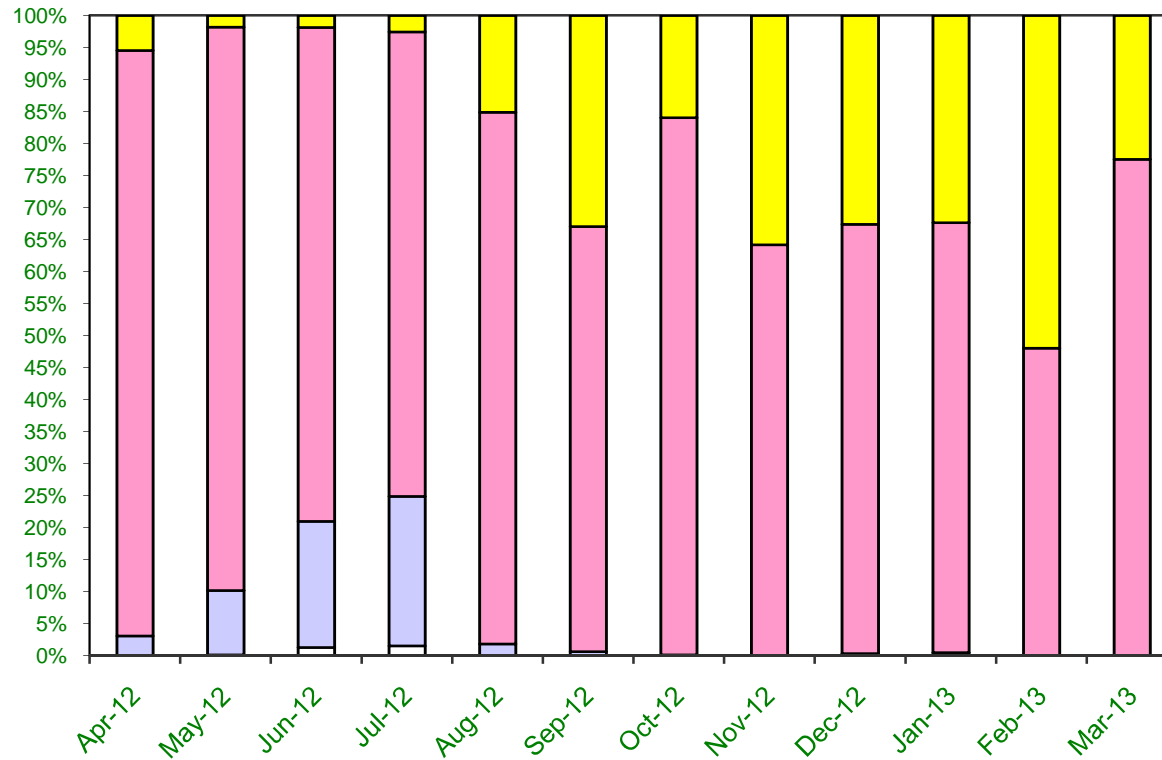


## OVERALL PERFORMANCE VOLTAGE AT 132 kV



## Frequency Performance

Percentage time occurrence



- $\geq 51.0\text{Hz}$
- 50.20 - 51.00Hz
- 49.50 - 50.00Hz
- 49.00 - 49.50Hz
- 48.5 - 49.0Hz
- $< 48.5\text{Hz}$

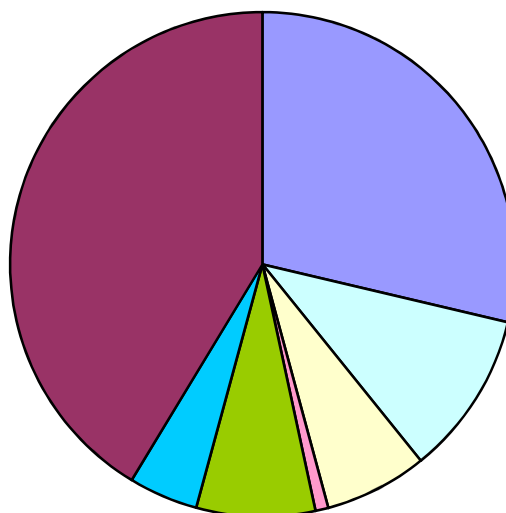
	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13
■ $\geq 51.0\text{Hz}$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
■ 50.20 - 51.00Hz	4.16	1.62	1.70	2.32	10.06	18.54	9.25	19.56	19.05	19.03	27.59	12.01
■ 49.50 - 50.00Hz	69.33	78.56	70.16	65.87	55.23	37.35	48.54	35.02	39.23	39.51	25.50	41.42
■ 49.00 - 49.50Hz	2.33	8.99	17.90	21.19	1.20	0.36	0.09	0.03	0.19	0.28	0.03	0.04
■ 48.5 - 49.0Hz	0.00	0.11	1.20	1.39	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
■ $< 48.5\text{Hz}$	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Months















### INTERRUPTION DUE TO MAJOR INCIDENT

Incident	Duration of Interruption	No. of Interruption
Snapping of Jumper / Conductor / Earth wire	81:43:00	65
Insulator Failure	29:56:00	43
Bursting of CT / PT	18:49:00	22
Breaker Problem	2:21:00	8
System Disturbance	21:41:00	8
Failure of LA	12:39:00	25
Others	117:44:00	87
The duration of interruption indicated above is the sum total of interruptions occurred at different areas(S/s) during the year. However there was no total blackout experienced for the State during the year 2012-13.		

### INTERRUPTION (HRS) DUE TO MAJOR INCIDENT DURING 2012-13



- Snapping of Jumper / Conductor / Earth wire
- Insulator Failure
- Bursting of CT / PT
- Breaker Problem
- System Disturbance
- Failure of LA
- Others

EASTERN REGIONAL LOAD DESPATCH CENTRE			
EASTERN REGION TRANSMISSION NETWORK K ( 220KV & ABOVE)			
	765 KV S/S	 765KV LINE	 THERMAL PS
	400 KV S/S	 400KV LINE	 HYDRO PS
	220KV S/S	 220KV LINE	 Bus Section Open
	400 KV S/S State		 Isolator Open
	HVDC S/S	 HVDC LINE	 T-Connection
DRAWN ON : Date 12.04.12 ( Revised Feb'13)		DRAWN BY: ERLDC POSOCO	