

# ***OPTCL***



**(Approved by OERC vide Letter No. OERC-Engg-5/98 (Vol.XXI)/ 299 dt. 16.10.2020)**

## **PERFORMANCE OF THE TRANSMISSION SYSTEM OF OPTCL FOR 2019-20**

[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]

**PERFORMANCE OF TRANSMISSION SYSTEM OF OPTCL (AS REPORTED) DURING THE YEAR 2019-20.**

**1. Procurement of Power:**

2.

Source	Commission's Approval ( MU)	Actual Drawl for the State Consumption (MU)	Remarks
OHPC	5881.74	6168.43	State's Maximum and Minimum demand was 5151 MW and 2574MW respectively
Thermal(TTPS+OPGC)	6855.75	9114.75	
CPP & Co-generation Plants	0	526.28	
Renewable Generation	1467	1274.40	
IPP	8217.30	2588.52	
EREB	6309.24	6803.996	
Net Banking +IEX+ STOA+ Sale to the Utilities		-944.83	
Total	28731.03	25531.528	

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**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	ATRI	243	209
2	Balasore	237	203
3	Bhadrak	236	202
4	Bhanjanagar	243	210
5	Bidanasi	242	212
6	Budhipadar	236	212
7	Chandaka	237	200
8	Duburi	237	212
9	Jaynagar	241	224
10	Joda	241	213
11	Katapalli	236	207
12	Lapanga	241	220
13	Laxmipur	241	221
14	Mendhasal	244	196
15	Meramundali	240	206
16	Narendrapur	244	193
17	Nayagarh	244	206
18	Paradeep	238	201
19	Sadeipali	237	205
20	Tarkera	262	213
21	Theruvali	244	212

Allowable Range (380 -420 kV)			
Sl. No.	Name of the 400 kV Grid Sub-station	Maximum Voltage in kV	Minimum Voltage in kV
1	Duburi (N)	423	395
2	Lapanga	420	403
3	Mendhasal	425	375
4	Meramundali	424	400

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	142	118
2	Berhampur	150	114
3	Puri	143	110
4	Khurda	140	108

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

INTERRUPTION DUE TO MAJOR INCIDENT			
Incident Duration of Interruption No. of Interruption	Duration of Interruption (Hrs:Min:Sec)	No. of Interruption	Remarks
Snapping of Jumper / Conductor / Earth wire	42:42:00	44	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 2019-20.
Insulator Failure	10:20:00	12	
Bursting of CT / PT	3:32:00	4	
Breaker Problem	0:00:00	1	
Major System Disturbance	638:23:00	9	
Failure of LA	21:58:00	20	
Others	303:52:00	381	

**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.in](http://www.sldcorissa.org.in)

**COMMISSION'S OBSERVATION ON THE PERFORMANCE OF THE  
TRANSMISSION SYSTEM OF OPTCL FOR 2019-20**

The salient features of the performance of transmission system of OPTCL for the year 2019-20 is given below and the detail information in support to that is available in SLDC website i.e., [www.sldcorissa.org.in](http://www.sldcorissa.org.in)

**A. Procurement of Power:**

The Commission had approved the purchase of power by GRIDCO from various sources in the ARR & Tariff order for 2019-20 against which the actual performance have been indicated in the following table:

Source	Commission's Approval ( MU)	Actual Drawl for the State Consumption (MU)	Remarks
OHPC	5881.74	6168.43	State's Maximum and Minimum demand was 5151 MW and 2574MW respectively
Thermal(TTPS+OPGC)	6855.75	9114.75	
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Total	28731.03	25531.528	

There is an import of 1495.243 MU through power banking, open access, trading & IEX) and export of 2678.745MU (100.433MU as sales to other utilities, 238.671 on account of deviation and 2339.641 through trading, OA, banking & IEX export) during the FY 2019-20. Hence, in the said financial year GRIDCO has an export of 1183.50 MU on this account.

2. During FY 2019-20 the daily peak demand touched at 5151 MW maximum on dt.04.04.2019 and a minimum of 2574 MW on dt.05.04.2019. The peak demand of 5151 MW in 2019-20 is about 276 MW lower than the peak demand experienced during the previous year 2018-19 (5427MW). The total energy drawl is 25532MU in FY 2019-20 against 26269 MU in 2018-19, which indicates the decrease in electricity consumption of around 737 MU in the State.

**B. Line Interruption:**

3. OPTCL's system has faced aggregated Annual interruptions varying from 3 hour to 638 hours at different locations on account of conductor/jumper/earth wire snapping, insulator failure, bursting of Current Transformer/Potential Transformer, breaker problem, system disturbance, Lightning Arrester failures etc. The duration as mentioned above is the sum total of interruptions occurred at different areas (s/s) during the FY 2019-20. The duration of interruptions is more in FY 2019-20 because of occurrence of Cyclone 'Fani' during the month of May, 2019. 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. It has been reported about 4 hours of load restriction during the second quarter for the FY 2019-20 on rotation basis due to failure in generating stations. The load restriction has been imposed to curtail demand due to non-availability of generation/failure of generating stations. OPTCL claimed that there was no black out experienced in the State during the FY 2019-20. OPTCL should find out latest technical methods for effective utilization of existing/proposed higher level transmission system by upgrading the existing substation/ transmission lines and equipments to increase power transfer capacity and reliability. Further, OPTCL should take the help of emerging techniques of control, monitoring, protection, communications, etc. for efficient operation of its transmission system in an optimal manner because of expected large scale integration of distributed renewable generation with their uncontrollable generation variability in coming years. OPTCL should have periodic O&M and R&M activities for efficient functioning of its transmission elements and also plan for a Disaster Resilient Transmission System to prevent the damage to a large extent during natural disaster.

**C. Frequency Profile:**

4. 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 49.9 to 50.05 Hz band. OPTCL has experienced frequency as low as 49.55 Hz and as high as 50.32 Hz during 2<sup>nd</sup> quarter of FY 2019-20. DISCOMs should adhere to their schedule drawl in order to reduce their drawl from the grid during low frequency and maintain grid discipline.

**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 108 kV minimum & 193 KV maximum in its 132 KV system, 193 kV minimum & 262 kV maximum in its 220 KV system and 375 kV minimum & 424 kV maximum in its 400 kV system. As reported, the voltage levels at few 132 KV S/Ss have been lower than the allowable limits. Therefore, OLTC of the power transformers should be in healthy condition and all the field engineers should be trained to operate it during peak and load condition to maintain the voltage within the permissible Also, 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, the matter in grid S/S, it shall take up with them for remedial measure.

**E. Load Restriction:**

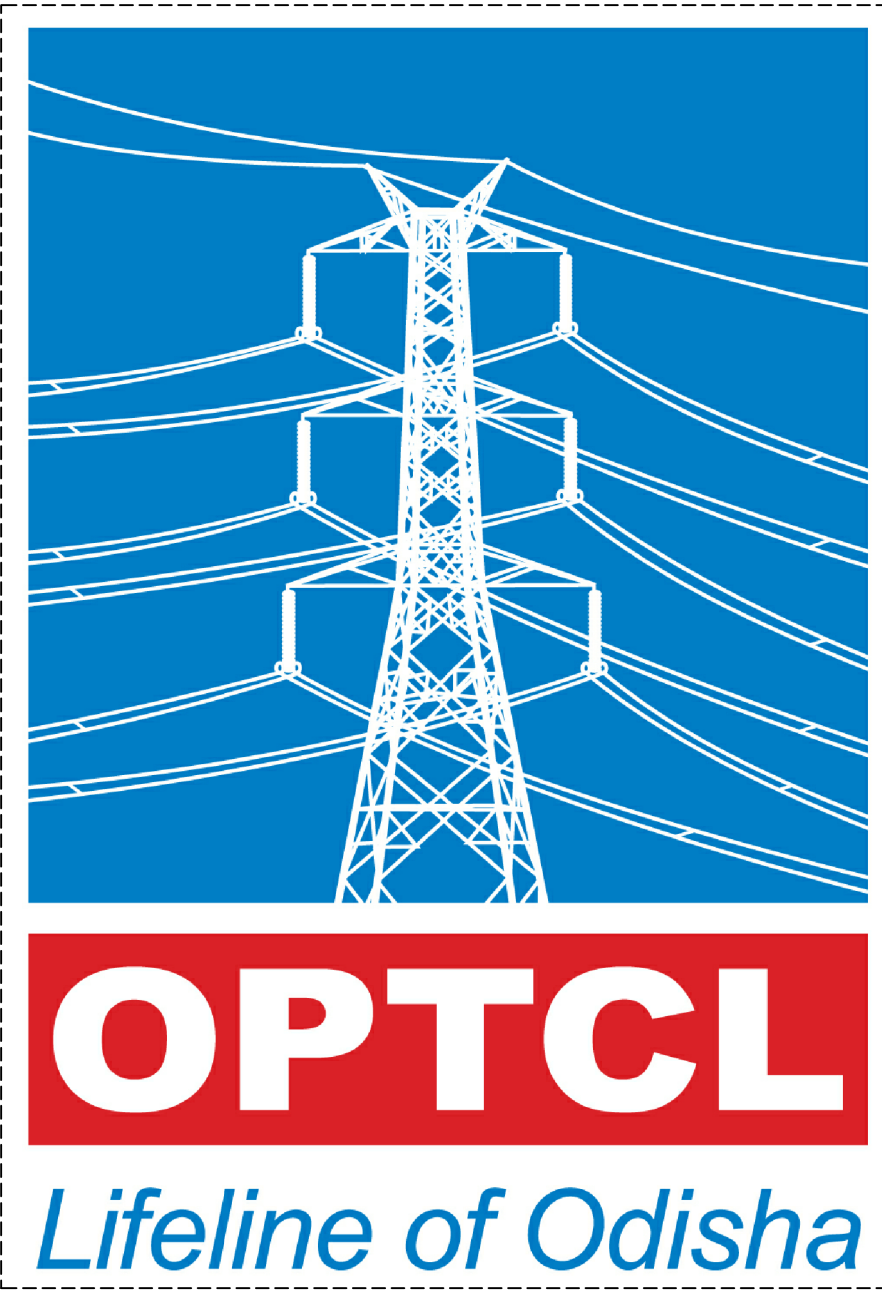
6. M/s. OPTCL has claimed that the load restriction due to non-availability of the transmission capacity as 'NIL' which in turn indicates that during FY 2019-20 that OPTCL system availability was 100%. The projects in the pipe-line already approved by the Commission should be completed by OPTCL within the time schedule to avoid cost & time over-run. Simultaneously, OPTCL needs to ensure avoidance of under loading of lines and substations to minimize system losses and should conduct comprehensive system study before proceeding for any network expansion plan.

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

7. SLDC, being the apex body to ensure integrated operation of the power system of the state on real time basis, should be responsible for optimum scheduling and dispatch of electricity within the state. Since, SLDC is responsible for carrying out real time operations, supervision and control of intra-state transmission system and dispatch of electricity through secure and economic operation of state grid in a transparent, neutral & non-discriminate manner, its staffs are to be appropriately trained for efficient functioning of the centre. Recommendation in the report on Scheduling, Accounting, Metering and Settlement of transaction in electricity ("SAMAST") should be implemented.

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# JHARKHAND

# WEST BENGAL

CHHATTISGARH

SOUTH ZONE

NORTH ZONE

CENTRAL ZONE

BAY OF BENGAL

ANDHRA PRADESH

## LEGEND

DETAILS OF LINE	Existing	Proposed / U/C
765KV TRANSMISSION LINE	—	---
500KV TRANSMISSION LINE	—	---
Solar Projects	—	---
400KV TRANSMISSION LINE	—	---
220KV TRANSMISSION LINE	—	---
132KV TRANSMISSION LINE	—	---
HYDRO POWER STATION	(H)	(H)
THERMAL POWER STATION	(T)	(T)
GRID S/S & TRACTION S/S	●	○
SWITCHING STATION / CGP/ IPP	⊕	⊕
BULK CONSUMER	■	□
STATE BOUNDARY	—	---
DISTRICT BOUNDARY	—	---
ZONE BOUNDARY	—	---
Solar Pooling Station	SPS	

ODISHA POWER TRANSMISSION CORPORATION LIMITED  
BHUBANESWAR

## SCHEMATIC TRANSMISSION MAP OF OPTCL(EXISTING & PROPOSED)

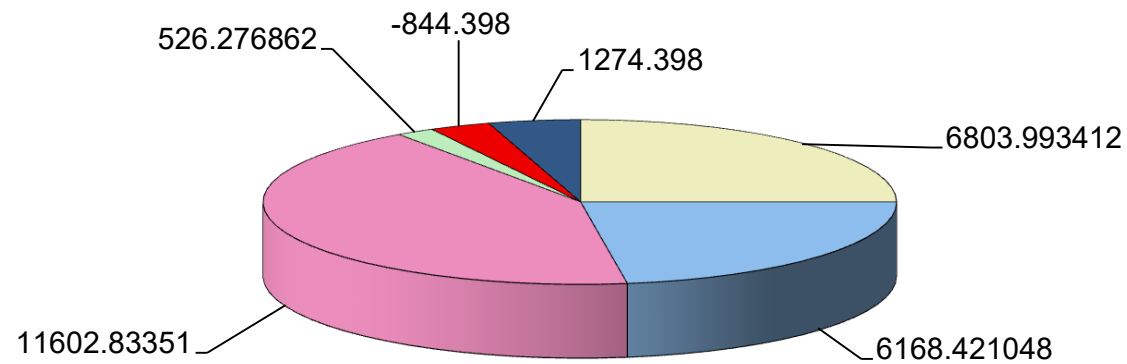
Length in kms.

NOT TO SCALE



## GRID DEMAND FOR THE YEAR 2019-20

[Total Drawal 25531.525 MU ]



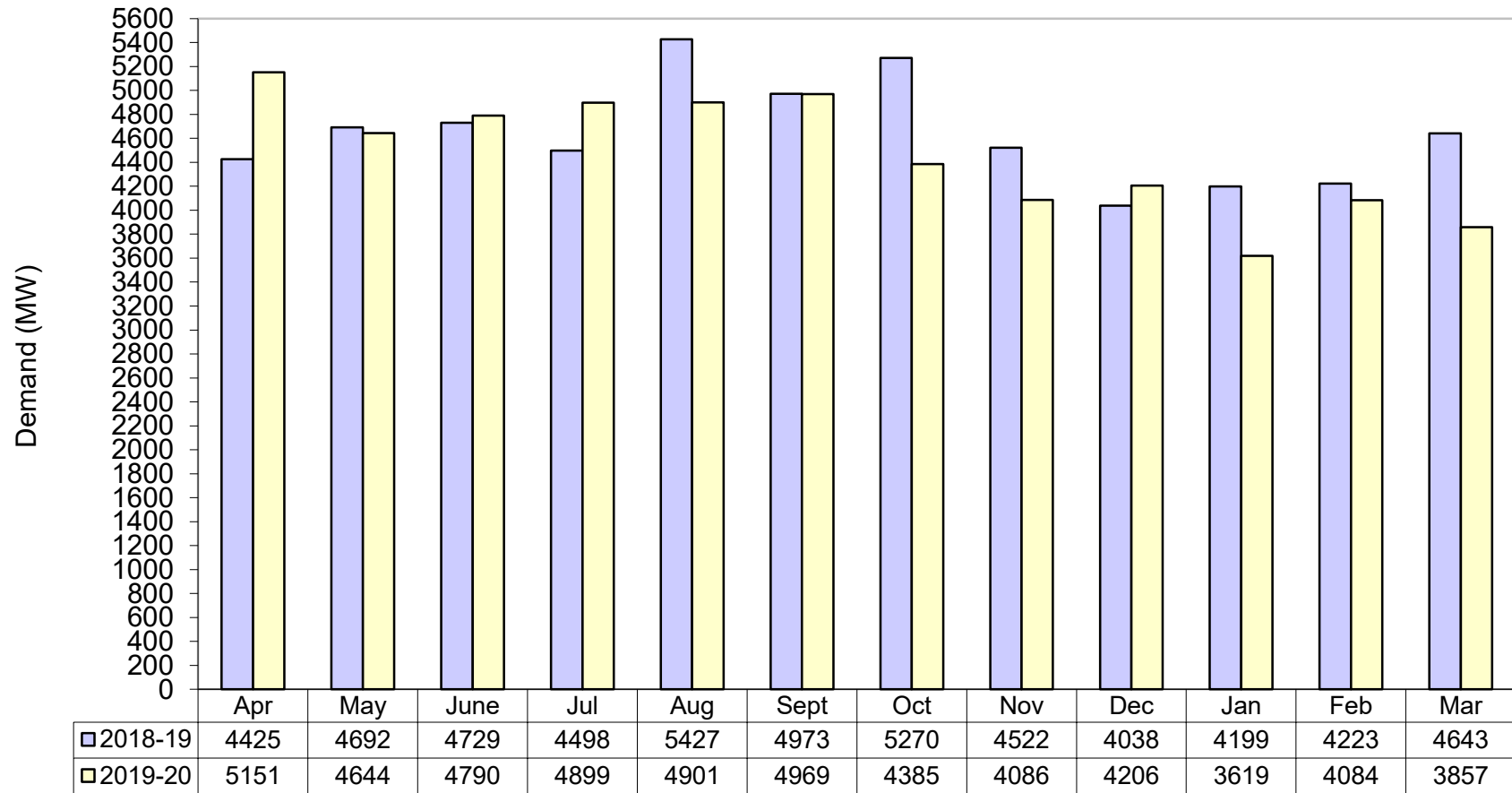
Net EREB Total Hydro NET Thermal (OPGC + TTPS+IPP) CPP Net (BankingPower+IEX+STOA) Renewable Energy

# DAILY PEAK DEMAND (MW) EXCLUDING TRADING FOR THE YEAR 2019-20

Day	Apr.19	Mai.19	Jun.19	Jul.19	Aug.19	Sep.19	Okt.19	Nov.19	Dez.19	Jän.20	Feb.20	Mär.20	Max	Min
1	4094	4326	4578	3550	4460	4311	3876	4075	4098	3408	3741	3522	4578	3408
2	4661	4155	4140	3706	4208	4168	3773	4086	4206	3435	3706	3608	4661	3435
3	5101	2962	3907	3849	4336	4157	4033	3939	4184	3204	3832	3407	5101	2962
4	5151	2574	4119	3767	4462	4157	4114	3843	3952	3311	3731	3395	5151	2574
5	5095	2944	4240	3751	4405	4309	4094	3775	3763	3150	3462	3409	5095	2944
6	4974	3170	4082	3799	4579	4128	3649	3604	3724	3409	3621	3403	4974	3170
7	4281	3429	3429	3770	4159	4148	3537	3510	3802	3381	3638	3365	4281	3365
8	3904	3656	4119	3998	3990	4150	3402	3306	3658	3314	3799	3478	4150	3306
9	3720	3694	4249	3981	4508	4346	3539	3198	3832	3349	4084	3635	4508	3198
10	4252	3798	4268	4187	4672	4487	3616	3616	3828	3326	3997	3470	4672	3326
11	4015	3816	4790	4088	4430	4497	4112	3517	3857	3379	4050	3743	4790	3379
12	4100	3764	4736	4157	4119	4451	4137	3692	3799	3350	3935	3577	4736	3350
13	4197	3811	4172	4100	4179	4583	4001	3569	3787	3553	3918	3828	4583	3553
14	4262	3804	4316	4371	4311	4630	4168	3317	3880	3545	3648	3766	4630	3317
15	4195	3802	4089	4899	4388	4872	4049	3412	3720	3431	3677	3610	4899	3412
16	4396	3908	3769	4688	4901	4702	3854	3461	3464	3443	3587	3786	4901	3443
17	4186	4026	4097	4137	4595	4437	3891	3281	3545	3475	3621	3857	4595	3281
18	4096	4644	4051	4645	4088	4969	3950	3453	3569	3485	3609	3850	4969	3453
19	3979	4644	4242	4571	4209	4964	4105	3634	3479	3426	3624	3463	4964	3426
20	4140	4584	4565	4422	4403	4529	4385	3656	3458	3507	3654	3506	4584	3458
21	3778	4413	3684	4335	4765	4296	4014	3699	3465	3520	3473	3346	4765	3346
22	3619	4335	3919	4563	4458	4031	3989	3816	3386	3572	3661	3248	4563	3248
23	4023	4277	4277	4597	4279	4206	3709	3730	3412	3585	3511	3334	4597	3334
24	4263	4152	4152	4420	4256	4193	3269	3603	3427	3539	3469	3762	4420	3269
25	4408	4214	4214	3983	4059	3934	3563	3582	3375	3619	3590	3855	4408	3375
26	4423	4215	4215	4096	4180	3885	3573	3729	3343	3481	3495	3827	4423	3343
27	4393	4206	4434	4146	4264	4005	3548	3717	3435	3568	3424	3850	4434	3424
28	4333	4207	4323	4046	4410	3776	3755	3690	3668	3597	3532	3790	4410	3532
29	4361	4126	4250	3914	4230	3662	3789	3888	3623	3560	3666	3721	4361	3560
30	4444	4615	3808	4056	4454	3896	3710	3816	3657	3548		3458	4615	3458
31		4625		4210	4418		3739		3430	3559		3559	4625	3430
MAX	5151	4644	4790	4899	4901	4969	4385	4086	4206	3619	4084	3857	5151	3560
MIN	3619	2574	3429	3550	3990	3662	3269	3198	3343	3150	3424	3248	4150	2574



## COMPARISON OF MONTHLY PEAK DEMAND (MW) EXCLUDING TRADING FOR THE YEAR ENDING 2018-19 & 2019-20

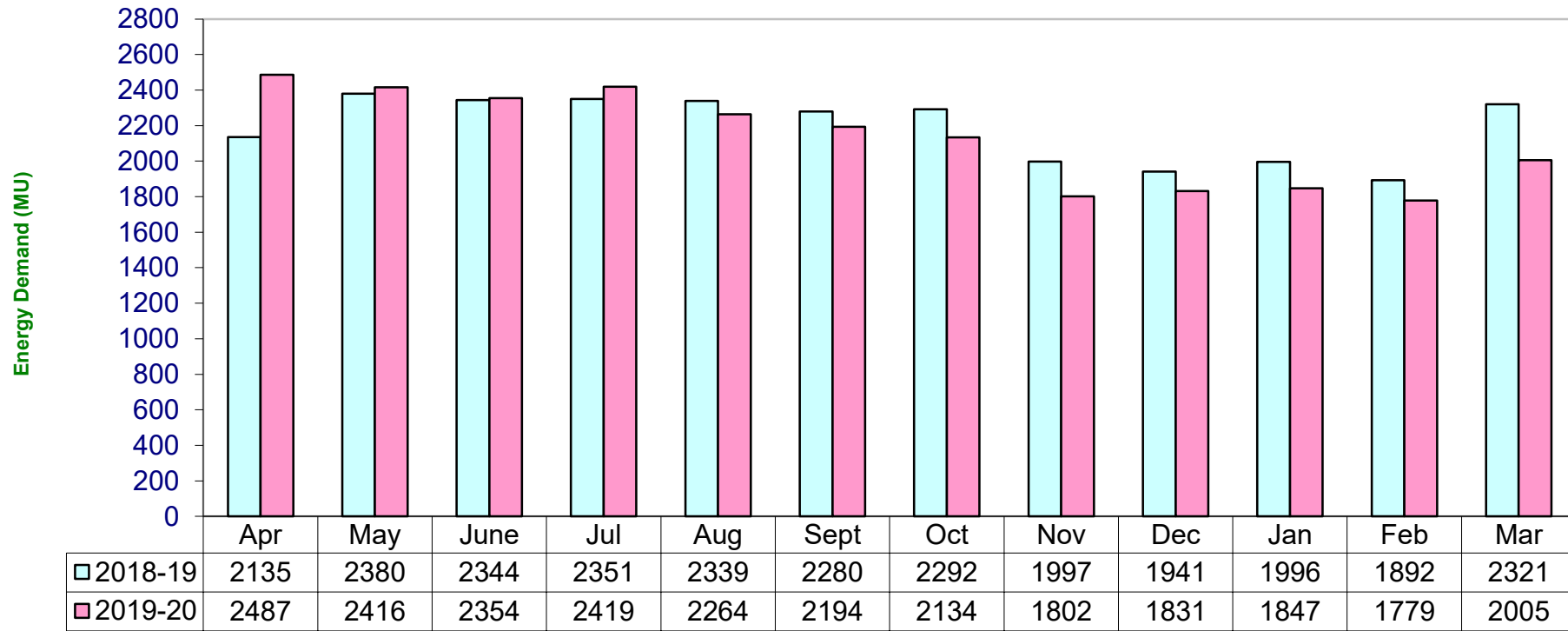


Month

Annual Peak Demand :	2019-20 - 5151 MW	2018-19 - 5427 MW
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■ 2018-19    ■ 2019-20

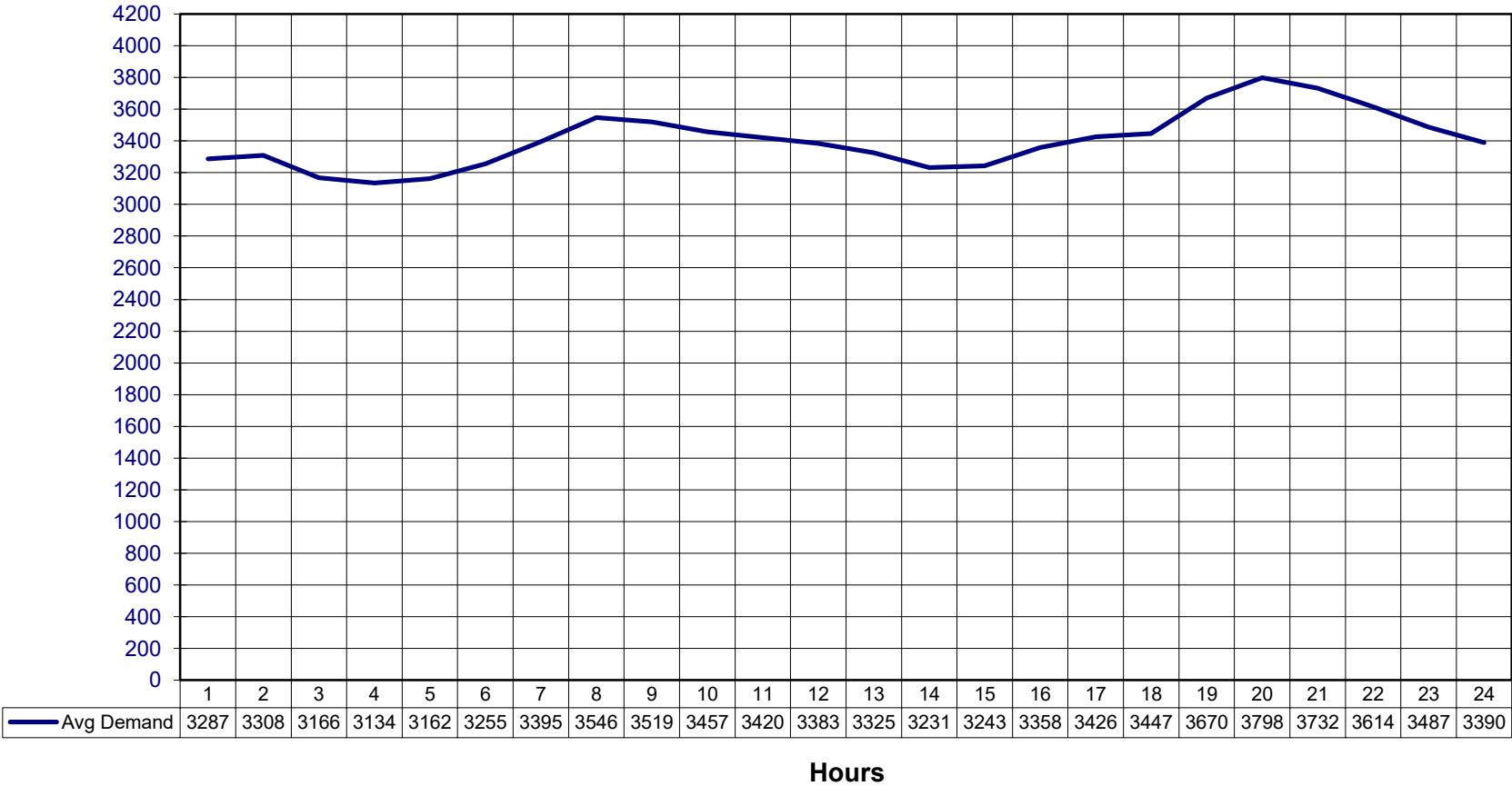
## COMPARISON OF MONTHLY ENERGY DEMAND (MU) EXCLUDING TRADING & RETURN BANKING POWER FOR THE YEAR ENDING 2018-19 & 2019-20



Month

Annual Energy Demand :      2019-20 - 25531.525 MU      2018-19 - 26268.694 MU

DEMAND CURVE FOR HOURLY AVERAGE DEMAND EXCLUDING TRADING FOR YEAR ENDING MARCH 2020

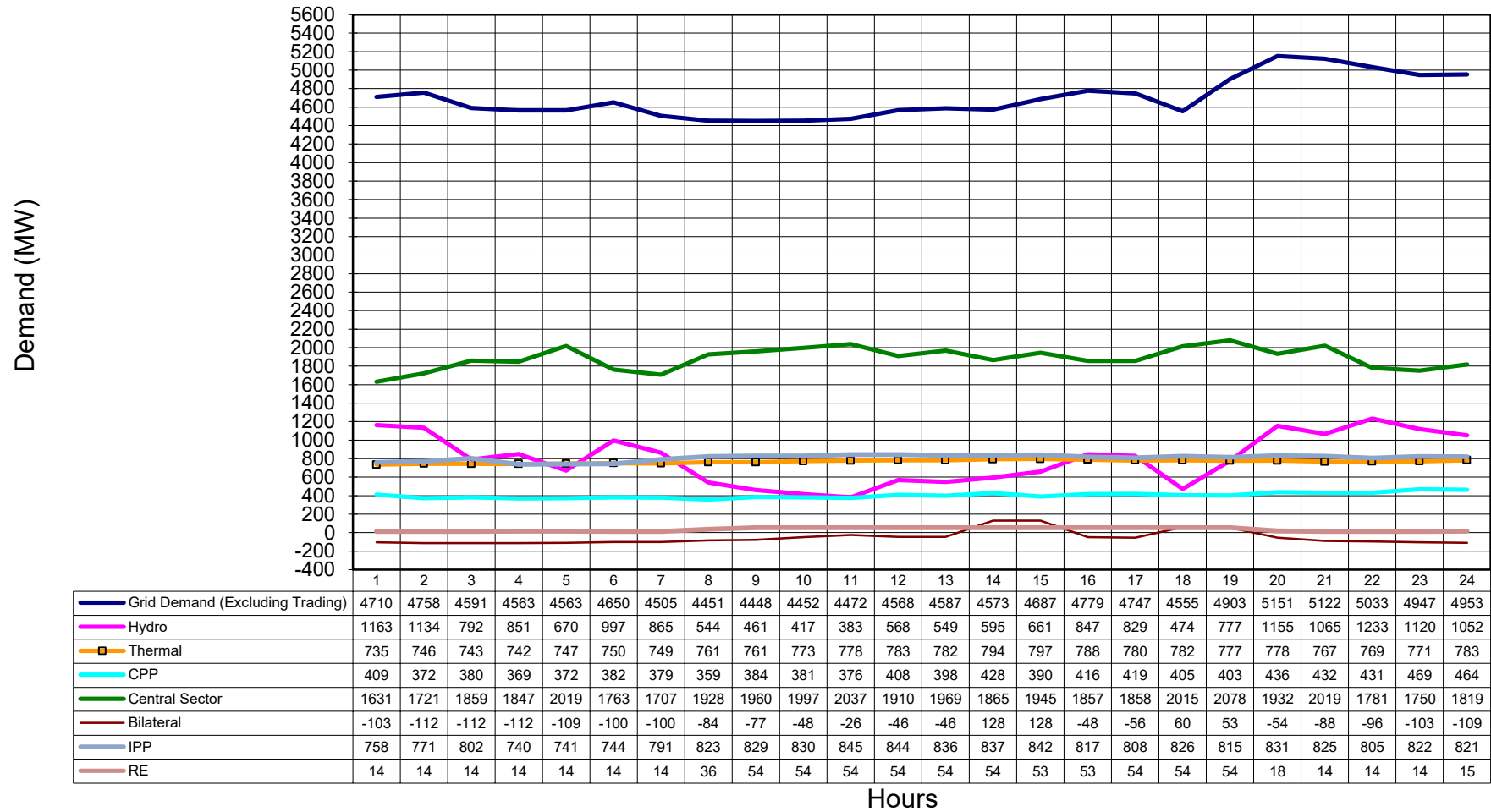




## Hourly Average Demand (Month wise) in support of Page-6

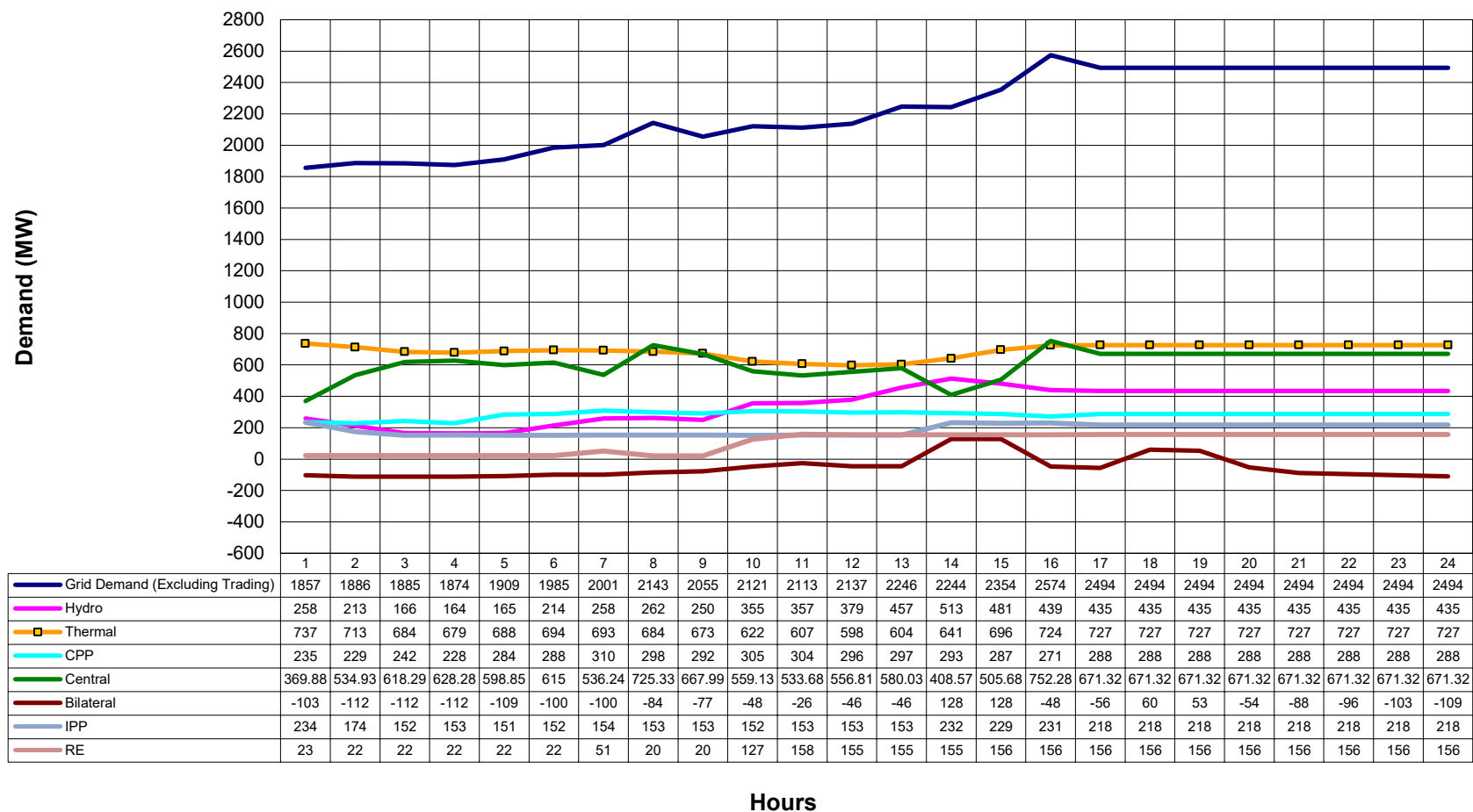
Hours---->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Apr.19	3939	3925	3771	3723	3712	3720	3637	3649	3641	3662	3717	3799	3834	3825	3917	3997	3960	3686	3911	4201	4203	4172	4142	4108
Mai.19	3725	3763	3565	3515	3499	3404	3333	3376	3351	3363	3415	3488	3548	3583	3693	3756	3672	3346	3285	3605	3654	3659	3723	3761
Jun.19	3797	3865	3652	3578	3537	3451	3420	3461	3454	3456	3529	3611	3705	3772	3905	4016	3905	3541	3457	3809	3874	3865	3888	3873
Jul.19	3748	3836	3603	3542	3528	3517	3548	3666	3694	3631	3596	3581	3558	3515	3544	3633	3650	3492	3623	4045	4077	4033	3967	3884
Aug.19	3948	4032	3814	3780	3793	3822	3858	3972	3950	3900	3853	3815	3757	3681	3718	3818	3869	3806	4058	4316	4291	4243	4162	4058
Sep.19	3859	3899	3709	3663	3651	3692	3737	3878	3863	3849	3804	3756	3691	3619	3660	3805	3836	3836	4175	4281	4223	4150	4075	3969
Okt.19	3289	3302	3168	3134	3166	3243	3343	3475	3446	3404	3371	3325	3258	3186	3201	3302	3351	3510	3807	3793	3707	3603	3490	3398
Nov.19	2702	2697	2606	2614	2716	2938	3179	3350	3268	3129	3052	2947	2833	2694	2690	2868	3093	3429	3631	3507	3360	3150	2934	2798
Dez.19	2550	2543	2485	2493	2593	2867	3240	3529	3479	3333	3212	3082	2936	2737	2654	2833	3088	3440	3652	3509	3299	3053	2771	2617
Jän.20	2307	2274	2240	2241	2323	2589	3024	3360	3336	3193	3059	2921	2759	2537	2424	2541	2748	3081	3438	3370	3184	2918	2609	2412
Feb.20	2647	2577	2564	2541	2617	2867	3279	3559	3503	3378	3259	3150	2983	2753	2654	2777	2959	3199	3621	3621	3465	3216	2924	2751
Mär.20	2933	2984	2819	2791	2813	2947	3147	3276	3246	3190	3174	3125	3040	2875	2851	2950	2978	2992	3387	3521	3445	3312	3156	3046
Avg. Annual	<b>3287</b>	<b>3308</b>	<b>3166</b>	<b>3134</b>	<b>3162</b>	<b>3255</b>	<b>3395</b>	<b>3546</b>	<b>3519</b>	<b>3457</b>	<b>3420</b>	<b>3383</b>	<b>3325</b>	<b>3231</b>	<b>3243</b>	<b>3358</b>	<b>3426</b>	<b>3447</b>	<b>3670</b>	<b>3798</b>	<b>3732</b>	<b>3614</b>	<b>3487</b>	<b>3390</b>

## HOURLY DEMAND CURVE FOR 04.04.2019 (MAX PEAK DEMAND OF THE YEAR (2019-20))



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

## HOURLY DEMAND CURVE FOR 05.04.2019 (MIN PEAK DEMAND OF THE YEAR 2019-20)



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



# **INSTALLED CAPACITY (AS ON 31.3.2020) ENERGY GENERATION / ENERGY DRAWAL BY OPTCL**

SECTOR	Installed capacity (MW)	Energy Generation (incl. Aux) (MU)	Energy Drawal by GRIDCO (MU)
<b>A. STATE SECTOR</b>			
OHPC(Hydro)*	2063.5	6356.889	6168.421
OPGC (Thermal)	1740	6527.080	6115.489
TTPS (Thermal)	460	3317.151	3022.345
TTPS (UI-OD)			23.083
IPPs			2588.516
CPP (Synchronised to OPTCL System)			526.277
Renewable Energy Including Co-gen	-		1274.398
<b>B. CENTRAL SECTOR (Orissa Share)</b>			
Hydro	189.40		
Thermal	1585.65	-	7042.664
C. Banking Power+OA+Trading+IEX (Import)			1495.243
<b>TOTAL DRAWAL</b>			<b>28210.270</b>
D. Banking Power+OA+Trading+IEX (Export)			2339.641
E. Deviation(Export)			238.671
F. Sold to Other Utilities			100.433
<b>Net GRIDCO demand</b>			<b>25531.525</b>

Export to ICCL

9.440

Export to NALCO

35.777

\* Includes Orissa share from Machhkund.

## **2 TRANSMISSION LINES AND SUBSTATIONS**

<b>A. CIRCUIT LINES</b>	As on 31.03.2019	Capacity Addition in 2019-2020	As on 1.4.2020	Remark
400 kV line (ckt.km)	1196.872	0.000	1196.872	
220kV line (ckt.km)	5974.856	208.55	5974.856	-
132kV line (ckt.km)	6823.303	155.835	6979.138	-
<b>B. SUBSTATIONS</b>				<b>New Substation</b>
400 / 220 / 132kV (nos.)	3	0	3	-
400 / 220 (nos.)	1	0	1	-
220/132/33kV (nos.)	20	2	22	Aska New, Jayapatana
220/33kV (nos.)	10	1	11	Kasipur
132/33 kV (nos.)	92	5	97	(Unit-8, Betanati, Kharagprasad, Agarapada, Patangi, Bhubaneswar)(Aska New excluded)
132/33/25 kV (nos.)	1	0	1	-
132/33/11 kV (nos.)	1	0	1	-
132kV Switching Stations (OPTCL)	4	-1	3	(Kharagprasad excluded)
132kV LILO Switching Stations of Industries	16	1	17	JSWCL
<b>Total</b>	<b>140</b>	<b>8</b>	<b>156</b>	-

### **Note:**

#### **Capacity addition details for 220kV:**

- 220 kV Bhanjanagar - Aska New DC-57.200 ckm
- 220 kV Laxmipur NALCO DC-73.98 ckm
- 220 kV Jayapatana LILO DC(on Therubali - IndravatiCkt IV)-32.000 ckm
- 220 kV Keonjhar PG - Keonjhar DC-15.000 ckm
- 220 kV Jayanagar - PGCIL DC Ckt (3 & 4)-15.460 ckm
- 220 kV Balimela - Malkangiri DC-44.820 ckm
- Upgraded
- 220kV 220 kV Keonjhar PG - Keonjhar SC on DC Towers - (-)7.500 ckm
- 220kV Balimela - MalkangiriCkt-I SC on DC Towers- (-) 22.410 ckm

#### **Capacity addition details for 132kV:**

- 132 kV Aska New LILO DC ( on 132 kV Aska - Berhampur Line) – 5.200 ckm
- 132 kV Bhadrak – Anandpur SC (in DC Towers) – 46.764 ckm
- 132 kV Agarpada LILO DC (Bhadrakh - Anandpur Line) – 23.340 ckm
- 132 kV JSWCL LILO DC ( on 132 kV Duburi Old - MESCO Ckt - II)- 9.380 ckm
- 132 kV Kesinga - JunagarhCkt II SC (in DC Towers)- 53.000 ckm
- 132 kV New Bolangir 'T' (on 132 kV Bolangir - Sonapur Line)-2.011 ckm
- 132 kV Chandaka - Bhubaneswar-B Ckt-I UG SC- 11.200 ckm
- 132 kV Kamakhyanagar RTSS-4.940 ckm

### 3 **PERFORMANCE OF OPTCL DURING 2019-20**

#### 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	4.00	0.00	0.00	4.00
Percentage(%)	0.00	0.18	0.00	0.00	0.05

\* —▶ 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 50.05 Hz

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
(In Hrs)	459.68	493.13	592.03	496.58	2041.43
Percentage(%)	21.05	22.33	26.81	22.74	23.30

(ii) Maximum continous period beyond 50.05 Hz

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
(In Hrs)	3.23	2.93	2.18	1.67	3.23
Percentage(%)	0.15	0.13	0.10	0.08	0.04

(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	50.26	50.32	50.18	50.26	50.32
Date/Time	<u>16.06.19</u> 09:30 hr	<u>15.07.19</u> 13:06 hr	<u>26.10.19</u> 13:00 hr	<u>29.03.20</u> 13:30hr	<u>15.07.19</u> 13:06hr

(iv) Below 49.9 Hz

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
(In Hrs)	185.57	0.88	89.82	130.97	407.24
Percentage(%)	8.50	0.04	4.07	0.60	4.65

(v) Maxm. Continous period below 49.9 Hz

Duration	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	<u>Annual</u>
(In Hrs)	1.20	1.02	0.85	1.15	1.20
Percentage(%)	0.055	0.046	0.038	0.053	0.014

(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	49.69	49.55	49.72	49.73	49.55
Date/Time	<u>09.05.19</u> 14:15 hr	<u>20.08.19</u> 19:19 hr	<u>18.11.19</u> 06:15 hr	<u>06.01.20</u> 14:15 hr	<u>20.08.19</u> 19:19 hr

### 3. C - 2 VOLTAGE PROFILE ( 2019-20 )

#### MAXIMUM VOLTAGES OF MAJOR GRID SUB-STATIONS. ( 400kV )

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	Duburi (N)	416.674	03.05.19	06:30	417.655	08.08.19	04:00	419.85	28.12.19	02:30	423.20	25.03.20	05:15	<b>423.20</b>	<b>25.03.20</b>	<b>05:15</b>
2	Lapanga	419.79	22.06.19	05:00	417.713	04.08.19	05:45	416.674	27.11.19	02:45	417.54	06.03.20	02:30	<b>419.79</b>	<b>22.06.19</b>	<b>05:00</b>
3	Mendhasal	424.93	15.05.19	18:45	417.54	07.09.19	03:30	421.18	28.12.19	02:30	421.99	19.03.20	20:45	<b>424.93</b>	<b>15.05.19</b>	<b>18:45</b>
4	Meramundali	414.08	21.06.19	05:00	416.50	07.09.19	03:30	420.715	28.12.19	02:30	424.01	19.03.20	20:45	<b>424.01</b>	<b>19.03.20</b>	<b>20:45</b>

#### MINIMUM VOLTAGES OF MAJOR GRID SUB-STATIONS. ( 400kV )

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	Duburi (N)	396.062	20.05.19	15:00	394.97	22.07.19	23:00	403.22	03.10.19	18:30	404.203	31.03.20	23:00	<b>394.97</b>	<b>22.07.19</b>	<b>23:00</b>
2	Lapanga	403.305	12.06.19	05:15	406.74	21.08.19	22:30	409.17	19.10.19	16:15	408.30	26.02.20	18:00	<b>403.31</b>	<b>12.06.19</b>	<b>05:15</b>
3	Mendhasal	375.39	08.06.19	10:30	385.555	10.08.19	22:45	396.351	03.10.19	18:30	402.182	12.02.20	18:45	<b>375.39</b>	<b>08.06.19</b>	<b>10:30</b>
4	Meramundali	400.33	28.06.19	08:15	402.12	10.08.19	23:15	400.85	22.11.19	10:15	409.284	07.01.20	09:30	<b>400.33</b>	<b>28.06.19</b>	<b>08:15</b>



**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	ATRI	243.23	05.05.19	06:30	234.744	07.09.19	03:30	237.464	28.12.19	02:45	237.868	19.03.20	20:45	243.23	05.05.19	06:30
2	Balasore	234.34	25.05.19	17:00	231.742	25.09.19	04:15	237.00	09.11.19	01:15	234.866	16.01.20	01:00	237.00	09.11.19	01:15
3	Bhadrak	236.014	25.05.19	17:00	232.146	25.09.19	04:15	234.173	09.11.19	00:45	235.097	19.03.20	20:45	236.01	25.05.19	17:00
4	Bhanjanagar	238.958	05.05.19	06:15	236.36	26.09.19	04:00	239.196	28.12.19	02:45	242.718	19.02.20	20:45	242.72	19.02.20	20:45
5	Bidanasi	242.134	05.05.19	11:30	236.533	07.09.19	03:45	239.658	16.12.19	04:15	238.272	01.01.20	04:15	242.13	05.05.19	11:30
6	Budhipadar	231.511	28.06.19	06:00	231.626	02.07.19	05:45	235.674	23.11.19	05:30	232.614	12.01.20	04:30	235.67	23.11.19	05:30
7	Chandaka	236.014	15.05.19	18:45	230.645	25.09.19	04:00	235.097	09.11.19	03:15	236.656	17.01.20	02:30	236.66	17.01.20	02:30
8	Duburi	233.127	03.05.19	06:30	231.684	25.09.19	04:15	236.829	28.12.19	02:30	233.365	20.01.20	02:45	236.83	28.12.19	02:30
9	Jaynagar	238.208	21.06.19	10:30	239.94	26.09.19	05:45	239.6	26.10.19	04:15	240.524	29.03.20	17:30	240.52	29.03.20	17:30
10	Joda	234.513	21.04.19	16:30	231.107	29.09.19	06:00	240.871	28.12.19	02:45	237.233	09.01.20	03:00	240.87	28.12.19	02:45
11	Katapalli	228.451	21.06.19	05:00	229.663	08.08.19	04:45	236.367	21.12.19	14:00	228.977	05.02.20	04:30	236.37	21.12.19	14:00
12	Lapanga	230.876	22.06.19	05:00	232.319	08.08.19	04:45	238.792	23.11.19	05:45	240.871	17.03.20	17:15	240.87	17.03.20	17:15
13	Laxmipur	239.651	20.06.19	18:15	241.50	06.07.19	14:30	239.89	05.11.19	13:30	240.93	19.03.20	20:45	241.50	06.07.19	14:30
14	Mendhasal	236.99	15.05.19	18:45	233.47	07.09.19	03:30	240.29	28.12.19	02:45	243.82	09.02.20	15:45	243.82	09.02.20	15:45
15	Meramundali	227.70	21.06.19	06:15	228.624	08.08.19	03:45	239.889	28.12.19	02:30	230.132	11.02.20	03:45	239.89	28.12.19	02:30
16	Narendrapur	244.33	03.05.19	07:30	237.688	13.07.19	16:00	236.194	09.11.19	03:30	239.023	17.01.20	02:30	244.33	03.05.19	07:30
17	Nayagarh	244.33	05.05.19	07:30	235.552	07.09.19	03:30	242.718	07.12.19	07:45	240.351	19.03.20	20:45	244.33	05.05.19	07:30
18	Paradeep	233.878	04.05.19	06:15	233.13	08.08.19	04:30	238.45	28.12.19	02:45	237.93	19.03.20	22:00	238.45	28.12.19	02:45
19	Sadeipali	232.43	21.06.19	05:00	234.86	23.09.19	19:15	237.23	25.10.19	05:00	235.56	22.01.20	16:30	237.23	25.10.19	05:00
20	Tarkera	261.53	24.06.19	09:30	231.86	08.08.19	05:45	229.67	19.12.19	13:45	238.56	25.03.20	14:00	261.53	24.06.19	09:30
21	Theruvuli	244.39	27.05.19	18:00	238.73	06.07.19	14:30	240.81	05.11.19	13:15	239.83	17.01.20	01:45	244.39	27.05.19	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	ATRI	209.40	25.05.19	14:15	209.399	10.08.19	22:45	220.028	19.12.19	17:45	225.167	24.02.20	10:00	209.40	25.05.19	14:15
2	Balasore	202.82	21.05.19	13:45	207.378	22.07.19	22:45	218.931	03.10.19	18:30	219.624	28.03.20	20:15	202.82	21.05.19	13:45
3	Bhadrak	202.067	19.06.19	11:15	206.57	22.07.19	23:00	214.89	03.10.19	18:30	219.393	10.01.20	18:00	202.07	19.06.19	11:15
4	Bhanjanagar	210.149	10.05.19	20:30	212.055	10.08.19	20:15	221.067	03.10.19	18:45	225.282	12.02.20	18:45	210.15	10.05.19	20:30
5	Bidanasi	212.112	10.05.19	15:30	221.234	09.07.19	13:30	222.395	03.10.19	18:00	223.723	24.02.20	10:00	212.11	10.05.19	15:30
6	Budhipadar	224.294	09.04.19	10:00	225.10	24.07.19	15:30	212.349	24.12.19	17:00	226.379	01.02.20	15:45	212.35	24.12.19	17:00
7	Chandaka	199.53	10.05.19	19:30	204.722	10.08.19	22:45	215.063	30.12.19	08:30	222.338	10.01.20	08:45	199.53	10.05.19	19:30
8	Duburi	212.055	21.05.19	15:15	214.364	22.07.19	23:00	222.395	19.12.19	17:45	223.377	07.01.20	09:15	212.05	21.05.19	15:15
9	Jaynagar	224.352	04.04.19	12:45	229.317	11.08.19	19:15	226.148	19.12.19	18:00	228.977	12.02.20	18:45	224.35	04.04.19	12:45
10	Joda	213.382	10.05.19	00:00	214.65	22.07.19	22:45	223.608	04.10.19	19:45	216.22	17.03.20	18:00	213.38	10.05.19	00:00
11	Katapalli	206.859	23.05.19	10:15	217.077	24.07.19	15:45	220.663	23.11.19	08:30	216.04	17.03.20	18:00	206.86	23.05.19	10:15
12	Lapanga	221.811	12.06.19	05:15	222.042	21.08.19	05:30	219.624	24.12.19	17:15	225.167	02.02.20	09:00	219.62	24.12.19	17:15
13	Laxmipur	221.12	19.05.19	09:30	225.33	11.08.19	19:15	227.88	24.12.19	17:15	229.61	12.02.20	18:45	221.12	19.05.19	09:30
14	Mendhasal	196.25	10.05.19	21:15	208.42	10.08.19	22:45	219.39	03.10.19	18:45	225.28	24.02.20	10:00	196.25	10.05.19	21:15
15	Meramundali	217.77	20.05.19	15:00	208.821	10.08.19	21:45	205.71	03.10.19	11:45	206.46	04.01.20	17:30	205.71	03.10.19	11:45
16	Narendrapur	192.54	18.05.19	15:15	220.195	22.07.19	21:15	215.294	03.10.19	18:45	221.414	10.01.20	18:15	192.54	18.05.19	15:15
17	Nayagarh	206.281	10.05.19	20:30	210.958	30.08.19	13:30	209.174	06.10.19	13:45	219.047	15.01.20	08:30	206.28	10.05.19	20:30
18	Paradeep	201.027	20.06.19	00:00	203.28	20.08.19	21:30	203.92	03.10.19	12:30	213.39	07.01.20	09:15	201.03	20.06.19	00:00
19	Sadeipali	210.61	04.05.19	16:45	209.40	24.09.19	18:00	218.70	16.10.19	16:15	204.61	06.01.20	16:45	204.61	06.01.20	16:45
20	Tarkera	212.81	08.04.19	18:45	222.16	22.07.19	23:30	218.58	02.10.19	19:15	219.34	04.01.20	08:30	212.81	08.04.19	18:45
21	Theruvuli	213.32	10.05.19	20:30	212.40	10.08.19	20:15	224.36	01.10.19	18:45	225.63	12.02.20	16:00	212.40	10.08.19	20:15

**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	142.082	05.05.19	11:45	139.20	07.09.19	03:30	140.93	09.11.19	03:45	138.62	04.03.20	14:15	<b>142.08</b>	<b>05.05.19</b>	<b>11:45</b>
2	Berhampur	149.82	27.05.19	18:00	141.793	13.07.19	16:00	141.45	28.12.19	02:15	142.201	20.03.20	05:45	<b>149.82</b>	<b>27.05.19</b>	<b>18:00</b>
3	Puri	142.54	05.06.19	21:15	139.368	07.09.19	03:30	143.07	09.11.19	03:45	139.315	02.03.20	03:30	<b>143.07</b>	<b>09.11.19</b>	<b>03:45</b>
4	Khurda	139.89	05.05.19	06:45	138.329	08.08.19	03:45	136.6	09.11.19	00:15	137.063	19.03.20	19:30	<b>139.89</b>	<b>05.05.19</b>	<b>06:45</b>

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

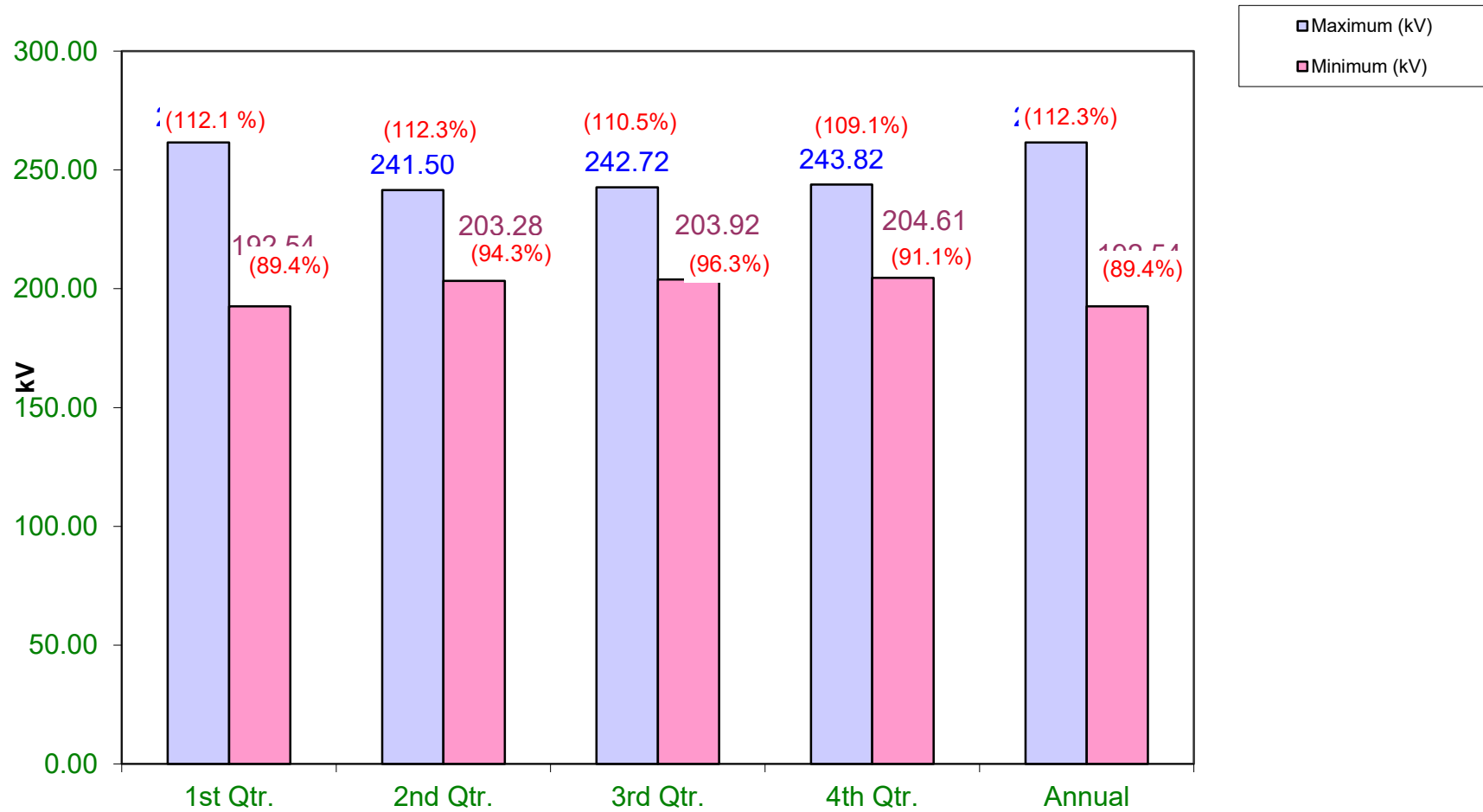
Sl. No.	Name of the Sub-station	Quarter - 1			Quarter - 2			Quarter - 3			Quarter - 4			ANNUAL		
		Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.	Voltage in kV	Date	Time in Hrs.
1	Cuttack	118.007	07.06.19	16:15	121.99	10.08.19	22:45	118.47	04.10.19	14:15	124.939	09.02.20	10:45	<b>118.01</b>	<b>07.06.19</b>	<b>16:15</b>
2	Berhampur	114.716	08.06.19	10:30	114.14	10.08.19	22:45	124.30	04.12.19	07:00	127.54	28.01.20	08:15	<b>114.14</b>	<b>10.08.19</b>	<b>22:45</b>
3	Puri	110.386	10.06.19	19:30	111.483	10.08.19	22:45	120.55	21.10.19	18:00	121.763	10.01.20	08:45	<b>110.39</b>	<b>10.06.19</b>	<b>19:30</b>
4	Khurda	108.13	08.06.19	10:30	121.93	10.08.19	22:45	124.25	19.12.19	17:45	126.209	07.01.20	08:30	<b>108.13</b>	<b>08.06.19</b>	<b>10:30</b>

**Note:**

The bus voltages are recorded from 15min block voltage from meter data .

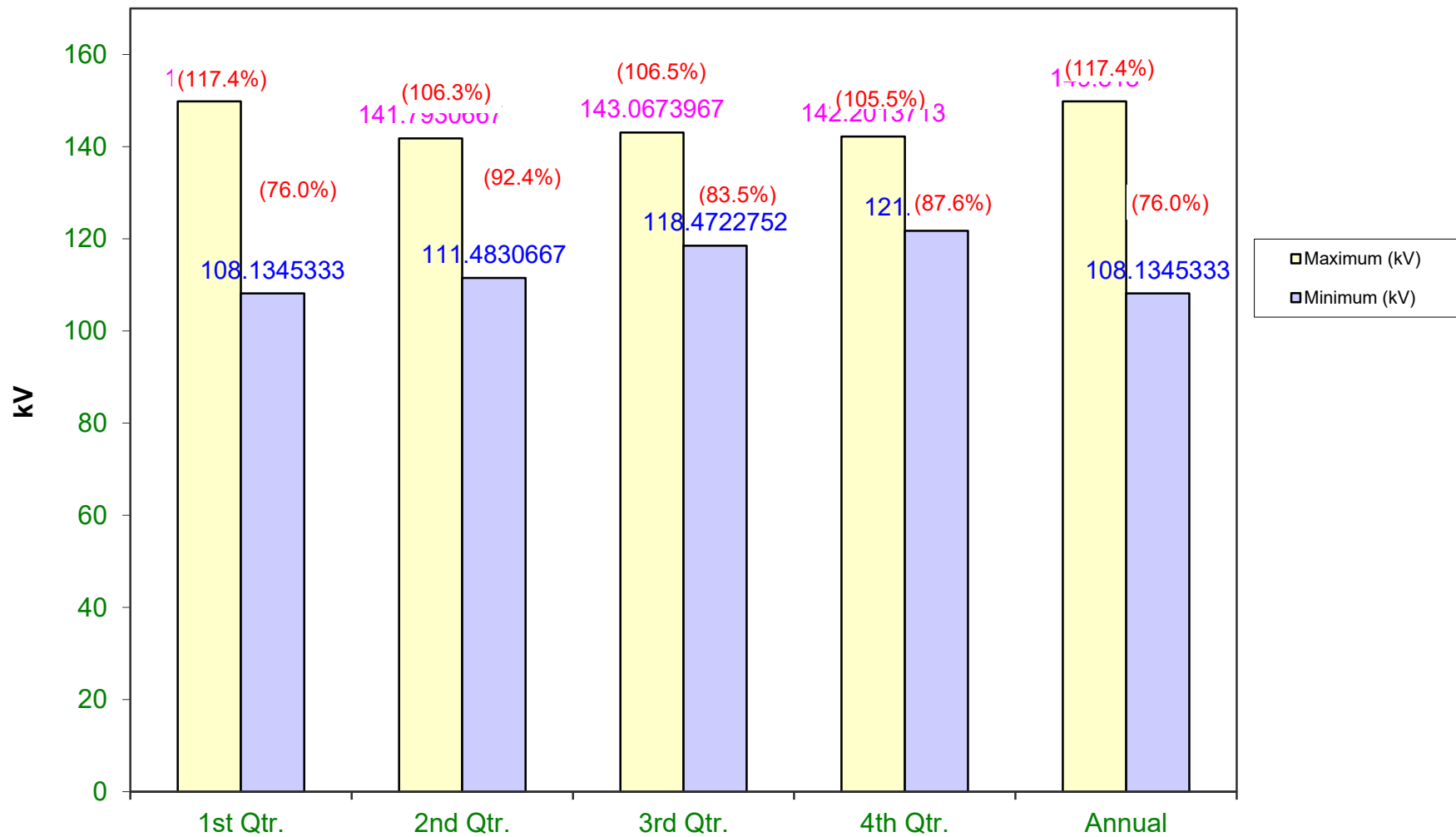
Further, low voltages during contingency conditions are also recorded as minimum voltages excluding disturbance period and any PT failure period.

## OVERALL PERFORMANCE VOLTAGE AT 220kV



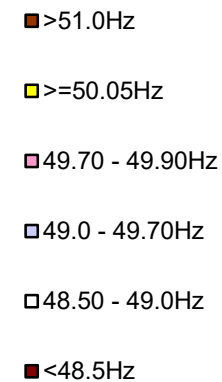
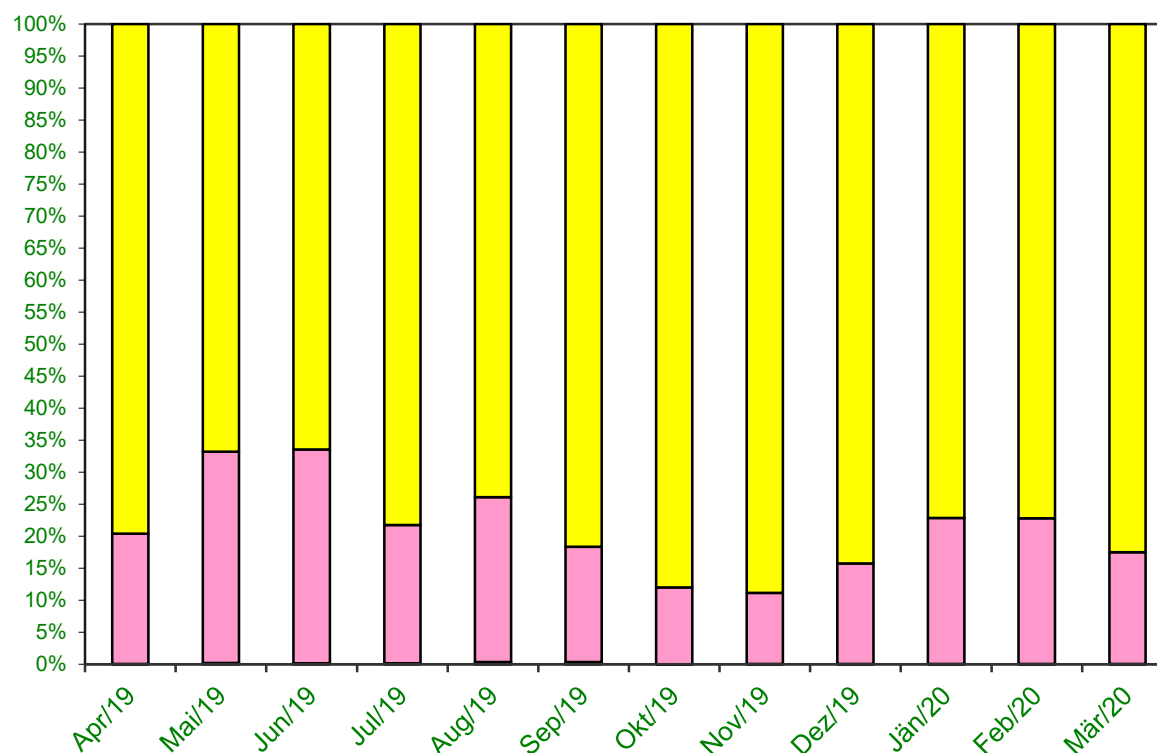


## OVERALL PERFORMANCE VOLTAGE AT 132 kV



## Frequency Performance

Percentage time occurrence



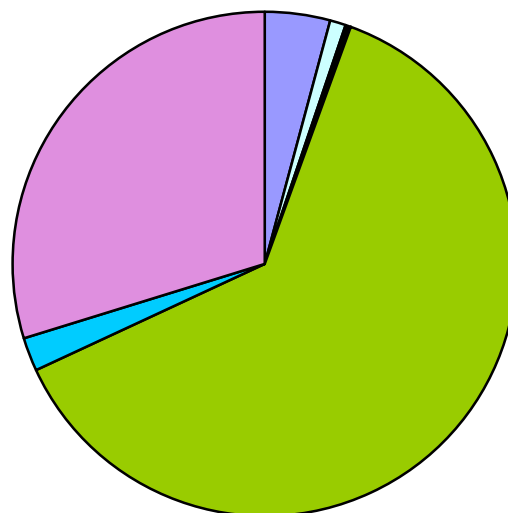
	Apr.19	Mai.19	Jun.19	Jul.19	Aug.19	Sep.19	Okt.19	Nov.19	Dez.19	Jän.20	Feb.20	Mär.20
■ >51.0Hz	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
■ >=50.05Hz	25.37	17.85	144.18	25.39	20.92	20.64	21.79	28.63	30.07	20.62	22.17	25.38
■ 49.70 - 49.90Hz	6.49	8.81	72.40	7.00	7.29	4.56	2.97	3.59	5.61	6.10	6.53	5.37
■ 49.0 - 49.70Hz	0.02	0.05	0.33	0.05	0.10	0.08	0.00	0.01	0.02	0.01	0.01	0.01
■ 48.50 - 49.0Hz	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
■ <48.5Hz	0.00	0.00	0.00	0.00	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	42:42:00	44
Insulator Failure	10:20:00	12
Bursting of CT / PT	3:32:00	4
Breaker Problem	0:00:00	1
Major System Disturbance*	638:23:00	9
Failure of LA	21:58:00	20
Others	303:52:00	381
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 2019-20.		

### INTERRUPTION (HRS) DUE TO MAJOR INCIDENT DURING 2019-20



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