

# ***OPTCL***



**(Approved by OERC vide Letter No. OERC-Engg-5/98 (Vol.XXIII)/ 276 dt. 15.11.2022)**

## **PERFORMANCE OF THE TRANSMISSION SYSTEM OF OPTCL FOR 2021-22**

[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 2021-22.****1. Procurement of Power:**

Source	Energy Requirement as per Commission's Approval ( MU)	Actual Drawl of energy for the State Consumption (MU)	Remarks
OHPC	5881.74	4667.25	State's Maximum and Minimum demand was 5645 MW and 2965 MW respectively
Thermal(OPGC)	6934.56	9179.60	
CPP & Co-generation Plants		574.41	
Renewable Generation	2702.35	1047.13	
IPP	4847.48	4065.33	
EREB	8425.83	14013.85	
Deviation(Export)		-369.01	
Net Banking +IEX+ STOA+ Sale to the Utilities		-5551.68	
Total	28791.96	27626.87	

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

Allowable Voltage Range at 220 kV level (245-198 kV)			
Sl. No.	Name of the 220/132 kV Grid Sub-station	Maximum Voltage in kV	Minimum Voltage in kV
1	ATRI	238	213
2	Balasore	237	211
3	Bhadrak	241	207
4	Bhanjanagar	245	217
5	Bidanasi	240	204
6	Budhipadar	232	203
7	Chandaka	235	202
8	Duburi	236	215
9	Jaynagar	249	214
10	Joda	231	214
11	Katapalli	231	213
12	Lapanga	231	204
13	Laxmipur	243	220
14	Mendhasal	240	214
15	Meramundali	235	220
16	Narendrapur	252	203
17	Nayagarh	240	214
18	Paradeep	239	201
19	Sadeipali	235	207
20	Tarkera	231	200
21	Theruvalli	243	215

Allowable Voltage Range at 400 kV level (380 -420 kV)			
Sl. No.	Name of the 400 kV Grid Sub-station	Maximum Voltage in kV	Minimum Voltage in kV
1	Duburi (N)	426	396
2	Lapanga	421	401
3	Mendhasal	425	390
4	Meramundali	433	395

Allowable Voltage Range at 132 kV level (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	120
2	Berhampur	151	116
3	Puri	138	112
4	Khurda	139	112

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

INTERRUPTION DUE TO MAJOR INCIDENT			
Nature of Incident	Duration of Interruption (Hrs:Min:Sec)	No. of Interruption	Remarks
Snapping of Jumper / Conductor / Earth wire	18:26:00	53	The duration of interruption in transmission line(s), sub-station(s)/ sub-station equipment is the sum total of interruptions occurred in different areas during the year. However no total blackout was experienced by the State during the year 2021-22.
Insulator Failure	12:49:00	25	
Bursting of CT / PT	15:40:00	12	
Breaker Problem	0:02:00	3	
Major System Disturbance	2:21:00	6	
Failure of LA	7:48:00	18	
Others	194:19:00	490	

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

**COMMISSION'S OBSERVATION/ DIRECTION ON THE SYSTEM  
PERFORMANCE REPORT SUBMITTED BY SLDC AS REGARDS TO OPERATION  
OF TRANSMISSION SYSTEM OF OPTCL FOR FY 2021-22**

**Background:**

OPTCL is operating as State Transmission Utility (STU) and is responsible for development of Transmission system (Transmission lines and Sub-stations) of 132 kV and above voltage level. SLDC is assigned with the responsibility to ensure integrated operation of the power system of the state on real time basis and to maintain grid discipline. The information relating to system operation is available in SLDC website i.e., [www.sldcorissa.org.in](http://www.sldcorissa.org.in). The observations and direction of the Commission on the system performance report submitted by SLDC for smooth operation of state grid for the FY 2021-22 are as follows:

**A. Energy Consumption and transaction through Open Access & Energy Banking:**

2. The energy consumption from various sources, transaction through open access and energy banking for the FY 2021-22 are summarized in the following table:

Source	Energy Requirement as per Commission's Approval ( MU)	Actual Drawl of energy for the State Consumption (MU)	Remarks
OHPC	5881.74	4667.25	State's Maximum and Minimum demand was 5645 MW (on 17.07.2021) and 2965 MW (on 26.05.2021) respectively
Thermal(OPGC)	6934.56	9179.60	
CPP & Co-generation Plants		574.41	
Renewable Generation	2702.35	1047.13	
IPP	4847.48	4065.33	
EREB	8425.83	14013.85	
Deviation(Export)		-369.01	
Net Banking +IEX+ STOA+ Sale to the Utilities		-5551.68	
Total	28791.96	27626.87	

There is an import of 806.974 MU through power banking, open access, trading & IEX) and export of 5920.697 MU (176.348 MU as sales to other utilities, 369.010 MU on account of deviation and 5375.339 MU through trading, OA, banking & IEX export) during the FY 2021-22. Hence, in the said financial year GRIDCO has an export of 5113.723 MU on this account.

3. During FY 2021-22, the daily peak demand touched 5645 MW on dt.17.07.2021 and minimum demand was 2965 MW on dt.26.05.2021. The peak demand in 2021-22 is about 597 MW (11.82%) more than the peak demand experienced during the previous year 2020-21 (5048 MW). The total energy drawl is about 27627 MU in FY 2021-22 against 25448 MU in 2020-21, which indicates the increase in electricity consumption of around 2179 MU (8.56%) in the State.

**B. 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 49.62 Hz and as high as 50.32 Hz during the 2<sup>nd</sup> quarter of FY 2021-22. DISCOMs should adhere to their drawl schedule to avoid over drawl from the grid during low frequency in order to maintain grid discipline. Further, large scale integration of generation from renewable resources introduces challenge for smooth operation of future power system due to reduction in system inertia and introduction of synthetic inertia in a big way. Therefore, effective methods may also be adopted in case of sudden changes in demand/ generation in order to maintain the frequency within the acceptable limits.

**C. 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 of 122-145 kV at 132 kV level, 198-245 kV at 220 kV level and 380-420 kV at 400 kV level. OPTCL has however experienced minimum voltage at four (4) 132 kV substations beyond the permissible limit. The voltage at Berhampur substation has gone upto 151 kV. Similarly, voltage at Cuttack, Berhampur, Puri, Khorda has gone below 120 kV. The voltage profile at 220 kV level was quite satisfactory except at Jayanagar and Narendrapur Substations where voltage has gone beyond permissible limit, i.e. 249 kV and 252 kV respectively. Therefore, OLTC of the power transformers should be in healthy condition and should be operated to maintain the voltage within the permissible limits in addition to other measures including reactive compensation. Hence, OPTCL should carry out reactive compensation study for a better voltage control and reliable operation of its transmission system. Also, the reactive load of DISCOMs is to be monitored regularly and OPTCL shall take up the matter with DISCOMs for providing adequate compensation in

distribution system as remedial measure and required system studies may also be carried out for advising DISCOMs to resolve such issues.

**D. Interruption due to failure/ outage of transmission system:**

6. The system interruption during the FY 2021-22 is observed to vary from 2 hours to 18 hours due to failure/ outage of various transmission system elements, i.e. on account of conductor/jumper/earth wire snapping, insulator failure, bursting of Current Transformer/ Potential Transformer, breaker problem, system disturbance, Lightning Arrester failures etc.. It has been reported that the load restriction has been imposed to curtail demand due to non-availability of generation/ failure of generating stations. But no black out has been experienced in the State during the FY 2021-22. Reliable communication system is going to play an important role in the power system in future. OPGW based communication system will not only facilitate smooth flow of data/ information but also help in improving protection system for efficient operation of transmission system. SLDC need to ensure that required information is available from substations through SCADA/ RTU for billing and smooth operation of the system. Further, efficient operation of its transmission system is very much required because of expected large scale integration of renewable generation with variability in injection of power in coming years. Operation feedback regarding overloading of transmission lines and transformers, over/ under voltage at various substations need to be provided timely to OPTCL so that remedial action can be taken at their end for mitigation of problem and smooth operation of system.

**E. Load Restriction:**

7. M/s. OPTCL has claimed that the load restriction due to transmission constraint is 'NIL'. OPTCL has to take steps for faster and timely execution of the transmission projects, already approved by the Commission, with optimization of cost and to avoid cost and time overrun & ultimate tariff burden to the consumers. Further, OPTCL should plan expansion of transmission network based on system study for longer time frame taking in to account the operation feedback of SLDC to avoid under-utilization of transmission assets ensuring no under loading of transmission lines and optimum loadings on substations to minimize system losses and overall transmission cost, ultimately reducing tariff burden on consumers. OPTCL need to take prior approval of the Commission for the investment required for transmission network expansion/ strengthening.

**F. Smooth Operation of the Grid with large scale integration of generation from RE sources:**

8. SLDC is the apex body responsible for optimum scheduling and dispatch of electricity within the state to ensure integrated operation and maintaining grid discipline of the power system of the state on real time basis. SLDC is responsible for smooth, secure and reliable operation of intra-state transmission system while carrying out real time operations. Further, in the backdrop of increasing cyber threat, SLDC is required to ensure stable operation of state grid and take appropriate measures against cyber attack of the grid for safe, secure & efficient operation of the power system. The OERC Regulation on Deviation Settlement Mechanism (DSM) is likely to be in place shortly. Hence, SLDC need to gear up with required tools for smooth implementation of DSM. Phasor Measurement Units (PMUs) are supposed to be installed at 400 kV sub-station and 220 kV & above voltage level generating stations for real time monitoring of the grid. Therefore, SLDC may take necessary action for installation of PMU at such locations. Moreover, the study/analysis of PMU data is to be carried out properly after major tripping/ disturbance/outage of transmission line or generator so that remedial measures can be taken accordingly.

The reduction in traditional source of generation and increase in use of generation from renewable energy sources, particularly during day time, is causing fundamental changes in steady state and dynamic behavior of the power system. The operation feedback by SLDC to STU/ OPTCL under the prevailing environment is essential for long term planning of the transmission system.

\*\*\*\*\*

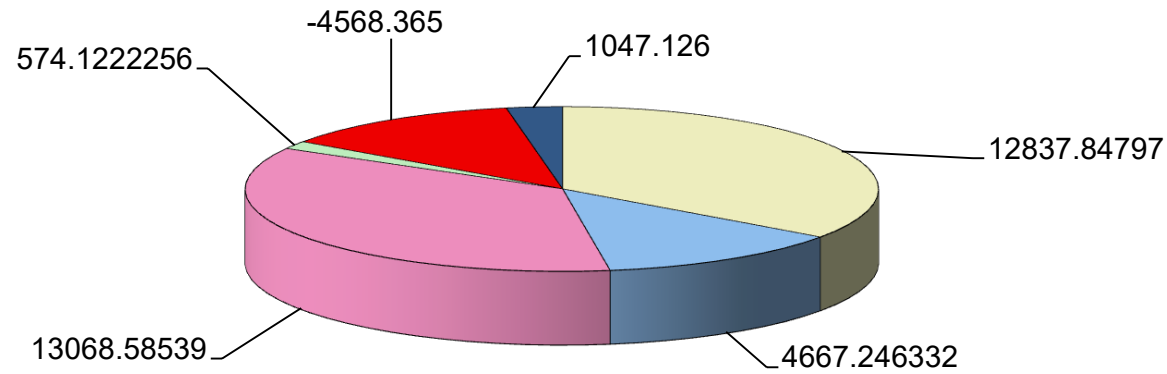






## GRID DEMAND FOR THE YEAR 2021-22

[Total Drawal 27626.563 MU ]



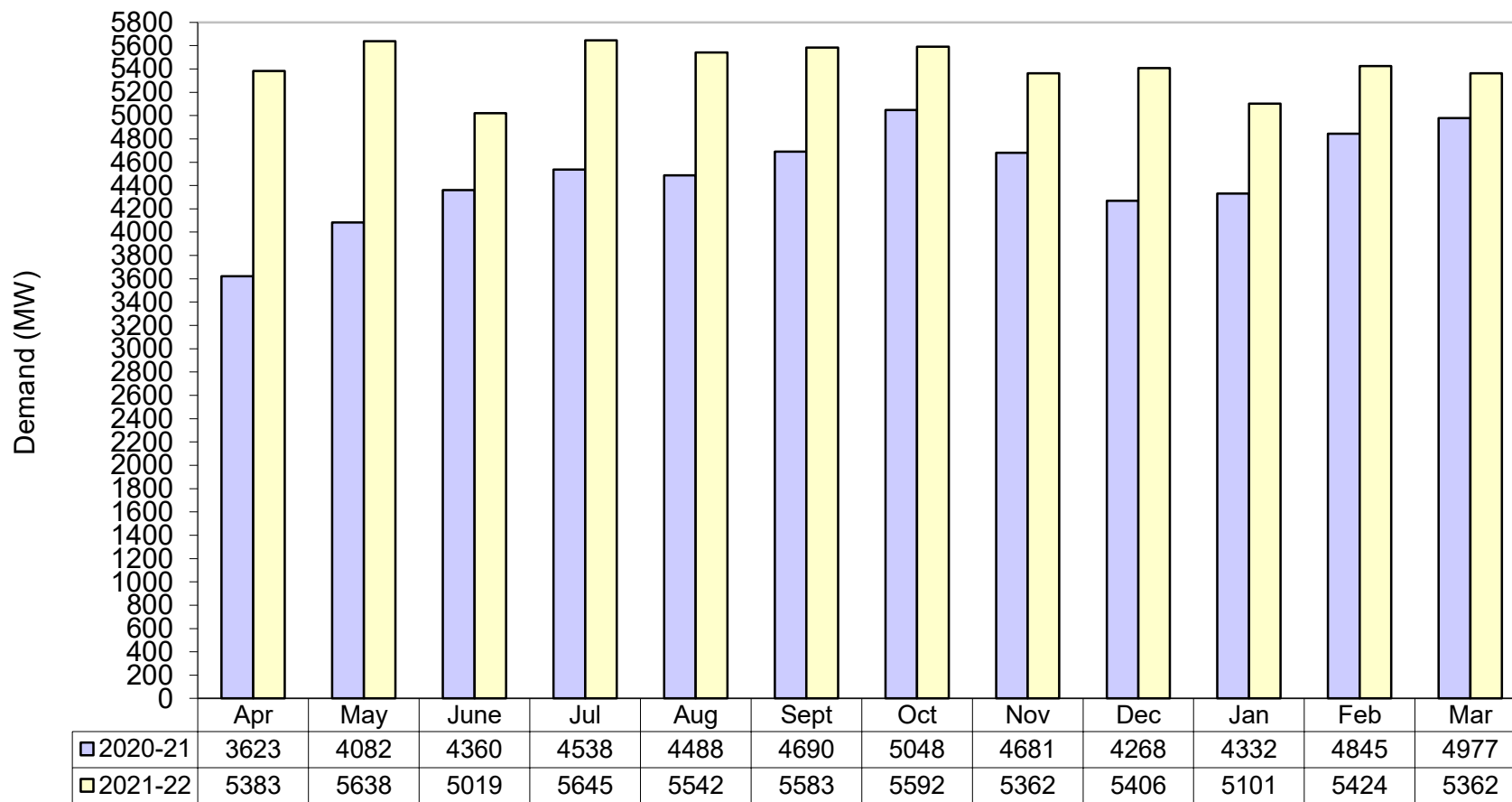
Net EREB Total Hydro NET Thermal (OPGC + TTPS+IPP) CPP Net (BankingPower+IEX+STOA) Renewable Energy



# **DAILY PEAK DEMAND (MW) EXCLUDING TRADING FOR THE YEAR 2021-22**

Day	Apr.21	Mai.21	Jun.21	Jul.21	Aug.21	Sep.21	Okt.21	Nov.21	Dez.21	Jän.22	Feb.22	Mär.22	Max	Min
1	4517	4943	4677	4639	4732	4848	4664	5195	4207	5101	4591	4905	5195	4207
2	4591	4806	4296	5121	5106	4922	4818	5142	4228	5024	4564	5083	5142	4228
3	4863	4824	4611	5461	5006	5371	4676	5337	4220	5010	4533	4912	5461	4220
4	4710	4221	4775	5250	5056	5412	5020	5243	3997	4856	4430	4832	5412	3997
5	5331	4046	4640	4957	5270	5583	5255	5362	4040	4778	4586	4819	5583	4040
6	4912	4352	4585	5064	5372	5201	5592	5287	4414	4882	4761	5220	5592	4352
7	5065	4070	4505	4788	5326	5287	5436	5011	4487	4886	4858	4996	5436	4070
8	4853	4366	4260	4689	5244	5486	5423	4808	4697	4472	5014	4575	5486	4260
9	4493	4073	4920	4846	5282	5302	5097	4875	4652	4460	5123	4790	5302	4073
10	4394	4507	4739	4822	5173	5319	5207	4952	4924	4258	5029	5055	5319	4258
11	4264	4255	4619	5028	5283	4937	5402	4859	5210	4324	5048	5106	5402	4255
12	4493	4235	4758	4921	5107	4242	4987	4909	5215	4196	5009	5058	5215	4196
13	4525	3671	4642	5121	5298	4047	4974	5011	4515	4389	4974	5111	5298	3671
14	4358	4368	4787	5143	5209	4483	4758	5089	4589	4459	5036	5140	5209	4358
15	4323	4491	4372	5186	4978	4654	4916	4937	4626	4475	4976	4681	5186	4323
16	4571	4571	4117	5566	5111	4882	4826	4862	4603	4617	4947	4985	5566	4117
17	4460	4742	4557	5645	5301	5121	4971	4808	4679	4639	5132	4948	5645	4460
18	4242	5638	4621	5413	5492	5173	5005	4789	4710	4840	4982	4852	5638	4242
19	4520	5605	4762	5302	4979	5096	5010	4683	4687	4840	5252	4743	5605	4520
20	4539	5458	5019	4924	4930	4799	5147	4544	4960	4880	4913	4931	5458	4539
21	5102	5225	4829	4998	4953	4755	5167	4432	4958	4710	5231	5006	5231	4432
22	5038	4923	4285	5210	4990	4941	5323	4489	5107	4773	5323	5160	5323	4285
23	5063	5149	4305	5061	5113	4833	5228	4482	5406	4632	5303	4990	5406	4305
24	5224	4985	4447	5438	5125	4990	5304	4409	5238	4558	5101	4821	5438	4409
25	5172	4505	4535	5376	5542	5004	4680	4837	4751	4426	5000	5196	5542	4426
26	5033	2965	4560	5283	5334	4666	5359	4834	4969	4392	5010	5018	5359	2965
27	5218	4173	4781	5017	5149	4677	5459	4832	5066	4570	4973	5233	5459	4173
28	5383	4980	4794	5017	4900	4763	5216	4699	5040	4562	5424	5362	5424	4562
29	5272	4938	4889	4938	4693	4792	5260	4303	4946	4670		5069	5272	4303
30	5045	5038	4902	5175	4689	4772	5465	4226	4948	4538		4909	5465	4226
31		5066		5310	4735		5202		5025	4648		4805	5310	4648
MAX	5383	5638	5019	5645	5542	5583	5592	5362	5406	5101	5424	5362	5645	4648
MIN	4242	2965	4117	4639	4689	4047	4664	4226	3997	4196	4430	4575	5142	2965

### COMPARISON OF MONTHLY PEAK DEMAND (MW) EXCLUDING TRADING FOR THE YEAR ENDING 2020-21 & 2021-22

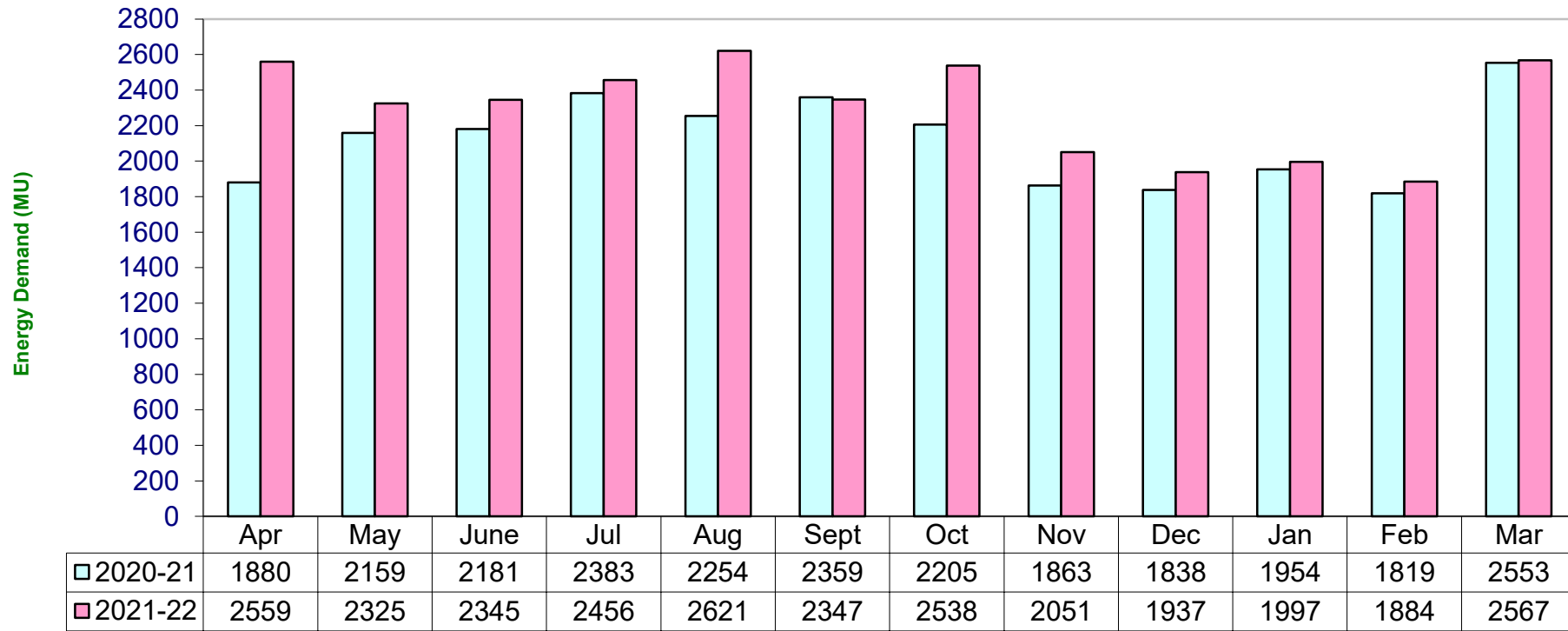


Month

Annual Peak Demand :      2020-21 - 5048 MW      2021-22 - 5645 MW

■ 2020-21    ■ 2021-22

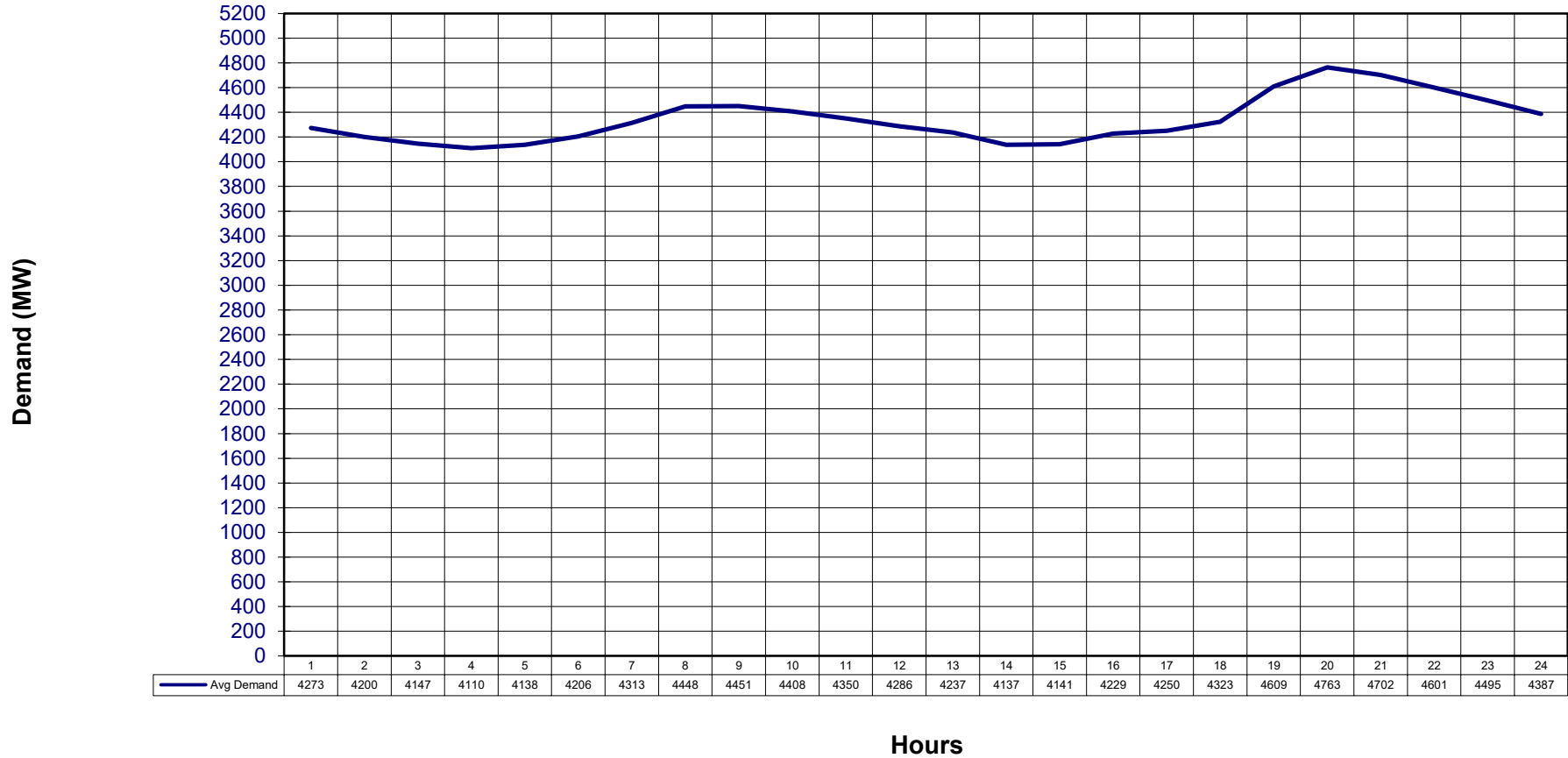
## COMPARISON OF MONTHLY ENERGY DEMAND (MU) EXCLUDING TRADING & RETURN BANKING POWER FOR THE YEAR ENDING 2020-21 & 2021-22



Month

Annual Energy Demand :      2020-21 - 25447.678 MU      2021-22 - 27626.563 MU

DEMAND CURVE FOR HOURLY AVERAGE DEMAND EXCLUDING TRADING FOR YEAR ENDING MARCH 2022



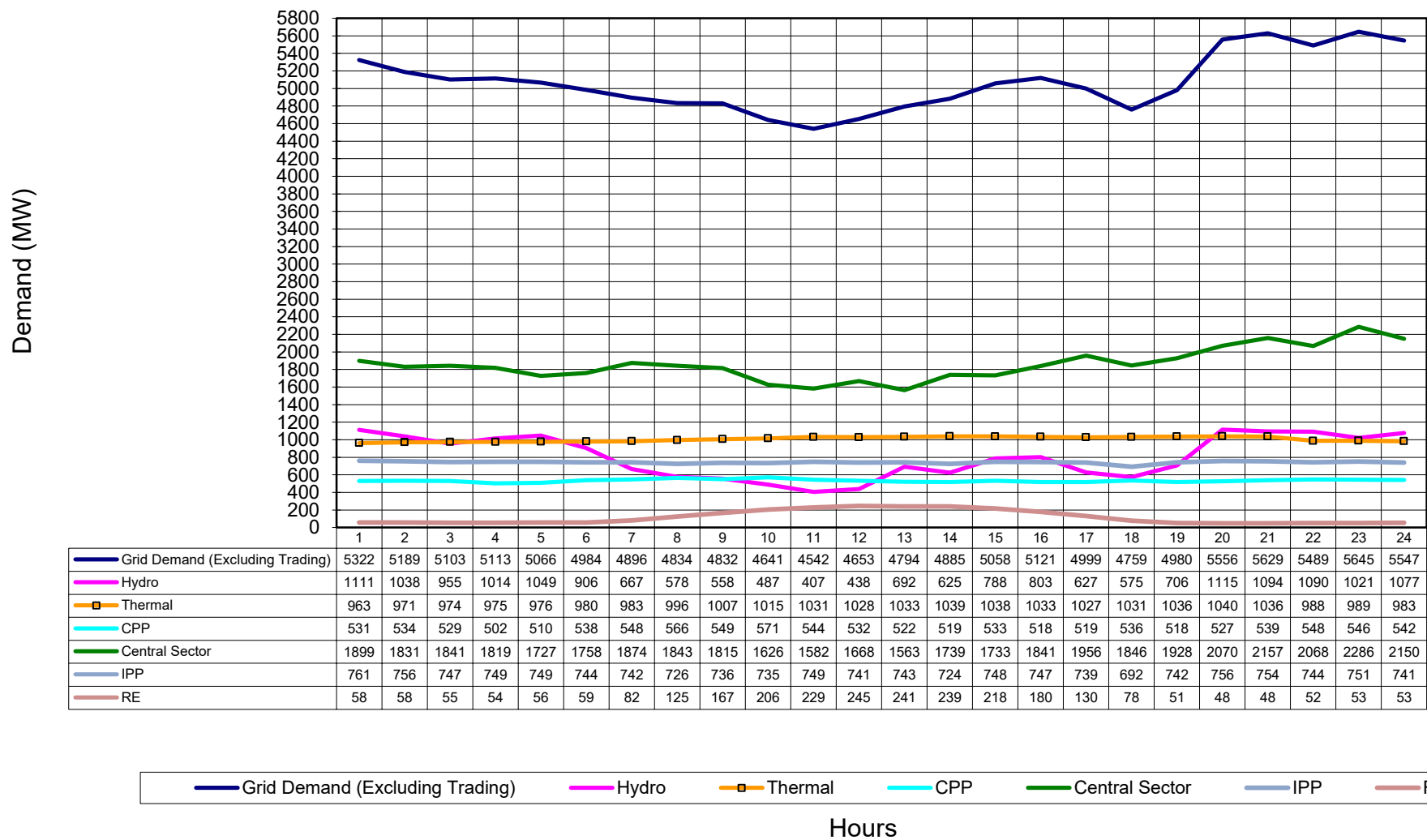


## Hourly Average Demand (Month wise) in support of Page-6

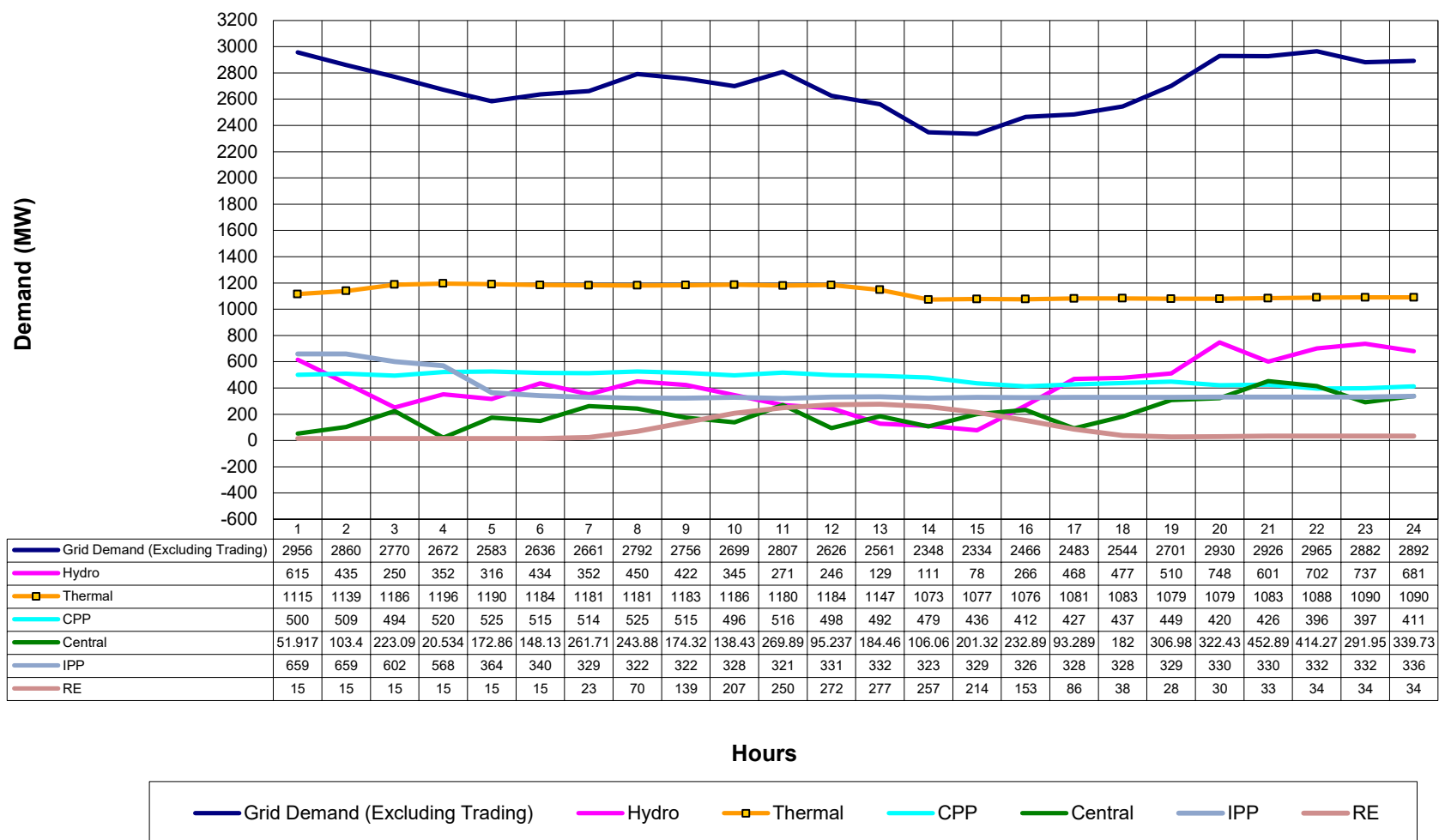
Page - 6(a)

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.21	4478	4380	4305	4245	4226	4169	4076	4056	4058	4062	4135	4194	4264	4267	4350	4392	4275	4091	4389	4671	4647	4636	4671	4608
Mai.21	4244	4128	4049	4011	3992	3938	3912	3961	3964	3971	4009	4037	4038	4016	4087	4126	3990	3792	3939	4329	4389	4413	4445	4390
Jun.21	4327	4236	4167	4095	4064	4016	4000	4068	4138	4160	4134	4115	4096	4069	4107	4155	4075	3924	4026	4465	4528	4528	4531	4454
Jul.21	4716	4590	4496	4424	4431	4420	4428	4465	4482	4484	4472	4417	4405	4347	4415	4509	4460	4336	4525	4971	5007	4978	4952	4860
Aug.21	4713	4605	4538	4477	4485	4473	4446	4455	4448	4421	4392	4345	4346	4287	4344	4416	4402	4344	4665	5076	5043	5008	4992	4893
Sep.21	4509	4433	4374	4349	4354	4378	4384	4472	4511	4501	4471	4424	4384	4311	4342	4409	4393	4387	4777	4899	4848	4761	4692	4604
Okt.21	4688	4642	4612	4568	4589	4644	4657	4724	4691	4632	4582	4523	4493	4425	4466	4566	4536	4678	5074	5057	4982	4893	4824	4751
Nov.21	4005	3983	3955	3931	4029	4196	4399	4564	4518	4424	4315	4183	4094	3941	3903	4044	4210	4637	4842	4713	4581	4376	4168	4040
Dez.21	3653	3612	3580	3596	3700	3941	4324	4660	4653	4552	4382	4215	4063	3853	3758	3888	4070	4505	4719	4589	4401	4177	3910	3760
Jän.22	3431	3382	3367	3356	3439	3662	4114	4553	4583	4474	4287	4082	3925	3680	3541	3644	3862	4248	4605	4518	4336	4045	3731	3530
Feb.22	4006	3976	3946	3931	4005	4196	4536	4859	4837	4731	4558	4415	4273	4075	3981	4089	4248	4477	4932	4914	4758	4573	4303	4124
Mär.22	4504	4427	4376	4332	4343	4435	4483	4543	4525	4486	4469	4482	4460	4368	4395	4507	4485	4460	4819	4958	4902	4822	4718	4635
Avg. Annual	<b>4273</b>	<b>4200</b>	<b>4147</b>	<b>4110</b>	<b>4138</b>	<b>4206</b>	<b>4313</b>	<b>4448</b>	<b>4451</b>	<b>4408</b>	<b>4350</b>	<b>4286</b>	<b>4237</b>	<b>4137</b>	<b>4141</b>	<b>4229</b>	<b>4250</b>	<b>4323</b>	<b>4609</b>	<b>4763</b>	<b>4702</b>	<b>4601</b>	<b>4495</b>	<b>4387</b>

## HOURLY DEMAND CURVE FOR 17.07.20201 (MAX PEAK DEMAND OF THE YEAR (2021-22))



## HOURLY DEMAND CURVE FOR 26.05.2021 (MIN PEAK DEMAND OF THE YEAR 2021-22)



# 1 INSTALLED CAPACITY (AS ON 31.3.2021) 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)*	2009.5	4789.173	4667.246
OPGC (Thermal)	1740	10024.048	9179.603
TTPS (Thermal)	-	0.000	0.000
TTPS (UI-OD)			0.000
IPPs			4065.330
CPP (Synchronised to OPTCL System)			574.122
Renewable Energy Including Co-gen	-		1047.126
<b>B. CENTRAL SECTOR (Orissa Share)</b>			
Hydro	268.38		
Thermal	1778.763	-	13206.858
C. Banking Power+OA+Trading+IEX (Import)			806.974
<b>TOTAL DRAWAL</b>			<b>33547.260</b>
D. Banking Power+OA+Trading+IEX (Export)			5375.339
E. Deviation(Export)			369.010
F. Sold to Other Utilities			176.348
<b>Net GRIDCO demand</b>			<b>27626.563</b>

Export to ICCL 34.141  
Export to NALCO 38.874

\* Includes Orissa share from Machhkund.

## 2 TRANSMISSION LINES AND SUBSTATIONS

A.CIRCUIT LINES	As on 31.03.2021	Capacity Addition in 2021-2022	As on 1.4.2022	Remark
400 kV line (ckt.km)	1196.872	0.000	1196.872	
220kV line (ckt.km)	6222.362	276.792	6499.154	-
132kV line (ckt.km)	7396.330	615.098	8011.428	-
<b>B. SUBSTATIONS</b>				<b>New Substation</b>
400 / 220 /132kV (nos.)	3	0	3	-
400 / 220 (nos.)	1	1	2	+1 (Meramundali-B)
220/132/33kV (nos.)	23	2	25	+2 (Pratapsasan, Gunupur)
220/132	1	0	1	
220/33kV (nos.)	12	3	15	+3 (Telkoi, Deogarh, Lephripada)
132/33 kV (nos.)	101	7	108	+8 (Thuapalli, Rajnagar, Gondia, Hirakud, Daitari, Nabarangpur, Brajrajnagar, Rourkela) -1 (Pratapsasan)
132/33/25 kV (nos.)	1	-1	0	-1 (Rourkela)
132/33/11 kV (nos.)	1	-1	0	-1 (Brajrajnagar)
132kV Switching Stations (OPTCL)	3	0	3	-
132kV LILO Switching Stations of Industries	19	1	20	+1 (Rungta Mines Ltd.)
<b>Total</b>	<b>165</b>	<b>12</b>	<b>177</b>	-

Note:

### Capacity addition details for 220kV:

- 220 kV Telkoi LILO from 220 kV TTPS - Joda Ckt-I - 29.166 ckm
- 220 kV Deogarh LILO DC from 220 kV Rengali-Barkote line - 24.740 ckm
- 220 kV Lephripada LILO (220 kV Budhipadar - Basundhara) - 7.750 ckm
- 220 kV Bonai-Bimlagarh RTSS SC on DC Towers - 20.218 ckm
- 220 kV Laxmipur RTSS SC on DC - 2.450 ckm
- 220 kV T- Connection from Meramundali-Duburi line to Meramundali-B GSS - 0.658 ckm
- 220 kV T- Connection from Meramundali-Goda line to Meramundali-B GSS - 0.658 ckm
- 220 kV New Bolangir-Kesinga SC on DC - 83.856 ckm
- 220 kV Bolangir PG-Kesinga SC on DC - 80.596 ckm
- 220 kV Gunupur LILO DC (on Therubali - Narendrapur Ckt I) - 27.200 ckm

### Capacity addition details for 132kV:

- 132 kV Thuapalli LILO DC (from 132 kV Katapali - Bargarh SC line) - 34.818 ckm
- 132 kV Samagaria - Malatipatpur RTSS SC on DC - 5.535 ckm
- 132 kV Therubali-Bhalumaska RTSS SC on DC - 31.100 ckm
- 132 kV Akhusingh - Gunupur SC (in DC Towers) - 23.296 ckm
- 132 kV Nabarangpur LILO from 132 kV Jayanagar-Tentulikhunti Ckt-II - 39.200 ckm
- 132 kV Aska New - Digapahandi DC - 76.374 ckm
- 132 kV Meramundali - Rungta Mines Ltd., DSP SC (in DC Towers) - 10.530 ckm
- 132 kV Rungta Mines LILO DC (on 132 kV Joda-Rourkela SC Line) - 4.320 ckm
- 132 kV Rungta Mines Sw. Stn. To Karakolha Steel Plant SC (in DC Towers) - 0.894 ckm
- 132 kV Padampur - Nuapada DC - 136 ckm
- 132 kV Pattamundai - Rajnagar DC - 44.572 ckm
- 132 kV Kuchel - Bangiriposi Ckt-II (SC on DC) - 31.256 ckm
- 132 kV Hinjili LILO DC (from 132 kV Berhampur-Aska New SC line) - 0.820 ckm
- 132 kV Gondia LILO DC (on 132kV TTPS-Duburi Ckt-II) - 48.918 ckm
- 132 kV Podagada-Patangi SC - 52 ckm
- 132 kV Daitari LILO DC from 132 kV BC Mohanty- Barnipal (TISCO) SC line - 19 ckm
- 132 kV ICCL - Salipur Ckt-II on DC Towers - 25.815 ckm
- 132 kV Hirakud LILO DC(Burla PH - Lapanga Ckt-I) - 0.418 ckm
- 132 kV Paradeep - SIJU RTSS - 5.081 ckm
- 132 kV Bahugram LILO DC (132 kV ICCL-Salipur Line) - 6.058 ckm

(132 kV Boinda - RTSS Boinda line of 3.361 km adjusted during FY 2019-20)

**Taken Over by OPTCL:** 132 kV Polasponga - ESSAR (ESIL) SC on DC - 19.093 ckm



### 3 **PERFORMANCE OF OPTCL DURING 2021-22**

#### 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	0.00	0.00	0.00	0.00
Percentage(%)	0.00	0.00	0.00	0.00	0.00

\* —▶ 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)	393.15	409.18	372.45	299.68	1474.47
Percentage(%)	18.00	18.53	16.87	13.87	16.83

(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)	1.18	1.88	1.37	0.70	1.88
Percentage(%)	0.05	0.09	0.06	0.03	0.02

(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	50.18	50.32	50.28	50.18	50.32
Date/Time	<u>04.06.21</u> 18:00 hr	<u>14.07.21</u> 13:15 hr	<u>20.12.21</u> 02:00 hr	<u>06.01.21</u> 13:00hr	<u>14.07.21</u> 13:15 hr

(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)	149.28	111.02	193.13	223.78	677.22
Percentage(%)	6.84	5.03	8.75	10.36	7.73

(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)	2.35	2.22	2.80	1.02	2.80
Percentage(%)	0.11	0.10	0.13	0.05	0.03

(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	49.71	49.6	49.6	49.58	49.6
Date/Time	<u>28.05.21</u> 22:30 hr	<u>24.09.21</u> 18:45 hr	<u>07.10.21</u> 18:15 hr	<u>22.03.22</u> 22:00 hr	<u>24.09.21</u> 18:45 hr

### **3. C - 2 VOLTAGE PROFILE ( 2021-22 )**

#### **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)	425.68	26.05.2021	13:15	422.74	14.09.2021	02:30	426.37	05.12.2021	03:00	426.4	04.02.2022	23:45	<b>426.43</b>	<b>04.02.2022</b>	<b>23:45</b>
2	Lapanga	413.15	11.05.2021	13:00	414.42	20.09.2021	02:15	414.31	29.12.2021	03:00	421.29	27.03.2022	15:15	<b>421.29</b>	<b>27.03.2022</b>	<b>15:15</b>
3	Mendhasal	425.22	11.05.2021	13:00	422.16	13.09.2021	04:45	425.22	22.12.2021	03:30	423.9	07.01.2022	02:30	<b>425.22</b>	<b>11.05.2021</b>	<b>13:00</b>
4	Meramundali	429.95	26.05.2021	13:15	431.3	30.09.2021	03:15	433.36	29.12.2021	02:45	432.2	02.01.2022	14:00	<b>433.36</b>	<b>29.12.2021</b>	<b>02:45</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)	396.47	29.06.2021	23:00	397.10	01.07.2021	00:30	405.18	08.10.2021	18:45	395.8	27.03.2022	14:30	<b>395.83</b>	<b>27.03.2022</b>	<b>14:30</b>
2	Lapanga	403.28	07.04.2021	15:15	405.88	04.09.2021	23:45	403.74	08.11.2021	17:45	401.03	23.03.2022	15:45	<b>401.03</b>	<b>23.03.2022</b>	<b>15:45</b>
3	Mendhasal	390.40	18.05.2021	14:30	394.50	12.08.2021	14:30	397.51	08.10.2021	18:45	389.9	28.03.2022	14:45	<b>389.94</b>	<b>28.03.2022</b>	<b>14:45</b>
4	Meramundali	406.86	18.05.2021	14:30	410.3	01.07.2021	10:30	412.86	17.12.2021	11:30	394.8	27.03.2022	14:45	<b>394.79</b>	<b>27.03.2022</b>	<b>14:45</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	237.8	11.05.2021	13:00	235.4	13.09.2021	04:45	237.6	29.12.2021	03:00	236.6	07.01.2022	02:30	237.80	11.05.2021	13:00
2	Balasore	237.3	25.05.2021	17:30	234.3	13.09.2021	06:00	234.0	22.12.2021	03:15	234.0	14.01.2022	23:45	237.28	25.05.2021	17:30
3	Bhadrak	240.6	25.05.2021	17:00	237.3	14.09.2021	02:45	235.6	27.12.2021	01:15	235.8	15.01.2022	00:45	240.63	25.05.2021	17:00
4	Bhanjanagar	243.0	11.05.2021	12:45	244.9	02.08.2021	14:00	241.4	20.12.2021	02:45	240.2	17.01.2022	02:30	244.90	02.08.2021	14:00
5	Bidanasi	239.4	11.05.2021	13:00	235.5	13.09.2021	04:45	239.5	29.12.2021	03:00	238.3	17.01.2022	03:00	239.54	29.12.2021	03:00
6	Budhipadar	230.6	11.05.2021	14:30	231.0	15.09.2021	00:45	231.9	29.12.2021	03:45	232.0	05.01.2022	01:30	231.97	05.01.2022	01:30
7	Chandaka	231.7	11.05.2021	13:00	227.8	13.09.2021	04:45	232.1	29.12.2021	03:00	235.3	05.02.2022	00:15	235.26	05.02.2022	00:15
8	Duburi	235.7	11.05.2021	13:15	234.5	13.09.2021	07:45	234.3	29.12.2021	03:00	234.7	07.01.2022	01:00	235.67	11.05.2021	13:15
9	Jaynagar	239.8	05.06.2021	17:30	239.7	26.07.2021	11:00	242.4	15.10.2021	13:45	248.8	27.02.2022	12:45	248.77	27.02.2022	12:45
10	Joda	231.3	11.05.2021	13:00	230.1	07.07.2021	20:00	231.2	29.12.2021	03:00	229.43	02.01.2022	02:45	231.28	11.05.2021	13:00
11	Katapalli	231.2	11.05.2021	13:00	230.0	07.07.2021	20:00	231.2	29.12.2021	03:00	229.41	02.01.2022	02:45	231.16	11.05.2021	13:00
12	Lapanga	230.2	11.05.2021	13:00	229.9	07.07.2021	21:00	230.6	29.12.2021	03:00	230.1	10.01.2022	03:00	230.59	29.12.2021	03:00
13	Laxmipur	239.9	08.05.2021	03:15	239.5	26.07.2021	11:00	242.8	19.12.2021	03:00	240.8	25.02.2022	01:45	242.77	19.12.2021	03:00
14	Mendhasal	239.7	11.05.2021	13:00	236.8	13.09.2021	04:45	239.3	22.12.2021	03:30	238.4	07.01.2022	02:15	239.71	11.05.2021	13:00
15	Meramundali	232.4	11.05.2021	13:00	234.0	14.09.2021	05:45	233.3	29.11.2021	03:45	235.0	21.01.2022	23:45	235.03	21.01.2022	23:45
16	Narendrapur	251.6	11.05.2021	12:45	251.6	26.07.2021	11:00	240.1	23.12.2021	23:15	238.3	21.02.2022	13:00	251.60	11.05.2021	12:45
17	Nayagarh	240.3	11.05.2021	12:45	237.1	14.09.2021	03:45	238.6	05.12.2021	03:30	237.9	17.01.2022	02:30	240.29	11.05.2021	12:45
18	Paradeep	238.7	11.05.2021	13:30	238.6	13.09.2021	07:00	236.9	25.12.2021	00:45	237.7	07.01.2022	02:45	238.67	11.05.2021	13:30
19	Sadeipali	235.3	11.05.2021	13:00	232.8	07.07.2021	20:00	234.1	30.12.2021	02:45	230.5	02.01.2022	02:45	235.26	11.05.2021	13:00
20	Tarkera	230.6	11.05.2021	14:00	230.5	14.09.2021	06:00	230.7	19.12.2021	02:00	230.5	10.01.2022	03:15	230.70	19.12.2021	02:00
21	Theruvuli	242.8	11.05.2021	12:45	237.5	20.07.2021	17:30	242.2	18.12.2021	23:30	240.1	25.02.2022	04:45	242.83	11.05.2021	12:45

**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	214.0	27.04.2021	14:30	217.0	01.07.2021	22:45	218.2	08.10.2021	18:45	213.2	31.03.2022	15:15	213.21	31.03.2022	15:15
2	Balasore	211.0	03.04.2021	22:45	212.7	17.07.2021	19:00	218.2	06.10.2021	18:15	214.8	27.03.2022	14:30	210.96	03.04.2021	22:45
3	Bhadrak	209.1	04.04.2021	12:45	207.0	17.07.2021	19:00	217.8	06.10.2021	18:15	214.0	27.03.2022	13:00	207.03	17.07.2021	19:00
4	Bhanjanagar	219.6	18.05.2021	14:30	220.7	07.07.2021	11:45	222.4	07.10.2021	18:30	217.3	31.03.2022	15:15	217.31	31.03.2022	15:15
5	Bidanasi	204.0	30.06.2021	12:30	203.9	01.07.2021	14:45	216.2	08.10.2021	18:45	209.5	30.03.2022	14:30	203.86	01.07.2021	14:45
6	Budhipadar	214.1	08.04.2021	15:30	203.4	28.09.2021	17:30	203.0	13.10.2021	16:15	214.2	30.03.2022	09:45	203.05	13.10.2021	16:15
7	Chandaka	202.4	27.04.2021	14:15	207.9	19.07.2021	15:30	211.6	08.10.2021	18:15	211.2	31.03.2022	15:15	202.41	27.04.2021	14:15
8	Duburi	215.2	29.06.2021	22:30	216.2	01.07.2021	00:30	220.3	06.10.2021	18:15	216.8	27.03.2022	14:30	215.23	29.06.2021	22:30
9	Jaynagar	228.7	17.05.2021	07:45	229.1	01.07.2021	08:45	228.6	28.12.2021	16:30	214.0	27.02.2022	11:15	213.96	27.02.2022	11:15
10	Joda	213.5	08.04.2021	16:15	216.6	20.07.2021	17:15	217.9	27.10.2021	18:15	214.6	31.03.2022	16:45	213.50	08.04.2021	16:15
11	Katapalli	213.4	08.04.2021	16:15	216.4	20.07.2021	17:15	217.9	27.10.2021	18:15	214.6	31.03.2022	16:45	213.38	08.04.2021	16:15
12	Lapanga	216.3	27.06.2021	11:45	208.2	15.08.2021	09:00	204.1	30.11.2021	10:30	221.0	29.03.2022	15:30	204.15	30.11.2021	10:30
13	Laxmipur	228.8	17.05.2021	22:30	227.3	03.09.2021	19:00	219.7	31.12.2021	10:15	226.7	27.03.2022	14:45	219.73	31.12.2021	10:15
14	Mendhasal	214.0	27.04.2021	14:15	217.8	12.08.2021	14:30	219.3	08.10.2021	18:45	214.2	31.03.2022	15:15	214.02	27.04.2021	14:15
15	Meramundali	221.1	18.05.2021	14:30	220.4	25.08.2021	12:45	221.3	05.10.2021	09:15	220.7	27.03.2022	14:45	220.43	25.08.2021	12:45
16	Narendrapur	202.6	23.04.2021	12:15	213.3	03.09.2021	19:00	215.1	22.10.2021	08:45	213.2	30.03.2022	10:15	202.64	23.04.2021	12:15
17	Nayagarh	214.3	18.05.2021	14:30	216.4	02.08.2021	15:15	219.2	08.10.2021	18:45	214.4	27.03.2022	14:45	214.31	18.05.2021	14:30
18	Paradeep	201.3	04.04.2021	14:30	204.6	02.07.2021	10:30	214.9	06.10.2021	22:30	209.5	27.03.2022	20:15	201.32	04.04.2021	14:30
19	Sadeipali	207.3	26.04.2021	21:45	208.1	06.08.2021	16:15	212.3	31.10.2021	17:45	206.6	27.03.2022	15:30	206.57	27.03.2022	15:30
20	Tarkera	200.4	08.04.2021	13:00	223.1	18.07.2021	00:00	215.9	28.12.2021	10:15	214.7	16.03.2022	17:00	200.39	08.04.2021	13:00
21	Theruvuli	220.7	17.05.2021	22:30	220.1	03.09.2021	19:00	221.4	21.12.2021	18:00	215.3	16.03.2022	13:45	215.35	16.03.2022	13:45

**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	141.97	11.05.2021	13:00	140.58	13.09.2021	04:45	139.77	22.12.2021	03:30	139.0	07.01.2022	02:15	<b>141.97</b>	<b>11.05.2021</b>	<b>13:00</b>
2	Berhampur	150.51	11.05.2021	12:45	140.12	13.09.2021	04:45	141.97	05.12.2021	03:30	136.54	03.02.2022	02:00	<b>150.51</b>	<b>11.05.2021</b>	<b>12:45</b>
3	Puri	137.23	11.05.2021	13:00	136.48	13.09.2021	03:30	137.64	04.12.2021	04:00	136.8	17.01.2022	03:00	<b>137.64</b>	<b>04.12.2021</b>	<b>04:00</b>
4	Khurda	139.31	11.05.2021	12:45	137.4	20.07.2021	17:30	138.39	29.12.2021	03:00	137.9	07.01.2022	02:15	<b>139.31</b>	<b>11.05.2021</b>	<b>12:45</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	120.03	30.06.2021	12:30	119.97	01.07.2021	14:45	127.48	08.10.2021	18:15	122.5	28.03.2022	14:45	<b>119.97</b>	<b>01.07.2021</b>	<b>14:45</b>
2	Berhampur	115.58	23.04.2021	12:15	122.74	25.07.2021	22:30	124.47	22.12.2021	08:30	123.20	31.03.2022	11:00	<b>115.58</b>	<b>23.04.2021</b>	<b>12:15</b>
3	Puri	122.63	27.04.2021	15:15	116.51	01.07.2021	22:45	111.71	07.10.2021	16:45	117.3	21.03.2022	11:30	<b>111.71</b>	<b>07.10.2021</b>	<b>16:45</b>
4	Khurda	112.06	27.04.2021	14:30	125.9	01.07.2021	22:45	126.03	06.10.2021	18:30	124.8	28.03.2022	14:45	<b>112.06</b>	<b>27.04.2021</b>	<b>14:30</b>

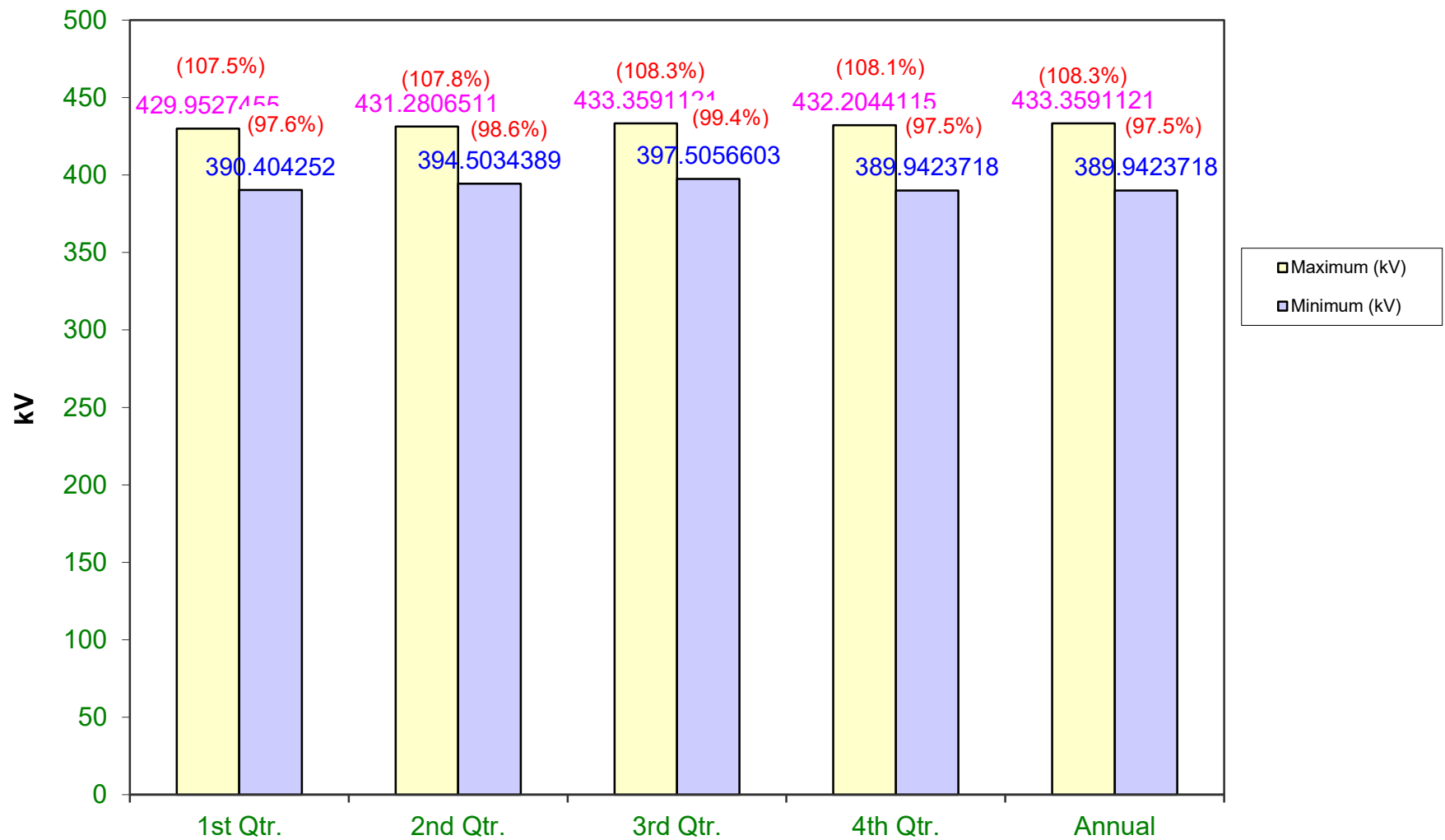
**Note:**

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

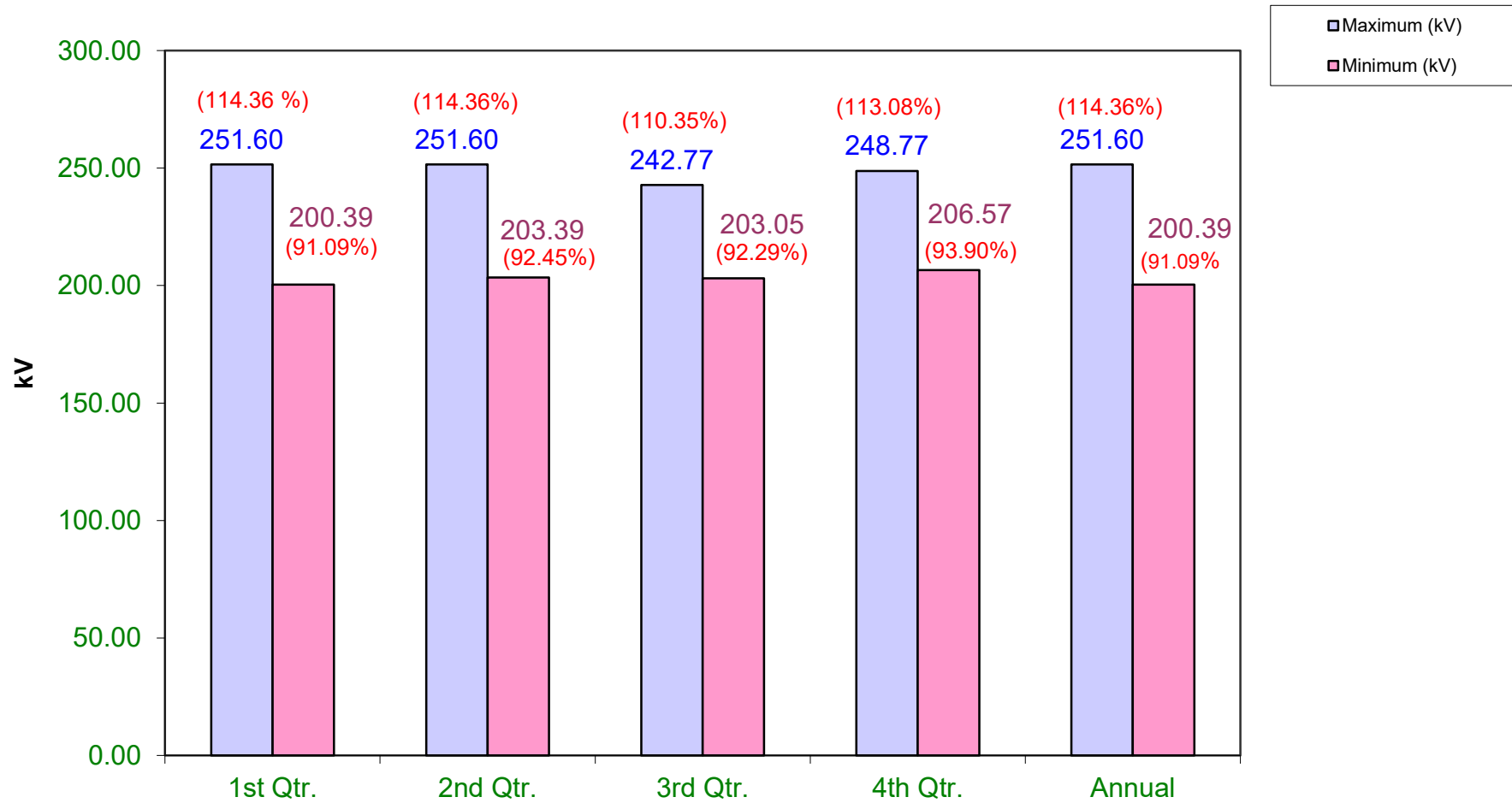
Further, low voltages during contingency conditions are also recorded as minimum voltages excluding disturbance period and any PT failure period.



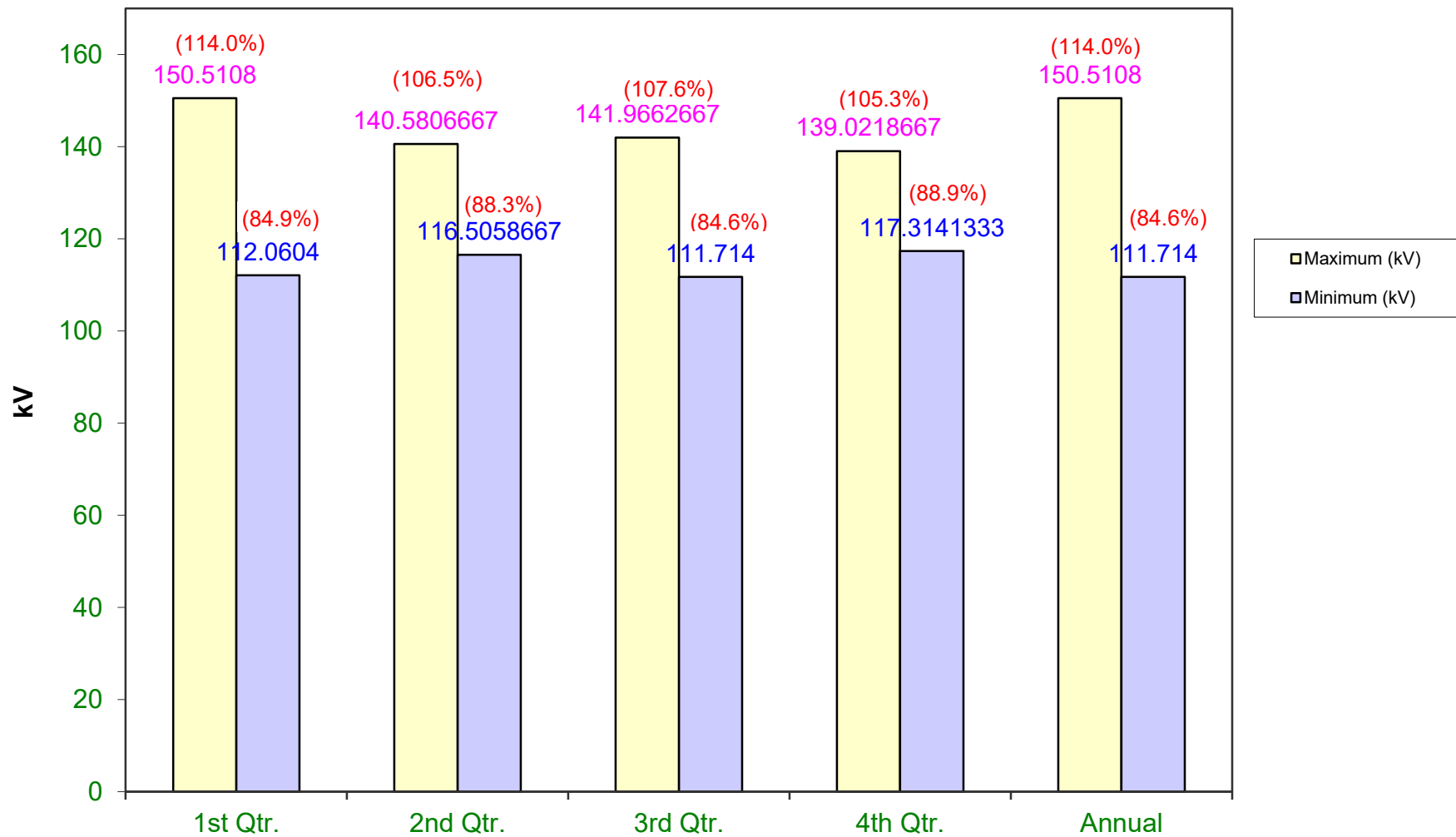
## OVERALL PERFORMANCE VOLTAGE AT 400 kV



## OVERALL PERFORMANCE VOLTAGE AT 220kV

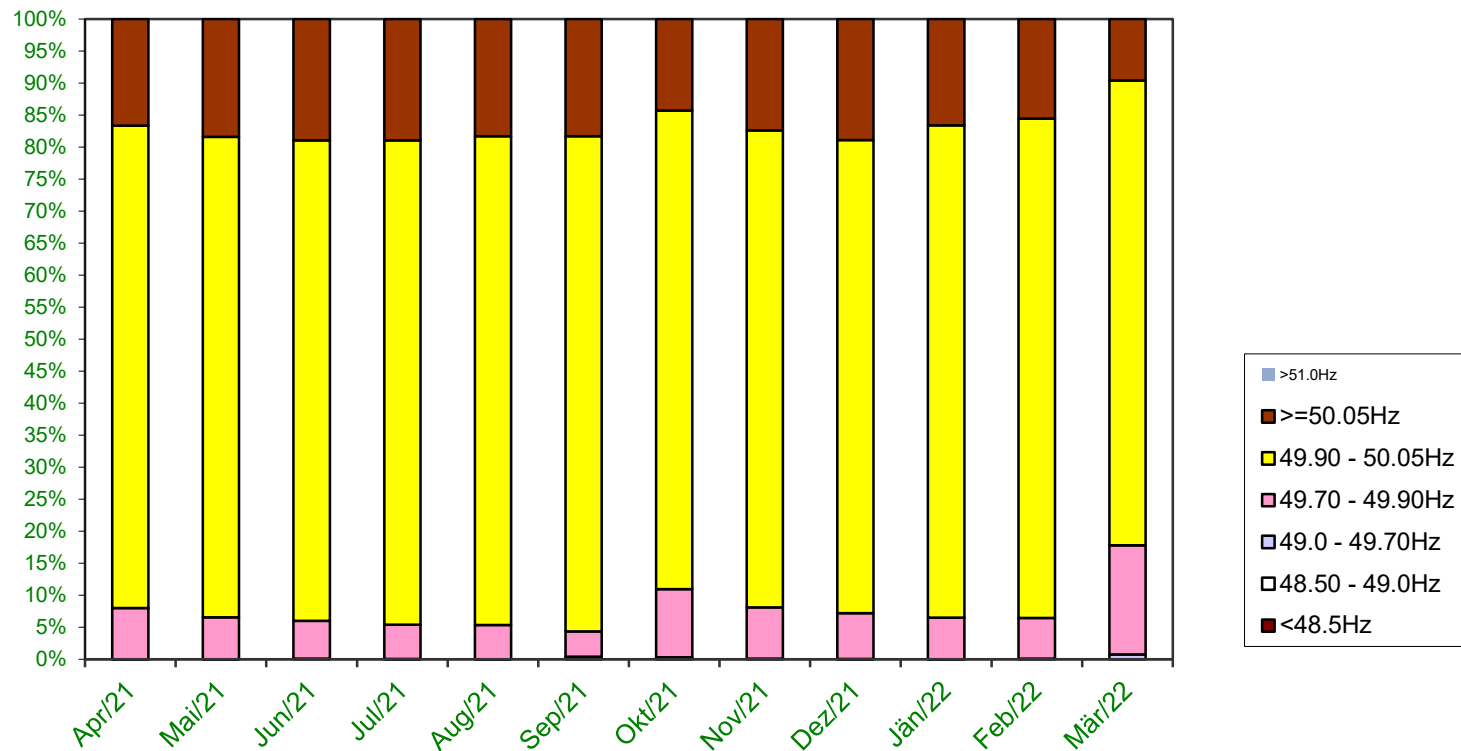


## OVERALL PERFORMANCE VOLTAGE AT 132 kV



## Frequency Performance FOR FY 2021-22

Percentage time occurrence

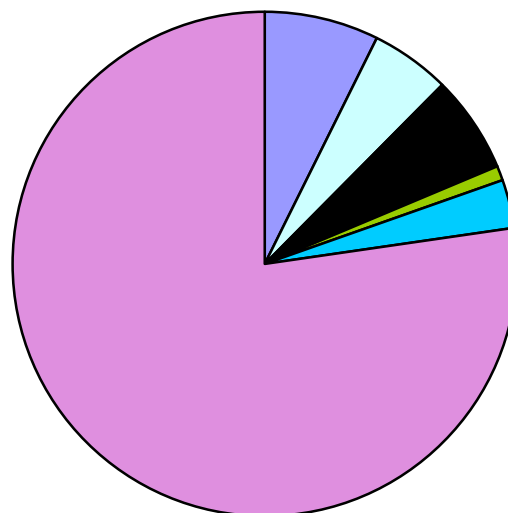


Months

### INTERRUPTION DUE TO MAJOR INCIDENT

Incident	Duration of Interruption	No. of Interruption
Snapping of Jumper / Conductor / Earth wire	18:26:00	53
Insulator Failure	12:49:00	25
Bursting of CT / PT	15:40:00	12
Breaker Problem	0:02:00	3
Major System Disturbance*	2:21:00	6
Failure of LA	7:48:00	18
Others	194:19:00	490
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 2021-22.		

### INTERRUPTION (HRS) DUE TO MAJOR INCIDENT DURING 2021-22



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