भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग
Power System Planning & Appraisal-I Division

To

-As per list enclosed-

विषय: पश्चिमी क्षेत्र विद्युत समिति (पारेषण योजना) (WRPCTP) की होने वाली तीसरी बैठक की कार्यसूची

Subject: Agenda note of the 3rd meeting of Western Region Power Committee (Transmission Planning) (WRPCTP)

Sir/ Madam,

The agenda note for the 3rd meeting of Western Region Power Committee (Transmission Planning) (WRPCTP) which is scheduled to be held at **11:00 AM on 16.04.2021** through VC (Microsoft Teams) is attached herewith. The same is also available on CEA website (www.cea.nic.in) at the link: https://cea.nic.in/pspc-region/western-region/?lang=en. The link to join the meeting would be intimated in due course.

Yours faithfully,

Signature Not Verified
Digitally signed by ISHAN SHARAN
Date: 2021.04.08 18:32:15 IST

(Ishan Sharan)
Chief Engineer (PSP&A-I)

List of Addressees:

1.	Member (Power System), Central Electricity Authority, Sewa Bhawan, RK Puram, Sec-1, New Delhi - 110066	2.	Member Secretary, WRPC, F-3, MIDC Area, Andheri (East), Mumbai – 400093 Fax – 022-28370193	3.	COO (CTU) POWERGRID, Saudamini, Plot no. 2, Sector -29, Gurgaon-122 001 Fax-0124-2571809
4.	Director (System Operation), POSOCO B-9, Qutub Institutional Area, Katwaria Sarai New Delhi – 110010	5.	Chief Electrical Engineer, Vidyut Bhavan, 3rd Floor, Panaji, Goa - 403001	6.	Managing Director, GETCO, Sardar Patel Vidyut Bhawan, Race Course, Vadodara-390007
7.	Managing Director, MPPTCL, Block no -2, Shakti Bhawan, Rampur, Jabalpur – 482008 (M.P)	8.	Chairman & Managing Director, MSETCL, Prakashganga, Plot No.C-19, E-Block, Bandra-Kurla Complex, Bandra (E), Mumbai - 400051	9.	Secretary (Power), Administration of Daman & Diu (U.T.), Fort Area, Moti Daman-396220
10.	Secretary (Power), UT of Dadra & Nagar Haveli, Secretariat, Amli, Silvassa - 396230	11.	Managing Director, CSPTCL, Dangania, Raipur (CG)-492013	12.	Chairman & Managing Director (NTPC), NTPC Bhawan, SCOPE Complex, Institutional Area, Lodhi Road, New Delhi - 110003
13.	Chairman & Managing Director (NHPC), N.H.P.C Office Complex, Sector-33, Faridabad - 121003 (Haryana)	14.	Managing Director (SECI), 1st Floor, D-3, A Wing, Prius Platinum Building District Centre, Saket, New Delhi - 110017		

Agenda note for the 3rd Meeting of Western Region Power Committee (Transmission Planning) scheduled to be held on 16.04.2021

1. Confirmation of Minutes of 2nd meeting of Western Region Power Committee (Transmission Planning) held on 04.09.2020 at Ahmedabad

1.1. The minutes of the 2nd meeting of WRPCTP held on 04.09.2020 were issued vide CEA File No.CEA-PS-11-23(19)/1/2019-PSPA-I Division/I/11987/2020 dated 26.10.2020.

1.2. CTU vide its email dated 14.12.2020 (attached as Annexure-I) and MPPTCL vide letter no. 04-02/PSP-2143 dated 01.12.2020 (attached as Annexure-II) have submitted the observations / comments on the minutes of the 2nd meeting of WRPCTP.

1.3. In the email, CTU has suggested to add item 15.10 in the 2nd WRPCTP minutes as given below:

*"**15.10** It was further observed that the proposed conversion of fixed line reactor at Bina (PG) end of Sagar (MP)- Bina(PG) 400kV line into switchable line reactor (under ISTS scope) does not mention about implementing the NGR bypassing arrangement for utilization of the line reactor as bus reactor for voltage control when required. In view of the same, it was agreed to modify the scope of work under ISTS as follows:*

- *Conversion of 50MVAr fixed line reactor at Bina (PG) end of Sagar (MP)- Bina(PG) 400kV line into switchable line reactor along with NGR bypassing arrangement."*

1.4. MPPTCL has requested reconductoring of Shujalpur (PG)-Shujalpur (MP) 220kV D/c line with conductor of twin zebra ampacity instead of twin moose ampacity and requested the approval for charging of 125 MVAR bus-cum-line reactor at Sagar.The issues raised by MPPTCL has been included as a separate agenda.

1.5. Members may deliberate the corrigendum suggested by CTU and confirm the minutes of the meeting.

A. ToR 2(i) – QUARTERLY REVIEW AND STRENGTHNING OF INTER-REGIONAL TRANSMISSION SYSTEM

2. Quarterly Review of transmission lines and substations

2.1. A list transmission lines and substations/ICTs commissioned in the Western Region upto Q3 of FY 2020-21 are attached as Annexure-III.

2.2. Members may update the status.

3. Assessment of growth in generation capacity and demand in the region

3.1. The generation capacity plan of Western Region is as under (as on 28.02.2021):

State	Coal	Hydro	RES	Gas	DG	Nuclear

Goa	0.00	0.00	0.05	0	0.00	0.00
Daman & Diu	0.00	0.00	0.00	0	0.00	0.00
Gujarat	5410.00	772.00	82.34	2177.82	0.00	0.00
Madhya Pradesh	5400.00	1703.66	83.96	0	0.00	0.00
Chhattisgarh	1840.00	120.00	11.05	0	0.00	0.00
Maharashtra	9750.00	2850.84	388.13	0	0.00	0.00
Dadra & Nagar Haveli	0.00	0.00	0.00	672	0.00	0.00
Central Sector	19947.95	1635.00	666.30	3280.67	0.00	1840.00
Private	33347.17	481.00	27398.79	4676	0.00	0.00
Total	75695.12	7562.50	28630.62	10806.49	0.00	1840.00

3.2. The actual/anticipated demand of states in Western Region are as under:

	Peak Demand (in MW) according to 19th EPS			**Actual**
State	**2020-21**	**2021-22**	**2024-25**	**Peak (2020-21) Till Feb,21**
Goa	813	858	999	572
Daman & Diu	405	426	498	349
Gujarat	20,172	21,429	25,471	17,292
Madhya Pradesh	14,802	15,676	18,014	14,965
Chhattisgarh	5,809	6,208	7,513	4,513
Maharashtra	27,148	28,866	34,911	24,097
Dadra & Nagar Haveli	1201	1,291	1,584	872
Total	**66847**	**71,020**	**84,502**	**61,229**

3.3. The anticpated capacity addition in the states of Western Region by 2024-25 may kindly be updated.

State	**Coal**	**Hydro**	**RES**	**Gas**	**DG**	**Nuclear**
Goa						
Daman & Diu						
Gujarat						
Madhya Pradesh						
Chhattisgarh						
Maharashtra						
Dadra & Nagar Haveli						
Central Sector						
Private						

Total						

3.4. Members may deliberate and update.

4. Requirement for strengthening of Inter-regional transmission system

4.1. For assessing the inter-regional export-import requirements for the year 2024-25, the Load Generation Balance for all India studies for 2024-25 needs to be deliberated and finalized. Considering various availability factors, under different scenarios for thermal, gas, hydro, Wind/Solar etc., generation and demand load factor for Western Region, the calculation of (surplus-deficit) inter-regional export-import requirements for the year 2024-25, corresponding to following nine (09) scenarios needs to be evaluated.

A total of 09 scenarios are considered as given below:

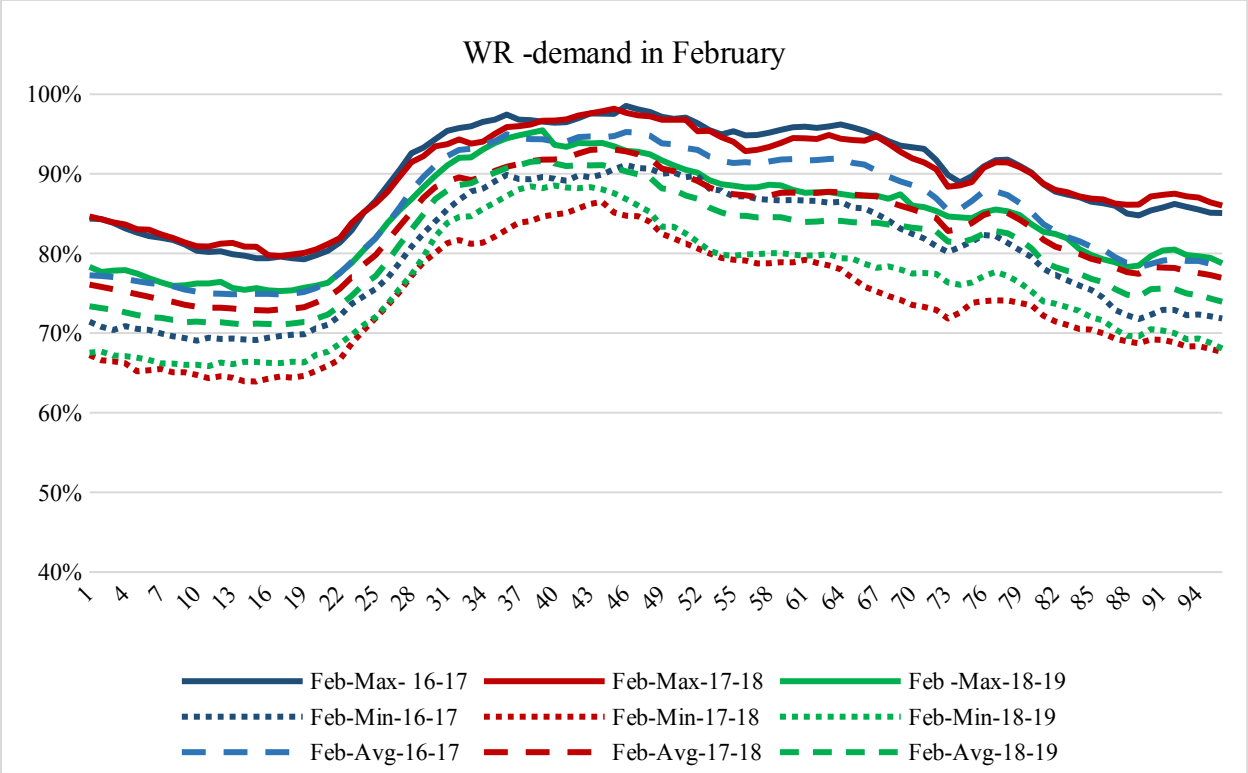
Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9
February			June			August		
After Noon Peak	Evening Peak	Night Off peak	After Noon Peak	Evening Peak	Night Off peak	After Noon Peak	Evening Peak	Night Off peak

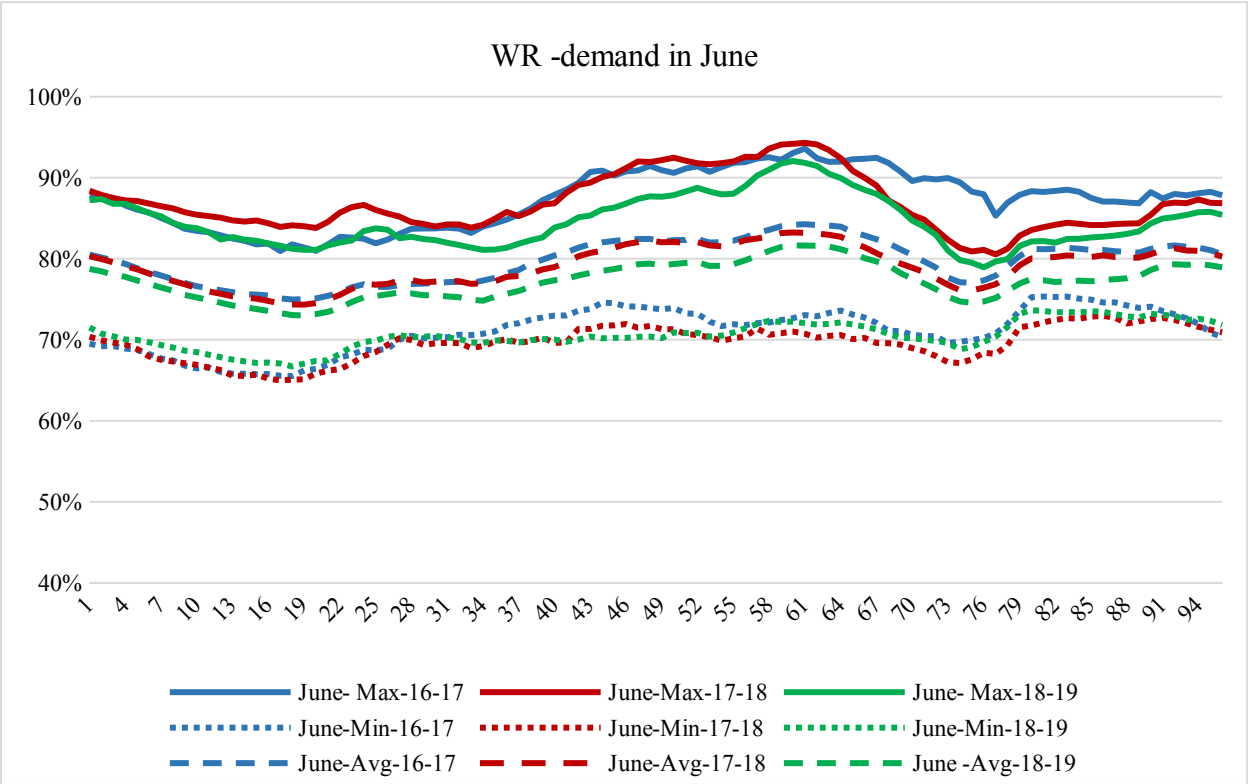
4.2. A meeting were held among CEA, CTU and POSOCO to finalize the for Load Generation Balance for All India Studies for 2024-25 on 11.03.2021 (Minutes are attached as Annexure-IV(A)).

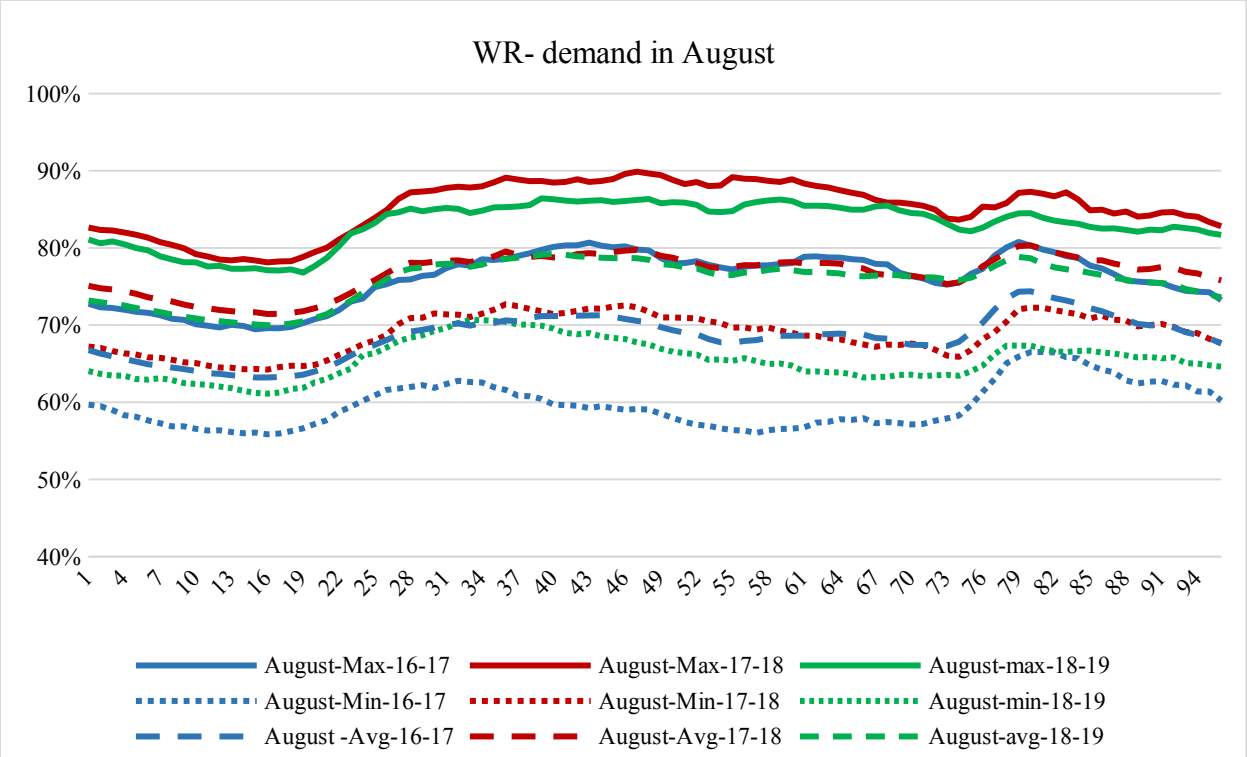
4.3. Demand Factor and Normalized Demand for the above 09 scenarios in WR is:

Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9
0.93	0.82	0.72	0.84	0.84	0.78	0.72	0.75	0.65

The above demand factor has been worked out based on the actual demand data for the year 2016-17, 2017-18 and 2019-20 which are depicted below for Western Region .


WR -demand in February
100%
90%
80%
70%
60%
50%
40%
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82 85 88 91 94
Feb-Max- 16-17
Feb-Max-17-18
Feb -Max-18-19
Feb-Min-16-17
Feb-Min-17-18
Feb-Min-18-19
Feb-Avg-16-17
Feb-Avg-17-18
Feb-Avg-18-19


WR -demand in June
100%
90%
80%
70%
60%
50%
40%
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82 85 88 91 94
June- Max-16-17
June-Max-17-18
June- Max-18-19
June-Min-16-17
June-Min-17-18
June-Min-18-19
June-Avg-16-17
June-Avg-17-18
June -Avg-18-19



4.4. Members may deliberate and provide their inputs.

5. Review of Transmission system by system operator

5.1. System Strengthening at Shujalpur on account of operational constraints ((n-1) non compliance):

5.1.1. In the 2nd meeting of WRPC(TP), the following system strengthening was required on account of N-1 non-cmplience of ICTs at 400/220 kV Shujalpur S/s and Shujalpur (PG)-Shujalpur (MP) 220kV D/c line:

A. ICT Augmentation of 2x315 MVA, 400/220 kV Shujalpur(PG) substation under ISTS
(i) 1x500MVA, 400/220kV ICT augmentation at Shujalpur (PG)

B. Reconductoring of Shujalpur (PG)-Shujalpur (MP) 220kV D/c line (conductor with ampacity equivalent to ACSR twin moose at nominal voltage) under Intra –state by MPPTCL.

5.1.2. MPPTCL vide its letter no. 04-02/PSP-2143 dated 01.12.2020 (attached as Annexure-II) has sought the following:

(i) whether the system strengthening is associated with Phase-II works of power evacuation from Rajgarh SEZ or its is to be taken up independently.

(ii) the conductor equivalent to ACSR twin moose capacity for 220 kV line may not be available in Indian Market and it may not possible to use the conductor with ampacity equivalent to ACSR twin moose at nominal voltage on the existing towers of 220 kV line. MPPTCL has requested to confirm the reconductoring of Shujalpur(PG)-Shujalpur(MP) 220 kV D/c line was required to be carried out with the conductor with ampacity equivalent to ACSR twin moose at nominal voltage or with the conductor with ampacity equivalent to ACSR twin zebra at nominal voltage.

5.1.3. In regard to point 5.1.2(i), it is informed that the system strengthening is required based on the operational feedback from POSOCO and same has also been mentioned in the discussion of 2nd meeting of WRPC(TP).

In regard to point 5.1.2(ii), CEA vide email dated 28.01.2021 has provided the list of available options as per the CEA "Guidelines for Rationalised Use of High Performance Conductors" for HTLS conductor equivalent to ACSR twin moose available in Indian Market (attached as Annexure-IV).

It was also informed that as per the system studies, the maximum power flow requirement under N-1 case is about 500 MVA for which ampacity requirement is about 1300 Amp. Based on the ampacity requirement, MPPTCL is requested to finalize the conductor and intimate the same to this office for further deliberation in forthcoming meeting of WRPC(TP). It is also requested to provide the details regarding existing conductor and nominal operating temperature of the Shujalpur (PG) – Shujalpur 220 kV D/c line.

5.1.4. MPPTCL may present the details.Members may deliberate.

5.2. Operational Feedback of NLDC

The operational feedback of NLDC for the period from October 2020 to December 2020 is as follows:

A. Transmission Line Constraints

Sl. No	Corridor	Season/ Antecedent Conditions	Description of the constraints
1	400kV Kudus - Kala D/C corridor	This corridor is highly loaded as it is the low impedance path for DNH to meet its demand and also due to nonavailability of 220kV lines from kudus.	**Constraints:** When 400 kV Kudus-Kala D/c lines carry more than 1050 MW, the corridor is N-1 non-compliant. **Remedial Actions:** Commissioning of 400kV Padghe (GIS) – Kharghar and Padghe (GIS)- Ghatkopar would relieve Kudus-Kala D/C. Commissioning of 220kV outlets from Kudus would give some relief on Kudus-Kala D/C. At present 2x500MVA 400/220kV Kudus ICTs are idle charged in the absence of 220kV outlets. **Present Status:** **CEA Monthly report Construction of Transmission Lines (220kV & above)-Nov 2020:** 220kV Padghe-Wada & Kolshet-Wada LILO at kudus by Dec 2021(Schedule date was Nov'18). 220kV Tarapur-Borivali & Boisar-

			Ghodbandar LILO by Dec 2021(Schedule was Jul'19). **MSETCL may update the status / timeline for the implemetation**
2	220kV Boisar(PG)-Boisar(MS) T/C	Most of the time with higher Mumbai demand and less generation at 220kV Tarapur, Trombay and Dahanu	**Constraint:** The lines become N-1 non-compliant when total loading on these lines is above 600MW (Considering N-1 loading of 300MW/ckt). These ckts are mostly loaded above 200MW each and managed with load trimming scheme implemented by MSETCL. The lines were N-1 noncompliant for 14% of the time during the quarter. **Remedial Actions:** 400/220kV, 2x500MVA Kudus ICTs are idle charged since Mar'18. Commissioning of downstream network at Kudus will help to relieve the congestion in Boisar area. MSETCL may update the status / timeline for the implemetation
3	400kV Warora(MS) - Wardha(PG) S/C and Koradi-II Wardha(PG) S/c	High loading is observed when generation at Koradi-II and APML Tiroda are high. **Sensitivity:** Koradi-II- 11.5% APML Tiroda-25.4%	**Constraints:** When the total power flow on 400 kV Koradi II-Wardha (PG) S/C and 400 kV Warora (MS)- Wardha (PG) S/C is above 1800MW, the corridor becomes N-1 noncompliant. Sensitivity of Koradi-II-Wardha outage is 35% on Warora-Wardha. Bypassing of Koradi-Wardha(PG) and Wardha(PG)- Warora(MS) at Wardha(PG) and bus split at 400kV Wardha-PG have been discussed in 37th, 39th, 40th & 41st standing Committee meetings WR and was agreed. Restricted operation of HVDC Bhadrawati & Chandrapur-Padghe Bipole are done for controlling high loading of these ckts. **Remedial Actions:** The Evacuation plan for APML, Tiroda (5 X 660 MW) Rattan India Amravati (5 X 270 MW), Chandrapur Stg-II (2 X 500 MW), IEPL (1 X 270MW), and Dhariwal (1 X 300 MW) need to be studied by the STU in order to check whether the existing plan and available network will provide secure evacuation under various N-1 contingencies. **2nd WRPC (TP):** It was decided to have another Joint Study meeting for planning additional outlets from Warora (M) among CEA, CTU, POSOCO & STU, and MSETCL. MSETCL and PGCIL to inform the status of bypassing of the ckts at Wardha (PG) and bus splitting as fault level at 400kV Wardha (PG) is high
4	400kV	When generation	**Constraint:**

	Chandrapur -Chandrapur (II) D/C	at Chandrapur is less and Chandrapur (II) is high	Less generation at Chandrapur is leading to critical loading on these lines. Chandrapur-Padghe HVDC flow had to be restricted to ensure N-1 security of these lines, which reduced the operational flexibility with HVDC and also caused low voltages at Parli, Lonikhand & Padghe area. For 10% of the time, lines were N-1 non-compliant during in Oct 2020. **Remedial Action** **2nd WRPC(TP):** LILO of one D/c line of 400 kV Chandrapur-I – Bhadravati 2xD/c line at Chandrapur-II is approved. **MSETCL may update the status / timeline for the implemetation**
5	400kV Parli PG-Parli MS D/c line	Maharashtra drawal above 9000MW and low generation at Parli	**Constraint:** The lines become N-1 non- compliant when total power flow on these lines is 900MW and above. Further these line loadings were the limiting constraint for import TTC/ATC of Maharashtra. Bypassing of 400 kV Koradi-II-Wardha(PG) and 400 kV Wardha(PG)- Warora(MS) at 400kV Wardha(PG) and making 400 kV Koradi-IIWarora(MS) S/C(which is already approved in SCM) would relieve 400kV Parli(PG)-Parli(MS) by around 67 MW /ckt in addition to controlling the fault level at Wardha(PG). This reduction in line loading is equivalent to keeping 400MW generation at Parli in service. Constraint was observed for only 21% of the time in Oct 2020. **Remedial Action** **2nd WRPC(TP):** LILO of both circuits of Warora Pool – Parli (PG) D/c line at Parli (M) was approved. **MSETCL may update the status / timeline for the implemetation**
6	400kV Lonikhand - Jejuri S/C	Low generation at Koyna & high load in Western Maharashtra	There are 3x500MVA, 400/220kV ICTs at Jejuri S/s with only two incoming 400kV lines i.e 400kV Koyna IV-Jejuri S/C & 400kV Lonikhand-Jejuri S/C line. **Constraint:** Maximum load observed at Jejuri during the quarter was 1020MW and for about 17% of the time it was more than 800MW in month of Oct 2020. With this Jejuri system was N-1 non-compliant and this caused low voltage issues at Jejuri during peak load hours of Maharashtra. **Remedial Measures:** 400kV Lonikhand-

			Karad LILO at Jejuri was planned for commissioning by 2018-19. This LILO shall be done on priority basis to avoid any disturbance in Jejuri area. **Present status:** LILO not yet commissioned. **MSETCL may update the status / timeline for the implemetation**
7	400kV Padghe-Kalwa D/c	High loading is observed in general during High demand & Less generation in Mumbai system.	**Constraint:** The corridor becomes N-1 non-compliant when total loading is above 1100 MW. Many a times Chandrapur- Padghe Bipole flow is restricted to control the loading on these lines in past. Also facilitating outage in this corridor on week days is difficult. Outages are being planned only on Saturday/Sundays with planned load shedding. Tripping of these ckts cause alert situation in Mumbai system. Mumbai internal generation has to be maximized immediately to contain loading on 400kV Pune-Kharghar and Pune-Kalwa lines. **Remedial Action:** Commissioning of 400kV Ghatkopar S/S and Padghe (GIS)-Kharghar, Padghe-Navi Mumbai-Ghatkopar and Kharghar-Ghatkopar would give additional infeed to Mumbai and relieve loading of Padghe-Kalwa D/C. **Present status:** The Transmission scheme "WRSS-XIX" is under implementation through TBCB route. The SPV has already been acquired by M/s Sterlite Grid 13 Limited on 23.06.2020 **MSETCL may update the status of Vikhroli S/s.**
8	220kV Pune PG-Talegaon D/c	All the time	**Constraint:** When total loading on these lines is 260MW and above, (N-1 loading considered as 250MW), the corridor becomes N-1 non-compliant. For 94% of the time lines were N-1 non-compliant during the quarter. **Remedial Action-** **43rd SCM:** 220kV Talegaon (PG)–Talegaon (M)–Urse–Chinchwad 220 kV D/C is planned & is under implementation. This line has been completed up to Urse S/

			s. Thus, Pune (PG) and Talegaon(M) have 4 no. of 220 kV lines. However, 2 no. of Talegaon (PG) – Talegaon (M) are kept open to restrict the loading on 220kV Urse–Chinchwad. It was intimated that Urse – Chinchwad 220 kV D/C and Pune (PG)–Hingewadi 220 kV D/C would be completed by Dec, 2018. **MSETCL may update the status.**
9	400kV Wanakbori-Dehgam D/c	With WTPS generation above 1900MW	**Constraint:** When generation at WTPS is above 1900MW, WTPS-Dehgam D/c lines become N-1 non-compliant. Wanakbori Unit-8 (800MW) was commissioned on 3rd Mar'19. However associated transmission system ie. 400kV WTPS-Soja D/c is not yet commissioned (Schedule-Dec'19). **Measures taken in real time**: Outages are being facilitated during less generation period and backing down of generation done in case of contingencies. **GETCO may update the status.**
10	220kV DSPM-Korba(E)	With full generation in DSPM and less generation in Korba East and Budhipadar	**Constraint:** DSPM (2x250 MW) generation was commissioned with LILO of existing 220kV Korba West- Korba East one ckt and 220kV Suhela-Banari line. No additional lines were planned for DSPM evacuation. This has resulted in overloading of 220kV DSPM-Korba East line when the power flow is towards Budhipadar end. SLDC CSPTCL raised concerns of forced backing down at DSPM even when they were overdrawing from the grid in past. For more than 24% (Avg) of the time, line was loaded above 200MW during this quarter. **Remedial Action:** Additional 220 kV lines to be planned for DSPM generation and strengthen the interconnection between Korba East and DSPM. **43rd SCM:** CSPTCL informed that LILO of 220 kV Siltara – Korba (E) S/C at DSPM is under implementation. **CEA Monthly report Construction of Transmission Lines (220kV & above)-Aug2020: LILO of** 220 kV Siltara – Korba (E) S/C at DSPM expected by July 2020. **CSPTCL may update the status.**
11	220kV Bhilai- Bhilai D/c line	Most of the time	**Constraint:** When total loading on these lines is above 300MW, the system is N-1 non-compliant. For more than 10% of the time, lines were

			N-1 non-compliant during the quarter. 220kV Bhilai-Gurur D/c lines kept opened by CSPTCL to control the loading. **Remedial Action:** CSPTCL to plan system strengthening of 220kV network at Bhilai and around.
12	220kV Kala-Khadoli D/C line	With commissioning of 3rd ICT at Kala and High Demand of DNH	**Constraint:** When total loading on lines is above 280MW, lines become N-1 non-compliant. Also, it is a limiting factor for import capability of DNH system. The lines were N-1 noncompliant for 66% of the time in Sept 2020. **41st SCM:** Commissioning of 2x500MVA Vapi-II S/S, 400kV Kakrapar-Vapi-D/C LILO at Vapi-II, 220kV Vapi II-Sayali D/C and Vapi-Khadoli D/C by reconfiguration are agreed. **Present status:** The Transmission scheme "WRSS-XIX" is under implementation through TBCB route. The SPV has already been acquired by M/s Sterlite Grid 13 Limited on 23.06.2020.

B. ICT Constraints:

Sl No.	ICT	Season/ Antecedent Conditions	Description of the constraints
1	2x315MVA+ 1x500MVA 400/220kV Dhule MSETCL ICTs	When Drawl is above 7000MW	**Constraint:** ICT-2 (315MVA) is under prolonged outage from 23- Sept-2020. ICTs become N-1 (considering tripping of 500MVA) non-compliant when total loading is above 460MW. About 42% of the time, ICTs were N-1 noncompliant during the quarter. **MSETCL may update the present status.**
2	2x315 MVA Akola MSETCL ICTs	Demand of Maharashtra above 21000MW & Drawal of 6500MW & less generation at Paras	**Constraint:** Akola ICTs become N-1 non- compliant when total loading is above 440MW. About 27% of the time, ICTs were N-1 non-compliant in the Oct-Dec, 2020 quarter. **2nd WRPC(TP):** MSETCL informed that additional 1x500MVA ICT is planned by STU and is under implementation.

			MSETCL may update the present status / timeline.
3	2x315+2x500 MVA Babaleshwar (MSETCL) ICTs	Demand of Maharashtra Above 21000MW & forced outage of Dhule ICT-2	**Constraint:** ICTs become N-1 non-compliant when total loading is above 1210MW. About 15% of the time, ICTs were N-1 non-compliant in Dec 2020. **MSETCL may update the developments**
4	2x315+1x500 MVA Kolhapur (MSETCL) ICTs	Demand of Maharashtra Above 21000MW & ICT-1 out.	**Constraint:** ICT-1 under outage since 10-Aug-2020 for replacement with 500MVA ICT. ICTs become N-1 non-compliant when total loading is above 480MW. About 25% of the time ICTs were N-1 noncompliant during the quarter. **MSETCL may update the present status / timeline.**
5	2x315 MVA Morena(CWRTL) ICTs	With high demand of MP	**Constraint:** ICTs become N-1 non-compliant when total loading is above 440MW. About 10% of the time, ICTs were N-1 noncompliant during the quarter. **1st WRPC (TP):** Additional 500MVA ICT is planned. **POWERGRID may update the status / timeline.**
6	2x315 MVA ICTs at Jabalpur(PG)	With high demand of MP	**Constraint:** When total loading is above 430MW, the ICTs become N-1 noncompliant. About 17% of the time, ICTs were N-1 non-compliant in Dec-2020. These ICTs are limiting constraint for MP import TTC. **42nd SCM of WR:** 3rd ICT, 500MVA is proposed at Jabalpur(PG). **CEA Monthly Progress Report Inter Regional - Interstate Transmission Schemes Nov 2020:** ICT is Expected by Aug'21. **POWERGRID may update the status / timeline.**
7	2x315,1x500 MVA ICTs at Satna(PG)	With MP Drawl of 6500MW.	**Constraint**: ICTs become N-1 non compliant when total loading is above 660MW. For about 31% of the time ICTs were N-1 non compliant during the quarter. Above loadings are with 220kV Satna PG-Maihar line open. **MPPTCL may update the**

			implementation status of Rewa UMSP- Rewa 220 kV DC line.
8	2x315 MVA Astha MPPTCL ICTs	During Rabi Season, with high demand of MP	**Constraint:** ICTs become N-1 non- compliant when total loading is above 400MW. For about 32% of the time ICTs were N-1 non compliant during the quarter. **MPPTCL may update the mitigation measures**
9	2x315 MVA ICTs at Shujalpur PG	During Rabi Season	**Constraint**: ICTs become N-1 non-compliant when total loading is above 380MW. For about 21% of the time ICTs were N-1 noncompliant during the quarter. **2nd WRPC (TP):** 3rd 1x500MVA ICT planned at Shujalpur.
10	2x315 MVA ICTs at Wardha(PG)	Demand of Maharashtra Above 22000MW	**Constraint**: ICTs become N-1 non-compliant when total loading is above 450MW. For about 12% of the time ICTs were N-1 noncompliant in Dec 2020. **1st WRPC(TP):** Additional 500MVA ICT is planned at Wardha PG. **POWERGRID may update the status / timeline.**
11	2x315 MVA Bhatapara (PG) ICTs	Demand of Chhattisgarh above 4000MW with 1900MW drawal	**Constraint:** ICTs become N-1 non-compliant when total loading is above 420MW. For 10% of the time ICTs were N-1 noncompliant in Dec-2020. **Remedial Action:** Additional ICTs in Chhattisgarh area along with downstream network would help Chhattisgarh system to draw more power from ISTS. **2nd WRPC (TP):** A separate meeting would be held with CEA, CTU, CSPTCL and POSOCOs to discuss the constraints and to plan system strengthening in Chhattisgarh area. Details with CSPTCL agenda.
12	2x315 MVA ICTs at NSPCL	When Chhattisgarh Demand more than 4000MW	**Constraint:** ICTs become N-1 non-compliant when total loading is above 450MW. About 32% of the time, ICTs were N-1 noncompliant in Dec-2020. These ICTs are the limiting constraint for Import TTC of Chhattisgarh. **Remedial Action:**Additional ICTs in Chhattisgarh area along with downstream network would help

			Chhattisgarh system to draw more power from ISTS. **2nd WRPC (TP):** A separate meeting would be held with CEA, CTU, CSPTCL and POSOCO to discuss the constraints and to plan system strengthening in Chhattisgarh area. **Present Status:** Joint meeting between CSPTCL, CEA, NSPCL, BSP, CTU and POSOCO was conducted on 15-Jan-2021 to discuss various alternatives & the network augumention required. Further studies required for finalization of measures to mitigate the constraints.

B. ToR 2(ii) – ASSESSMENT OF TRANSMISSION SYSTEM REQUIREMENTS IN NEAR, MEDIUM AND LONG TERM AND FORMULATE TRANSMISSION SCHEME

6. Transmission system for evacuation of power from Neemuch Solar Park (1000 MW):

6.1. In the 2nd WRPC(TP) meeting held on 04.09.2020, for evacuation of power from the solar park (1000 MW), following alternatives were discussed:

Alternative-I
- Establishment of 2x500MVA, 400/220kV Pooling Station at Neemuch
- Neemuch PS – Kota 400kV D/c line~ 70 km
- 1X125 MVAR, 420 kV bus reactor at Neemuch PS

Alternative-II
- Establishment of 2x500MVA, 400/220kV Pooling Station at Neemuch
- Neemuch PS - Chittorgarh (PG) 400kV D/c line ~130 km
- Augmentation of Chittorgarh (Rajasthan) by 1x500MVA, 400/220kV ICTs
- 1X125 MVAR, 420 kV bus reactor at Neemuch PS

Alternative-III
- Establishment of 2x500MVA, 400/220kV Pooling Station at Neemuch
- Neemuch PS – Mandsaur (MP) 400kV D/c line~ 120 km
- 1X125 MVAR, 420 kV bus reactor at Neemuch PS

6.2. The following was agreed wrt the Transmission system for evacuation of power from Neemuch Solar Park (1000 MW) :

(i) **Transmission system for evacuation of power from Neemuch Solar Park (1000 MW):**

a) Establishment of 2x500MVA, 400/220kV Pooling Station at Neemuch

b) Neemuch PS – Kota 400kV D/c line~ 70 km
c) 1X125 MVAR, 420 kV bus reactor at Neemuch PS
d) 4 nos. 220 kV line bays for solar park interconnection

(ii) With the agreed scheme, the issue of 400/220 kV ICTs at Kota becoming N-1 non-compliant in scenario of low generation at KTPS would be studied further in coordination with NR group.The scheme would also be discussed in the meeting of NRPC (TP). Any additional requirement arising out of Kota 400/220 ICT overloading, would be included in the scheme. The same would be intimated to the WRPC(TP) in the next meeting.

(iii) RUMS would apply for LTA application for its 500 MW Neemuch Solar Park (to be commissioned in July'2022 timeframe) for which Stage-II Connectivity has already been applied. Further, RUMS would also apply for Stage-II Connectivity application for additional 250 MW (out of remaining 500 MW) for which land has already been identified nearby Singoli village.

6.3. The matter was subsequently deliberated in the 3rd NRPC(TP) meeting held on 19.02.2021 wherein after detailed deliberations, it was decided that considering the large REZ potential already planned for interconnection in Rajasthan and that majority of power allocation from the solar project is to MP only, the alternatives I and II for interconnection at Kota / Chittorgarh are not acceptable and the Neemuch Solar park may be interconnected at a suitable location in Madhya Pradesh itself.

6.4. With respect to alternative-III, drawl from Shujalpur and Dehgam to Nagda is seen to reduce by ~230MW with 1000MW injection i.e. by 23%. Assuming that ISTS transfer sought from the plant is of similar range, this option is justified.

6.5. Mandsaur S/s being implemented under Green Energy Corridor (Intra-state) scheme was initially planned for various solar projects in the area. MPPTCL may kindly intimate the solar projects which have materialised in the Mandsaur area along with the margins available at this substation.

6.6. RUMS may intimate regarding status of Connectivity/LTA application .Members may deliberate on Alternative-III / other suitable alternatives may be discussed.

7. Review of Transmission scheme for evacuation of power from Dholera UMSP

7.1. In the 2nd meeting of WRPC(TP) held on 04.09.2020, GETCO requested to review the Transmission system for evacuation of power from Dholera UMSP (Phase I – 2GW) that has already approved in the 1st meeting of WRPC (TP) held on 11.01.2020. GETCO informed that 1 GW capacity out of the 5 GW Dholera UMSP being developed by GPCL has already been awarded . With award of this 1 GW capacity, it appears that the entire potential of 5 GW Dholera UMSP would materialise in near future. Proceeding with the already approved scheme under ISTS would require planning of additional system to cater to evacuation requirement under Phase-II (2 GW) of ISTS. Accodingly, it would be prudent to revise the already approved scheme and plan a 765/400

kV pooling station at Dholera along with 765 kV outlet upto planned Ahmedabad S/stn. The line may initially be kept charged at 400 kV under Phase-I. This would result in an optimal system to cater to the total evacuation requirement of 4 GW under ISTS which is being developed in two phases with 2 GW in each phase.

Accordingly, it was agreed to review the Transmission scheme for evacuation of power from Dholera UMSP (Phase-I: 2 GW), so as to develop an optimal ISTS system that would be able to cater to evacuation requirement of 2 GW each under phase-I and Phase-II.

7.2. Based on studies carried the following revised transmission system is proposed for evacuation of power from Dholera UMSP:

(i) Establishment of 3x1500MVA, 765/400kV Dholera Pooling Station with 1X330 MVAr, 765 kV bus reactor & 1x125MVAr 420kV bus reactor.
(ii) Dholera PS – Vataman switching station 765 kV D/C line – 40 km.
(iii) 400 kV line bays for termination of lines from solar park.

7.3. Members may deliberate.

8. System Strengthening in Gujarat associated with integration of RE projects from Khavda potential energy zone

8.1. In the 2nd meeting of WRPC(TP), the issue of high loadings on several other Intra-state and ISTS transmission lines in Gujarat with integration of 16 GW RE (including 10 GW at Khavda) in Gujarat was discussed. Two alternatives for dispersal of power beyond Vadodara towards southern Gujarat and Maharashtra under high RE conditions were presented, one 400 kV corridor and other 765 kV corridor. GETCO has given their preference for 765 kV corridor for onward power disbursal. In the meeting it was agreed that the transmission system strengthening in Gujarat associated with integration of RE projects from Khavda potential energy zone, would be further studied.

8.2. Accordingly, System studies were conducted by CTU for the 2024-25 time frame considering June scenario Afternoon Peak condition (High RE scenario) (considering RE capacity coming up in Rajasthan). LGBR considered is as given below:

Avl. factor	Thermal Central	Thermal State	Thermal Private	Hydro	Nuclear	Solar	Solar rooftop	Wind	National DF	Regional DF
NR	25%	31%		60%	80%	90%	60%	30%	86%	85%
WR	40%	30%	38%	30%	80%	80%	60%	40%	83%	82%
SR	0%	25%	0%	40%	80%	60%	60%	40%	75%	74%
ER	6%	26%	42%	60%	80%	60%	60%	0%	79%	78%
NER	0%	0%		60%	80%	60%	60%	0%	66%	65%
		28%								86%

Avl.	Thermal Central	Thermal State	Thermal Private	Hydro	Nuclear	Solar	Solar rooftop	Wind	Total avl.	Demand Factor	Surplus / Deficit
NR	2888	12319	0	13545	3536	48017	2700	1737	84741	74478	10264
WR	7568	10333	13940	2450	2592	28304	2700	14144	82031	69965	12067
SR	0	7374	0	4769	2656	18371	2700	12521	48390	55790	-7399

ER	1430	3213	1898	4909	0	150	240	0	11840	25454	-13614
NER	0	0	0	2890	0	60	60	0	3010	3800	-790
Total	**11886**	**33239**	**15837**	**28563**	**8784**	**94901**	**8400**	**28402**	**230013**	**229486**	**527**
		60962						**RE- 131703**			

8.3. As per the studies, high loadings as well as fault level issues are observed in the Gujarat Transmission System as listed below:

OUTPUT FOR ZONE 35 [GUJARAT]
SUBSYSTEM LOADING CHECK (INCLUDED: LINES; BREAKERS AND SWITCHES; TRANSFORMERS) (EXCLUDED: NONE)
LOADINGS ABOVE 75.0 % OF RATING SET B (MVA FOR TRANSFORMERS, CURRENT FOR NON-TRANSFORMER BRANCHES):

X--------- FROM BUS ----------X				X---------- TO BUS ----------X							
BUS#	X-- NAME --X	BASKV	AREA	BUS#	X-- NAME --X	BASKV	AREA	CKT	LOADING	RATING	PERCENT
3	ASOJ-BYP-KOS	400.00	3	354029	KOSAMBA	400.00*	3	1	680.5	850.0	80.1
164405	BHINMAL	400.00	1	354019	ZERDA	400.00*	3	1	835.0	850.0	98.2
352004	WANAKBORI	220.00	3	354004	WANAKBORI	400.00*	3	1	248.1	315.0	78.8
352024	BHIMASAR	220.00*	3	354024	BACHAU	400.00	3	1	298.5	315.0	94.7
352024	BHIMASAR	220.00*	3	354024	BACHAU	400.00	3	2	298.5	315.0	94.7
352210	VADODARAPG	220.00	3	354035	VADODARA	400.00*	3	2	483.1	500.0	96.6
352210	VADODARAPG	220.00	3	354035	VADODARA	400.00*	3	3	483.1	500.0	96.6
354002	GANCS4	400.00*	3	354003	DEHGM4	400.00	3	1	644.7	850.0	75.9
354002	GANCS4	400.00*	3	354003	DEHGM4	400.00	3	2	644.7	850.0	75.9
354009	GPEC4	400.00*	3	354021	KASOR4	400.00	3	1	720.6	850.0	84.8
354019	ZERDA	400.00	3	354136	BANASKANTHA	400.00*	3	1	824.7	850.0	97.0
354029	KOSAMBA	400.00	3	354047	VAV4	400.00*	3	1	666.5	850.0	78.4
354044	AHMDABAD PG	400.00	3	358044	AHMDABAD PG	765.00*	3	2	1154.7	1500.0	77.0
354044	AHMDABAD PG	400.00	3	358044	AHMDABAD PG	765.00*	3	3	1154.7	1500.0	77.0
354136	BANASKANTHA	400.00*	3	354137	SANKHARI	400.00	3	1	1143.8	850.0	134.6
354136	BANASKANTHA	400.00*	3	354137	SANKHARI	400.00	3	2	1143.8	850.0	134.6
354136	BANASKANTHA	400.00*	3	358136	BANASKANTHA	765.00	3	2	1603.9	1500.0	106.9
354136	BANASKANTHA	400.00*	3	358136	BANASKANTHA	765.00	3	3	1603.9	1500.0	106.9
358147	LAKADIA 765	765.00*	3	358199	BHUJ-II PS-7	765.00	3	1	1936.2	2500.0	77.4
358147	LAKADIA 765	765.00*	3	358199	BHUJ-II PS-7	765.00	3	2	1936.2	2500.0	77.4
358147	LAKADIA 765	765.00	3	358200	KHAVDA 765	765.00*	3	3	2598.1	2500.0	103.9
358147	LAKADIA 765	765.00	3	358200	KHAVDA 765	765.00*	3	4	2598.1	2500.0	103.9

Further, fault level at Dehgam S/s is observed to reach about 49kA as against its design rating of 40kA. At Dehgam S/s, there is more than 20kA contribution from Ranchhodpura (Vadavi) and Pirana/Nicol(Torrent) 400kV lines. This is also causing the fault level at Ranchhodpura (Vadavi) S/s of GETCO to reach 42kA.

It may be noted that the overloadings are also observed with Khavda RE injection of 10 GW. Hence, the transmission system strengthening needs to be implemented in matching time frame of agreed Khavda scheme.

8.4. To overcome the above loadings / fault level issue as well as to facilitate the additional RE integration in Khavda region , the following System strengthening is proposed:

Under Intra-state:

i) Bypassing of LILO of one circuit of Gandhar – Navsari(PG) 400kV D/c line at Vav S/s and restoring it to original configuration i.e. Gandhar – Navsari(PG) 400kV D/c line

ii) Utilisation of the 2 nos. 400kV bays vacated at Vav S/s (above) along with portion of LILO line (as required) for LILO of 2nd 400kV circuit of Kosamba(GETCO)– Ukai 400kV line at Vav (GETCO) S/s

iii) 420kV, 63MVAr fixed line reactor at Kosamba end of Bharuch – Kosamba 400kV D/c line (formed after proposed LILO of Fedra/Sanand – Kosamba 400kV D/c line at Bharuch S/s) to be converted into switchable

Under ISTS:

1. Scheme for fault level control at Dehgam, Asoj & Vadodara S/s

i) Bypassing of Rachhodpura(GETCO) – Dehgam(PG) 400kV D/c line at Dehgam(PG) S/s and connecting it with Dehgam(PG) – Pirana 400kV D/c line (one circuit via Nicol) so as to form Ranchhodpura(GETCO) – Pirana(PG) 400kV D/c line (one circuit via Nicol)

Note: As per information received from POWERGRID vide e-mail dated 03.09.2020, 400 KV D/c Dehgam-Ranchorpura line is crossing with 400 KV D/ c Dehgam-Pirana line near boundary wall of sub station premises (tower 2 & 3 of Ranchorpura line and tower 3& 4 of Pirana line from Dehgam SS end). It is possible to disconnect both the lines towards Dehgam end and join with each other so that 400 KV D/c Ranchorpura-Pirana line shall be established.

After the implementation proposed system strengthening scheme in Gujarat, the fault level at 400 kV buses at Vadodara and Asoj would be 39 & 41.9 kA respectively.

2. System strengthening in Gujarat

i) Banaskantha – Ahmedabad 765kV D/c line (~200km.) with 330MVAr, 765kV Switchable line reactor at Ahmedabad S/s end
ii) Establishment of 2x1500MVA, 765/400kV & 2x500MVA, 400/220kV Bharuch S/s with 1x330MVAr 765kV and 1x125MVAr 400kV Bus reactor. (with 110MVAr 765kV switchable single phase reactor (spare unit for bus/line reactor)
iii) Termination of Ahmedabad – Vadodara 765kV D/c line (~112km.) **(being implemented under Khavda Phase-II Part C scheme)** to Bharuch S/s so as to form Ahmedabad – Bharuch 765kV D/c line (~200km.) with 330MVAr, 765kV Switchable line reactor at Bharuch S/s end
iv) Bharuch – Padghe 765kV D/c line (~300km.) with 330MVAr, 765kV Switchable line reactor at Bharuch S/s end and 240MVAr, 765kV Switchable line reactor at Padghe end
v) LILO of Pirana(T) – Sugen/Unosugen 400kV D/c line at Bharuch S/s
vi) LILO of Fedra/Sanand – Kosamba 400kV D/c line at Bharuch S/s along with reconductoring of Bharuch – Kosamba section with HTLS conductor (with minimum capacity of 2100MVA at nominal voltage).

Associated Bay upgradation shall also be done at Kosamba matching with reconductoring capacity (if required, GETCO may confirm).

vii) LILO of Zerda – Kankroli 400kV S/c line at Bhinmal S/s (other circuit is already LILOed at Bhinmal S/s)

viii) Augmentation of Transformation capacity at Bhachau S/s by 1x500MVA, 400/220kV

ix) Augmentation of Transformation capacity at Padghe (GIS) 765/400kV substations by 1x1500MVA ICT

220kV System interconnections considered at Bharuch (to be developed under Intra-state) (GETCO may supplement):

- LILO of Gandhar – Haldarva 220kV D/c line at Bharuch
- LILO of Zagadia – Jambua 220kV line at Bharuch

In addition to above system, to alleviate loading of Banaskantha 765/400kV ICTs as well as Bansakantha-Sankhari 400kV D/c line, following options have been considered in studies:

Option-1:

- Augmentation of Transformation capacity at Banaskantha S/s by 1x1500MVA, 765/400kV
- LILO of Mundra (APL) – Zerda 400kV D/c line at Banaskantha

Note: Banaskantha – Sankhari 400kV D/c line still reaches ~1100MW under N-1

Option-2:

- Augmentation of Transformation capacity at Banaskantha S/s by 1x1500MVA, 765/400kV
- LILO of Sankhari – Zerda 400kV line at Banaskantha
- LILO of Sankhari – Ranchhodpura 400kV line at Banaskantha

Note: Banaskantha – Sankhari 400kV D/c line now becomes 2xD/c line and no contraints are envisaged

Option-3:

- Establishment of 765/400 kV, 2x1500MVA Sankhari (New) S/s
- LILO of Banaskantha – Ahmendabad 765kV D/c line at Sankhari (New)
- LILO of Banaskantha – Sankhari 400kV D/c line at Sankhari (New)
- Sankhari(New) – Prantij(GETCO) 400kV D/c line

Note:

- ***In Rapar Alternative:*** *Sankhari(New) – Sankhari 400kV D/c line still reaches ~1200MW under N-1 and hence this section would still need to be* ***reconductored (existing circuit is of 1100MVA capacity only).***
- ***In Vataman Alternative:*** *Entire Banaskantha* ***-*** *Sankhari(New) – Sankhari 400kV D/c line still reaches >1100MW under N-1 (Critical level)*

Considering the above system strengthening schemes and any one of the above alternatives, the Vadodara 400/220kV ICTs become N-1 critical (525-535 MW under N-1) and Vadodara – Jambua 220kV D/c line loading reaches ~280MW per ckt. GETCO may intimate loading limit of above 220kV line.

The schematic and sld depicting flows is enclosed as Annexure-V.

8.5. Members may deliberate.

9. Transmission System for evacuation of power from Khavda RE park (15 GW)

9.1. In December 2020, Hon'ble Prime Minister laid the foundation stone of the world's largest renewable energy park in Gujarat's Kutch. This 30 Gigawatt (GW) capacity hybrid renewable energy park will be built along the Indo-Pak border at Khavda using both wind and solar energy and is expected to play a major role in fulfilling India's vision of generating 450 GW of Renewable Energy (RE) power by 2030.

9.2. Govt. of Gujarat has allocated approx. 50,000 acres of land to a mix of private and public sector project developers for development of renewable energy projects in the Renewable Energy Park at Khavda. As per the terms and conditions, the developers have given an undertaking that they would setup 50% of allocated capacity within the three (03) years and 100 % capacity within five (05) years from the date of lease deed agreement. As per the timeline indicated by the Government of Gujarat, 50% of park capacity is to be commissioned by 2024 and balance by end of 2026. Hence, out of 27.7GW RE capacity, about 14GW RE capacity is expected to come up by 2024-25 and balance by 2026-27 time-frame.

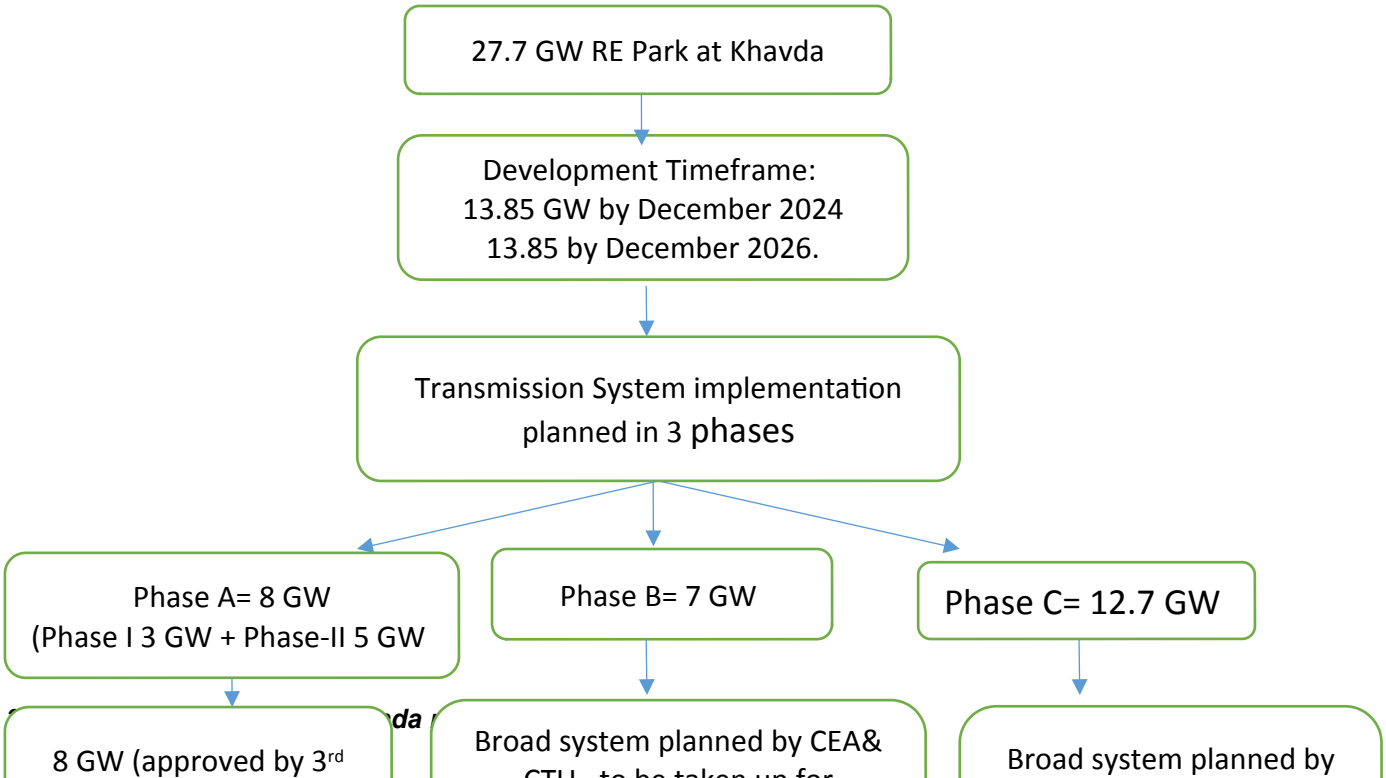
In the RE park three ISTS pooling station have been proposed to pool RE power for further evacuation. The Khavda pooling station of 7.5 GW capacity already planned and agreed could be designated as Khavda pooling station-I (KPS1). As per the layout of the Khavda RE park indicating the location of the pooling station, the pooling station along with capacity would be as given below:

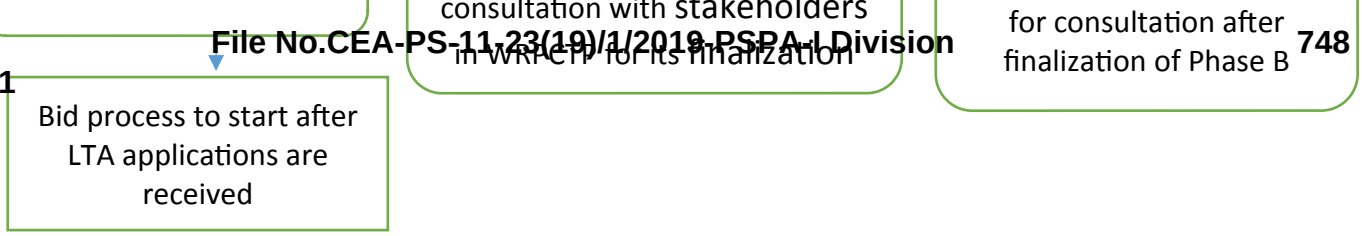
S.No.	Pooling Station	Location	Total pooling capacity	Likely Capacity by December 2024
1	Khavda Pooling Station-I (KPS1)	near the AGEL plot	9.5 GW	4.5 GW
2	Khavda Pooling Station-II (KPS2)	near GSECL/ GIPCL/ NTPC plot	10.5 GW	6 GW
3	Khavda Pooling Station-III (KPS3)	near SECI/ NTPC /SRL plot	7.7 GW	4.5 GW

9.3. The developer wise capacity allocated and and the likely pooling station for pooling their RE power for further evacuation is tabulated below:

Sl. No.	Name of Developers	Allocated Capacity (MW)	Capacity in GW by 2024-25 (Assumed)			
			KPS1	KPS2	KPS3	Total
1.	Adani Green Energy Limited	9500 (Hybrid)	4.5			4.5
2.	Gujarat State Electricity Corporation Limited	3325 (Hybrid)		1.7		1.7
3.	Gujarat Industries Power Company limited	2375 (Hybrid)		1.2		1.2
4.	NTPC Limited	4750 (Hybrid)		1.2	1.2	2.4
5.	Sarjan Realties Limited (Suzlon Group Company)	4750(Hybrid)		1.2	1.2	2.4
6.	Solar Energy Corporation of India (Land reserved for SECI)	3000 (Wind only)			1.5	1.5
	Total	**27700 MW**	**4.5**	**5.3 ~ 6**	**3.9 ~4.5**	**13.7 ~ 15**

9.4. The planning and implementation of the associated transmission scheme is proposed to be taken up in three phases. Phase A has already been planned and approved.The overview is as given below:





9.5. The transmission planning assumption for evacuation of power from Khavda RE Park is as given below:

i) As per the land allotted by Govt. of Gujarat in Khavda area for 27.7GW REZ (letter from GPCL is attached as Annexure-VI), 24.7GW is Hybrid and 3GW (to SECI) is Wind. Hence, out of 27.7 GW REZ in Khavda area, **24.7 GW is considered as Hybrid and balance 3GW as Wind**.

ii) As per the Guidelines for Tariff Based Competitive Bidding for Procurement of Power from Grid Connected Wind Solar Hybrid Projects issued by MNRE on 14.10.2020, rated power capacity of 1 (one) resource (wind or solar) shall be at least 33% of the total contracted capacity. Accordingly, since Solar is expected to be dominant in Khavda region, Wind capacity shall be at least 33% of Total Installed Capacity of Hybrid (24.7 GW). In view of the above, the RE capacity for Wind and Solar in Khavda area considered is given below:

- Solar: 16.7 GW (~60%)
- Wind: 11 GW (~40%)

Hence, solar/wind breakup for 15GW Khavda REZ by 2024-25 Time-frame shall be:

- Solar: 9 GW (~60%)
- Wind: 6 GW (~40%)

iii) For optimization of transmission system requirement, **75% diversity in wind** generation has been considered i.e. Wind dispatch of 4.5 GW against installed capacity of 6GW. The diversity is in line with peak dispatches observed at Bhuj PS in recent past (As per information received by CTU from WRLDC vide e-mails dated 17.08.2020 and 26.11.2020) as well as the capacity factor prescribed by CEA Transmission Planning Criteria, 2013.

No diversity in solar generation has been considered as ~100% generation output may be expected in afternoon period. Hence, actual

peak RE despatch from Khavda area is as below:

- Solar: 9 GW
- Wind: 4.5 GW

Total: 13.5GW

iv) No Storage capacity in Khavda RE park has been considered by 2024-25 time-frame.

v) The entire capacity would be evacuated through ISTS system. No transmission system under intra-state has been assumed.

vi) Minimum Transmission System for evacuation of RE from Khavda has been planned so as to avoid unnecessarily burden on consumers.

vii) LGBR considered for afternoon peak scenario is given at Annexure-VII

viii) Dholera Ph-I (2GW) has also been considered to be pooled at proposed Dholera PS considering a despatch of 1.5GW (75%).

9.6. Transmission System for Additional 7GW (Total 15GW) injection in Khavda area and

(i) Establishment of pooling stations (KPS2 and KPS3) in Khavda RE park

S. No.	Pooling station	Ultimate Capacity	Initial implementation by Dec 2024	Remarks
1	Khavda pooling station (KPS1) alongwith KPS1-Bhuj 765 kV D/C line.	7x1500 MVA, 765/400 kV alongwith space for future 1x1500, 765/400 kV ICT.	3x1500, 765/400 kV alongwith space for future 5x1500, 765/400 kV ICT.Only one bus section to be implemented.	Scheme already notified as Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I.
2	Khavda pooling station (KPS2*) alongwith KPS1-KPS2 765 kV D/C line Or LILO of one ckt KPS1-Bhuj 765 kV D/C line at KPS2	6x1500 MVA, 765/400 kV alongwith space for future 2x1500 MVA 765/400 kV ICT	4x1500, 765/400 kV alongwith space for future 4x1500 MVA 765/400 kV ICT. Both bus section to be implemented	Under finalization as a part of Khavda Phase-B

3	Khavda pooling station (KPS3*) alongwith KPS3-KPS2 765 kV D/C line	7x1500 MVA, 765/400 kV alongwith space for future 2x1500 MVA 765/400 kV ICT	3x1500, 765/400 kV alongwith space for future 6x1500 MVA 765/400 kV ICT. Only one bus section to be implemented.	Under finalization as a part of Khavda Phase-B

* KPS2 and KPS3 pooling stations shall be established in two sections (with bus sectionalizer at 765kV & 400kV level). Bus sectionalizer at 765kV level shall normally be closed and bus sectionalizer at 400kV level shall normally be open.

Khavda pooling station (KPS2) scope of works:

- Establishment of 765/400 kV, 4x1500MVA, KPS2 (GIS) with 2X330 MVAR 765 kV bus reactor and 2X125 MVAR 400 kV bus reactor. It will have space provisions for future expansion of 765/400 kV, 4x1500MVA.
- The pooling station shall be established in two sections (with bus sectionalizer at 765kV & 400kV level). On each bus section, there shall be 2x1500MVA 765/400kV ICTs, 1x330MVAr, 765 kV & 1x125MVAr 420kV bus reactor. Each section will have space for future expansion of 2x1500, 765/400 kV ICTs. Bus sectionalizer at 765kV level shall normally be closed and bus sectionalizer at 400kV level shall normally be open.
- 1x500MVA, 765/400kV (single phase) spare transformer at KPS2
- 110MVAr 765kV switchable single phase reactor (spare unit for bus/line reactor) at KPS2.
- KPS2-KPS3 765 kV D/C line or LILO of one ckt of KPS1-Bhuj 765 kV D/C line at KPS2

Khavda pooling station (KPS3) scope of works:

- Establishment of 765/400 kV, 3x1500MVA, KPS3 (GIS) with 1X330 MVAR 765 kV bus reactor and 1X125 MVAR 400 kV bus reactor. The pooling station would have space provision for future expansion of 6x1500 MVA, 765/400 kV ICT.
- The pooling station shall be created with bus section I with 765/400, 3x1500MVA ICTs and 1X330 MVAR 765 kV & 1X125 MVAR 400 kV bus reactors alongwith future space provision for expansion of 1x1500, 765/400 kV ICT. Bus section II shall be created with 765/400, 4x1500MVA ICTs and 1X330 MVAR 765 kV & 1X125 MVAR 400 kV bus reactors alongwith future space provision for expansion of 1500, 765/400 kV ICT. Bus sectionalizer at 765kV level shall normally be closed and bus sectionalizer at 400kV level shall normally be open
- 1x500MVA, 765/400kV (single phase) spare transformer at KPS3
- 110MVAr 765kV switchable single phase reactor (spare unit for bus reactor) at KPS3.

- KPS3- KPS2 765 kV D/C line.

(ii) Onward transmission system requirement from Khavda RE park: Under Phase-A, Khavda PS- Lakadia- Ahmedabad-Indore/Vadodara 765 kV D/C line has already been agreed for evacuation of about 8 GW of power. Additional evacuation of 7 GW power from Khavda RE park would require an additional 765 kV corridor towards load centres. Two alternatives has been studied, namely, Alt1 (Khavda – Rapar-Ahmedabad 765 kV D/C line & Vataman- Bharuch 765 kV D/C line) and Alt2 (Khavda – Halvad - Vataman- Bharuch 765 kV D/C line).

Alternative 1:

- KPS2- Rapar 765kV D/c line (~180km.) with 1x330MVAr switchable line reactor at KPS2 end.
- Establishment of 765kV switching station at Rapar with 765kV, 1x330MVAr bus reactor (with 110MVAr 765kV switchable single phase reactor (spare unit)
- Rapar – Ahmedabad 765kV D/c line (~250km.) with 1x240MVAr switchable line reactor at both ends (with 80MVAr 765kV switchable single phase reactor (spare unit) at Rapar)
- LILO of Lakadia – Banaskantha 765kV D/c line at Rapar (LILO length ~10km.)
- Augmentation of Transformation capacity at Ahmedabad 765/400kV substations by 1x1500MVA ICT
- Establishment of 765 kV switching station near Vataman with 1X330 MVAr, 765 kV bus reactor. 110MVAr 765kV switchable single phase reactor (spare unit for bus/line reactor)
- LILO of Lakadia – Vadodara 765kV D/c line at Vataman 765 switching station (~10km. LILO length)
- Vataman switching station – Bharuch 765kV D/c line (~150km.)

Note:
In this alternative, Vadodara 400/220kV ICTs become just N-1 compliant (500MW under N-1 condition) as loading is slightly reduced on ICTs as compared to Alternative-2 below (with 535MW (N-1) observed in Alt-2). Further, loading on Vadodara – Jambua 220kV D/c line is reduced to 265MW per ckt from ~282MW per ckt in alternative-2 below.

Alternative 2:

- Establishment of 765kV switching station at Halvad with 765kV, 1x330MVAr bus reactor (with 110MVAr & 80MVAr 765kV switchable single phase reactor (spare unit for bus/line reactors at Morbi)
- KPS2- Halvad 765kV D/c line (~220 km.) with 1x240 MVAr switchable line reactor at both end.

- LILO of Lakadia – Ahmedabad 765kV D/c line at Halvad (LILO length ~50km.)
- 240MVAr 765kV switchable line reactor on each ckt at Halvad end of Halvad – Ahmedabad 765kV D/c line
- Halvad – Vataman 765kV D/c line (~150km.) with 1x330MVAr switchable line reactor at Vatman end.
- Augmentation of Transformation capacity at Ahmedabad 765/400kV substations by 1x1500MVA ICT
- Establishment of 765 kV switching station near Vataman with 1X330 MVAr, 765 kV bus reactor. 110MVAr 765kV switchable single phase reactor (spare unit for bus/line reactor)
- LILO of Lakadia – Vadodara 765kV D/c line at Vataman 765 switching station (~10km. LILO length)
- Vataman switching station – Bharuch 765kV D/c line (~150km.)

9.7. With the above proposed transmission system slight modiication is required in the already agreed Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II: Part A.

S.No	Agreed scope of works	Modified scope of works
1	Augmentation of Khavda PS (GIS) by 4X1500 MVA, 765/400 kV ICTs with 1X330 MVAR 765 kV bus reactor and 1X125 MVAR 420 kV bus reactor on 2nd 765 kV and 400 kV bus respectively	Augmentation of **Khavda PS1** (GIS) by 4X1500 MVA, 765/400 kV ICTs with 1X330 MVAR 765 kV bus reactor and 1X125 MVAR 420 kV bus reactor on 2nd 765 kV and 400 kV bus respectively Implementation beyond LTA of 4.5 GW at KPS1.
2	Augmentation of 400/220 kV, 2X500 MVA transformation capacity at Khavda (GIS) P.S. (implementation to be taken as per connectivity/LTA granted at 220 kV level)	May be deleted as connectivity granted at 400 kV level. Khavda PS(GIS) may be read as Khavda pooling station 2(GIS) – KPS2 Implementation with LTA requirement more than 3 GW from Khavda RE park
3	Khavda PS (GIS) – Lakadia PS 765kV D/c line with 330 MVAR line reactors at Khavda end.	Khavda PS2 (GIS) – Lakadia PS 765kV D/c line with 330 MVAR line reactors at Khavda end.
4	2 nos. of 765 kV line bays each at Lakadia PS for Khavda PS (GIS) – Lakadia PS 765kV D/c line	2 nos. of 765 kV line bays each at Lakadia PS for Khavda PS2 (GIS) – Lakadia PS 765kV D/c line
5	1x330 MVAr Switchable line reactor for each circuit of Khavda PS (GIS) – Lakadia PS 765kV D/c line at Khavda end	1x330 MVAr Switchable line reactor for each circuit of Khavda PS2 (GIS) – Lakadia PS 765kV D/ c line at Khavda end

6		KPS1-KPS2 765 kV D/C line with bypassing of LILO of one ckt. of KPS1-Bhuj at KPS2 and utilisation of LILO section. Implementation in case LTA exceeding 3 GW at KPS1.

9.8. Member may deliberate.

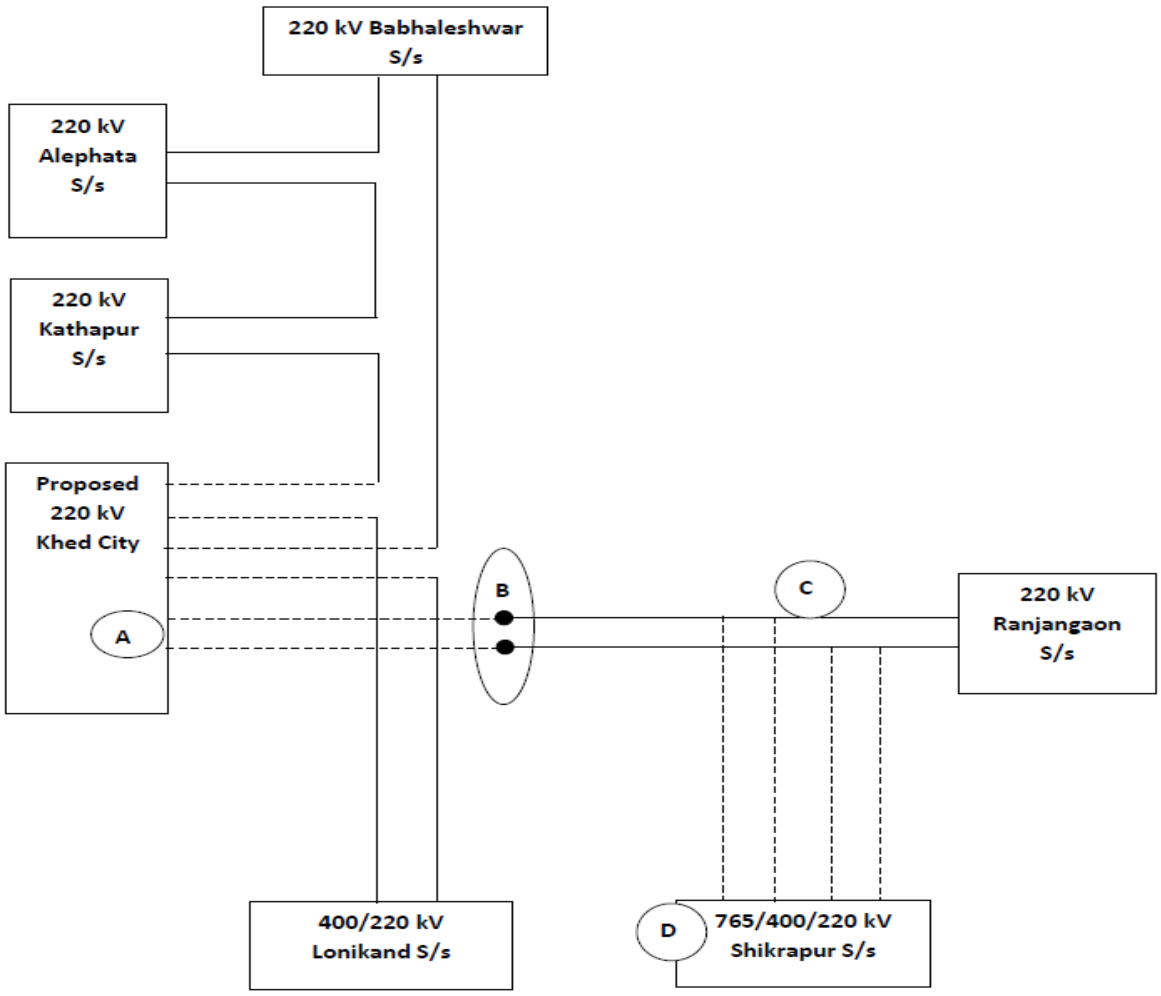
10. Creation of 220 kV level at 765/400 kV Pune GIS (Shikrapur) Substaion

10.1. In the 2nd meeting of WRPC(TP) held on 04.09.2020, the proposal of creation of 220 kV level at 765/400 kV Pune GIS (Shikrapur) Substaion by MSECTL was discussed. The proposal consists of following elements:

A. Under ISTS:
   (i) 220 kV level creation at 765/400 kV Pune GIS (Shikrapur) S/s along with 2x500MVA, 400/220kV ICT at 765/400kV Pune GIS (Shikrapur)
   (ii) 220kV line bay- 4 nos. at 765/400 kV Pune GIS (Shikrapur) S/s.

B. As a part of STU system:
   (i) Reorientation and termination of 220kV Babhleshwar – Ranjangaon ckt & Lonikand –Ranjangaon ckt at Point-B.
   (ii) 220kV Khed City – Point B (Ranjangaon) D/C line – 13.5 km (STU Plan Year 2022-23)
   (iii) LILO on both ckts of 220kV Khed City – Ranjangaon D/C line at 765/400/220kV Pune GIS (Shikrapur) S/s – LILO distance 5 km. (STU Plan Year 2022-23)

SLD for proposed 220 kV Network from 765/400/220 kV Pune GIS (Shikrapur) S/s is as follows:



Point A – Point B = 13.5 km Proposed D/C line
Point C – Point D = 5 km proposed M/C line

10.2. In the meeting, the issue of N-1 non-compliency of proposed 2x500 MVA, 400/220 kV ICTs at Pune GIS (Shikrapur) was highlighted. CTU intimated that the adequate space is available only for 2 nos. 500 MVA, 400/220 kV ICTs and 4 nos. of 220 kV line bays.

10.3. After deliberation, the sheme for creation of 220 kV level at 765/400 kV Pune GIS (Shikrapur) Substation was agreed in principle by the members. However, it was decided that the scheme would be further studied and finalised in the next WRPC (TP) meeting.

10.4. MSETCL may present their proposal considering availability of space for only 2 nos. of 400/220 kV ICTs at 765/400 kV Pune GIS (Shikrapur) of PGCIL. Members may please discuss.

11. Transmission system strengthening beyond Kolhapur for export of power from Solar & Wind Energy Zones in Southern Region (Gadag SEZ, Karnataka)

11.1. The following transmission system was agreed in the 2nd SR Standing Committee on Transmission held on 10.06.2019 for evacuation of power from Phase-II Solar Energy Zone in Gadag, Karnataka:

Gadag SEZ (2500 MW)

i. Establishment of 400/220 kV, 5x500 MVA Gadag Pooling Station.
ii. Gadag PS-Koppal PS 400 kV (high capacity equivalent to quad moose) D/C Line.
iii. Gadag PS-Narendra (New) PS 400 kV (high capacity equivalent to quad moose) D/C Line.
iv. 220 kV line bays for interconnection of solar projects (8 nos.)
v. 1x125 MVAr (400 kV) bus reactor at Gadag PS.
vi. Upgradation of Narendra (New) to its rated voltage of 765 kV level alongwith 2x1500 MVA transformer and 1x330 MVAr Bus Reactor.
vii. Upgradation of Kolhapur (PG) to its rated voltage of 765 kV level alongwith 2x1500 MVA transformer and 1x330 MVAr Bus Reactor.
viii. Upgradation/charging of Narendra new - Kolhapur (PG) 765 kV D/c line (initially charged at 400 kV) to its rated voltage of 765 kV along with 1x330 MVAr switchable Line Reactor on Kolhapur (PG) end of each circuit.

From the above, it is observed that Narendra(New) - Kolhapur has been agreed to be charged at 765kV level and therefore system studies were carried out to identify transmission system strengthening requirement beyond Kolhapur to avoid any overloading in Maharashtra / Goa transmission system.

System studies indicate that the following transmission elements become N-1 insecure after Upgradation/charging of Narendra new - Kolhapur (PG) 765 kV D/c line (initially charged at 400 kV) to its rated voltage of 765 kV:

- Kolhapur (PG) - Kolhapur(MSETCL) 400kV D/c line
- Kolhapur(MSETCL) - Karad(MSETCL) 400kV D/c line

11.2. Further, In the 3rd meeting of NCT held on 20th & 28th January, 2021, it was agreed that Strengthening of Kolhapur (PG) - Kolhapur (MSETCL) 400 kV section may be taken in RPCTP based on the operational constraint reported by POSOCO

11.3. Subsequently, POSOCO vide its letter dated 02.02.2021 (Annexure-VIII) has intimated that during Dec'20 – Jan'21 period, the power flow in the Kolhapur (PG) - Kolhapur(MSETCL) 400kV D/c line has been observed very high with N-1 non-compliance. NLDC and RLDCs are taking various measures in operations such as resuction in power order of HVDCs toward southern region (Talchel – Kolar, Bhadravati, Raigarh – Pugalur) to relive the loading of Kolhapur (PG) - Kolhapur(MSETCL) 400kV D/c line.

11.4. Members may deliberate the option of re-conductoring of Kolhapur (PG) – Kolhapur (MSETCL) 400kV D/c line or any other option.

C. ToR 2(iii) – APPLICATIONS FOR CONNECTIVITY AND ACCESS

12. Summary of the connectivity and LTA granted in the connectivity and LTA meetings of WR

12.1. Stage-II Connectivity / RE connectivity (within own premises) to RE developers in Western Region

The details of stage-II connectivity / RE connectivity (within own premises) granted to RE applicants from 44th to 55th meetings of WR constituents for Connectivity & Long-term Access applications in Western Region is tabulated below:

Sl.	Name of Applicant (Organization)	Stage-II Application No	Stage-II Conn Quantum (MW)	Date: Stage-II connectivity required	Criteria Stage II*	Proposed ISTS System for Stage-II connectivity	Dedicated Transmission System for Stage-II connectivity (under scope of applicant)
1.	Srijan Energy Systems Private Limited	1200002419	150	15/01/2021	A SECI Tr-VI (Wind)	**Bhuj-II PS (GIS) (New)** • Establishment of Bhuj II PS with at least 1x1500MVA (765/400kV), 1x500MVA (400/220kV) ICTs • Reconfiguration of Bhuj PS – Lakadia PS 765kV D/c line so as to establish Bhuj II – Lakadia 765 kV D/c line as well as Bhuj -Bhuj II 765kV D/c line	Srijan Energy Systems Private Limited - Bhuj-II PS 220kV S/c line along with associated line bays at generation end
2.	Sherisha Rooftop Solar SPV Four Private Limited	1200002452	50	31/03/2021	A (REMCL LOA for 50MW^)	**Raipur (PG) S/s (existing)**	Sherisha Rooftop Solar SPV Four Private Limited - Raipur 220kV S/c line (capacity at least 300MW at nominal voltage) along with associated line bays at both ends
3	Adani Renewable Energy Holding Four Ltd. (Erstwhile Adani Green Energy Four	1200002437	500	01/07/2022$	A [Solar PV Power plant (2000MW) linked with Solar PV Manufacturing Plant	**Khavda PS (GIS)** • Establishment of Khavda 765/400kV, 1x1500MVA, 400/220kV, 1x500MVA PS (GIS)	Adani Green Energy Four Limited - Khavda PS(GIS) 400kV S/c line (on D/c towers)* (with minimum power carrying capacity of 1250MW per ckt at nominal votage) along with associated line bays at generation end **(Implementation of 400kV GIS bay at ISTS**

Sl.	Name of Applicant (Organization)	Stage-II Application No	Stage-II Conn Quantum (MW)	Date: Stage-II connectivity required	Criteria Stage II*	Proposed ISTS System for Stage-II connectivity	Dedicated Transmission System for Stage-II connectivity (under scope of applicant)
	Limited)				(500MW per annum)]	• Khavda PS (GIS) – Bhuj PS 765 kV D/c line	**end to be under ISTS scope)**
3.	Masaya Solar Energy Private Limited	1200002397	300	02/08/2021	A SECI Tr-VI (Solar)	**Khandwa (PG) (existing)**	Masaya Solar Energy Private Limited - Khandwa(PG) 220kV S/c line[&] along with associated line bay at both ends (under the scope of applicant)
4.	Adani Wind Energy Kutchh Three Limited (Erstwhile Adani Green Energy Three Limited)	1200002773	250	30/10/2020	A SECI Tr-VI (Solar)	Bhuj PS (existing)	• Interconnection of AGETL's wind project to Dayapar/Ratadiya PS (Established for providing Stage-II connectivity to AGEMPL for its 175MW & 300MW wind projects) • Dayapar/Ratadiya Pooling Station - Bhuj PS 220kV D/c line (with capacity of at least 725MW at nominal voltage) along-with associated bays at Bhuj PS (nos. 219 & 220) & generation switchyard (Existing line of AGEMPL and AGETL to share this line with AGE(MP)L's projects with application nos. 1200001362 at Dayapar/Ratadiya & 1200001484 at Chhugar/Atada)
5.	Adani Renewable Energy Holding Four Ltd. (Erstwhile Adani Green Energy Four Limited)	1200002678	2000	30/12/22[$]	A [SECI LOA no. 37292 for 6000MW: Solar PV Power plant (3x2000MW) linked with Solar PV Manufacturing Plant	Khavda PS (Proposed)	• Adani Green Energy Four Limited - Khavda PS(GIS) 400kV D/c line (with minimum power carrying capacity of 1250MW per ckt at nominal voltage) along with associated line bays at generation end • Implementation of 1 no. 400kV GIS bay at Khavda PS end is under ISTS. Implementation of 2nd 400kV GIS bay at Khavda PS needs to be deliberated.

Sl.	Name of Applicant (Organization)	Stage-II Application No	Stage-II Conn Quantum (MW)	Date: Stage-II connectivity required	Criteria Stage II*	Proposed ISTS System for Stage-II connectivity	Dedicated Transmission System for Stage-II connectivity (under scope of applicant)
6.	Adani Renewable Energy Holding Four Ltd. (Erstwhile Adani Green Energy Four Limited)	1200002679	1000	30/06/23[$]	(3x500MW per annum)]		• Adani Green Energy Four Limited Pooling Station-2 (PS-2) - Khavda PS(GIS) 400kV S/c line (on D/c towers)* (with minimum power carrying capacity of 1250MW per ckt at nominal voltage) along with associated line bays at generation end. • Implementation of 400kV GIS bay at ISTS end needs to be deliberated
7.	Continuum Power Trading (TN) Pvt Ltd	1200002879	90	01/10/2020	B L&A Mode	Bhuj PS (existing)	• Interconnection of CTN's wind project to Pooling Station of M/s IWISL (Dayapar) (Established for grant of connectivity to IWISL for its 500MW wind project) • IWISL (Dayapar) - Bhuj PS 220kV D/c line along-with associated bays at Bhuj PS (AIS bay nos. 205 & 208) & generation switchyard (To be shared with IWISL's 500MW wind project with application no. 1200000390 at Dayapar) (Already commissioned)
8.	NTPC Ltd. (20 MW solar PV project)	12000029330 (Connectivity application)	20	08/06/2021	Under provision 2(1)(b)(i)(e) of CERC Connectivity Regulations, 2009 (and its amendments thereof)	Existing 220kV switchyard of NTPC Jhanor Gandhar Gas Power Plant (JGGPP) (Principal generator)	• Interconnection with 220kV bus of the NTPC JGGPP
9.	NTPC Ltd. (56 MW solar PV project)	12000029957 (Connectivity application)	56	21/07/2021	Under provision 2(1)(b)(i)(e) of CERC Connectivity Regulations, 2009	Existing 220kV switchyard of NTPC Kawas Gas Power Plant (KGPP) (Principal Generator)	• Interconnection with 220kV Bus of NTPC KGPP

Sl.	Name of Applicant (Organization)	Stage-II Application No	Stage-II Conn Quantum (MW)	Date: Stage-II connectivity required	Criteria Stage II*	Proposed ISTS System for Stage-II connectivity	Dedicated Transmission System for Stage-II connectivity (under scope of applicant)
					(and its amendments thereof)		

Note:
***^** LOA submitted with the application is in the name of M/s Refex Energy Limited (REL). Applicant has submitted REMCL letter dtd. 15.01.20 clarifying that above LOA (has been issued to the consortium of M/s Refex Energy Ltd. & M/s Sherisha Solar Pvt. Ltd. and for all practical and regulatory purposes, the LOA is deemed to have been issued by REMCL to 100% SPV of the consortium company i.e. M/s SRSSFPL (applicant) & can be utilized by the above SPV.*

$ Adani Green Energy Four Limited shall be required to complete the dedicated transmission line(s) and pooling sub-station(s) within 24 months from the date of intimation of bay allocation

**In the event of stringing of the 2nd 400kV circuit by the applicant, when required, all liabilities shall be borne by M/s Adani Green Energy Four Limited*

12.2. LTA Applications from RE developers in Western Region

Sl.	Name of Applicant (Organization)	Stage-I Connectivity Quantum Granted (in MW)	Stage-II Connectivity Details	ISTS substation for Stage-II connectivity	Seeking LTA for (MW)	Date of Receipt of App.	Date from which LTA sought	Date upto which LTA required	Beneficiaries for LTA	LTA Application No
1	Sitac Kabini Renewables Private Limited	300	300	Bhuj-II PS	300	28/12/19	30/06/21*	30/06/46	100MW-SR (Target) 200MW-NR (Target)	1200002413
2	Srijan Energy Systems Private Limited	150	150	Bhuj-II PS	50	12/03/20	15/03/21*	15/03/46	Goa (WR)	1200002522
3	Masaya Solar Energy Private Limited	300	300	Khandwa (PG) (existing)	300	27/01/20	25/03/22	25/03/47	SR (Target)	1200002451
4	Renew Wind Energy (AP2) Private Limited	300	300	Bhuj PS	37.5	17/09/20	20/11/20*	31/12/45	GRIDCO-ER	1200002862
5	Adani Wind Energy Kutchh Three Limited (Erstwhile	250	250	Bhuj PS	250	30/09/20	31/01/21*	31/01/46	40MW-Chandigarh Administration 85MW-UPPCL 75MW-KSEBL 50MW-GRIDCO Ltd.	1200002874

Sl.	Name of Applicant (Organization)	Stage-I Connectivity Quantum Granted (in MW)	Stage-II Connectivity Details	ISTS substation for Stage-II connectivity	Seeking LTA for (MW)	Date of Receipt of App.	Date from which LTA sought	Date upto which LTA required	Beneficiaries for LTA	LTA Application No
	Adani Green Energy Three Limited)									
6	Continuum Power Trading (TN) Pvt. Ltd	140	90	Bhuj PS	50	22/10/20	31/12/20*	15/11/45	MPPMCL	1200002895
7	CLP India Pvt. Ltd	250.8	250.8	Jam Khambhaliya	250.8	10/12/20	22/04/22*	21/04/47	WR TARGET-170.7MW SR TARGET-80.1MW	1200002953

* Or Availability of Transmission System for LTA, whichever is later

Application at Sl. No. 1 & 2:

For grant of LTA to the above applicant, the following transmission system was agreed:

i) Establishment of 2x1500MVA (765/400kV), 4x500MVA (400/220kV) Bhuj-II PS (GIS)
ii) Reconfiguration/LILO of Bhuj PS – Lakadia PS 765kV D/c line at Bhuj-II PS so as to establish Bhuj II –Lakadia 765 kV D/c line and Bhuj-Bhuj II 765kV D/c line
iii) Establishment of 2x1500MVA, 765/400kV Lakadia PS
iv) Bhuj PS – Lakadia PS 765kV D/c line
v) LILO of Bhachau – EPGL 400kV D/c (triple) line at Lakadia PS
vi) Lakadia – Vadodara 765kV D/c line

OR

Lakadia – Banaskantha 765kV D/c line

Application at Sl. No. 3:

Granted with existing system

Application at Sl. No. 4,5 & 6:

For grant of LTA to the above applicants, the following transmission system was agreed:

i) Establishment of 2x1500MVA, 765/400kV Lakadia PS
ii) Bhuj PS – Lakadia PS 765kV D/c line
iii) LILO of Bhachau – EPGL 400kV D/c (triple) line at Lakadia PS
iv) Lakadia – Vadodara 765kV D/c line

OR

Lakadia – Banaskantha 765kV D/c line

Application at Sl. No. 7

For grant of LTA to the above applicant, the following transmission system was agreed:

Connectivity System for RE projects (1500 MW) in Dwarka (Gujarat)

i) Establishment of 4x500MVA, 400/220kV Jam Khambhaliya PS (GIS)
ii) Extension of Essar–Lakadia/ Bhachau 400kV D/c (triple snowbird) line upto Jam Khambhaliya PS

Common Strengthening Scheme required for LTA

i) Establishment of 2x1500MVA, 765/400kV Lakadia PS
ii) LILO of Bhachau – EPGL 400kV D/c (triple) line at Lakadia PS
iii) Bhuj PS – Lakadia PS 765kV D/c line
OR
Lakadia – Vadodara 765kV D/c line
OR
Lakadia – Banaskantha 765kV D/c line

12.3. MTOA Details

Total MTOA quantum of 200.77 MW has been granted after the 1st WRPCTP meeting with drawl in WR (MPPMCL-58MW, JITPL-142.77MW). MTOA of 13.65MW with injection in WR is granted after 1st WRPCTP meeting.

12.4. Offering the Stage-II connectivity grantees at Bhuj-II PS an opportunity to get connected at Bhuj PS [44th WR Conn/LTA meeting held on 28.01.2020]

In the 44th WR Conn/LTA meeting held on 28.01.2020, It was informed that CERC vide common order dated 13.01.2020 in the Petition Nos. 56/MP/2019, 57/MP/2019 & 58/MP/2019 filed by M/s Vaayu Renewable Energy (Sironj) Private Ltd., M/s Vaayu Renewable Energy (Kaveri) Private Ltd. & M/s Vaayu Renewable Energy (Krishna) Private Ltd. respectively has directed to revoke the Stage-II connectivity granted to the 3 nos. projects of Vaayu (Sironj: 300MW, Kaveri: 250MW & Krishna: 300MW). Accordingly, the Stage-II connectivity granted to the above projects has been revoked vide letters dated 17.01.2020. With this, 3 nos. 220kV bays (Nos. 222, 223 & 231) are now available at Bhuj PS.

In this regard, it was informed that some Stage-II connectivity grantees at Bhuj-II PS had initially requested for connectivity grant at Bhuj PS but were instead granted connectivity at Bhuj-II PS on account of technical/physical limitations in providing additional connectivity at Bhuj PS. With the availability of 3 nos. 220kV bays at Bhuj PS, it was proposed to offer the Stage-II connectivity grantees at Bhuj-II PS an opportunity to get connected at Bhuj PS through a joint exercise based on their willingness & as per priority defined by the date of Stage-II application.

Out of the various grantees at Bhuj-II PS, only M/s Netra showed willingness to get connected at Bhuj PS keeping all other terms and conditions of the earlier connectivity / LTA grants unchanged. M/s NWPL also requested that the 220kV bay at Bhuj PS end may be implemented under ISTS and the same was agreed in the meeting. The transmission system for LTA was also modified with the above change in connectivity point from Bhuj-II PS to Bhuj PS as per details given below:

Transmission system required for LTA as per original intimation dated 06.03.2019	**Revised Transmission system required for LTA (after shifting of connectivity point from Bhuj-II PS to Bhuj PS)**
Transmission system strengthening at Bhuj-II PS: 1. Establishment of 2x1500MVA (765/400kV), 4x500MVA (400/220kV) Bhuj-II PS (GIS) 2. Reconfiguration of Bhuj PS – Lakadia PS 765kV D/c line at Bhuj-II PS so as to establish Bhuj II – Lakadia 765 kV D/c line and Bhuj PS -Bhuj II PS 765 kV D/c line. **Western Region Strengthening Scheme-21 (WRSS-21)** **PART-A** i) Establishment of 2x1500MVA, 765/400kV Lakadia PS ii) Bhuj PS – Lakadia PS 765kV D/c line iii) LILO of Bhachau – EPGL 400kV D/c (triple) line at Lakadia PS **PART-B** iv) Lakadia – Vadodara 765kV D/c line	i) Establishment of 2x1500MVA, 765/400kV Lakadia PS ii) Bhuj PS – Lakadia PS 765kV D/ c line iii) LILO of Bhachau – EPGL 400kV D/c (triple) line at Lakadia PS iv) Lakadia – Vadodara 765kV D/c line (Time-line as per TSA: Dec-20) **OR** Lakadia – Banaskantha 765kV D/c line (Time-line as per TSA: Jun-21)

12.5. LTA Applications from RE/ Conventional developers in other regions with drawl in Western Region

Sl. No.	Application No.	Applicant	Location	Date of Application	LTA (MW)	Beneficiaries (MW)	Date of start of LTA
1	1200002422	SBE Renewables	Jaisalmer, Rajasthan	31.12.2019	450	Target (NR): 50MW	07.05.2021

Sl. No.	Application No.	Applicant	Location	Date of Application	LTA (MW)	Beneficiaries (MW)	Date of start of LTA
		Ten Pvt Ltd				Target (WR): 400MW. Subsequently firmed up as HPPC (NR): 50MW CSPDCL (WR): 400MW	
2	1200002477	Azure Power India Pvt Ltd	Jodhpur, Rajasthan	19.02.2020	200	MPPMCL (firm)	15.10.2020
3	1200002454	Tata Power Renewable Energy Ltd	Jaisalmer, Rajasthan	30.01.2020	150	Target (WR)	01.07.2021
4	1200002634	Renew Surya Roshni Pvt Ltd	Jaisalmer, Rajasthan	09.06.2020	400	WR (Target)-200MW NR (Target)-200MW	01.08.2022
5	1200002639	Altra Xergi Power Pvt. Ltd.	Jaisalmer, Rajasthan	09.06.2020	380	WR (Target)-330MW NR (Target)-50MW	01.08.2022
6	1200002650	NTPC Ltd	Ramagundam, Telangana	29.06.2020	100	NTPC, Kudgi NTPC Solapur NTPC Mauda	01.03.2021
7	1200002494	Madhya Bharat Power Corporation Limited	Rongnichu HEP, Sikkim	29.02.2020	96	WR: Chhattisgarh State Power Distribution Company Limited (CSPDCL)	31.01.2021

D. ToR 2(iv) – REVIEW OF UPSTREAM AND DOWNSTREAM NETWORK

13. Status of downstream 220kV or 132kV network by STUs from the various commissioned and under-construction ISTS substations

The status of the 220 kV line bays from various 400/220 kV ISTS substations as well as downstream network is updated in the table below:

Sl. No.	ISTS S/s	Voltage ratio, Trans. Cap	Un utilised bays	Status of ISTS bay	Lines for unutilised bays	Status of Lines
WR						

Sl. No.	ISTS S/s	Voltage ratio, Trans. Cap	Unutilised bays	Status of ISTS bay	Lines for unutilised bays	Status of Lines
1	Mapusa (PG)	400/220kV (3x315 MVA)	2	Existing bay	Mapusa – Cuncolin 220 kV D/c line	Anticipated DOCO Sep'20(As per WRPC held on 28.6.19) **2nd WRPC(TP):** GED **not attended** the meeting **GED may update the status**
			2		Mapusa– Tuem 220 kV D/c line	The agency has been finalized for carrying out work from Mapusa to Tuem D/C line with GIS S/s at Tuem. The work will be awarded after the receipt of approval from the Govt. The completion period will be 20 months from the date of award *(As per 2nd WRSCT Minutes).* **2nd WRPC(TP):** GED **not attended** the meeting **GED may update the status**
2	Navsari	400/220 kV (2x315MVA + 1x500 MVA)	2	Existing bay	Navsari – Bhestan 220kV D/c line	M/s DGENTPL is not taking up the implementation of the scheme. Assigned to PGCIL on RTM basis. **2nd WRPC(TP):** PGCIL updated **Jan,2021** as expected completion schedule **GETCO may update the status**
3	Pirana	400/220kV (2x315MVA)	2	Existing bay	Pirana – Barjadi 220 kV D/c line	December, 2020 **2nd WRPC(TP):** GETCO updated **March,2021** as expected completion schedule **GETCO may update the status**
4	Vadodara GIS	400/220 kV (2 x 500 MVA)	2	Existing bay	220 kV Jhambua – Vadodara D/C Line	April/May, 2020 **2nd WRPC(TP):** GETCO updated **Dec,2020** as expected completion schedule **GETCO may update the status**
5	Indore (PG)	400/220 kV (2 x 500 MVA)	2	Existing bay	LILO portion of 220kV line for Indore(NZ) 220kV S/S upto Indore(PGCIL) 765kV S/s	2 years after the award of contract. Approximate award schedule is April, 2020. **2ndWRPC(TP):** MPPTCL stated that the line has **not yet awarded.** Also informed that severe RoW problem is there. **MPPTCL may update the**

Sl. No.	ISTS S/s	Voltage ratio, Trans. Cap	Un utilised bays	Status of ISTS bay	Lines for unutilised bays	Status of Lines
						status
6	Wardha	400/220 kV (2x315 MVA)	2	Existing bay	Wardha – Yavatmal 220 kV D/c line	Under construction, May 20 **2nd WRPC(TP):** MSETCL updated **March,2021** as expected completion schedule
7	Solapur	400/220 kV (2x315 +1x500 MVA)	2	Existing bay	Solapur – Bale (M) 220kV D/c line	Mar'20 **2ndWRPC(TP):** MSETCL updated **Dec,2021** as expected completion schedule as severe RoW problem is there. Also updated that Karjat S/s would be commissioned by March'22
			2		Solapur – Narangwadi 220 kV D/c line	Mar'20 **2nd WRPC(TP):** MSETCL updated **Dec,2020** as expected completion schedule **MSETCL may update the status of all 220 kV outgoing lines**
8	Navi Mumbai	400/220 kV (2 x 315 MVA)	4	Existing bay	LILO of Apta – Taloja and Apta - Kalwa section of the Apta-Taloja/Kalwa 220 kV D/c line at Navi Mumbai (PG)	Agreed to be implemented as ISTS under WRSS-XIX. Comm. Sch. - 30 months from date of transfer of SPV. **2nd WRPC(TP):** CEA informed that SPV has acquired by M/s Sterlite Grid 13 Limited on 23.06.2020 and the **SCoD is 22.12.2022** **Current status: Detailed Survey is under progress**

400 kV line bays:

S. No.	ISTS Substation	Proposed Bays	Commissioning Schedule	Lines emanating from Substation	Status of lines
1	Indore (PG)	2	Jul, 2018	Indore (PG) – Ujjain 400 kV D/c line	May' 2020 **2nd WRPC(TP):** MPPTCL informed that expected schedule of completion is **June'21 or delayed** due to severe Row problem **MPPTCL may update the status**

14. Status of 400kV and above level substations and transmission lines being implemented by STUs in WR under intra-state schemes

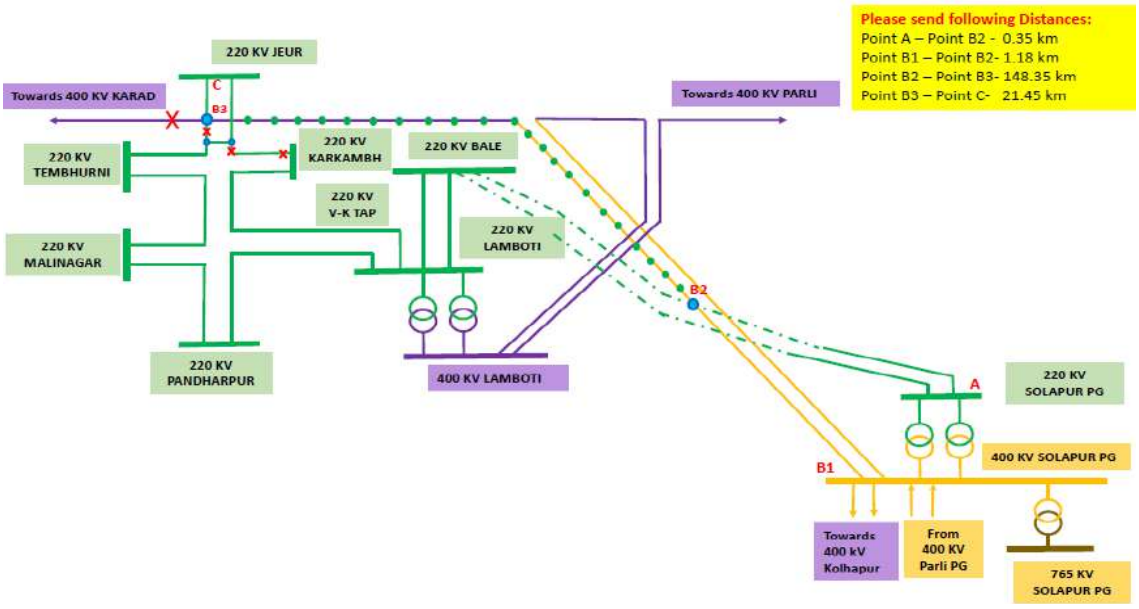
14.1. STUs may furnish the details and update the status of planned / under construction 400 kV & above level sub-stations and transmission lines in the following format.

S.No.	Sub-station / Transmission line	Capacity / Distance	Planned / Under construction	Scheduled commissioning	Current status
1					
2					

E. ToR 2(v) – EXAMINE AND EVALUATE INTRA-STATE PROPOSALS

15. Restoration of 400 kV Solapur – Karad line to its original configuration

15.1. MSETCL vide letter dated 18.03.2017 has requested for charging a part of the existing 400 kV Solapur (PG)–Karad S/C line at 220 kV level using one circuit of under construction Solapur (PG)-Bale 220 kV D/C line as an interim arrangement. The interim arrangement was proposed to solve the low voltage problems in Solapur District during agriculture peak load.



15.2. To discuss the proposal of MSETCL, a meeting was held on 12.04.2017 at CEA, New Delhi among CEA, CTU, POSOCO, MSETCL and RPTL. In the meeting, following was agreed:

i. The proposal of MSETCL as shown in the block diagram above was agreed as an interim arrangement to mitigate the low voltage problem faced in Solapur district.
ii. The interim arrangement shall be disconnected by Dec, 2017 or after the completion of Solapur (PG) – Bale 220 kV D/C line, whichever is earlier.
iii. The above proposal is agreed in principle and the proposal would be put up in forthcoming meeting of the Standing Committee on Power System Planning of Western Region for ratification.
iv. All the expenditure for implementation of the interim arrangement and its restoration shall be borne by M/s MSETCL.
v. MSETCL shall expedite the implementation of 400/220 kV Tembhurni / Karjat sub-station along with upstream and downstream network.
vi. MSETCL shall implement Under Voltage Load Shedding (UVLS) relays at all its S/s at the earliest and provide adequate reactive compensation at 33 kV and below voltage level in Solapur district at the earliest.
vii. MSETCL shall explore interconnection between Solapur (PG) – Lamboti (MSETCL) by using LILO portions of Parli - Karad 400 kV line at Solapur (PG) and Lamboti.
viii. The idle section of Solapur (PG) – Karad 400kV S/c line along with the line bays at Solapur (PG) end shall be deemed 100% available subjected to regulatory norms.

15.3. The MSETCL proposal was ratified in the 42nd meeting of Standing Committee on Power System Planning of Western Region held on 17.11.2017.

In the meeting, MSETCL had requested that the interim arrangement may be allowed to be continued beyond December 2017 and further till commissioning of proposed 400/220 kV Karjat S/s.

WRLDC had requested that further time extension of charging 400 kV Sholapur (PG)–Karad S/C on 220 kV level may not be considered as there would be evacuation constraints for Sholapur STPS.

In view of the concerns raised by MSETCL (low voltage after removal of interim arrangement) and WRLDC (evacuation constraint for Sholapur STPP due to continuation of interim arrangement), it was agreed that the issue may be further deliberated in OCC forum of WRPC. MSETCL was requested to expedite implementation of 400/220 kV Karjat S/s and 220 kV Sholapur (PG) – Bhale D/C line.

15.4. In the 2nd WRPCTP held on 04.09.2020, POSOCO had enquired about the non-utilisation of ICT's at Solapur PG and the status of 400kV Solapur- Karad line restoration to its original configuration ,as N-1 non-compliance of Solapur-Kolhapur D/C has been observed in the past after commissioning of 2nd unit of Solapur TPP.In the meeting it was decided that the matter would be deliberated in the next meeting.

15.5. POSCO to present the operational constraints being faced in view of the interim arrangement.

15.6. MSETCL may update the progress and commissioning schedule of 400/220 kV Karjat S/s and 220 kV Sholapur (PG) – Bhale D/C line. WRPC may apprise the deliberations held, if any, on the issue in OCC of WRPC.

15.7. Members may deliberate.

16. Evacuation of power beyond Warora

16.1. In the 2nd meeting of WRPC(TP), the implementation issues associated with the scheme "Measures to control fault level at Wardha Substation" were discussed. MSETCL stated that after the implementation of bypass arrangement, overloading is observed in Warora (MSETCL) – Chandrapur-II 400 kV D/c quad line during outage of one circuit and its overloading could be solved by LILO of one ckt. of Koradi-II –Warora (M) at Warora (PG) and Wardha – Warora Pool 400 kV D/c line to be kept normally open.

CTU stated that LILO of one ckt of Koradi-II –Warora (M) at Warora (PG) will eventually end up increasing the short circuit level at Warora (M) & Warora (PG) and it does not serve the purpose. He further added that another solar park is planned, wherein power will be evacuated through LILO of Wardha (PG)- Warora (PG) 400 kV D/c line so Wardha – Warora Pool 400 kV D/c line can not be kept open.

CEA suggested that after bypassing arrangement at Wardha S/s, issue of overloading of Warora (M) – Chandrapur-II 400 kV D/C during N-1 conditions, additional circuit (2nd) between Warora (M)- Chandrapur-II can be planned so that it will provide additional outlet for flow of power beyond Warora (M). Further, with implementation of additional 220 kV outlets from Koradi-II 400/220 kV substation, drawl from Koradi-II would increase and the power flow on Warora (M) - Chandrapur-II would get reduced. Also MSETCL is advised to look for various alternatives to relieve overloadings of ICT's at 765/400 kV Ektuni S/s, 400/220 kV Akola S/s and 400 kV Tiroda S/s. MSETCL proposal of LILO of 1 ckt of Koradi-II –Warora (M) at Warora.

MSETCL stated that they would further study the CEA proposal of (2nd) 400 kV line between Warora (M)- Chandrapur-II.

16.2. MSETCL may present the studies.

17. Establishment of the proposed Kistampeth – Sironcha 132 kV SCDC line as ISTS

17.1. MSETCL's proposal of establishment of 2X25 MVA, 132/33 kV substation at Sironcha along with 132 kV SCDC line from Kistampeth (Telangana State) with end bays each at Kistampeth and Sironcha S/s has been deliberated in the 1st meeting of WRSCT held on 05.09.2018, 2nd meeting of WRSCT held on 21.05.2019 and 1st meeting of WRPC(TP) held on 11.01.2020.

In line with the decision taken in the 1st meeting of WRPC(TP) held on 11.01.2020, the proposal was discussed in a separate meeting held on 14.08.2020 among CEA, WRPC, CTU, WRLDC, MSETCL & TSTRANSCO. Minutes of the meeting is enclosed as Annexure-IX. In the meeting, the following was agreed:

i. MSETCL has proposed establishment of Sironcha 132/33 kV substation to increase the redundancy of supply, improve the voltage profile and quality of power supply to Sironcha area. Currently existing Sironcha 66 kV substation was getting its feed through 132 km long line passing through dense forest area. The proposal to connect 132 kV Sironcha S/s with 132 kV Kistampeth S/s of Telangana State Transmission Company Limited

through 132 kV line involves only 32 km line length and was forest free terrain. TSTRANCO has agreed with the MSETCL proposal.

ii. With no requirement of any ISTS scheme in Kistampeth area by Telangana, there was no merit in taking up the Kistampeth – Sironcha 132 kV SCDC line as an interstate scheme to serve a load of about 20 MW.

iii. Kistampeth – Sironcha 132 kV S/C line, traversing two states is an inter-state line, however its implementation has already been taken up by MSETCL based on bilateral agreement with TSTRANCO. As agreed in the 1st WRSCT meeting held on 05.09.2018, the Sironcha 132/33 kV substation (MSETCL) would operate in radial mode from 132 kV Kistampeth S/s in Telangana.

iv. Regarding the commercial accounting of the energy transaction, WRPC to facilitate the same by deliberating the issue in Commercial Coordination Meeting.

17.2. Members may note.

18. Permission for Charging of 125MVAR switchable bus cum line reactor at Sagar 400kV substation of MPPTCL

18.1. In the 2nd meeting of WRPCTP held on 04.09.2020, MPPTCL has proposed the agenda to consider the installation of the switchable 125MVAR bus cum line reactor at Sagar 400kV S/s on Satna (PGCIL)-Sagar (MP) 400kV line and WRLDC may issue the charging permission of this transmission element, in view of space constraint at Sagar 400kV S/s for installation of additional 50 MVAR line reactor.

In the meeting, it was agreed that MPPTCL would submit all the requisite details along with the layout design of Sagar substation for further deliberations on the issue.

18.2. MPPTCL has furnished the (attached as Annexure-X) the layout of Sagar S/s along with the SLD depicting the operation of 125 bus reactor as line reactor and as bus reactor.

It is apparent that when 125 MVAR line reactor at Sagar end and 50 MVAR line reactor at Satna end are in service, it would result in overcompensation of the line. Keeping the 125 MVAR line reactor out would result in non-utilisation of the asset.

18.3. Members may deliberate.

19. Other Agenda points by MPPTCL

19.1. Installation of 3rd 3x315 MVA, 400/220 kV ICT at Astha S/s of MPPTCL

19.1.1. MPPTCL vide letter dated 24.02.2021 has intimated that currently 2 nos. of 2x315 MVA, 400/220 kV ICTs are installed at Astha S/s. The maximum load recorded during the last three years is given below:

Installed Capacity	Max. Load during 2018-19	Max. Load during 2019-20	Max. Load during 2020-21
630 MVA	558 MVA	533 MVA	547 MVA

The loading on the 400/220 kV ICTs at Astha is critical during peak load and N-1 non-compliant. In view of this, MPPTCL is proposing to install 3rd 315 MVA, 400/220 kV ICT at Astha.

19.1.2. Members may deliberate.

19.2. Installation of additional ICTs at ISTS sub-stations in MP

19.2.1. MPPTCL vide letter dated 05.02.2021 has intimated that the additional ICTs at Jabalpur, Itarsi, Seoni, Morena and Shujalpur has been agreed in the Regional standing committee/ RPCTP meetings, but same are yet to be commissioned. Installation of ICT at above places is utmost required to handle the expected Rabi season demand.

The details of the ICTs is given below:

S.no.	ICT capacity	Sub-station	Name of the meeting	MoP OM regarding allotment	Implementation timeframe
1.	1x500 MVA	Jabalpur	41st & 42nd SCPSPWR	MoP OM No: 15/3/2018-Trans dated 21.08.2018 (MoM of 2nd ECT)	-
2.	1x500 MVA	Itarsi	41st & 42nd SCPSPWR	MoP OM No: 15/3/2018-Trans dated 21.08.2018 (MoM of 2nd ECT)	-
3.	1x500 MVA	Seoni	1st WRPC(TP)	MoP OM No: 15/3/2018-Trans-Pt(2) dated 25.09.2020	15 months
4.	1x500 MVA	Morena	2nd WRPC(TP)	MoP OM No: 15/3/2018-Trans-Pt(2) dated 25.09.2020	15 months
5.	1x500 MVA	Shujalpur	2nd WRPC(TP)	Not yet allocated. Scheme recommended by NCT in its 4th meeting held on 20.01.2021 and 28.01.2021	

19.2.2. POWERGRID may submit the status of implementation of the above ICTs.

20. Agenda points by CSPTCL

20.1. CSPTCL vide its letter no. 02-04/PL-25(F-1)/1315/Raipur dated 03.12.2020 (attached as Annexure-XI) has submitted the various issues being faced by them. To discuss the issues, a meeting was held on 17.12.2020. The summary of the discussions held in the meeting are given below:

S.No.	Agenda items submitted by CSPTCL	Decision taken in the meeting held on 17.12.2020
1.	High loading of NSPCL ICT's, requirement of 3rd 315 MVA 400/220 kV ICT at 400/220 kV NSPCL S/s, Bhilai	The agenda items from S. No. 1 to 4 are basically to reduce the loading of ICT's at 400/220 kV NSPCL S/s, Bhilai. It is decided to study the various options in a separate joint study meeting with CEA, CTU, POSOCO, CSPTCL, NSPCL and BSP. NSPCL is also requested to see the feasibility of splitting of 400 kV bus at NSPCL. CSPTCL is requested to provide the details of 220 kV interconnection and their loads so that the studies would be carried out holistically.
2.	Rearrangement of 400 kV Bus at 400 kV S/s PGCIL Raipur	
3.	Rearrangement of 220 kV Bhatapara-Raipur (PGCIL) & 220 kV Bhilai-Siltara lines as 220 kV Bhatapara-Bhilai & 220 kV Siltara-Raipur(PGCIL) lines	
4.	Rearrangement of 220 kV Raipur (PGCIL)-Khedamara & 220 kV Khedamara-Borjhara lines as 220 kV Raipur (PGCIL)-Borjhara line	
5.	Requirement of 3rd 315 MVA 400/220 kV ICT at 400/220 kV Raigarh (PGCIL) S/s	Requirement of additional ICT would be studied is a separate joint study meeting with CEA, CTU, POSOCO & NSPCL.
6.	Requirement of 3rd 315 MVA 400/220 kV ICT at 400/220 kV Bhatapara (PGCIL) S/s	Requirement of additional ICT would be studied is a separate joint study meeting with CEA, CTU, POSOCO & NSPCL.
7.	Request for providing 2 nos. of 400 kV feeder bays at 765/400 kV Sipat Pooling Station at Sipat, Bilaspur	CTU would provide the status of availability of space at 765/400 kV Sipat PS. The issue would be deliberated in a separate joint study meeting.
8.	Feasibility for extending 400 kV alternate source to 400/220/132 kV CSPTCL, Jagdalpur from 400/220 kV Jeypur (PGCIL) S/s, Orissa	It was decided to deliberate this issue in a separate joint study meeting. Since, this involves interconnection of two regions, hence it needs deliberation in ERPC(TP) also.
9.	400 kV Khedamara-Kiranpur (MP) line is kept undesired switched off due to over voltage issue at Kiranpur end	CSPTCL is requested to take up this issue with MPPTCL directly. CSPCTL could approach CEA at later stage, if any problem faced.
10.	Request for providing 2 nos. of 220 kV bays at 400/220 kV S/s Raipur (PGCIL)	CTU would provide the status of availability of space at 400/220 kV Raipur (PGCIL). The issue would be deliberated in a separate joint study meeting.

20.2. In addition to this, the issue of loading of DSPM-Korba(E) 220 kV S/c line was discussed in the 2nd meeting of WRSCT held on 21.05.2019. In the 43rd

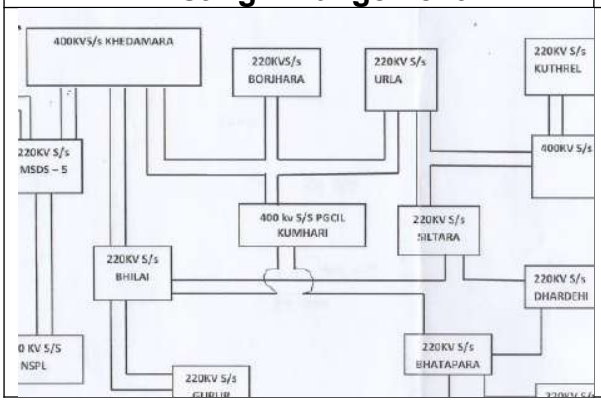
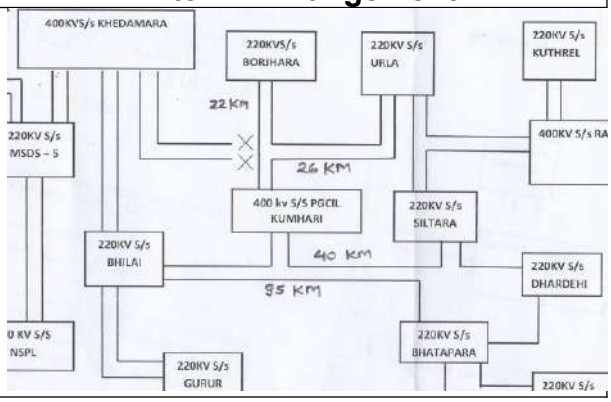
meeting of SCPSPWR held on 11.05.2018, CSPTCL had intimated that LILO of Siltara – Korba (E) S/C at DSPM was under implementation, which would be completed by Aug, 2018. However, the 2 no. of 220 kV bays at DSPM had to be provided by M/s CSPGCL, which were expected to be ready by December, 2019.

The issue of requirement of 3rd 315 MVA ICT at 400/220kV Raigarh S/s has also been discussed in the 2nd meeting of WRSCT. In the meeting, it was observed that the loading under n-1 condition is marginal and the issue may be discussed in separate meeting with their STUs.

20.3. Further, the issue of highloading of ICTs at NSPCL were deliberated in the two meetings held on 15.01.2021 & 23.02.2021 respectively. The MoM of the meeting held on 23.02.2021 were issued vide CEA letter dated 23.03.2021 (attached as Annexure-XII). The following was agreed:

(i) Re-arrangement of 220 kV feeders by CSPTCL

- Re-arrangement of 220 kV Khedamara – Borjhara S/s line & 220 kV Khedamara – Raipur S/c line to 220 kV Raipur – Borjhara S/c line.
- Re-arrangement of 220 kV Raipur – Bhatapara S/c line & 220 kV Bhilai – Siltara S/c line to 220 kV Bhilai – Bhatapara S/c line & 220 kV Raipur – Siltara S/c line.
- As intimated by CSPTCL the above re-arrangement provides marginal relief on NSPCL ICT (2x315 MVA) loadings. CSPTCL may implement the scheme and the same would be brought to the notice of WRPC-TP in their next meeting.
- Existing configuration and configuration after re-arrangement is as give below:

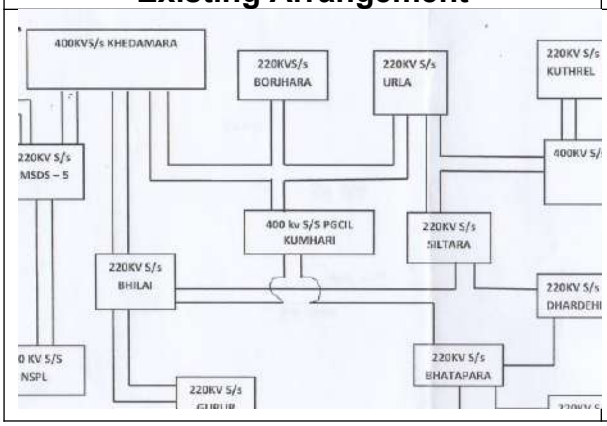
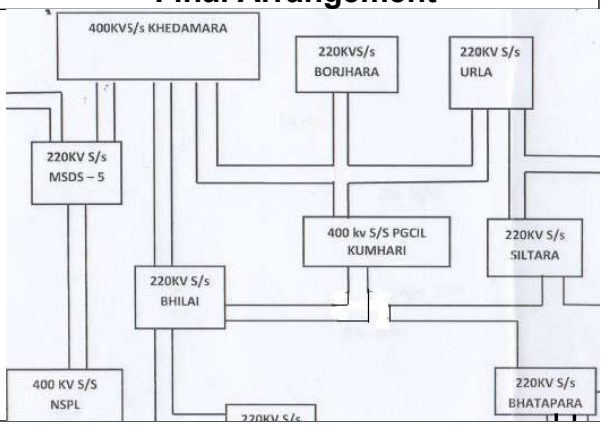
Existing Arrangement	Interim Arrangement
	

(ii) Swapping of Circuit 2 & 3 of Chandrapur (Bhadravati) with Circuit 3 & 4 of Korba at 400 kV Bus of Raipur (PG) S/s.

- Along with swapping of 400 kV ckts Raipur (PG), CSPTCL to carry out the following re-arrangement of 220 kV lines to increase 220 kV feeds to Bhilai 220 kV substation:

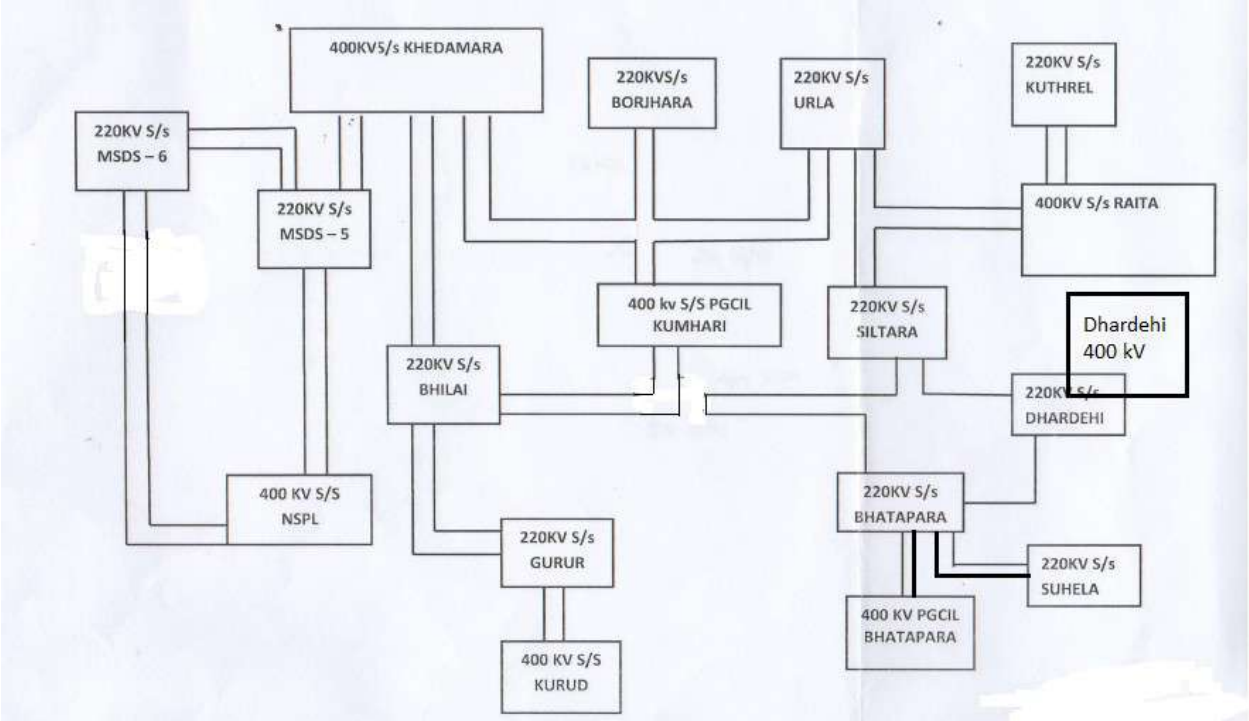
  Re-arrangement of 220 kV Bhilai – Bhatapara S/c line & 220 kV Raipur – Siltara S/c line so as to form 220 kV Bhilai – Raipur D/c line & 220 kV Bhatapara – Siltara S/c line- By CSPTCL

- CSPTCL has shown its willingness to implement the swapping works with their own resources in view of the severe load management problem being faced by them due to restricted drawl capacity from ISTS.
- Scheme agreed in principle and the same would be taken up for ratification by WRPC-TP. Regarding the implementation modalities of the scheme CSPTCL to deliberate with PGCIL and convey their decision wrt implementation of the scheme by CSPTCL or as an ISTS scheme
- Existing configuration and configuration after re-arrangement is as give below:

Existing Arrangement	Final Arrangement
	

(iii) In addition CSPTCL would take up the implementation of the following schemes as Intra-state strengthening scheme:

- Establishment of 400 kV Dhardehi S/s by LILO of one circuit of 400 kV Korba(W) – Raita D/c line and 400 kV Sipat – Dhardehi D/c line . Proposal would be included in the agenda for the next WRPCTP meeting.
- LILO of one ckt of 220 kV Bhatapara (PG) – Suhela line at Bhatapara (CSPTCL).
- The single line diagram showing proposals at (ii) and (iii) is as given below:



20.4. WRPC (TP) may kindly note the the 220 kV re-arrangements proposed at point 20.3 and may ratify the 400 kV bus swapping arrangement at Raipur (PG).

CSPTCL and POPWERGRID may intimate the implementation modalities of 400 kV bus swapping arrangement at Raipur (PG) alongwith with the implementation time required.

20.5. Based on the outcomes of the meeting held on 23.02.2021, the status of the issues highlighted by CSPTCL is as given below:

S.No.	Agenda items submitted by CSPTCL	Status
1.	High loading of NSPCL ICT's, requirement of 3rd 315 MVA 400/220 kV ICT at 400/220 kV NSPCL S/s, Bhilai	The issue gets resolved with the implementation of agreed scheme at point 21.3.
2.	Rearrangement of 400 kV Bus at 400 kV S/s PGCIL Raipur	
3.	Rearrangement of 220 kV Bhatapara-Raipur (PGCIL) & 220 kV Bhilai-Siltara lines as 220 kV Bhatapara-Bhilai & 220 kV Siltara-Raipur(PGCIL) lines	
4.	Rearrangement of 220 kV Raipur (PGCIL)-Khedamara & 220 kV Khedamara-Borjhara lines as 220 kV Raipur (PGCIL)-Borjhara line	
5.	Requirement of 3rd 315 MVA, 400/220 kV ICT at 400/220 kV Raigarh (PGCIL) S/s	The issue not reported in operational feedback of POSOCO. POSOCO may update.
6.	Requirement of 3rd 315 MVA 400/220 kV ICT at 400/220 kV Bhatapara (PGCIL) S/s	The issue resolved with the establishment of 400/220 kV Dhardehi S/s.

7.	Request for providing 2 nos. of 400 kV feeder bays at 765/400 kV Sipat Pooling Station at Sipat, Bilaspur	CTU may provide the status of availability of space at 765/400 kV Sipat PS.
8.	Feasibility for extending 400 kV alternate source to 400/220/132 kV CSPTCL, Jagdalpur from 400/220 kV Jeypur (PGCIL) S/s, Orissa	CTU to give the feedback regarding CSPTCL proposal.
9.	400 kV Khedamara-Kiranpur (MP) line is kept undesired switched off due to over voltage issue at Kiranpur end	CSPTCL may update the details of discussion held with MPPTCL.
10.	Request for providing 2 nos. of 220 kV bays at 400/220 kV S/s Raipur (PGCIL)	CTU may provide the status of availability of space at 400/220 kV Raipur (PGCIL).
11.	High loading of DSPM-Korba(E) 220 kV S/c line	The issue gets resolved with the establishment of LILO of Siltara – Korba (E) S/C at DSPM. CSPTCL may update the implementation status of the line.

Members may deliberate.

ANNEXURE-I

Email **PSPA-1, CEA**

Re: Minutes of the 2nd meeting of Western Region Power Committee (Transmission Planning) (WRPCTP) held on 04.09.2020.

From : Pratyush Singh {प्रत्युष सिंह} <pratyush.singh@powergridindia.com> Mon, Dec 14, 2020 05:53 PM

Subject : Re: Minutes of the 2nd meeting of Western Region Power Committee (Transmission Planning) (WRPCTP) held on 04.09.2020.

To : PSPA-1, CEA <cea-pspa1@gov.in>

Cc : awd cea1 <awd.cea1@gmail.com>, vikas cea <vikas.cea@gov.in>, priyam srivastava <priyam.cea@gmail.com>, Ashok Pal {अशोक पाल} <ashok@powergridindia.com>, Partha Sarathi Das {पार्थ सारथि दास} <psdas@powergridindia.com>, Bhaskar Laxmanrao Wagh {भास्कर लक्ष्मण वाघ} <bhaskarwagh@powergridindia.com>, shashank Shekhar {Shashank Shekhar} <shashankshekhar@powergridindia.com>, Ajay Kumar {अजय कुमार} <sriajaykumar@powergridindia.com>, goutamroy cea <goutamroy.cea@nic.in>

Dear Sir,

This is with reference to the minutes of the 2nd WRPC(TP) meeting held on 04.09.2020 issued vide letter dated 26.10.2020. In this regard, it may be noted that NGR bypassing arrangement associated with "Conversion of 50MVAr fixed line reactor at Bina (PG) end of Sagar (MP)- Bina(PG) 400kV line into switchable line reactor" was also discussed and agreed during the meeting under Item No. 15 of the minutes. However, the above discussion does not appear in the minutes of the meeting.

In view of the same, it is requested to incorporate the following point under para 15.9 of the minutes by issuing a suitable corrigendum in this regard:

"**15.10** It was further observed that the proposed conversion of fixed line reactor at Bina (PG) end of Sagar (MP)- Bina(PG) 400kV line into switchable line reactor (under ISTS scope) does not mention about implementing the NGR bypassing arrangement for utilization of the line reactor as bus reactor for voltage control when required. In view of the same, it was agreed to modify the scope of work under ISTS as follows:

- Conversion of 50MVAr fixed line reactor at Bina (PG) end of Sagar (MP)- Bina(PG) 400kV line into switchable line reactor along with NGR bypassing arrangement."

Regards,

Pratyush Singh
Manager
Central Transmission Utility Department
Power Grid Corporation of India Ltd.

From: PSPA-1, CEA <cea-pspa1@gov.in>
Sent: 27 October 2020 10:24
To: PS Mhaske Chairperson CEA; SE(Protection), WRPC; Operation WRPC; Member Secretary; Laxmikant Singh Rathore; Subir Sen {सुबीर सेन}; Ashok Pal {अशोक पाल}; Partha Sarathi Das {पार्थ सारथि दास}; Pratyush Singh {प्रत्युष सिंह}; shashank Shekhar {Shashank Shekhar}; Ajay Kumar {अजय कुमार}; srnarasimhan@posoco.in; nallarasan@posoco.in; pushpa@posoco.in; chitrankshi@posoco.in; psanodiya@posoco.in; wrldcreliability@posoco.in; CE P and D; ceps321@yahoo.com; mmdhoke@gmail.com; Stu getco; desystem@gebmail.com; cestu@mahatransco.in; stusysplan@gmail.com; khedekarvg@yahoo.com; Chief Electrical Engineer; Stephen Fernandes; eeelectdnh@rediffmail.com; trans dnh; M.R.Ingle; cecnp csptcl; Dkchawda576@gmail.com; subhashthakur@ntpc.co.in; ntpccc@ntpc.co.in; cmd@nhpc.nic.in; dir-tech-sectt@nhpc.nic.in; Shri J.N. Swain JS; Shailesh Mishra; pikabaya56@gmail.com; nitinkumar gupta; devendra patel; PS Energy; avaneesh shukla3; mduvnb@gmail.com; trenhpc@gmail.com
Cc: Goutam Roy; awd cea1; priyam srivastava; Vikas Sachan; Tejas Kiran Patil
Subject: Minutes of the 2nd meeting of Western Region Power Committee (Transmission Planning) (WRPCTP) held on 04.09.2020.

Sir / Madam,

The 2nd meeting of Western Region Power Committee (Transmission Planning) (WRPCTP) was held on 04.09.2020. PFA the Minutes of Meeting.

MoM are also available on CEA website (www.cea.nic.in) at the link:
http://cea.nic.in/compsplanningwr.html i.e.
Home page - Wings - Power Systems -PSP&A-1 - Standing Committee on Power System Planning Western Region.

Thanks & Regards,
Power System Planning & Appraisal - I,
Central Electricity Authority.

ANNEXURE-II

MADHYA PRDAESH POWER TRANSMISSION CO. LTD.
(A wholly owned Govt of Madhya Pradesh Undertaking)
CIN: U40109MP2001SGC014880
Block No.2, Shakti Bhawan,Rampur, Jabalpur (MP)-482008. Tel : (0761) 2702132,2242
Fax No.:(0761) 2660908. e-mail: ce.pnd@mptransco.nic.in

No. 04-02/PSP-2143 /Jabalpur, Date: 01/12/2020

To,

Shri Gautam Roy,
Chief Engineer(PSP&A-I),
Central Electricity Authority,
Ministry of Power,
Sewa Bhawan, RK Puram,
NEW DELHI-110066.

Fax No. : 011-26102045

E-mail : cea-pspa1@gov.in

Sub: Minutes of the 2nd meeting of Western Region Power Committee (Transmission Planning) (WRPCTP).

Dear Sir,

Vide your letter/e-mail dated 27.10.2020, the minutes of 2nd meeting of Western Region Power Committee (Transmission Planning) (WRPCTP) held on 04.09.2020 have been circulated. The observations/comments of MPPTCL on the minutes are as under :-

Point No. 5.13(II) :

The system strengthening at Shujalpur on account of operational constraint (N-1 non compliance) has been agreed as under :-

A. ICT Augmentation of 2x315MVA, 400/220kV Shujalpur(PG) substation under ISTS
   (i) 1x500MVA, 400/220kV ICT augmentation at Shujalpur(PG).

B. Reconductoring of Shujalpur(PG)-Shujalpur(MP) 220kV D/c line (conductor with ampacity equivalent to ACSR twin moose at nominal voltage) under Intra-state by MPPTCL.

In context to above, it may kindly be informed whether the system strengthening is associated with Phase-II works of power evacuation from Rajgarh SEZ or it is to be taken up independently.

In regard to point-B, it may be pertinent to mention that the conductor equivalent to ACSR twin moose capacity for 220kV lines may not be available in Indian Market and it may not be possible to use conductor with ampacity equivalent to ACSR twin moose at nominal voltage on the existing towers of 220kV line. Therefore, it may kindly be informed that whether the

reconductoring of Shujalpur(PG)-Shujalpur(MP) 220kV D/c line is required to be carried out with the conductor with ampacity equivalent to ACSR twin moose at nominal voltage or with the conductor with ampacity equivalent to ACSR twin Zebra at nominal voltage.

Point No. 10.2.5(ii) :

Here it is to submit that under Point (ii) it is mentioned that MPPTCL would also put up for the concurrence NRPC(TP) as Auriya(UP)-Mehgaon 220kV line is between WR and NR. In context to this, it is requested that the proposal may kindly be included by CEA in the meeting of Northern Region Power Committee (Transmission Planning) for concurrence of NR constituents.

Point No. 15 :

In regard to installation of 125MVAR switchable bus-cum-line reactor at Sagar 400kV S/s of MPPTCL, it is to mention that in the contract placed on M/s L&T, Chennai under Green Energy Corridor Project Phase-I, installation of 125MVAR bus reactor at Sagar 400kV S/s was included. However, as insisted by NLDC during the 2nd meeting of Western Region Standing Committee on Transmission, in spite of space constraint, MPPTCL has installed 125MVAR bus reactor on Satna-Sagar 400kV ckt, such that it can be used as line reactor as well as bus reactor as per the requirement. However, since it is not matching with the agreed scope in the Standing Committee, permission of charging this reactor as line reactor is not being accorded by WRLDC. In view of this, it is requested that as discussed during the meeting and mentioned in point No.15.7, a fresh study may kindly be carried out for according approval for charging of 125MVAR bus-cum-line reactor at Sagar 400kV S/s. A copy of layout of Sagar 400kV Substation is enclosed for further needful.

Based on the studies carried out by CEA, if any modification/addition in the reactive capacity/arrangement at Sagar 400kV Substation is desired, CEA may kindly forward its recommendation so that NLDC may be approached for funding of the works of modification/addition of reactors through Power System Development Fund (PSDF).

It is requested that the concurrence/approval/clarification of CEA on the aforementioned points may kindly be forwarded so as to initiate further action in the matter.

With regards.

(Sanjay Kulshreshtha)
Chief Engineer (Plg. & Design)
MPPTCL-Jabalpur

Copy to :-

1. The Staff Officer to MD, MPPTCL, Jabalpur.

Transmission Lines Completed During FY- 2020-21

ANNEXURE-III

As on 28-Feb-2021

Voltage Level (kV)	Name of Transmission Lines	Circuit Type	Executing Agency	Line Length (cKM)	Month of Completion
1.	2.	3.	4.	5.	6.
800 kV					
CENTRAL SECTOR					
1	Raigarh (HVDC stn) - Pugalur (HVDC stn) HVDC Bipole Link	BIPOLE	PGCIL	3531	SEP-20
Total of CENTRAL SECTOR				**3531**	
Total of 800 kV				**3531**	
765 kV					
CENTRAL SECTOR					
2	Tehri Pooling Station - Meerut (Remaining part)	S/C	PGCIL	1	APR-20
3	Charging of Tehri Pooling - Meerut line (2nd Ckt.)	S/C	PGCIL	1	JUN-20
Total of CENTRAL SECTOR				**2**	
Total of 765 kV				**2**	
400 kV					
CENTRAL SECTOR					
4	Hiriyur - Mysore line (Ckt.-II)	D/C	PGCIL	206	APR-20
5	Baharampur (PG) -Bheramerar (Bangladesh) line (2nd Ckt.) - India Portion	D/C	PGCIL	172	MAY-20
6	NNTPS Sw. Yd. - Ariyalur (Villupuram) Line	D/C	PGCIL	147	JUL-20
7	Rajarhat - Purnea line (Triple Snowbird) (Balance Portion)	D/C	PGCIL	420	JUL-20
8	Banaskantha PS - Banaskantha (PG) line	D/C	PGCIL	132	AUG-20
9	Pugalur HVDC - Arasur line (Q)	D/C	PGCIL	118	SEP-20
10	Pugalur HVDC - Pugalur line (Q)	D/C	PGCIL	100	SEP-20
11	Tehri Gen. - Tehri Pooling Station	S/C	PGCIL	13	JAN-21
Total of CENTRAL SECTOR				**1308**	
STATE SECTOR					
12	LILO of chittoor - Krishnapatnam at Rachagunneri S/S	D/C	APTRANSCO	127	SEP-20
13	LILO of both ckt. Jhakri Abdullapur at (Gumma) Pragati Nagar	D/C	HPPTCL	3	OCT-20
14	LILO of one circuit of Akal - Jodhpur (new) line at Jaisalmer-2 (GEC-I)	D/C	RVPNL	14	OCT-20
15	Thennampatty - SEPC IPP	D/C	TANTRANSCO	104	OCT-20

16	Sagardighi TPS - Gokarna line	D/C	WBSETCL	89	OCT-20
17	Ramgarh - Bhadla line (Ckt-I)	D/C	RVPNL	160	DEC-20
18	Ramgarh - Bhadla line (Ckt-II)	D/C	RVPNL	160	JAN-21
Total of STATE SECTOR				**657**	
PRIVATE SECTOR					
19	New Kohima -New Mariani (Twin Moose ACSR) (K-MTL - TBCB)	D/C	KPTL	236	JUL-20
20	Imphal - New Kohima (Twin Moose ACSR) (K-MTL - TBCB)	D/C	KPTL	272	DEC-20
21	Surajmaninagar - P. K. Bari line (NER-II TL-TBCB)	D/C	SGL	155	JAN-21
Total of PRIVATE SECTOR				**663**	
Total of 400 kV				**2628**	
	230 kV				
STATE SECTOR					
22	Neyveli - Kadalangudi line	S/C	TANTRANSCO	77	APR-20
23	LILO in 230 kV Othakalmandapam - Palladam at the proposed Edayarpalayam 400 kV SS	D/C	TANTRANSCO	4	JUL-20
24	LILO in the existing 230 kV Neyveli TS-I Tiruvannamalai at Sankarapuram 230 kV SS	D/C	TANTRANSCO	64	JUL-20
25	Neyveli 230/110 kV SS to the existing Thiruvannamalai and Cuddalore feeders	D/C	TANTRANSCO	6	SEP-20
26	LILO in the existing 230 kV Pasumalai - Alagarkoil at the proposed Samayanallur 230 kV SS	D/C	TANTRANSCO	9	OCT-20
27	Cuddalore - Veerapuram (SP Koil) Via Neyveli	D/C	TANTRANSCO	348	JAN-21
28	LILO of existing 230 kV Shoolagiri - Vinnamangalam line at the proposed Tirupattur 230 kV SS	D/C	TANTRANSCO	12	JAN-21
Total of STATE SECTOR				**520**	
Total of 230 kV				**520**	
	220 kV				
CENTRAL SECTOR					
29	LILO of Parulia - Dtps at Durgapur steel TPS	D/C	DVC	14	NOV-20
Total of CENTRAL SECTOR				**14**	
STATE SECTOR					
30	Jagalur (Hiremallanahole) - Kudligi	D/C	KPTCL	83	APR-20
31	Kothipura (Ramanagara) - Tubinakere	D/C	KPTCL	142	APR-20
32	LILO of one Ckt. of Bhopal - Hoshangabad at Adampur	D/C	MPPTCL	6	MAY-20
33	LILO of Meramundali - Duburi Ckt-I at Goda	S/C	OPTCL	12	MAY-20
34	PGCIL Bhadson - Salempur	D/C	HVPNL	13	JUN-20
35	LILO of 220 kV Sarni - Pandhurna line at Betul (PGCIL)	D/C	MPPTCL	78	JUN-20
36	LILO of both ckt. Nagda - Neemuch at Mandsaur (LILO	DCDS	MPPTCL	56	JUN-20

	from loc.No. 211) S/s (GEC-I)				
37	LILO of Ratlam - Daloda 220kV line at Jaora (2nd Ckt.)	D/C	MPPTCL	4	JUN-20
38	LILO of 2nd Ckt. of PGCIL Jalandhar - Kotla Jangan (nakodar) line at Kartarpur	D/C	PSTCL	1	JUN-20
39	Rudrapur (Brahmwari) - Ghansali (Srinagar) line	D/C	PTCUL	150	JUN-20
40	LILO of one Ckt. of 220kV KTS-Lower Sileru-I line - 400/220kV Asupaka S/S	D/C	TSTRANSCO	1	JUN-20
41	LILO of Sikandararao - Jawaharpur TPSat Kashganj	D/C	UPPTCL	88	JUN-20
42	Dwarka - Pappan Kalan-I (underground XLPE Cable)	D/C	DTL	3	JUL-20
43	Termination of one d/c of Achhalia- Jambuva line at Vyankatpura s/s	D/C	GETCO	72	JUL-20
44	Lahal - bhudhil line	S/C	HPPTCL	2	JUL-20
45	LILO of both Ckts. of Badshahpur - Sector -77 at Sohna Road Gurugram	D/C	HVPNL	3	JUL-20
46	LILO of Kadakola - Chamarajanagara line to the proposed line at Begur	M/C	KPTCL	100	JUL-20
47	LILO of one Ckt of Ashta- Dewas line at 220 kV S/S Chapda S/S	D/C	MPPTCL	68	JUL-20
48	LILO of Pandharpur - Malinagar at Bhalwani S/S	D/C	MSETCL	20	JUL-20
49	Upgradation of 132kV Malegaon - Manmad SCSC line to 220kV line using same corridor/ROW	D/C	MSETCL	65	JUL-20
50	Bolangir (OPTCL) - Bolangir (PGCIL)	D/C	OPTCL	3	JUL-20
51	Gonda - Sohawal (PG)	D/C	UPPTCL	41	JUL-20
52	Kaithal (PGCIL) - Neemwala	D/C	HVPNL	64	AUG-20
53	Daltonganj (PG)- Garhwa	D/C	JUSNL	183	AUG-20
54	Godda - Dumka line	D/C	JUSNL	142	AUG-20
55	Godda - Lalmatia	D/C	JUSNL	44	AUG-20
56	Jasidih - Dumka	D/C	JUSNL	149	AUG-20
57	Jasidih - Giridih line	D/C	JUSNL	154	AUG-20
58	LILO of both ckt of Nagda - Neemuch 220 KV line at Mandsore(Sitamau) 400 kV S/s (Ckt II)	DCDS	MPPTCL	47	AUG-20
59	Mandsaur (Sitamau) - Marut Shakti Pool (GEC-I)	DCDS	MPPTCL	93	AUG-20
60	LILO of one Ckt of existing STPS - Ratangarh line at 220kV GSS Rawatsar	D/C	RVPNL	85	AUG-20
61	Chhata- Vrindawan Line	S/C	UPPTCL	35	AUG-20
62	Maath(400)- Vrindawan Line	S/C	UPPTCL	44	AUG-20
63	Shalimarbagh - Sanjay Gandhi Transport Nagar	M/C	DTL	8	SEP-20
64	Asoj - IOCL line with ACSR Zebra conductor	D/C	GETCO	66	SEP-20
65	LILO of Wanakbori - Asoj and Wanakbori - Vyankatpura line on M/C tower with ACSR Zebra conductor and	D/C	GETCO	23	SEP-20
	OPGW at Selvaliya S/S				
66	LILO of FGPP - BBMB Samaypur line at Sector58 S/s	D/C	HVPNL	5	SEP-20

67	LILO of one ckt. Nuna Majra - Daultabad at Sec.-107 Gurugram	D/C	HVPNL	4	SEP-20
68	Madakkathara - Malaparamba line	D/C	KSEB	97	SEP-20
69	Shujalpur - Narsinghgarh Line	DCDS	MPPTCL	51	SEP-20
70	Kamalapuram LISS - V.K.Ramavaram line	D/C	TSTRANSCO	28	SEP-20
71	Baghpat (220) - Baghpat (400) (2nd line)	D/C	UPPTCL	15	SEP-20
72	LILO of Ataur - Muradnagar-II line at Madhuban Bapudham	D/C	UPPTCL	24	SEP-20
73	Kanwan - Dhar line (GEC-I)	DCDS	MPPTCL	63	OCT-20
74	LILO of Jhalawar - Chhabra line at 220 KV GSS Aklera	D/C	RVPNL	98	OCT-20
75	LILO of both Purnea (PG) - Begusarai at Khagaria (New)	D/C	BSPTCL	14	NOV-20
76	Bemetara - Mungeli line 2nd circuit	S/C	CSPTCL	40	NOV-20
77	Gurur - Kurud (Bangoli)	D/C	CSPTCL	74	NOV-20
78	Jambuva - Waghodia (PGCIL) line with AL-59 Conductor	D/C	GETCO	68	NOV-20
79	LILO of Vallabhipur - Vartej line at Maglana S/s	D/C	GETCO	9	NOV-20
80	Palanpur - Amarigadh (DFCC) line	D/C	GETCO	80	NOV-20
81	Snail -Hatkoti	D/C	HPPTCL	13	NOV-20
82	Konnakuzhy - Chalakudy line	D/C	KSEB	22	NOV-20
83	LILO of Jadla - Jamsher at 220 KV S/S Banga	D/C	PSTCL	11	NOV-20
84	Bhatia - Bhogat line (AL-59)	D/C	GETCO	26	DEC-20
85	LILO of one Ckt. of Ukai - Achhaliya line no.3 at Virpor (Package -2)	D/C	GETCO	27	DEC-20
86	Devanahalli Hardware park - Devanahali HW park S/S	M/C	KPTCL	12	DEC-20
87	LILO of Second Ckts. from BAIL (Begur - Hoskote at Devanahlli H/W Park	S/C	KPTCL	18	DEC-20
88	Brahmapuram - Thuthiyoor line	M/C	KSEB	8	DEC-20
89	Thuthiyoor - Kaloor (UG Cable)	D/C	KSEB	14	DEC-20
90	Badod - Nalkheda (Susner) (GEC)	DCDS	MPPTCL	105	DEC-20
91	Shirsuphal - Shirsai line	S/C	MSETCL	3	DEC-20
92	LILO of Muzaffarnagar - Nanauta line at Badhaikalan	D/C	UPPTCL	10	DEC-20
93	Chelari - Nallalam	M/C	KSEB	25	JAN-21
94	LILO on 220 kV Deoli (PG) - Ghatodi line for 220kV Yavatmal	D/C	MSETCL	21	JAN-21
95	Subashgram (PG) - Baruipur	D/C	WBSETCL	64	JAN-21
Total of STATE SECTOR				**3197**	
Total of 220 kV				**3211**	
Grand Total				**9892**	

Sub-Stations Completed During FY - 2020-21

As on 28-Feb-2021

Sl No	Name of Sub Stations	Voltage Ratio (kV/kV)	Executing Agency	Capacity (MW/MVA)	Month of Completion
1.	2.	3.	4.	5.	6.
		800 kV			
CENTRAL SECTOR					
1	Raigarh and Pugalur Station with 6000 MW HVDC Terminal (Pole-I)	800	PGCIL	1500	SEP-20
	TOTAL CENTRAL SECTOR			**1500**	
	TOTAL 800 kV			**1500**	
		765 kV			
CENTRAL SECTOR					
2	Tehri PS (GIS) (3 ICTs)	765/400	PGCIL	2400	APR-20
3	Tehri Pooling Station (GIS) (4th ICT)	765/400	PGCIL	800	JAN-21
4	Extn at Meerut substation	765/400	PGCIL	1500	JUN-20
	TOTAL CENTRAL SECTOR			**4700**	
	TOTAL 765 kV			**4700**	
		400 kV			
CENTRAL SECTOR					
5	Extn. at Bhadla S/s (ICT-I)	400/220	PGCIL	500	DEC-20
6	Extn. at Rourkela S/s (ICT-I)	400/220	PGCIL	315	DEC-20
7	New Mariani S/s (ICT-I)	400/220	PGCIL	500	DEC-20
8	Extan. at Maithon	400/220	PGCIL	500	JUL-20
9	Extension at Amritsar (Balachak) PG Substation	400/220	PGCIL	500	OCT-20
10	Augmentation at Bhuj S/S (3rd ICT)	400/220	PGCIL	500	SEP-20
11	Banaskantha s/s	400/220	PGCIL	1000	SEP-20
	TOTAL CENTRAL SECTOR			**3815**	
	TOTAL 400 kV			**3815**	
		220 kV			

CENTRAL SECTOR					
12	Repl. of 1x50 MVA to 1x160 MVA at Balipara S/stn.(ICT-II)	220/132	PGCIL	110	APR-20
	TOTAL CENTRAL SECTOR			**110**	
	TOTAL 220 kV			**110**	
		400 kV			
STATE SECTOR					
13	Muzaffarnagar (Additional T/F)	400/220	UPPTCL	500	DEC-20
14	Kurud (Dhamtari) (T/F-II)	400/220	CSPTCL	315	DEC-20
15	Podili (3rd ICT))	400/220	APTRANSCO	315	DEC-20
16	Rachaganneri (T/F-II)	400/220/132	APTRANSCO	315	DEC-20
17	Maradam (Addl ICT)	400/220	APTRANSCO	500	JAN-21
18	Gr. Noida G.B. Nagar (Additional T/F)	400/132	UPPTCL	200	JUL-20
19	Gumma S/S	400/220	HPPTCL	315	NOV-20
20	Lahal S/S	400/220	HPPTCL	630	NOV-20
21	Rachaganneri (T/F-I)	400/220/132	APTRANSCO	315	NOV-20
22	Podili (2nd ICT))	400/220	APTRANSCO	315	NOV-20
23	Kurud (Dhamtari) (T/F-I)	400/220	CSPTCL	315	NOV-20
24	Sector-123 Noida New T/F- I and II	400/132	UPPTCL	400	OCT-20
25	Devanahalli (Hardware Park)	400/220	KPTCL	1000	SEP-20
	TOTAL STATE SECTOR			**5435**	
	TOTAL 400 kV			**5435**	
		230 kV			
STATE SECTOR					
26	Karamadai (3rd Auto T/F)	230/110	TANTRANSCO	100	AUG-20
27	Karaikudi (Enhancement from 50 MVA to 100 MVA)	230/110	TANTRANSCO	50	JAN-21
28	Sankarapuram S/S	230/110	TANTRANSCO	100	JUL-20
29	Tirupur (JICA)	230/110	TANTRANSCO	100	JUN-20
30	Samayanallur S/S	230/110	TANTRANSCO	200	OCT-20
	TOTAL STATE SECTOR			**550**	
	TOTAL 230 kV			**550**	
		220 kV			
STATE SECTOR					
31	Sultanpur Lodhi (T/F)	220/66	PSTCL	100	APR-20

32	Bagalkot (Addl T/F)	220/110	KPTCL	100	AUG-20
33	Mehna Khera (T/F-II)	220/132	HVPNL	100	AUG-20
34	Mehna Khera (T/F-III)	220/132	HVPNL	100	AUG-20
35	Neemwala S/s	220/132	HVPNL	100	AUG-20
36	Garhwa	220/132	JUSNL	300	AUG-20
37	Giridih S/S	220/132	JUSNL	300	AUG-20
38	Godda GSS	220/132	JUSNL	300	AUG-20
39	Jasidih S/S	220/132	JUSNL	300	AUG-20
40	Sheopur (2nd T/F)	220/132	MPPTCL	160	AUG-20
41	Madhuvan Bapudham Ghaziabad (Aug) T/F-II	220/132	UPPTCL	160	AUG-20
42	Partapur Meerut (Aug) T/F-III	220/132	UPPTCL	160	AUG-20
43	Vrindawan Mathura (New) T/F-I	220/132	UPPTCL	160	AUG-20
44	Neemwala	220/33	HVPNL	100	AUG-20
45	Charla Meerut (Additional T/F)	220/132	UPPTCL	100	DEC-20
46	Ratangarh (T/F-II)	220/132	MPPTCL	160	DEC-20
47	Badhaikala Muzaffarnagar (New) T/F- I	220/132	UPPTCL	160	DEC-20
48	Motigop S/S	220/66	GETCO	160	DEC-20
49	Virpore S/s	220/66	GETCO	160	DEC-20
50	Madhuvan Bapudham Ghaziabad (New) T/F-II	220/132	UPPTCL	60	DEC-20
51	Chalakudy S/S	220/110	KSEB	200	DEC-20
52	Kaloor (T/F-I)	220/110	KSEB	160	DEC-20
53	Somanahalli T/F-II Aug (1x150 - 1x100)	220/66	KPTCL	50	JAN-21
54	Kaloor (T/F-II)	220/110	KSEB	160	JAN-21
55	Chikkodi (Aug)	220/110	KPTCL	100	JAN-21
56	Sukha (Jabalpur) (Addl. T/F-I)	220/33	MPPTCL	50	JAN-21
57	Batta (Aug)	220/33	HVPNL	100	JAN-21
58	Thallak (Aug)	220/66	KPTCL	100	JAN-21
59	Joda S/S	220/132/33	OPTCL	160	JUL-20
60	Rupkheda (Zalod)	220/132	GETCO	300	JUL-20
61	Upgradation of Chapda 132Kv S/s to 220kv with 1x160MVA	220/132	MPPTCL	160	JUL-20
62	Manmad Sub-Station (Up-Gradation)	220/132	MSETCL	200	JUL-20
63	Maath (Aug) T/F-II	220/132	UPPTCL	160	JUL-20
64	Sultanpur (Aug) (Additional T/F)	220/132	UPPTCL	160	JUL-20
65	Sarsawa (Saharanpur) (ICT-II) S/S	220/132	UPPTCL	160	JUL-20
66	Madhuvan Bapudham (New) T/F-I	220/132	UPPTCL	160	JUL-20
67	Barejdi S/s	220/66	GETCO	160	JUL-20
68	Rupkheda (Zalod) S/s	220/66	GETCO	160	JUL-20

69	Begur	220/66	KPTCL	200	JUL-20
70	Pratap Vihar T/F (Aug.)	220/132	UPPTCL	100	JUN-20
71	Barahua T/F-I (Aug.) (200-100)	220/132	UPPTCL	100	JUN-20
72	Bahraich T/F-II (Aug.)	220/132	UPPTCL	160	JUN-20
73	Sarita Vihar (Replacement) (160-100)	220/66	DTL	60	JUN-20
74	IMT Manesar Gurugram Sector -1	220/66	HVPNL	100	JUN-20
75	Temghar Replacement T/F (50 MVA replaced by 80 MVA)	220/22	MSETCL	30	JUN-20
76	Upgration of Depalpur 132 Kv S/s 220kv with 1x160MVA	220/132	MPPTCL	160	JUN-20
77	Nanauta T/F (Aug.)	220/33	UPPTCL	60	JUN-20
78	Adampur	220/33	MPPTCL	50	JUN-20
79	Noida Sector-148 T/F-II (Aug.)	220/132	UPPTCL	100	JUN-20
80	Gurugram Sector-95 (T/F-II)	220/33	HVPNL	100	MAY-20
81	Goda S/S	220/132/33	OPTCL	320	MAY-20
82	Kudligi (Badeladaku) S/S	220/66	KPTCL	200	MAY-20
83	Baja Khanna (Aug. of 100 MVA T/F with 160 MVA T/F)	220/66	PSTCL	60	MAY-20
84	Bangan (Addl. T/F)	220/66	PSTCL	100	MAY-20
85	Ferozepur road Ludhiana (Aug. of 100 MVA T/F with 160 MVA T/F)	220/66	PSTCL	60	MAY-20
86	Maur (Addl. T/F)	220/66	PSTCL	100	MAY-20
87	Ratangarh (GEC-I)	220/132	MPPTCL	160	MAY-20
88	Shahjahanpur (T/F-II)	220/132	UPPTCL	160	MAY-20
89	Sanjay Gandhi Transport Nagar (SGTN) GIS	220/66	DTL	320	NOV-20
90	Narsinghpur (Addl T/F)	220/132	MPPTCL	160	NOV-20
91	Pipariya (Addl T/F)	220/132	MPPTCL	160	NOV-20
92	Udaipura S/S (Upgradation)	220/132	MPPTCL	160	NOV-20
93	Vidisha (Addl. T/F)	220/132	MPPTCL	160	NOV-20
94	Chitegaon (Repl ICT)	220/132	MSETCL	100	NOV-20
95	Kesinga (2nd Auto T/F)	220/132	OPTCL	160	NOV-20
96	Aklera (Dist. Jhalawar)	220/132	RVPNL	160	NOV-20
97	Hata Kushinagar T/F- II (Augmentation)	220/132	UPPTCL	100	NOV-20
98	Kasganj (New) T/F- I	220/132	UPPTCL	160	NOV-20
99	Patparganj (Addl.)	220/33	DTL	100	NOV-20
100	Govindpalli	220/33	OPTCL	40	NOV-20
101	Babara (Dist. Amreli) S/S	220/132	GETCO	300	NOV-20
102	Ashoknagar (Addl T/F)	220/132	MPPTCL	160	NOV-20
103	Babara (Dist. Amreli) S/S	220/66	GETCO	320	NOV-20

104	Bakana (T/F-I)	220/66	HVPNL	160	NOV-20
105	Rajokheri (T/F-I)	220/66	HVPNL	160	NOV-20
106	Mokama S/S	220/132	BSPTCL	420	NOV-20
107	Kothamangalam (T/F-II)	220/110	KSEB	100	NOV-20
108	Deroli Ahir (T/F-II)	220/132	HVPNL	160	NOV-20
109	Gorabazar S/S	220/132	MPPTCL	160	OCT-20
110	Hoshangabad S/S	220/132	MPPTCL	160	OCT-20
111	Asoj (Aug.) (1x160)	220/66	GETCO	160	OCT-20
112	Somanahalli T/F-I Aug (1x150 - 1x100)	220/66	KPTCL	50	OCT-20
113	Neebkarori T/F- II (Capacity Augmentation)	220/132	UPPTCL	100	OCT-20
114	Kothamangalam (T/F-I)	220/110	KSEB	100	OCT-20
115	Kesinga (1st Auto T/F)	220/132	OPTCL	160	SEP-20
116	New Tanda Ambedkar Nagar (Aug) T/F-III	220/132	UPPTCL	160	SEP-20
117	Deroli Ahir S/s	220/33	HVPNL	100	SEP-20
118	Manjeri s/s	220/110	KSEB	200	SEP-20
119	Neemwala (3rd T/F)	220/132	HVPNL	100	SEP-20
120	Rawatsar	220/132	RVPNL	160	SEP-20
121	Mesanka	220/66	GETCO	160	SEP-20
122	RGEC Sonipat (2nd T/F)	220/33	HVPNL	100	SEP-20
	TOTAL STATE SECTOR			**13750**	
	TOTAL 220 kV			**13750**	
		400 kV			
PRIVATE SECTOR					
123	Sohna Road (Gurgaon) (GIS) (GPTL - TBCB)	400/220	SGL	1000	APR-20
124	P.K. Bari S/S (NER-II TL- TBCB)	400/132	SGL	630	JAN-21
125	Surajmaninagar (NER-II TL -TBCB)	400/132	SGL	630	JAN-21
126	New Kohima S/s (K-MTL-TBCB)	400/220	KPTL	1000	JUL-20
	TOTAL PRIVATE SECTOR			**3260**	
	TOTAL 400 kV			**3260**	
	GRAND TOTAL			**33120**	

ANNEXURE-IV

Table-IV

Typical values of Ampacity and AC Resistance at various temperatures for ACSR Zebra and Equivalent AAAC, Al59 & High Performance Conductors

S. No.	Conductor	Dia (mm)	Resistance at 20° C (Ohm/km)	Weight (Kg/km)	Parameter	Operating Temperature								
						75°C	85°C	95°C	125°C	150°C	180°C	200°C	210°C	250°C
1.	ACSR Zebra	28.62	0.06868	1621	Ampacity (A)	552	702							
					R_{ac}(Ohm/km)	0.0849	0.0876							
2.	AAAC	28.62	0.0706	1337	Ampacity (A)	550	700	819						
					R_{ac} (Ohm/km)	0.0855	0.08806	0.0905						
3.	Al59	28.62	0.0618	1337	Ampacity (A)	583	741	866						
					R_{ac} (Ohm/km)	0.07616	0.07853	0.08089						
4.	TACSR	28.62	0.0685	1621	Ampacity (A)	554	703	822	1086	1253				
					R_{ac} (Ohm/km)	0.0846	0.0873	0.09	0.0981	0.1048				
5.	ACCC	28.14	0.0536	1565	Ampacity (A)	624	792	925	1221	1408	1593			
					R_{ac} (Ohm/km)	0.0662	0.0683	0.0705	0.0769	0.0822	0.0888			
6.	STACIR	25.4	0.0775	1587	Ampacity (A)	513	648	754	989	1138	1286	1373	1412	
					R_{ac} (Ohm/km)	0.09545	0.0985	0.1016	0.1108	0.1185	0.1261	0.1338	0.1369	
7.	GZTACSR (Gap)	27.1	0.0676	1621	Ampacity (A)	547	691	806	1063	1225	1385	1479	1523	
					R_{ac} (Ohm/km)	0.08552	0.0883	0.09105	0.09936	0.1063	0.1146	0.1202	0.12294	
8.	ACSS	28.04	0.0684	1619	Ampacity (A)	552	700	818	1080	1254	1409	1505	1550	1717
					R_{ac} (Ohm/km)	0.08456	0.08727	0.0899	0.09813	0.1049	0.1130	0.1185	0.1212	0.1321

Table-III

Typical values of Ampacity and AC Resistance at various temperatures for ACSR Moose and Equivalent AAAC, Al59 & High Performance Conductors

S. No.	Conductor	Dia (mm)	Resistance at 20°C (Ohm/km)	Weight (kg/km)	Parameter	Operating Temperature								
						75°C	85°C	95°C	125°C	150°C	180°C	200°C	210°C	250°C
1.	ACSR Moose	31.77	0.05552	2004	Ampacity (A)	620	794							
					R_{ac} (Ohm/km)	0.06906	0.07125							
2.	AAAC	31.95	0.0568	1666	Ampacity (A)	619	795	933						
					R_{ac} (Ohm/km)	0.0694	0.0714	0.0733						
3.	Al59	31.77	0.0497	1648	Ampacity (A)	656	841	987						
					R_{ac} (Ohm/km)	0.0617	0.0636	0.0655						
4.	TACSR	31.77	0.0556	1997	Ampacity (A)	620	794	931	1237	1430				
					R_{ac} (Ohm/km)	0.06907	0.07131	0.0735	0.0801	0.0855				
5.	ACCC	31.77	0.0418	1990	Ampacity (A)	710	910	1068	1421	1644	1866			
					R_{ac} (Ohm/km)	0.05265	0.05426	0.05588	0.0607	0.06477	0.06962			
6.	STACIR	28.95	0.0599	2001	Ampacity (A)	585	744	869	1149	1324	1499	1601	1649	
					R_{ac} (Ohm/km)	0.0743	0.0766	0.079	0.08612	0.09203	0.09913	0.1037	0.10623	
7.	GZTACSR (Gap)	29.9	0.05134	2004	Ampacity (A)	629	801	937	1242	1433	1623	1735	1787	
					R_{ac} (Ohm/km)	0.0663	0.0684	0.07052	0.0769	0.0822	0.08861	0.09287	0.09501	
8.	ACSS	31.77	0.0521	2000	Ampacity (A)	633	810	950	1261	1457	1652	1766	1820	2018
					R_{ac} (Ohm/km)	0.06494	0.0669	0.06903	0.07516	0.08027	0.0864	0.09049	0.09245	0.10071

ANNEXURE-IV(A)

पावरग्रिड POWERGRID
पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

Ref No: C/CTU/AI/01

Date: 25.03.2021

To

1.	**Chief Engineer (PSP&A-I)** Central Electricity Authority Sewa Bhawan, R.K.Puram New Delhi-110066	2.	**Chief GM (SO)** POSOCO B-9, Qutab Institutional Area Katwaria Sarai, New Delhi-110 016

Sub: Minutes of Meeting held for Load Generation Balance for All India Studies for 2024-25 on 11.03.2021 through VC

Sir/Ma'am,

The meeting for Load Generation Balance for All India Studies for 2024-25 was held on 11.03.2021 through VC. The Minutes of the meeting enclosed herewith.

Thanking you.

Yours faithfully,

V. Thiagarajan

(V. Thiagarajan)

Sr. General Manager (CTU)

Copy for Kind information : Dy. COO(CTU)

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Minutes of Meeting held on 11.03.2021 for Load Generation Balance for All India Studies for 2024-25

1. Sr. GM (CTU) welcomed all the participants in the meeting on Load Generation Balance for all India studies for 2024-25. Brief of load generation scenarios created for all India studies were presented during the meeting. The List of participants is attached at **Annexure-I.**

2. It was informed that three different seasons (Monsoon-August, summer-June and winter-February) were chosen in line with all India studies for 2021-22. In this reference, to capture the recent demand pattern and to avoid the disruption caused in demand due to COVID, demand data of August, June and February for the year 2019-20 was collected from POSOCO. Based on data, the average demand profiles of these months were analysed.

3. During the analysis, it was observed evening peak load for August, June and February occurred around 08:00 PM, 10:30 PM and 07:00 PM and off-peak load occurred after midnight for all three months. Further in order to capture the maximum effect of solar generation, solar max scenario was considered around 11:00 AM in place of morning peak scenario. Accordingly, these points on load pattern were chosen for LGB creation. POSOCO opined that solar max point may be taken at 11:30 AM – 1200 PM which was agreed.

4. Based on above points on demand profile for three different seasons, load factors for each region with respect to peak demand of that region in year 2019-20 were calculated. Same were presented during the meeting (enclosed at **Annexure-II**) and inputs regarding the same were sought.

5. Regional load factor calculated by CEA for different scenarios for 2021-22 studies were also analysed with respect to load factors evaluated. It was discussed and agreed that POSOCO would look into load profile of last two years and calculated factors of CTU at their end and if any change in new load factors same shall be shared before next meeting.

6. Further peak load for 2024-25 studies was also deliberated during the meeting and it was agreed that studies need to be carried out with EPS peak load of 266 GW. POSOCO stated that as the maximum demand in revised 19th EPS (econometric based) is only 235 GW even in optimistic scenario, the study may be carried out considering both the demand figures. On the concern raised by POSOCO on low growth in demand, CEA suggested that sensitivity analysis considering 5% to 10% lower demand may be carried out.

7. Generation despatching philosophy was also presented in the meeting (enclosed at **Annexure-III**). Regarding RE RPO allocation it was informed that in present LGB, total RE generation during a scenario was apportioned among the regions as per their demand.

8. It was suggested to review this approach by considering RPO of 21% energy consumption and remaining RE may be apportioned. It was further suggested to keep the state sector generator also in merit order rather that following higher capacity machine despatching first.

9. On thermal generation dispatch philosophy of apportioning generation between state and ISGS+IPP with respect to their installed capacity in a region, CGM (SO), NLDC opined that to represent the actual dispatch scenario it would be better to get the dispatch through combined merit order while also keeping in view the minimum number of units to be kept in service by each state for RE balancing. For this, previous data of units on bar under each scenario may be referred.

   It was also informed that POSOCO vide letter dated 30.09.2020 has submitted observations on the All-India Studies for RE integration in 2021-22 which were discussed in detail in the meeting. POSOCO has raised observations regarding similarity between Off peak demand and afternoon peak and maximum demand for all India being considered on higher side. It was also reported that demand in WR for afternoon should be more than evening scenario.

   CTU informed that load demand and generation dispatches considered in the 2021-22 studies were as per the CEA report dated 30.01.2020 and as decided in the meeting of CEA, CTU & POSOCO held on 23.07.2020.

   It was informed that net afternoon peak demand figures were arrived at after reduction of roof-top solar from regional demands. So the afternoon demand appears to be on lower side.

10. POSOCO has also raised observations on the generation dispatches considered in the studies. Various transmission element overloading and voltage violations within a region were also highlighted. Observations raised by POSOCO have been duly considered and accordingly the generation dispatches have been appropriately revised in the 2024-25 LGB/scenarios. Further, the load demand considered may be reviewed based on the receipt of revised load factors from POSOCO. It was also informed that All-India Studies for 2021-22 were primarily focused on the sufficiency of IR links in various scenarios and highlight the major issues likely to be faced on account of integration of huge quantum of RE in the Grid. However, the observations raised by POSOCO on various power flow/voltage violations have been duly noted and same shall be considered in detail in 2024-25 system studies.

11. Accordingly following was agreed in the meeting-
    a. POSOCO to review the load factor evaluated by CEA and CTU and revise the same, if required
    b. CTU shall incorporate changes state thermal generation despatch in merit order.
    c. Revised LGBR shall be circulated after incorporating changes as discussed and subsequent meeting may be held.

Sr. GM (CTU) thanked all the participants for their active participation and inputs in the meeting.

Annexure-I

List of Participants

Central Electricity Authority (CEA)

1. Sh. Ishaan Sharan, Chief Engineer
2. Sh. Awdhesh Kumar Yadav, Director

Central Transmission Utility (CTU)

1. Sh. V Thiagarajan, Sr. GM
2. Sh. P S Das, Sr. GM
3. Sh. Rajesh Kumar, GM
4. Sh. Kashish Bhambhani, Sr. DGM
5. Sh. Anil Kumar Meena, Sr. DGM
6. Sh. Sandeep Kumawat, Chief Manager
7. Sh. Ajay Dahiya, Chief Manager
8. Sh. Chinmay Sharma, Manager
9. Sh. Ankush Patel, Manager
10. Sh. Anupam, Dy. Manager
11. Sh. R N Sathvik, Dy. Manager
12. Sh. Ajay Kumar, Engineer

POSOCO

1. Sh. R.K. Porwal, CGM, NLDC
2. Sh. Priyam Jain, Dy. Manager, NLDC

Annexure-II

Regional Load Factors evaluated by load data for year 2019-20

	Scenarios	NR	WR	SR	ER	NER	All India
Jun-19	Solar peak	83%	83%	74%	79%	65%	90%
	Morning peak	88%	86%	76%	85%	69%	94%
	Evening peak	91%	84%	76%	91%	83%	95%
	Night off peak	82%	78%	67%	80%	63%	86%
Aug-19	Solar peak/ morning peak	78%	73%	71%	80%	71%	84%
	Evening peak	84%	74%	72%	93%	96%	89%
	Night off peak	75%	65%	59%	84%	73%	78%
Feb-20	Solar peak	70%	96%	90%	67%	58%	92%
	Morning peak	73%	95%	92%	70%	62%	94%
	Evening peak	71%	82%	82%	78%	81%	87%
	Night off peak	46%	72%	72%	57%	44%	69%

Regional Factors evaluated by CEA

Region		NR	WR	SR	ER	NER	All India
June	AN peak (%)	85	82	74	78	65	86
	Eve Peak (%)	97	85	85	95	97	95
	Night (%)	67	66	60	66	50	75
August	AN peak (%)	82	75	80	75	70	85
	Eve Peak (%)	96	84	90	97	99	96
	Night (%)	72	60	60	70	56	76
February	AN peak (%)	70	93	88	68	53	88
	Eve Peak (%)	78	92	93	90	91	95
	Night (%)	48	67	66	55	40	65

Annexure-III

Load generation Despatch Philosophy

- To prepare present load generation scenarios, regional load generation balancing philosophy has been adopted. Since RE has been considered as must run, hence overall RE generation been apportioned in each region as per their demand. After that despatches of other generation except thermal were fixed as per various scenarios. After subtracting the load met by RE and other generation, load to be met by thermal generation was identified.

- After identifying the thermal generation despatch requirement it was apportioned between state and ISGS+IPP with respect to their installed capacity in a region. Since number of plant coming online shall be highest in peak load scenario, same has been considered to identify the number of plant to meet the thermal despatch requirement by running at technical maximum capacity.

- This philosophy was used first to identify plants requirement for state sector generation first despatching the higher capacity units and then lower capacity units to meet the demand of that region. In case of shortfall of plants in state sector, the thermal requirement was carried forward in ISGS+IPP plants of that region. And even after that any shortfall in thermal generation remains, same was carried forwarded to plants in other region in the merit order.

- ISGS+IPP thermal plant were despatched in merit order basis first region wise and then all India basis to meet the leftover thermal generation requirement.

- Further to prepare the LGB of two other point of load curve of a month number of plants identified during the peak load were despatched between technical minimum and maximum as per thermal requirement of that scenario. However, it was ensured that numbers of online plants are kept same throughout a day. For solar max scenarios, it was observed that if number of plants is kept same, then it creates a surplus generation, which indicates that in these scenarios excess generations has to be curtailed or it has to be stored.

Assumptions considered for preparation of load generation scenarios for integration of RE in 2024-25

1. Time frame : 2024-25

2. Scenarios : Total 9 nos, June, 2021, August, 2021 and February, 2022, for Solar peak, load peak and load off-peak scenarios

3. Load Demand : as per the 19th EPS (All India – 266751 MW)

4. Demand factors : Calculated as per data received from POSOCO (enclosed in Annexure)

	Scenarios	NR	WR	SR	ER	NER	All India
Jun-19	Solar peak	83%	84%	75%	79%	60%	90%
	Peak demand	90%	84%	76%	90%	76%	95%
	Off peak demand	81%	78%	67%	79%	58%	86%
Aug-19	Solar peak	77%	72%	70%	78%	65%	83%
	Peak demand	83%	75%	72%	91%	88%	89%
	Off peak demand	75%	65%	59%	82%	67%	78%
Feb-20	Solar peak	66%	93%	89%	65%	52%	90%
	Peak demand	70%	82%	82%	77%	75%	87%
	Off peak demand	45%	72%	72%	56%	40%	69%

5. Generation: In order to meet the required demand of a region, RE has been considered as must-run. Total RE generation has been apportioned as per RE RPO to all regions as per their projected EPS demand.

6. For accounting the availability of solar roof-top generation, equivalent load is reduced from respective regions.

7. Nuclear, gas and hydro have been considered as per the scenario and the balance demand is met by thermal generation.

8. Evening peak scenario of each month was setup first as the number of thermal units required shall be maximum in this scenario. Total thermal generation requirement of this scenario is apportioned between state and central sector thermal generation as per their installed capacity in each region. Further, state thermal generation requirement is divided among the states as per their maximum demand in each month of 2019-20.

9. After obtaining state thermal generation requirement, thermal units were switched on at technical maximum (85/90%) in merit order for each state.

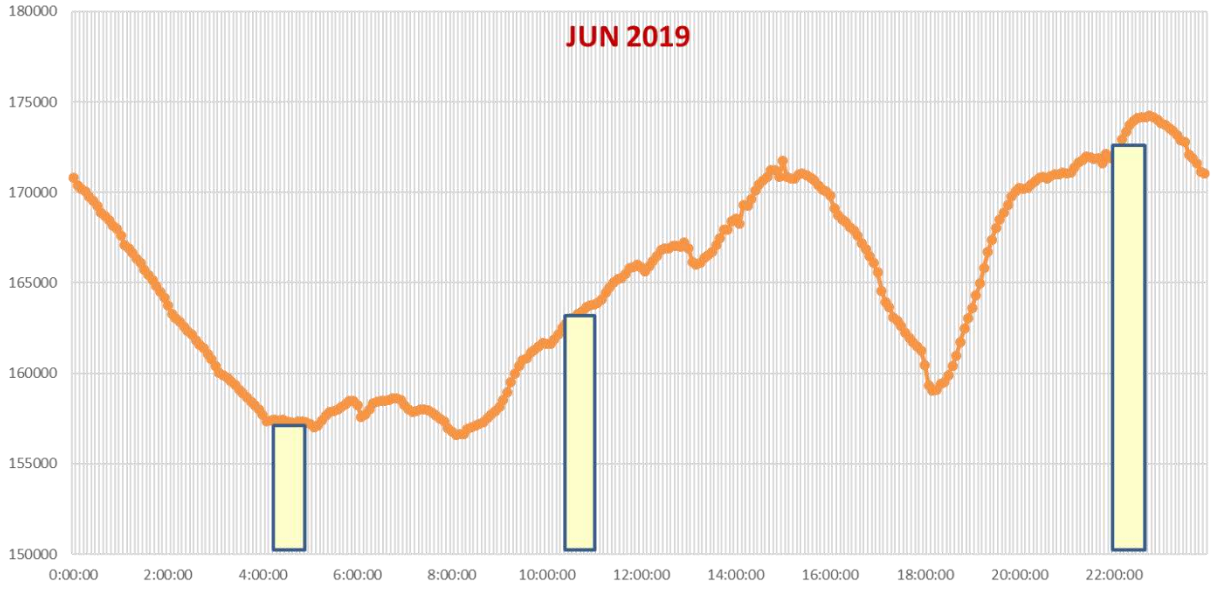
10. To meet central thermal requirement, ISGS & IPP thermal plants with lower variable cost have been identified by dispatching them at technical maximum (85%) region wise progressively. Demand of any region (like NR, SR) not met by thermal generation within that region is balanced by plants from other region (like WR, ER) considering all India merit order for evening peak scenario.

11. For preparing night off peak scenario of the month, as discussed above state and central generation requirement was identified and economic dispatch was carried out by considering same number of units. These generating plants were scaled down proportionately.

12. While preparing the solar max scenario it was observed that even after running all the on-bar plants at technical minimum, surplus thermal generation was available, which indicated that some plants needs to be switched off to balance the load generation. Accordingly, thermal plants with higher cost are switched off region wise progressively till the LGB is balanced.

Scenario	Aug-24	Jun-24	Feb-25
No of Plants Switched off	80	82	28
Quantum in MW	37 GW	40 GW	11 GW

Annexure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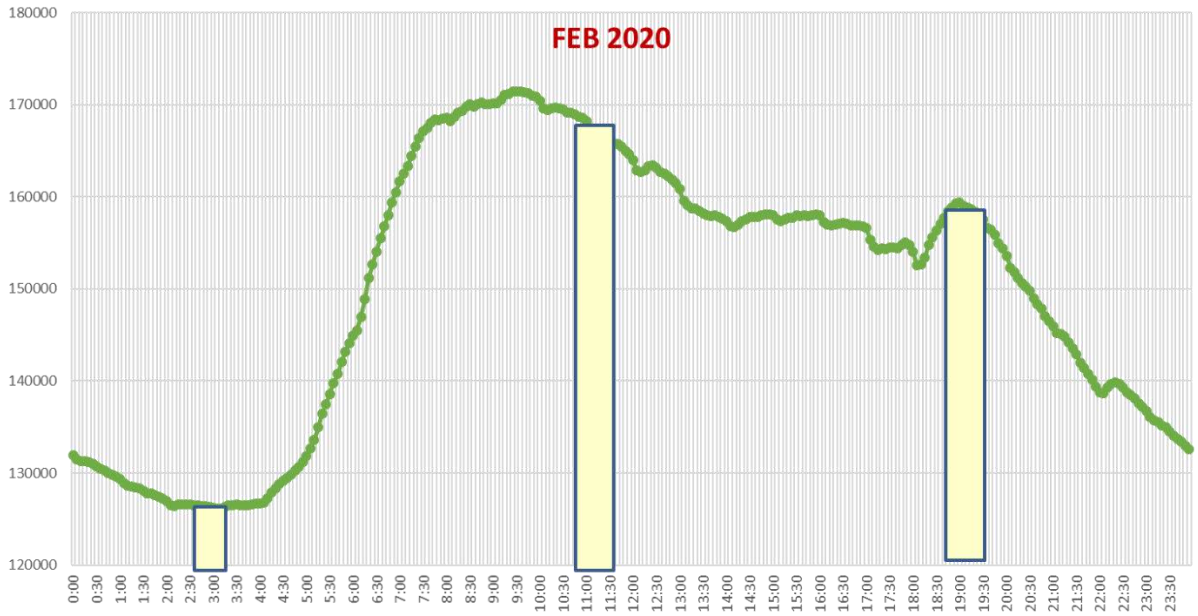
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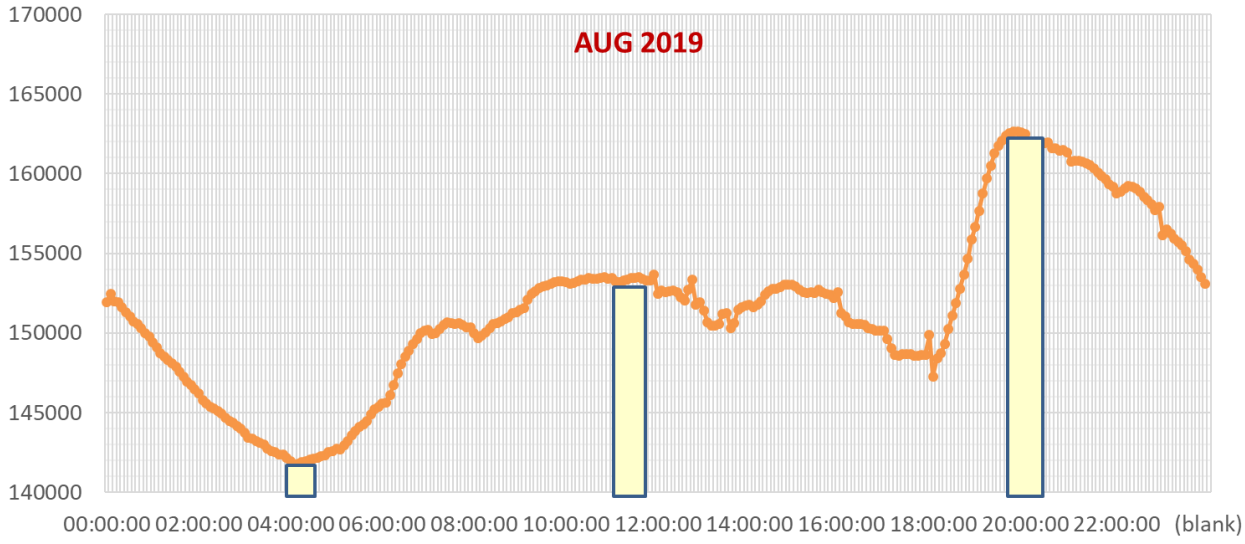
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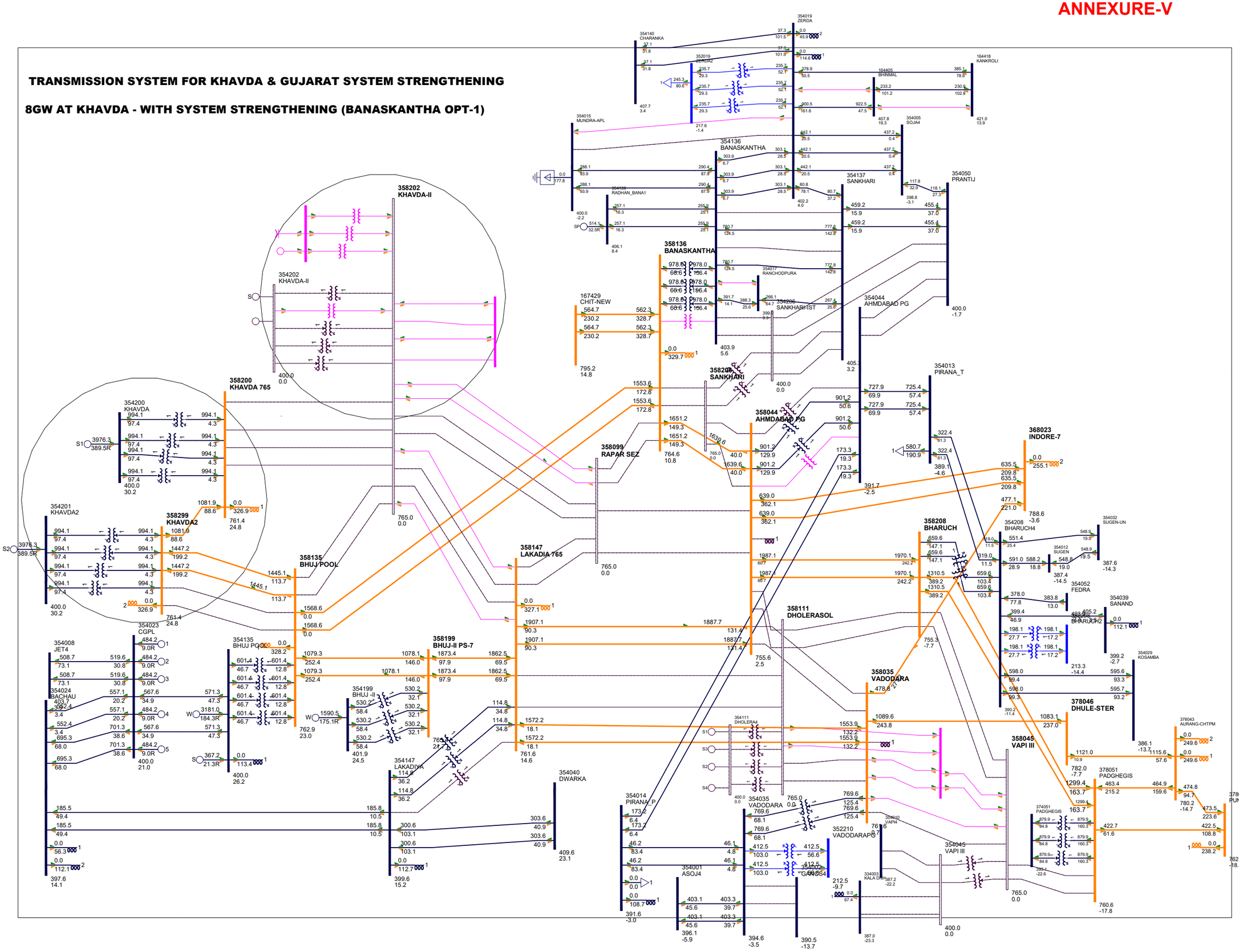
ANNEXURE-V

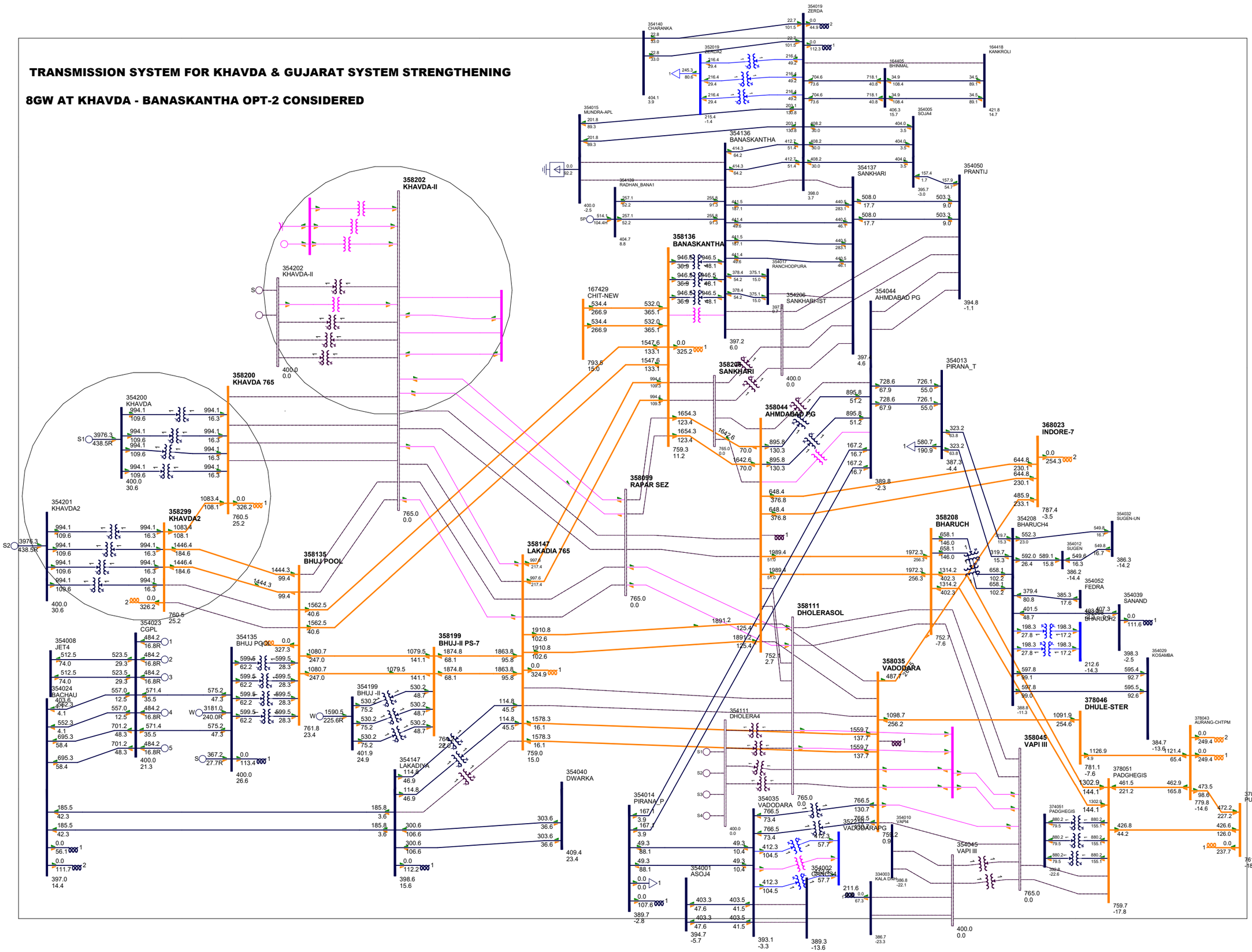
TRANSMISSION SYSTEM FOR KHAVDA & GUJARAT SYSTEM STRENGTHENING

8GW AT KHAVDA - WITH SYSTEM STRENGTHENING (BANASKANTHA OPT-1)



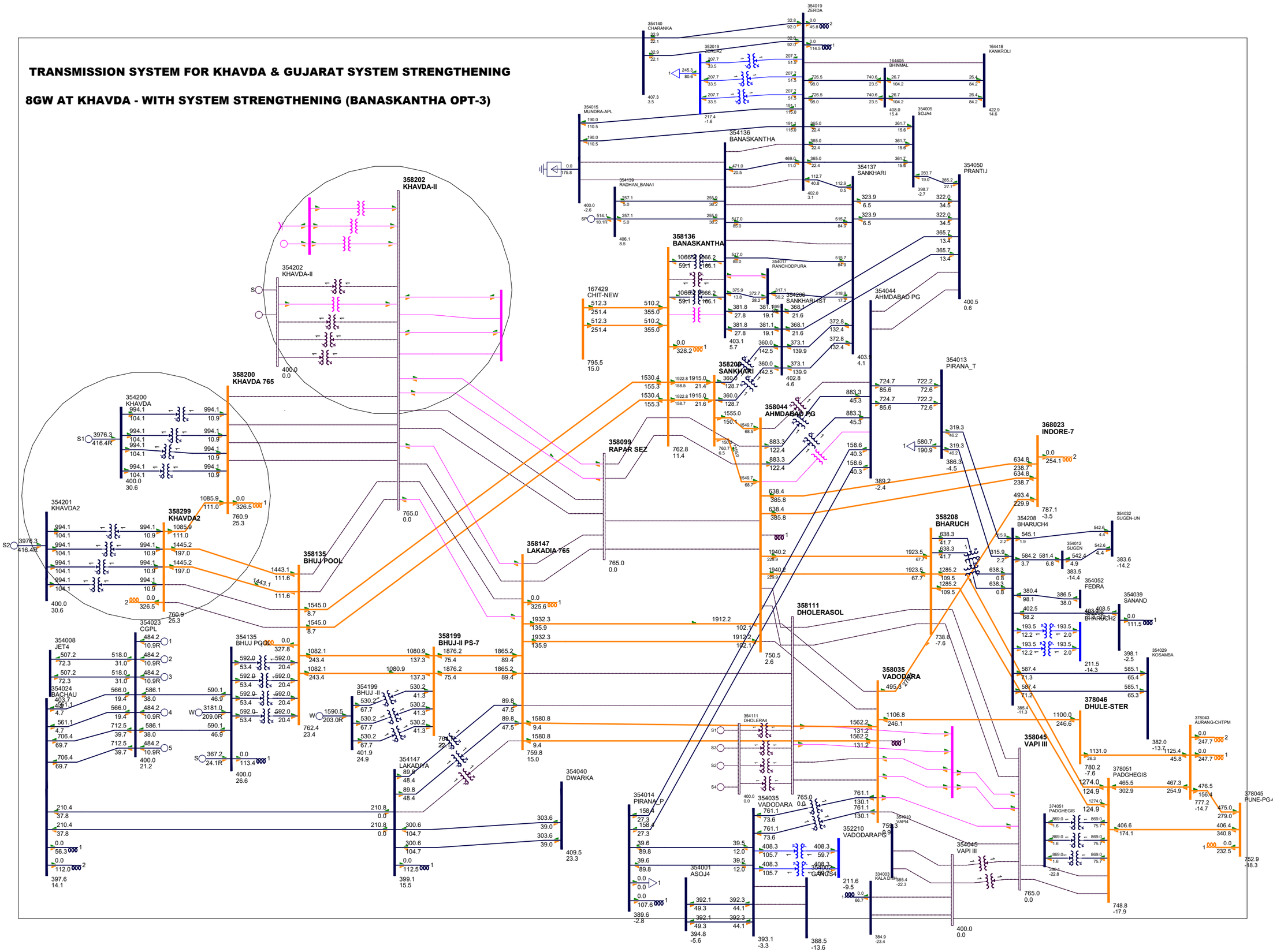
TRANSMISSION SYSTEM FOR KHAVDA & GUJARAT SYSTEM STRENGTHENING

8GW AT KHAVDA - BANASKANTHA OPT-2 CONSIDERED



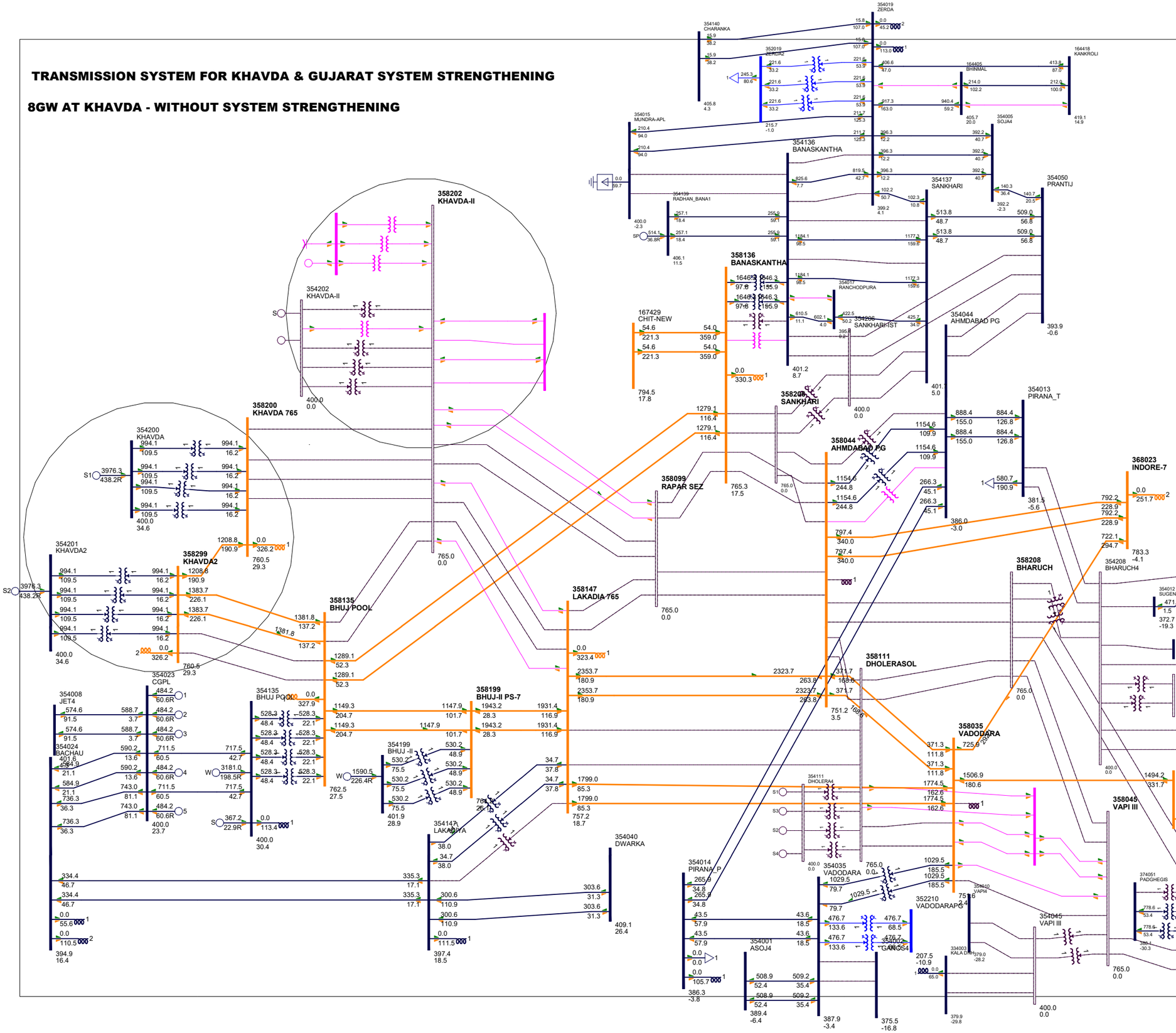
TRANSMISSION SYSTEM FOR KHAVDA & GUJARAT SYSTEM STRENGTHENING

8GW AT KHAVDA - WITH SYSTEM STRENGTHENING (BANASKANTHA OPT-3)



TRANSMISSION SYSTEM FOR KHAVDA & GUJARAT SYSTEM STRENGTHENING

8GW AT KHAVDA - WITHOUT SYSTEM STRENGTHENING

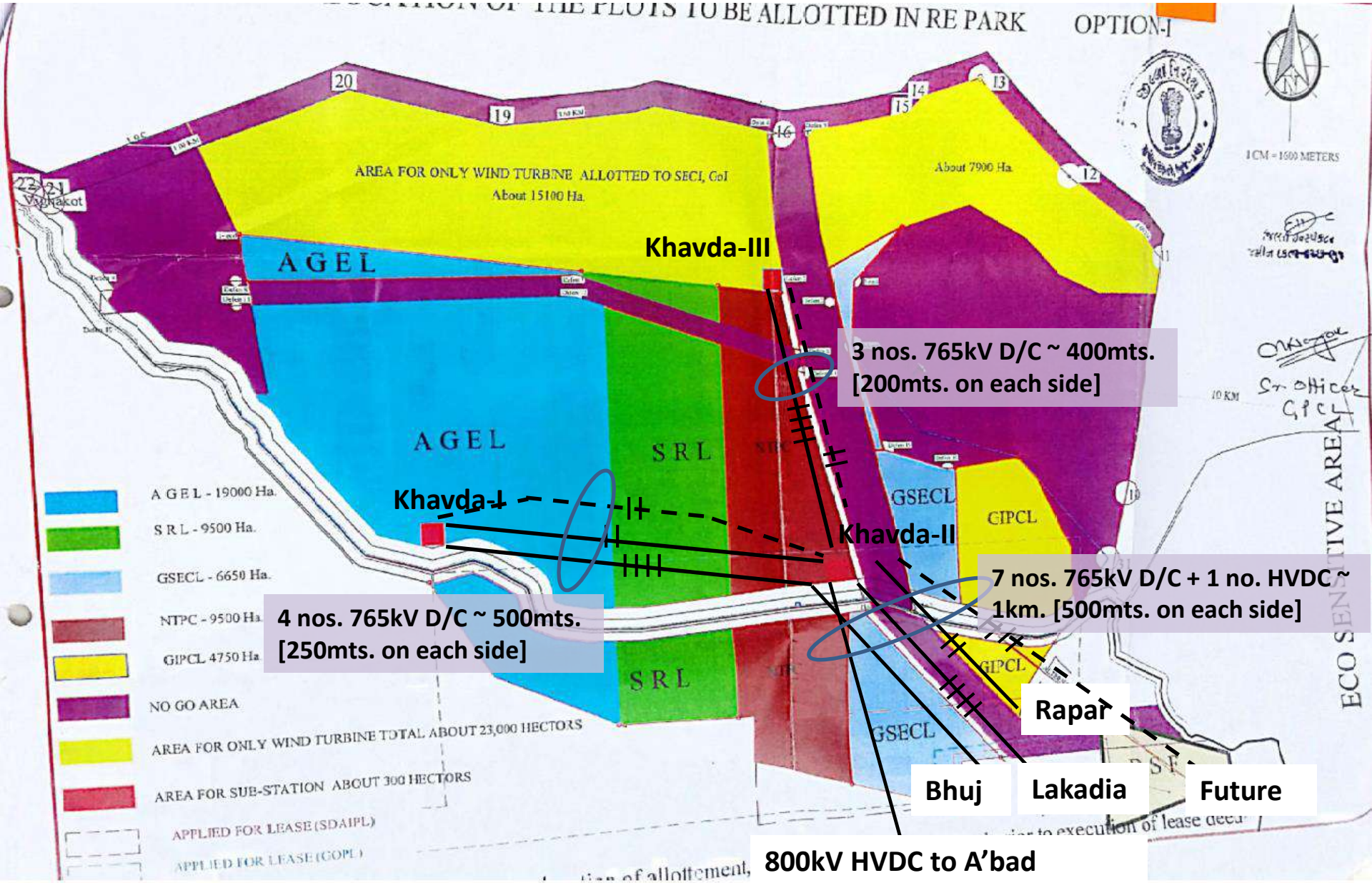


Gujarat - Evacuation of 15GW REZs in Khavda area by 2024-25 (RAPAR ALTERNATIVE)

Gujarat - Evacuation of 15GW REZs in Khavda area by 2024-25 (HALVAD ALTERNATIVE)

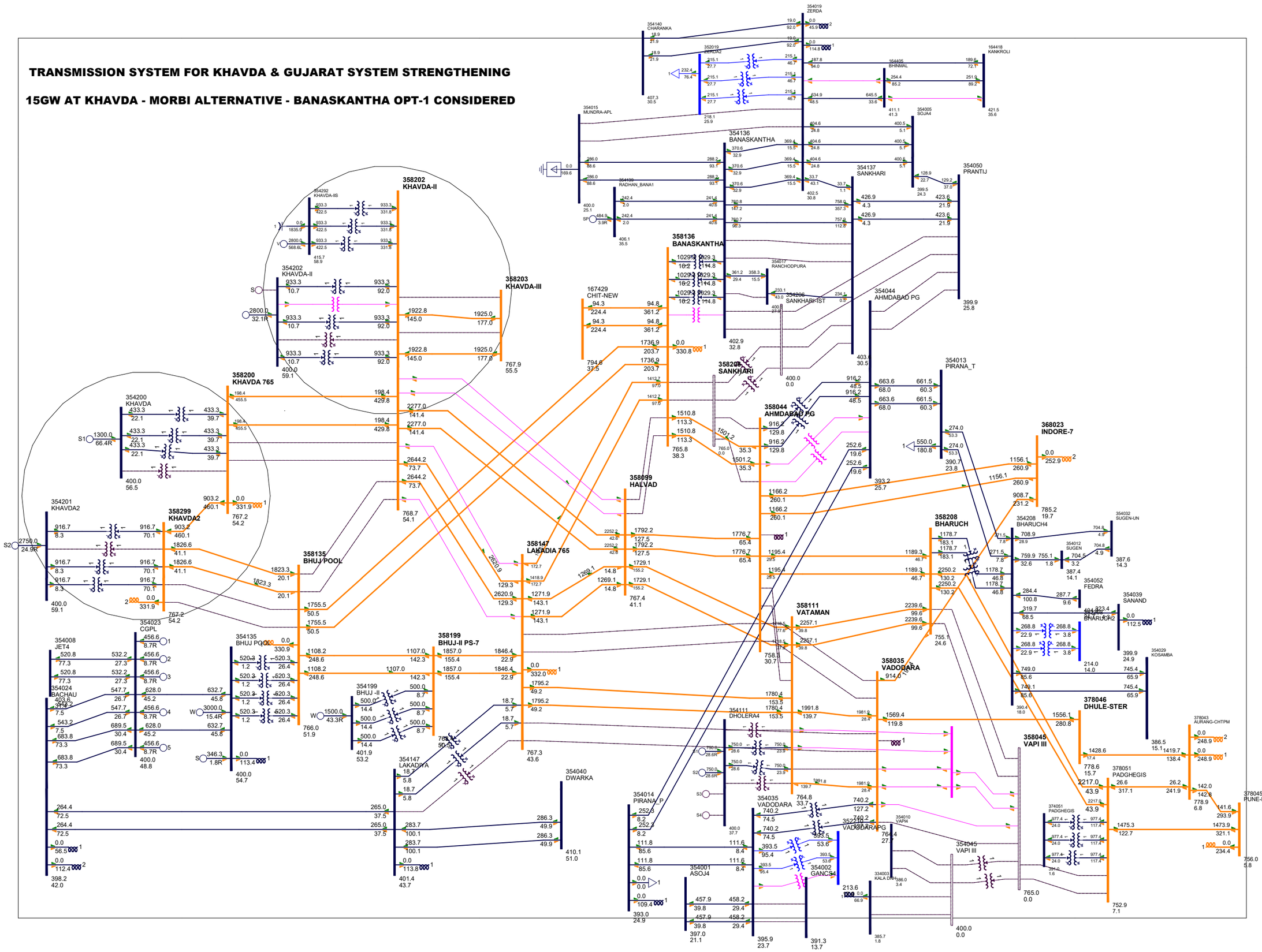
KHAVDA CORRIDOR REQUIREMENT

(dotted lines represents future provision)



TRANSMISSION SYSTEM FOR KHAVDA & GUJARAT SYSTEM STRENGTHENING

15GW AT KHAVDA - MORBI ALTERNATIVE - BANASKANTHA OPT-1 CONSIDERED



TRANSMISSION SYSTEM FOR KHAVDA & GUJARAT SYSTEM STRENGTHENING

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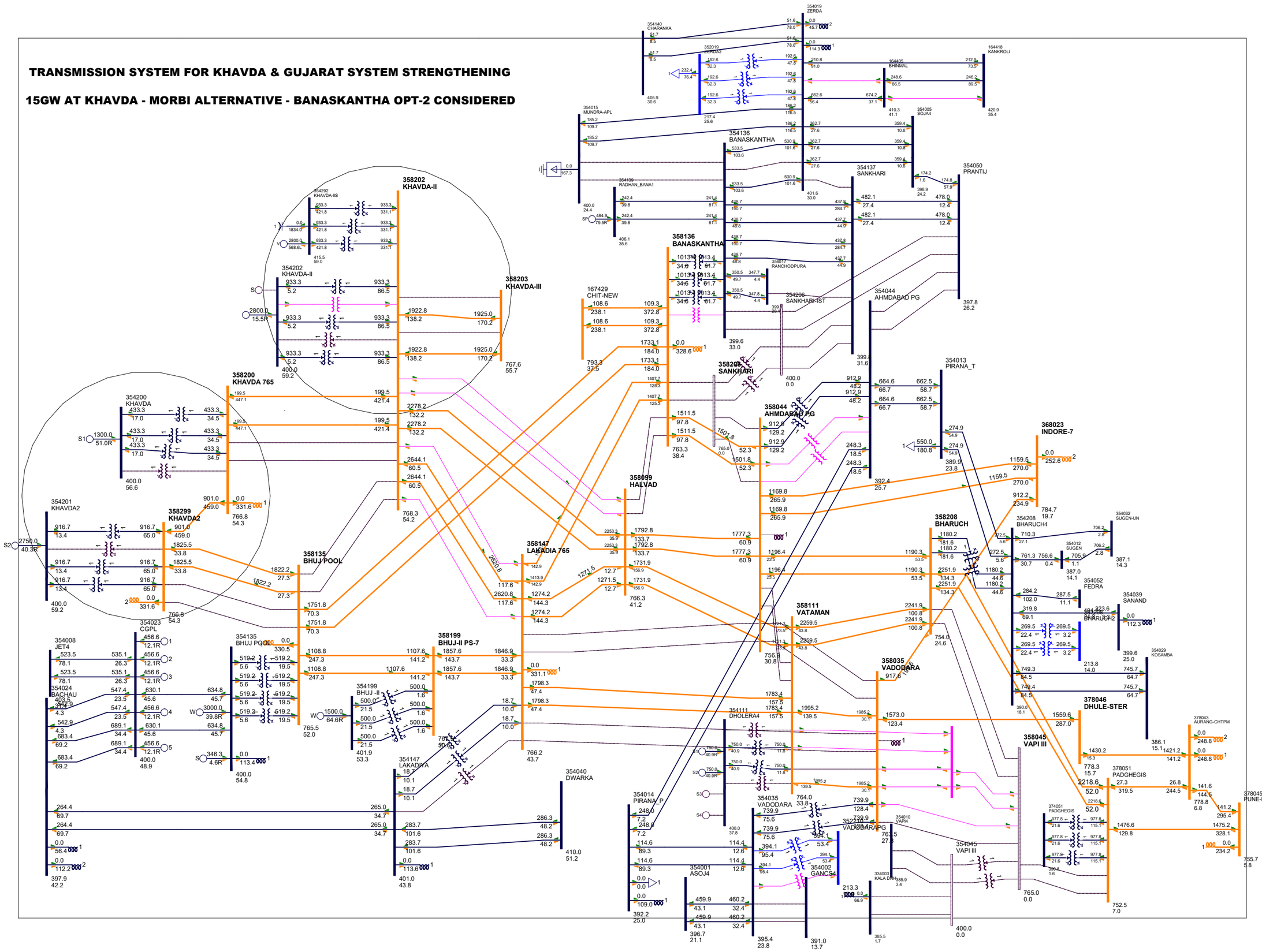

TRANSMISSION SYSTEM FOR KHAVDA & GUJARAT SYSTEM STRENGTHENING

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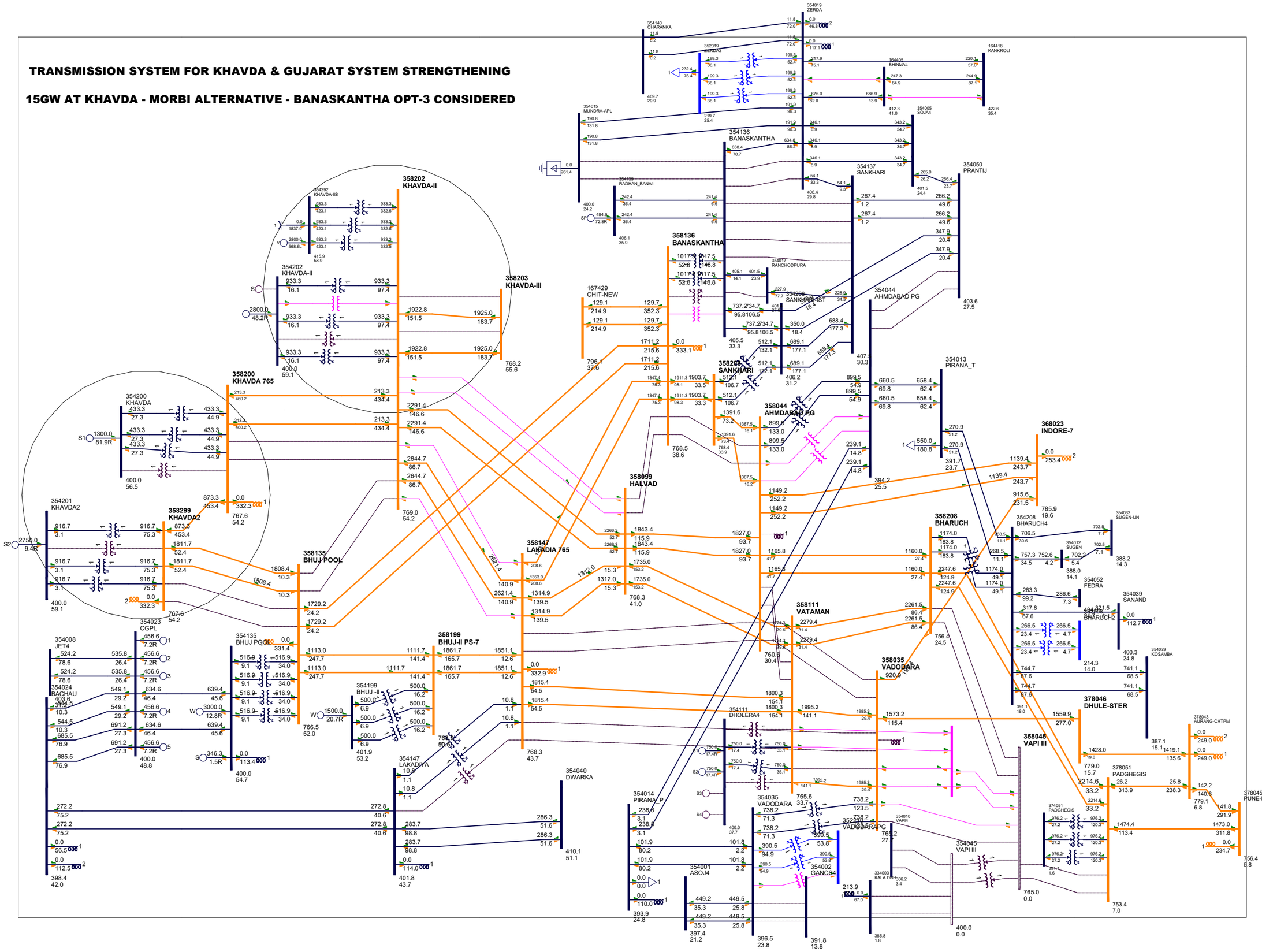
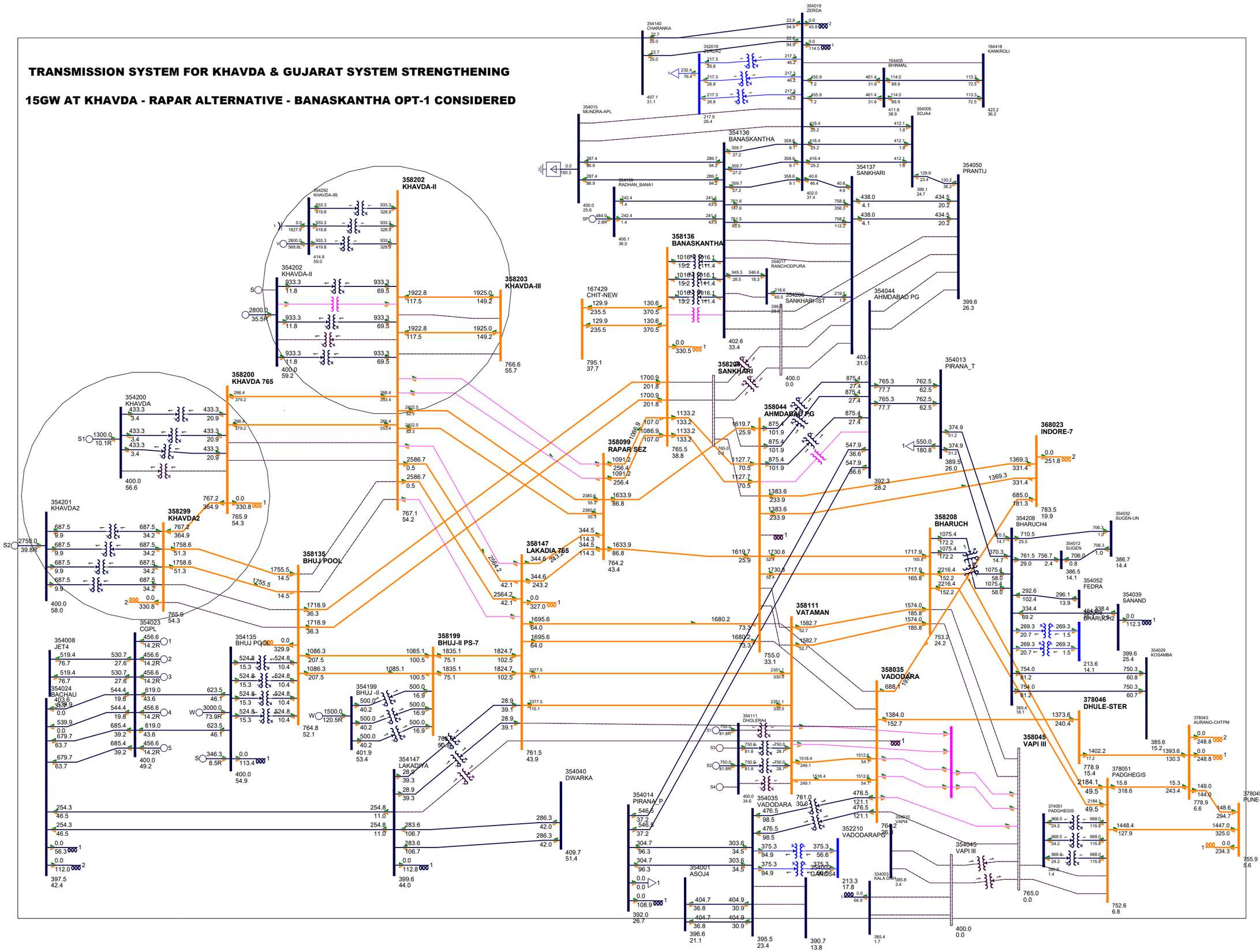


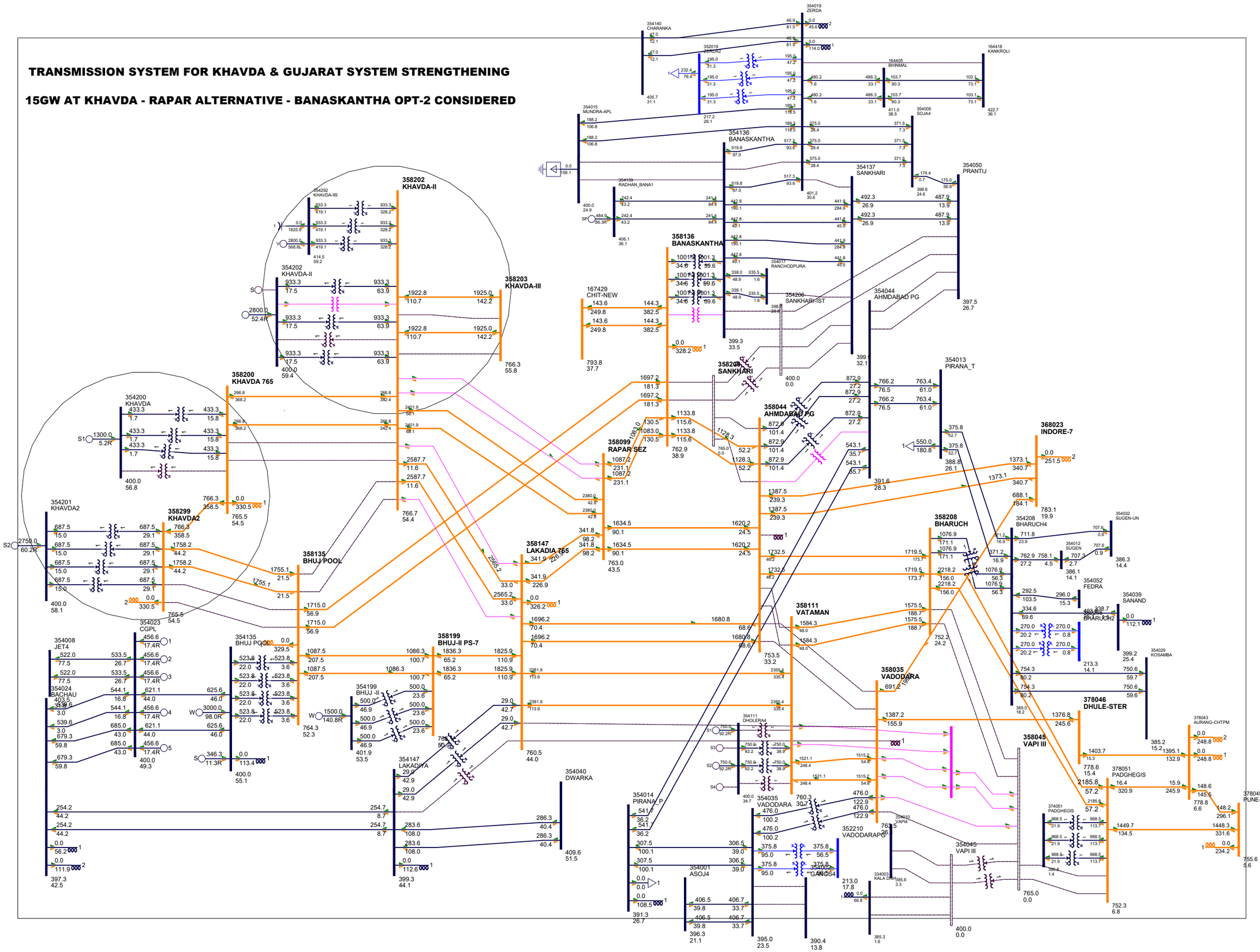
TRANSMISSION SYSTEM FOR KHAVDA & GUJARAT SYSTEM STRENGTHENING

15GW AT KHAVDA - RAPAR ALTERNATIVE - BANASKANTHA OPT-1 CONSIDERED



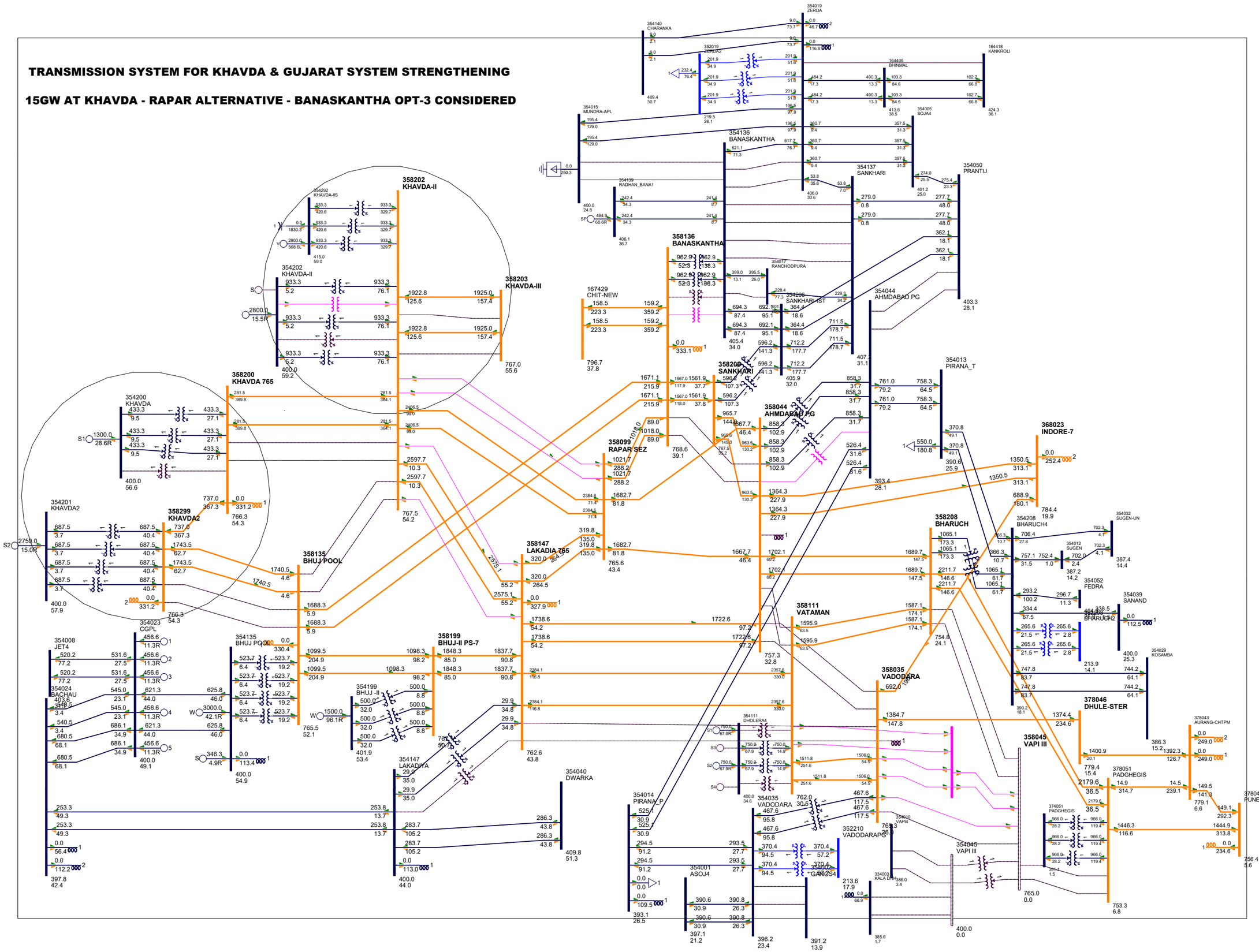
TRANSMISSION SYSTEM FOR KHAVDA & GUJARAT SYSTEM STRENGTHENING

15GW AT KHAVDA - RAPAR ALTERNATIVE - BANASKANTHA OPT-2 CONSIDERED



TRANSMISSION SYSTEM FOR KHAVDA & GUJARAT SYSTEM STRENGTHENING

15GW AT KHAVDA - RAPAR ALTERNATIVE - BANASKANTHA OPT-3 CONSIDERED



ANNEXURE-VI

GUJARAT POWER CORPORATION LTD.

GPCL/PD/875/51209 Date:17/09/2020

To,
The Chairman,
Central Electricity Authority
Sewa Bhawan, R. K. Puram, Sector-1,
New Delhi – 110 066.

Sub: Finalisation of Inter State Transmission System (ISTS) and Pooling Substations for 30 GW RE Park at Khavda, Kutch in Gujarat.

Ref : (1) Our letter No.GPCL/PD/875/RE Park/50976 dated 17/08/2020
(2) Email dated 10/08/2020

Respected Sir,

With regards to above, it is to state that Government of Gujarat has allocated land to following RE Park Developers for development of Renewable Energy Megawatt capacity in the above Renewable Energy Park at Khavda located near International Border in district Kutch, Gujarat adjacent to Vighakot post.

Sr. No.	Name of Developers	Allocated Capacity (in MW)
1	Adani Green Energy Limited	9500 (Hybrid)
2	Gujarat State Electricity Corporation Limited	3325 (Hybrid)
3	Gujarat Industries Power Company Limited	2375 (Hybrid)
4	NTPC Limited	4750 (Hybrid)
5	Sarjan Realities Limited (Suzlon Group Co.)	4750 (Hybrid)
6	Solar Energy Corporation of India (Land Reserved for SECI)	3000 (Wind Only)
	TOTAL	**27700 MW (27.7 GW)**

Further, it is also to convey that these developers from Sr. No. 1 to 5 have given an undertaking that they will set up 50% of allocated capacity within three (3) years and 100% capacity within five years from the date of lease deed agreement. Govt of Gujarat is likely to complete the land lease deed agreement process very soon.

As it is known that establishment of Power Evacuation system would also requires 3 to 4 years time. Therefore, it is essential to synchronize planning and execution of power evacuation system with the time schedule of RE projects to be established within this RE Park.

REGD. OFFICE :
Block No. 8, Sixth Floor,
Udhyog Bhavan, Sector-11,
Gandhinagar-382 011
Phone : 079 - 23251255-60
Fax No. : 91 - 79 - 23251254
www.gpcl.gujarat.gov.in
CIN:U40100GJ1990SGC013961

It is further to mention that GPCL has already shared the map of RE park along with tentative earmarking of locations (Lattitude & Longitude) of proposed three pooling sub-stations (10 Gigawatt each) within this RE Park vide email dated 9th September 2020. However, CEA may decide configuration of Power Evacuation Scheme and exact locations of sub-stations, route of Tr. lines.

Though the officials of PGCIL has made a visit to this site on 12/01/2020, Now CEA and PGCIL may again visit the site immediately and decide locations of sub-stations and Tr. lines so that adequate space/land is earmarked for this purpose while allotting exact land locations to the above RE Park Developers.

Notwithstanding the above, above RE Park Developers shall be approaching individually also for evacuation of power as per their time schedule of installing RE capacity in this park.

In view of above, it is requested to expedite and finalise the power evacuation system scheme for above RE Park.

Thanking you,

Yours faithfully,

Managing Director

C.C.to.:

(1) Secretary, Ministry of New and Renewable Energy, Government of India, Block No.14, CGO Complex, Lodhi Road, New Delhi – 110 003.

(2) Secretary (Power), Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi – 1.

(3) Additional Chief Secretary, Energy & Petrochemicals Department, Block No. 5, 5th Floor, New Sachivalaya, Gandhinagar.

(4) Chairman & Managing Director, SECI 1st Floor, D-3, A Wing, Prius Platinum Building District Centre, Saket, New Delhi – 110 017.

(5) Director, Central Electricity Authority, Sewa Bhavan, R.K.Puram, Sector-1, New Delhi – 110 066.

(6) Chairman & Managing Director, PGCIL B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi-110 016.

(7) Chairman & Managing Director, NTPC Limited, NTPC Bhawan, SCOPE Complex, Institutional Area, Lodhi Road, New Delhi – 110 003.

(8) Managing Director, Gujarat Energy Transmission Corporation Ltd. Sardar Patel Vidhyut Bhavan, Race Course, Vadodara – 390 007.

ANNEXURE-VII

All India Revised LGB 2024-25

Last modified 11-03-21

Installed Capacity

Regi	ermal Cen	ermal Sta	ermal Priv	otal Therm	Hydro	Nuclear	Solar	olar Roofto	Wind	Other Rer	Diesel	Gas	Total	EPS Peak D	Peak Demand		LTA	Apparent Demand
NR	11440	39616	0	51056	22576	4420	53352	4500	5790	1360	0	3956	**147010**	**86778**	81520		**0**	86778
WR	19000	34985	36865	90850	8168	3240	29490	4500	27510	0	0	10659	**174417**	**84502**	79382		**0**	84502
SR	11000	29775	6640	47415	11922	3320	30618	4500	31302	2864	1185	4075	**137200**	**74666**	70142		**0**	74666
ER	24440	12165	4500	41105	8182	0	250	400	0	0	0	0	**49937**	**32319**	30361		**0**	32319
NER	750	133	0	883	4816	0	100	100	0	0	0	1821	**7720**	**5790**	5439		**0**	5790
	66630	**116674**	**48005**	**231309**	**55663**	**10980**	**113810**	**14000**	**64602**	**4224**	**1185**	**20510**	**516283**	**266844**	266844			
		231309						**196635**						284055		114635		

Scenario 4 : Solar Max Jun 2024

Avail	ermal Cen	ermal Sta	ermal Priv	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	Other Rer	Diesel	Gas		National D	Regional DF
NR	30%	20%	0%	29%	70%	80%	95%	60%	50%	0%	0%	0%		88%	83%
WR	37%	16%	34%	27%	40%	80%	85%	60%	55%	0%	0%	0%		89%	84%
SR	55%	8%	47%	25%	40%	80%	85%	60%	55%	0%	0%	0%		80%	75%
ER	15%	20%	38%	10%	70%	80%	85%	60%	0%	0%	0%	0%		84%	79%
NER	0%	0%	0%	0%	70%	80%	85%	60%	0%	0%	0%	0%		64%	60%
	30%	16%	36%	24%										91%	242828

Avail	Central	ermal Sta	ermal Priv	qd Therm	Hydro	Nuclear	Solar	olar roofto	Wind	RE RPO	Diesel	Gas	Total avai	Demand F	Surplus/D	Net Avail	Net Dema	Apparent Demand
NR	3482	8099	0	14945	15803	3536	50684	2700	2895	42421	0	0	87199	76706	10493	84499	74006	76706
WR	6978	5524	12495	24101	3267	2592	25067	2700	15131	45634	0	0	73753	75594	-1841	71053	72894	75594
SR	6050	2327	3148	12070	4769	2656	26025	2700	17216	40143	0	0	64891	59638	5253	62191	56938	59638
ER	3549	2434	1712	4276	5727	0	213	240	0	15341	0	0	13874	27191	-13317	13634	26951	27191
NER	0	0	0	0	3371	0	85	60	0	2175	0	0	3516	3700	-184	3456	3640	3700
Total	**20059**	**18384**	**17354**	**55391**	**32938**	**8784**	**102073**	**8400**	**35242**	**145715**	**0**	**0**	**243234**	**242828**	**406**	**234834**	**234428**	

ANNEXURE-VIII

पावर सिस्टम ऑपरेशन कॉर्पोरेशन लिमिटेड
(भारत सरकार उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Government of India Enterprise)

केन्द्रीय कार्यालय : 61, आई एफ सी आई टावर, 8 एवं 9वी मंजिल, नेहरू प्लेस, नई दिल्ली-110019
Corporate Office : 61, IFCI Tower, 8 & 9th Floor, Nehru Place, New Delhi - 110019
CIN : U40105DL2009GOI188682, Website : wwwposoco.in, E-mail : posococc@posoco.in, Tel.: 011-40234672

संदर्भ: NLDC/SO/CEA/RPC/KLHR/ दिनांक: 02nd Feb 2021

To,

Member Secretary **Southern Regional Power Committee** 152, Madhava Nagar, Gandhi Nagar, Bengaluru, Karnataka 560001	**Member Secretary** **Western Regional Power Committee** M.I.D.C. Central Road, Seepz, Andheri East, Mumbai, Maharashtra 400093

विषय:– High Loading of 400 kV Kolhapur (PG) – Kolhapur (MS) D/C lines and Remedial Measures – Regarding

Sir,

400 kV Kolhapur (PG) – Kolhapur (MS) D/C (twin moose) is an important line on the Southern and Western regional boundary of the Indian grid (network diagram enclosed at **Annexure-I**). The line connects southern Maharashtra area in the Western Region with Kudgi TPS (3x800 MW) in the Southern Region and is also important for connecting the Mapusa (Goa) system with Kolhapur (PG).

The high loading of 400 kV Kolhapur (PG) – Kolhapur (MS) D/C has been highlighted by NLDC/RLDCs through its various Operational Feedbacks as well as in different forums. Recently, during Dec'20 – Jan'21 period, the power flow on this line has been observed to be very high with N-1 compliance issues being faced for significant period (trend enclosed at **Annexure-II**). The high loading on the line during this period may be attributed to multiple factors viz., high generation at Kudgi TPS (after revision in its variable charge), low generation at plants in southern Maharashtra region (Koyna HEP, Jaigad, RGPPL etc.), high load around Kolhapur area, high renewable (solar) generation in southern region etc.

NLDC and RLDCs are undertaking various measures in operations horizon such as reduction in power order of HVDCs towards southern region (Talcher – Kolar, Bhadrawati, Raigarh - Pugalur) to the extent possible to relieve the loading of 400 kV Kolhapur (PG) – Kolhapur (MS) D/C. HVDC Raigarh-Pugalur is also being reversed (towards WR) during the high loading period This reversal of HVDC Raigarh - Pugalur is resulting in another constraint in the form of high loading of 400 kV Lara – Raigarh (twin moose) D/C line especially during low generation at Lara TPS. Similarly, during high generation at Lara TPS, loading of 400 kV Lara – Champa D/C line is observed to be on the higher side. Further, reduction in HVDC B'wati after a certain

पंजीकृत कार्यालय : प्रथम तल, बी-9, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली - 110016
Registered Office : First Floor, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi - 110016

extent is getting restricted due to high loading of 400 kV Warora (MS) – Wardha (PG) line (details enclosed at **Annexure-III**).

Apart from above, the additional measures that will significantly help in controlling the loading of 400 kV Kolhapur (PG) – Kolhapur (MS) D/C line in both operational as well as long-term horizon are given below:

a) Operationalization of 220 kV Kolhapur - Chikodi & 220 kV Mudshingi – Chikodi lines in such a way that Maharashtra load gets fed from Karnataka. This will significantly relieve the loading of 400 kV Kolhapur (MS) – Kolhapur (PG) D/C. Therefore, operationalization of these lines may be taken up with the concerned states on priority. Some load rearrangement by MSETCL might be required to keep loading of these 220 kV line within limits.

b) Bypassing of 400 kV Koradi II - Wardha (PG) line and 400 kV Wardha (PG) – Warora line at Wardha (PG) (forming 400 kV Koradi II – Warora 400 kV line) is already approved in 41st WR SCM meeting (minutes enclosed at **Annexure- IV**). Operationalization of this bypass arrangement on priority basis may be ensured to address the high loading constraint on 400 kV Warora (MS) - Wardha (PG) line during reversal of HVDC Bhadrawati.

c) Restoration of 400 kV Solapur – Karad line (MSETCL) which is under outage since Nov 2017 (subsequently some portion of this line has been utilized for 220 kV Solapur-Jeuri line) will also help in relieving the loading of 400 kV Kolhapur (MS) – Kolhapur (PG) D/C. The early restoration of this line may therefore be taken up with concerned agencies.

d) The possibility of increase in generation in the Southern/Western Maharashtra and reduction in Southern Region to address the high loading issue on 400 kV Kolhapur (MS) – Kolhapur (PG) D/C may be explored. Similarly, possibility of network reconfiguration which might help in addressing the constraint may also be explored in consultation with concerned states.

e) The operation of HVDC Raigarh – Pugalur in reverse direction (towards WR) poses constraint of high loading of 400 kV Lara – Raigarh (twin moose) D/C line especially under high generation at Raigarh PS and low generation at Lara TPS. The addressal of this also needs to be discussed and requisite actions need to be initiated accordingly.

f) Following system upgradation scheme has already been agreed in joint study meeting between CEA, CTU and POSOCO. Same was also put up for approval in 2nd SRPC (TP) meeting held on 01st Oct 2020.

- Reconductoring of 400 kV Kolhapur (PG) - Kolhapur (MS) D/C
- Construction of 765 kV Kolhapur (PG) -Pune (GIS) D/C

The scheme however could not be discussed and finalized in the meeting.

Further, the power flow on Western Maharashtra Axis is observed to be on the higher side during morning hours with the flow crossing 7000 MW on some occasions (details enclosed at **Annexure – V**).

Outlets to either Pune or Padghe from Kolhapur (PG) as mentioned above will provide additional connectivity to western Maharashtra area from southern region and will significantly enhance the reliability of the power supply in this area. Therefore, the approval and implementation of the proposed scheme can be taken up.

The availability of 400 kV Kolhapur (PG) – Kolhapur (MS) D/C line is critical for reliable power supply to Goa, southern Maharashtra (Kolhapur area) region as well as for safe evacuation of power from Kudgi TPS. With increase in renewable energy penetration in southern region, the loading of this line is expected to increase further. As the outage of this line could result in a large disturbance in Kolhapur area, it is of utmost importance that the issues are taken up at the earliest.

In view of above, it is requested to kindly take up these issues with all the concerned for implementation of above-mentioned measures.

Thanking you,

Yours Sincerely,

(Debasis De)

Executive Director, NLDC

Encl: As above

Copy to:

1. Chief Engineer (PSP&A-I) / (PSP&A-II) Central Electricity Authority, New Delhi — **with request to further taking up points (e) & (f)**
2. Chief Operating Office (CTU), POWERGRID, Gurgaon
3. Executive Director, WRLDC / SRLDC

Annexure-I

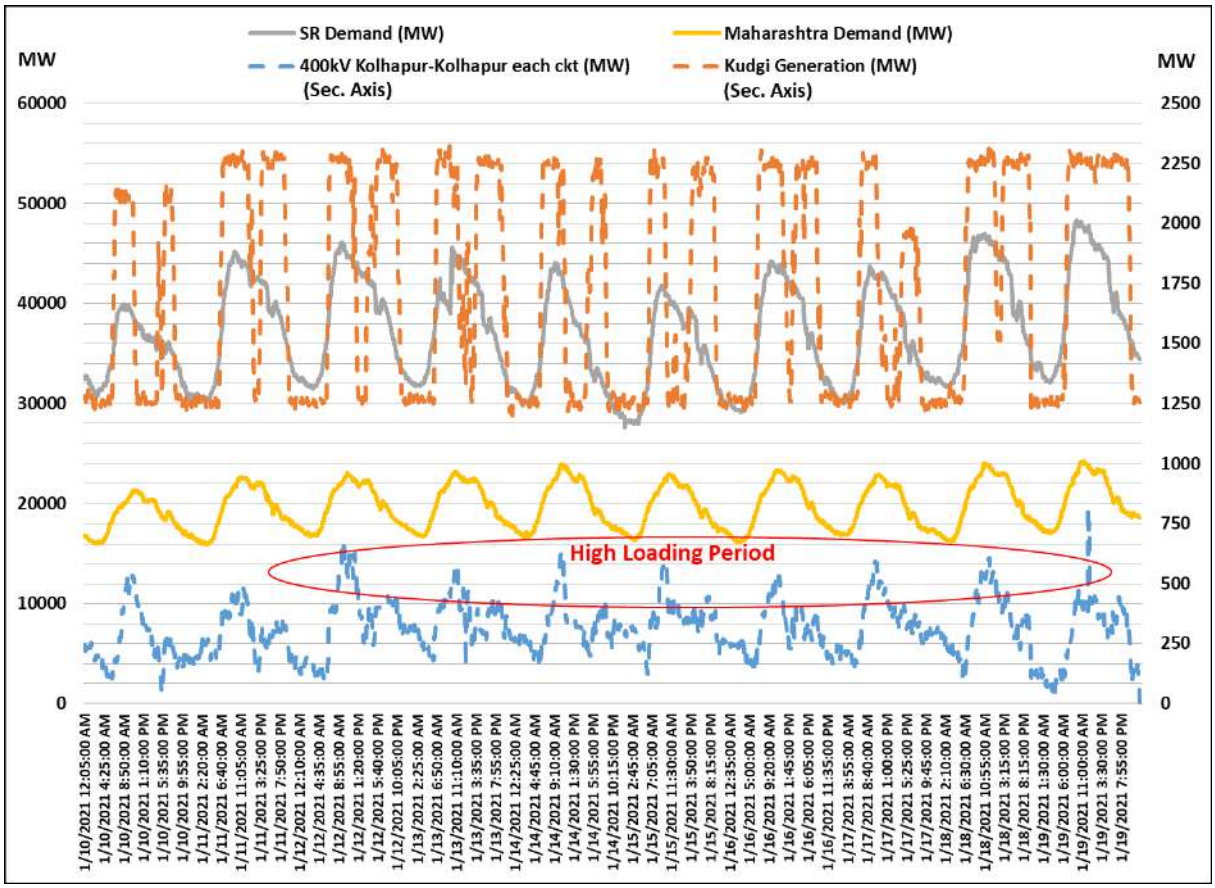
Network Diagram

Kolhapur (MS) – Kolhapur (PG) D/C

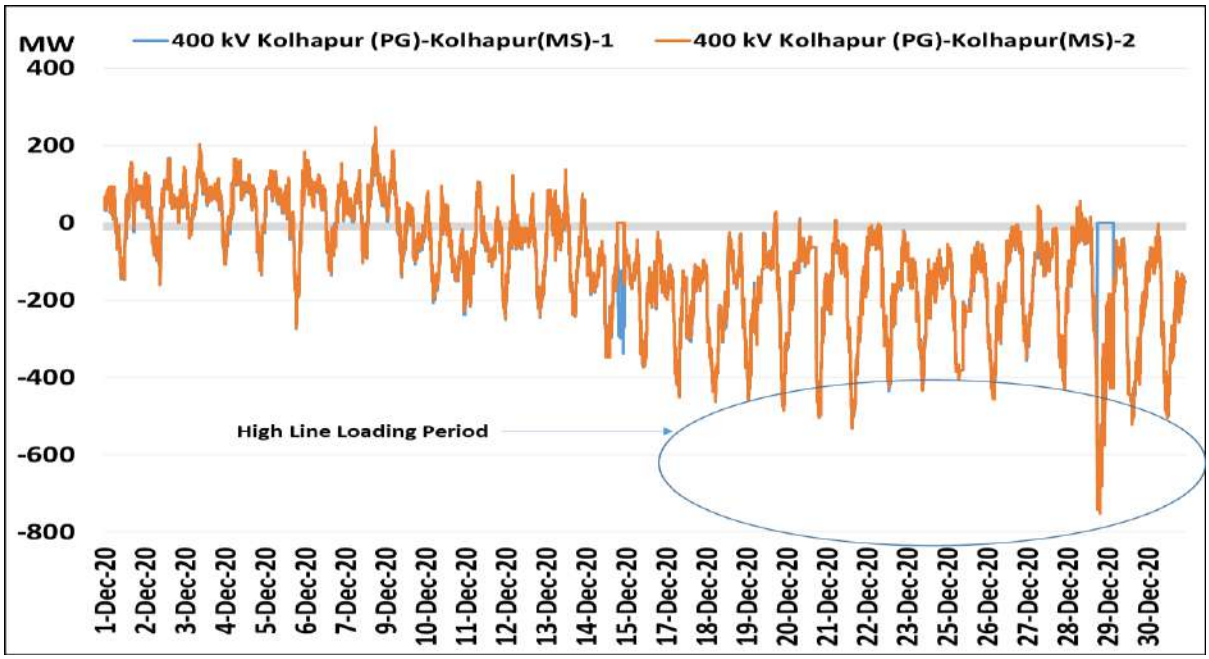
Annexure-II

Line Loading of 400 kV Kolhapur (PG) - Kolhapur (MS) D/C

10th Jan 2021 – 19th Jan 2021

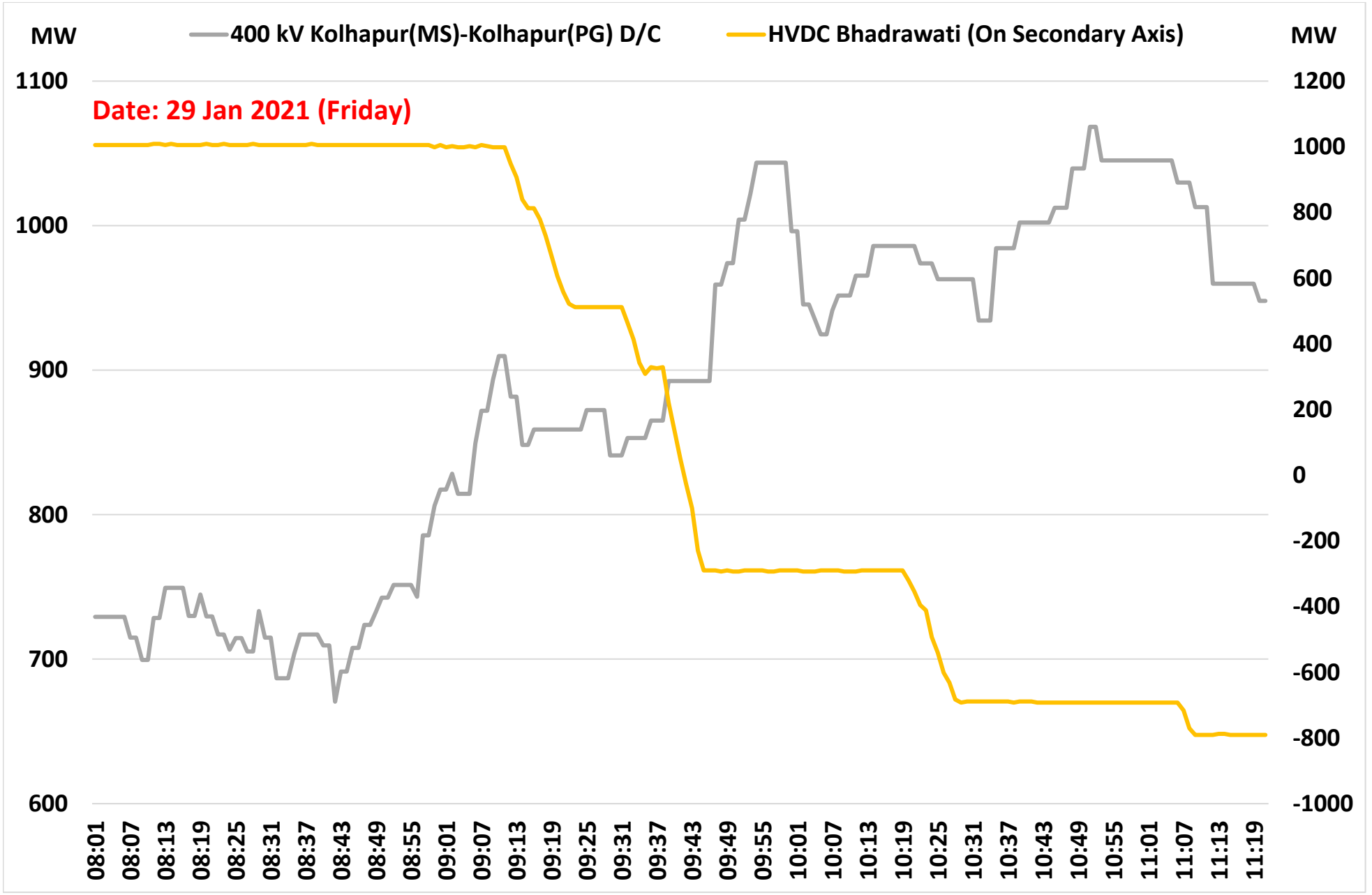


Dec 2020



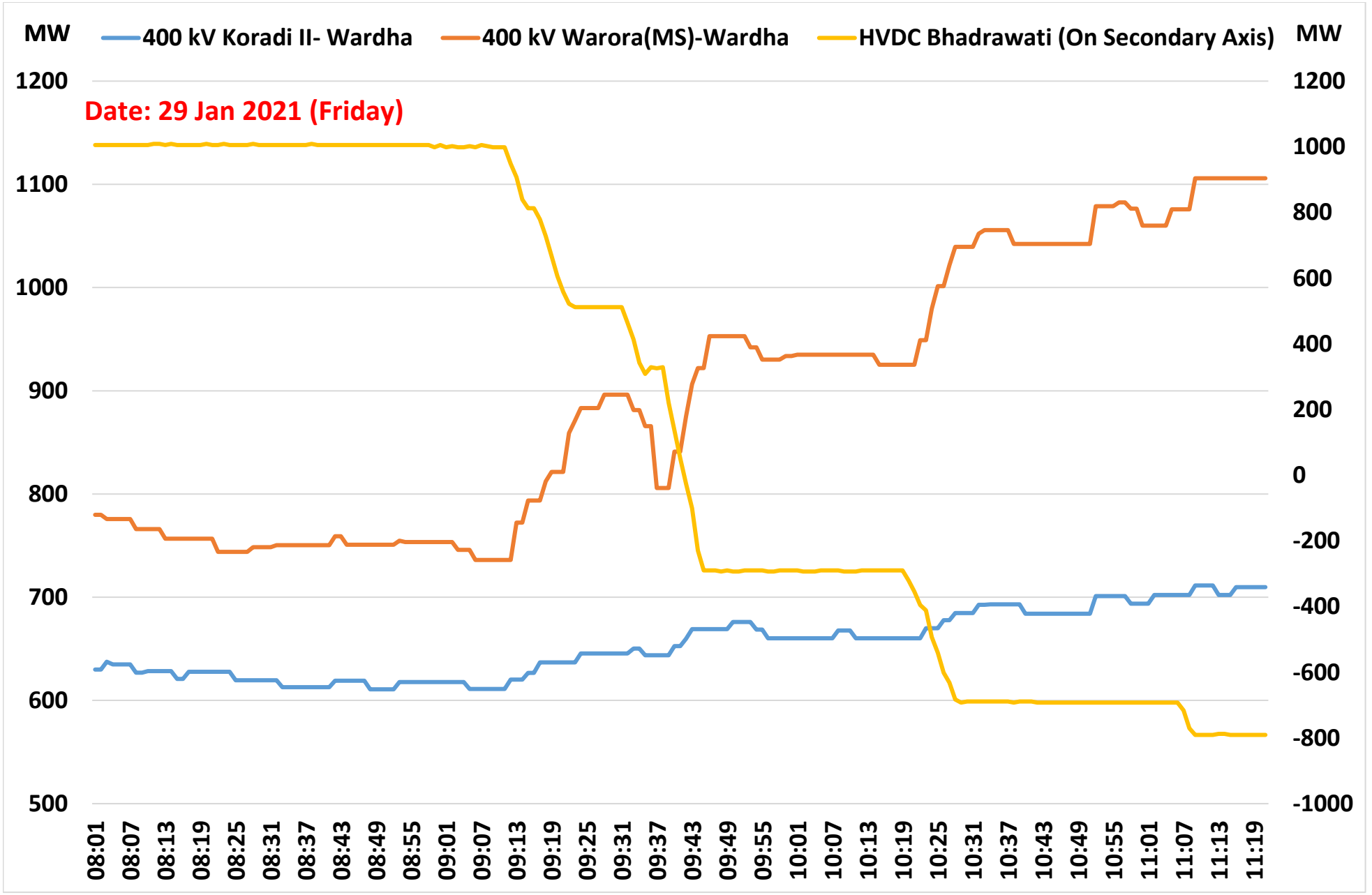
Annexure-III

Line Loading of 400 kV Kolhapur (PG) - Kolhapur (MS) D/C and HVDC Bhadrawati - 29th Jan 2021



Annexure-III

Line Loading of 400 kV Wardha - Waroda D/C, Koradi-II - Wardha D/C and HVDC Bhadrawati



Annexure-IV

भारत सरकार / Government of India
विद्युत मंत्रालय / Ministry of Power
केन्द्रीय विद्युत प्राधिकरण / Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग - I
Power System Planning & Appraisal Division-I
सेवा भवन आरए केए पुरम नई दिल्ली–110066
Sewa Bhawan, R. K. Puram, New Delhi-110066 [ISO: 9001:2008]
वेबसाइट / Website: www.cea.nic.in

No. 26/10/2017/PSP&PA-I/92- 106 **Date: 16.02.2017**

1. The Member (PS), Central Electricity Authority, Sewa Bhawan, R. K. Puram, New Delhi-110066
2. The Member Secretary, Western Regional Power Committee, MIDC Area, Marol, Andheri East, Mumbai Fax 022 28370193
3. The Director (Projects), GCIL, Saudamini, Plot No. 2, Sector-29, Gurgaon-122001 Fax 0124-2571760/2571932
4. Chairman and Managing Director, MPPTCL, Shakti Bhawan, Rampur, Jabalpur-482008 Fax 0761 2664141
5. The Managing Director, CSPTCL, Dangania, Raipur (CG)-492013 *Fax 0771 2574246/ 4066566*
6. The Managing Director, GETCO, Sardar Patel Vidyut Bhawan, Race Course, Baroda-390007 Fax 0265-2338164
7. Director (Operation), MAHATRANSCO, 'Prakashgad', Plot No.G-9, Bandra-East, Mumbai-400051 Fax 022-26390383/26595258
8. Chief Engineer (Trans), NPCIL, 9S30, VS Bhavan, Anushakti Nagar, Mumbai-400094 Fax 022-25993570
9. The Executive Director (Engg.), NTPC Ltd., Engg. Office Complex, A-8, Sector-24, NOIDA 201301 *Fax 0120-2410201/2410211*
10. The Chief Engineer, Electricity Department, The Government of Goa, Panaji Fax 0832 2222354
11. Executive Engineer (Projects) UT of Dadra & Nagar Haveli, Department of Electricity , Silvassa *Ph. 0260-2642338/2230771*
12. Executive Engineer, Administration of Daman & Diu (U.T.), Department of Electricity, Moti Daman-396220 *Ph. 0260-2250889, 2254745*
13. GM, WRLDC, Plot no F-3, MIDC Area, Marol, Andheri(East) Mumbai-400093 Fax no 022-28235434
14. CEO, POSOCO, B-9, Qutab Institutinal Area, Katwaria Sarai, New Delhi-110016 Fax 011-26852747
15. Director (Trans), MoP, Shram Shakti Bhawan, Rafi Marg, New Delhi

Sub: Minutes of the 41st Standing Committee meeting on Power System Planning of Western Region

Sir / Madam,

The minutes of the 41st Standing Committee meeting on Power System Planning of Western Region held on 21st December 2016 at New Delhi, is available on CEA website (www.cea.nic.in) at the following link: http://www.cea.nic.in/compsplanning.html (i.e. Home page-Wings-Power Systems-PSP&PA-I - Standing Committee on Power System Planning-Western Region).

Yours faithfully,

(Ravinder Gupta) 16/2/17
Chief Engineer, PSP&A-I

Encl: as above

7	Mapusa (PG) 3X315 MVA, 400/220	2	Jun/Jul'18 (WRSS-16)	Mapusa - Tuem 220 kV D/c	UC	No participation
8	Satna (PG) 1x500MVA, 400/220kV	2	Jun/Jul'18 (WRSS-16)	LILO of one circuit of Satna (MPPTCL) - Chhatarpur 220 kV line at Satna (PGCIL) 400 kV S/s (3Km)	Targeted to complete by March- 2018	
9	Vadodara GIS 2 x 500 MVA, 400/220 kV	4	March – 2017	220 kV Venkatpura-Vadodara D/C Line 220 KV Jambua – Vadodara D/C Line	Lines planned by GETCO	Dec, 2017 Dec, 2018
10	Bijawar (TBCB) 2 x 500 MVA, 400/220 kV	4	RfQ stage	LILO of Tikamgarh – Chhattarpur 220kV D/c line at Bijawar	To be awarded	
11	Navsari 2x315MVA + 1x500MVA, 400/220kV	2	May'18	Navsari – Bhestan 220kV D/c line	DGENTPL under TBCB	May'18
12	Rewa PS 2x500MVA, 400/220kV	6	Mar'17	Rewa UMSPP – Rewa PS 220kV 3xD/c line	UC by Rewa UMSPP	Mar'17

7. Measures to control fault level at Wardha Substation

7.1. Director (PSPA-I), CEA stated that the issue of measures to control the fault level at Wardha sub station was discussed in the 40th meeting of SCPSPWR held on 01.06.2016, wherein,400 kV bus splitting scheme through a series reactor to control fault level at Wardha substation was agreed in principle. However, in the studies it was observed that, the short circuit level of 74 kA at Koradi gets reduced to 56 kA with implementation of the bus splitting scheme at Wardha, which was still higher than its design limit of 40 kA. Therefore, it was decided in the 40th meeting of SCPSPWR to carry out joint studies by CEA, CTU, POSOCO and MSETCL for limiting the high fault level in Koradi complex.

7.2. He added that a joint studies meeting was held on 10.08.2016 among CEA, CTU, POSOCO and MSETCL to discuss issues regarding utilization of Navi Mumbai substation and High fault currents in Koradi complex. In the meeting, it was agreed that MSETCL shall examine the case of high fault current at Koradi (MSETCL) S/s and would evolve feasible alternatives in consultation with CEA, CTU and POSOCO. However, no further communication has been received in this regard from MSETCL.

7.3. MSETCL representative informed that presently, 2 no. of 660 MW units of Koradi II have been commissioned. There is a 400/220 ICT at Koradi II S/s, which is connected with Kaulewada S/s through 220 kV D/C line. Koradi II is also connected to Wardha and Warora (through termination of Koradi II - Wardha 400 kV D/C into one ckt of Warora – Wardha 400 kV D/C line - an interim arrangement). Further, Koradi - II would be connected with Koradi III through Koradi II – Koradi III (765/400/ 220 kV) 400 kV

D/C quad line, which is expected to be commissioned by March, 2017. As per the studies carried out by them, with the proposed bus splitting at Wardha, the short circuit level is within the design limit in both cases - with and without the existing interim arrangement. However, with bypassing of Koradi II-Wardha 400 kV D/C line and Wardha (PG) – Warora 400 kV line at Wardha, the 400 kV Koradi II – Warora lines and 220 kV Koradi II – Kaulewada D/C line may be over loaded. Therefore, MSETCL requested to keep the interim arrangement in place till the commissioning of 400 kV Koradi II – Koradi III D/C quad line.

7.4. CEA / MSETCL observed that in the bus splitting proposal at Wardha, all the three 765/400 kV ICTs at Wardha and feeder from Mouda are connected to Bus section – A only and bus section B has more no. of outgoing feeders than the incoming feeders. Therefore, one 400 kV outgoing feeder (say, Wardha – Akola 400 kV D/C line) may be kept on section A.

7.5. CTU stated the bus splitting proposal at Wardha has been arrived at looking into the physical reconfiguration possibilities at Wardha 765/400 kV substation. However, the suggestion would be looked into.

7.6. After further deliberation, it was decided to have a joint meeting of CEA, CTU, POSOCO & MSETCL to discuss the short circuit level at Koradi II and Wardha.

7.7. In line with the decision of 41st meeting of SCPSPWR held on 21.12.2016, a meeting was held on 13.01.2017 amongst CEA, CTU, POSOCO & MSETCL (minutes enclosed as Annexure-3) at CEA, New Delhi.

7.8. Based on the deliberation in the 41st meeting of SCPSPWR held on 21.12.2016 and subsequent meeting held on 13.01.2017, the following was agreed:

A. Scheme to control the fault level at Wardha substation

(i) Split of 400 kV Wardha substation into two sections, Section –A and Section-B as per following figure, with necessary switching arrangement.

(ii) Warora – Koradi II 400 kV (Quad) line [formed after disconnection of Koradi-II – Wardha 400 kV (Quad) line and connecting it with Warora – Wardha 400 kV (Quad) line at outskirt of Wardha substation]

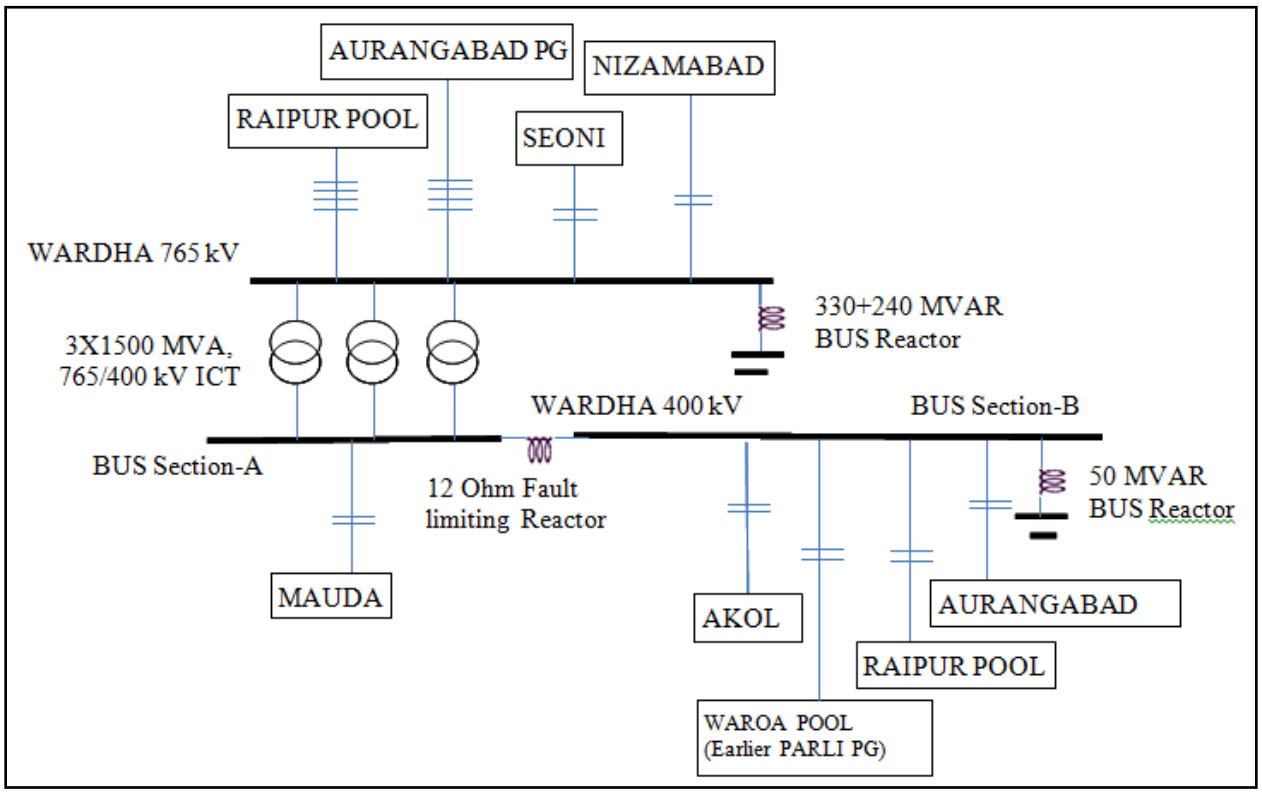
(iii) All necessary arrangement for Change in termination of Warora Pool -Wardha 400 kV D/C (Quad) line by disconnecting it from Wardha 400kV BUS Section A and terminating in vacant 400 kV bays of Warora and Koradi II 400 kV (Quad) lines at Wardha 400kV BUS Section B.

(iv) 12 Ohm fault limiting reactor to connect 400kV BUS Section A and BUS Section B of Wardha 400 kV BUS.

(v) 2 X 63MVAr line reactors at Wardha end of Wardha – Warora Pool 400kV D/c (quad) line to be used as bus reactors at Wardha S/s - section A (by using the two nos. of 400 kV bays which shall be vacant in Wardha Bus Section-A after shifting of Warora pool - Wardha 400 kV D/C line from Section-A to Section-B)

(vi) Necessary modification at Wardha substation like change of some elements including CTs if those are not designed for 50kA fault level.

Layout of Wardha 765/400 kV S/s is I type with two main BUS. BUS section A and B of one main BUS will be connected through 12 Ohm fault limiting reactor and BUS Section A and B in second main BUS will remain disconnected.



Splitting arrangement at Wardha (PG)

B. At present Koradi II - Wardha 400 kV D/C is terminated into one ckt of Warora – Wardha 400 kV D/C line as an interim arrangement (forming Koradi-II – Wardha 400 kV S/C line, Koradi-II – Warora 400 kV S/C line and Warora – Wardha 400 kV S/C line). Removal of the interim arrangement by bypassing of Koradi II-Wardha 400 kV D/C line and Wardha (PG) – Warora 400 kV line at Wardha (forming Koradi II – Warora 400 kV D/C line) would be done after commissioning of Koradi II – Koradi III 400 kV D/C quad line. At present, one ckt of Koradi II – Koradi III 400 kV D/C quad line has already been commissioned & another circuit is expected to be commissioned by March, 2017.

C. For evacuation of power from Koradi-II generation/ Tiroda generation project, system strengthening was required beyond Warora 400 (MSETCL) substation. MSETCL would finalise the transmission system strengthening beyond Warora and the same would be intimated in the next SCM of WR.

8. Progress of dedicated transmission lines of IPPs which are connected through interim arrangement

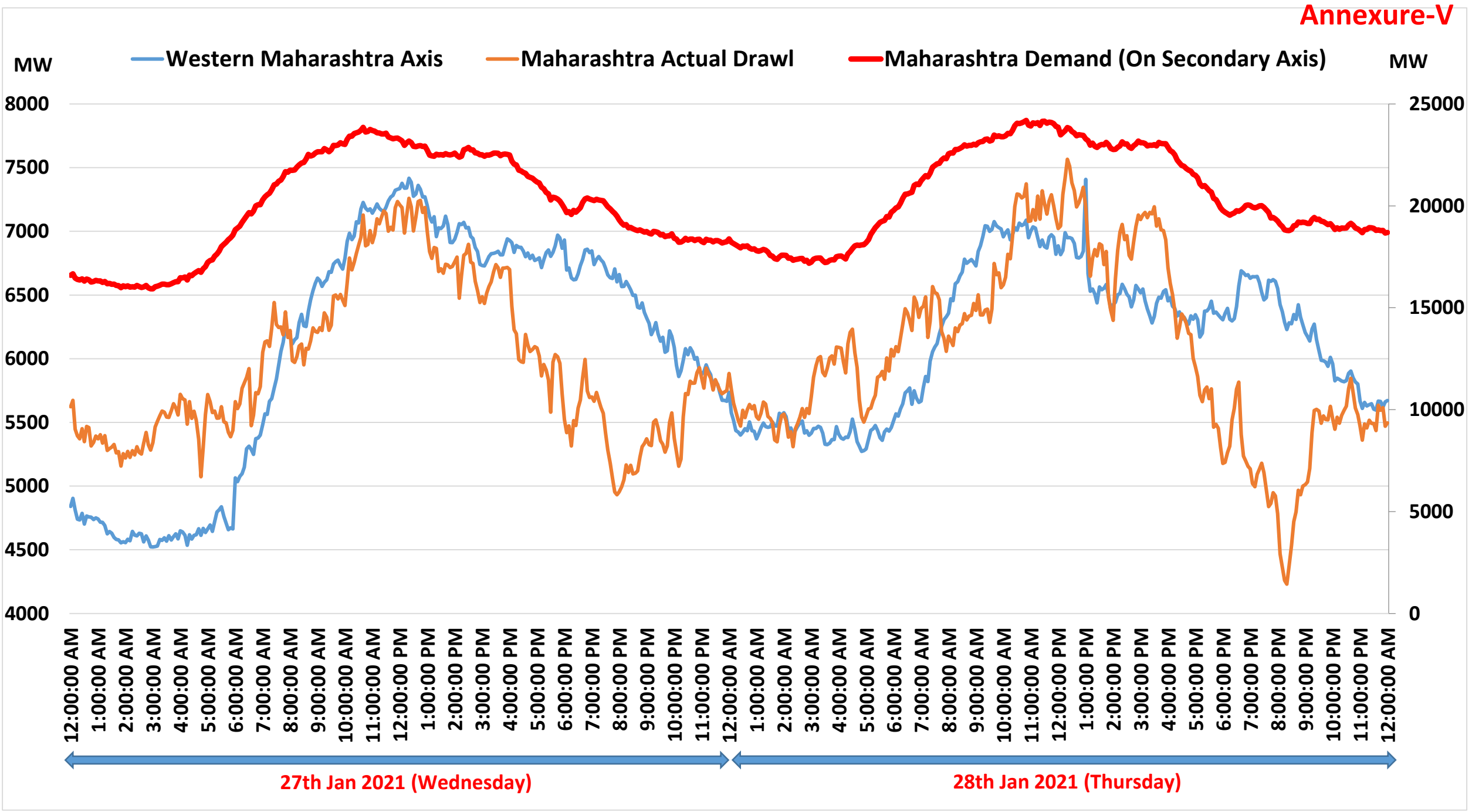
8.1. Director (PSPA-I), CEA stated that the progress of dedicated transmission lines of IPPs in Western Region, which were connected through interim arrangement was reviewed in 40th meeting of SCPSPWR held on 01.06. 2016. Subsequently, a meeting was held in CEA on 16.09.2016 to review the status of implementation of the dedicated transmission lines of the IPPs connected through interim arrangement. Out of the six IPPs, four IPPs have already removed their interim arrangement and are connected to the grid through their dedicated transmission system. Only two IPPs namely, Vandana Vidyut Ltd (VVL) and Essar Power M.P. Ltd (EPMPL) are still connected to the grid through their interim arrangement.

8.2. Representative of M/s Essar informed that EPMPL is a generating company having generation project of 1200 MW at Mahan, out of which one unit of 600 MW has achieved COD on 29th April 2013. The evacuation system of EPMPL, interalia, includes the EPMPL generation switchyard - Bilaspur pooling station 400 kV D/C line, being implemented by Essar Power Transmission Company Limited (EPTCL) as Transmission Licensee. There has been delay in implementation of the EPMPL generation switchyard - Bilaspur pooling station 400 kV D/C line. The transmission line is 337 km in length and has 942 no. of towers. The balance works left as on date is 4 no. of foundations to be completed, 33 no. of towers to be erected, stringing to be done for 140 km. It was stated that due to financial constraints and some issues at site, the works were held up. It is expected that the work would be resumed by Feb, 2017 and expected to complete by Dec, 2017.

8.3. Representative of M/s VVL intimated that its 2 x 135 MW has been commissioned in 2014, but they have no PPA. Further due to non-availability of coal, the plant is under forced shutdown from last 24 months. This led to financial crunch, thus the dedicated line couldn't be taken up. It was also informed that M/s VVL is consistently pursuing with its lenders for restructuring of its loan through regular meetings with lenders and it is expected that by March, 2017 the loan would be restructured. After loan restructuring proposal, they would be in a position to give the commitment for completion of their dedicated transmission line. M/s VVL requested their plant to remain connected with the grid through the existing LILO till the completion of their dedicated line.

8.4. NLDC informed that even though generating units are not in operation but the generating switchyard of M/s VVL is still connected with ISTS. Also there is no operation & maintenance staff at the generating switchyard. Therefore, from grid safety and security aspects, the LILO may be bypassed from their switchyard to avoid any instance of fault. Further, M/s VVL is drawing some nominal power through this

Annexure-V


Western Maharashtra Axis
Maharashtra Actual Drawl
Maharashtra Demand (On Secondary Axis)
MW
MW
8000
7500
7000
6500
6000
5500
5000
4500
4000
25000
20000
15000
10000
5000
0
12:00:00 AM
1:00:00 AM
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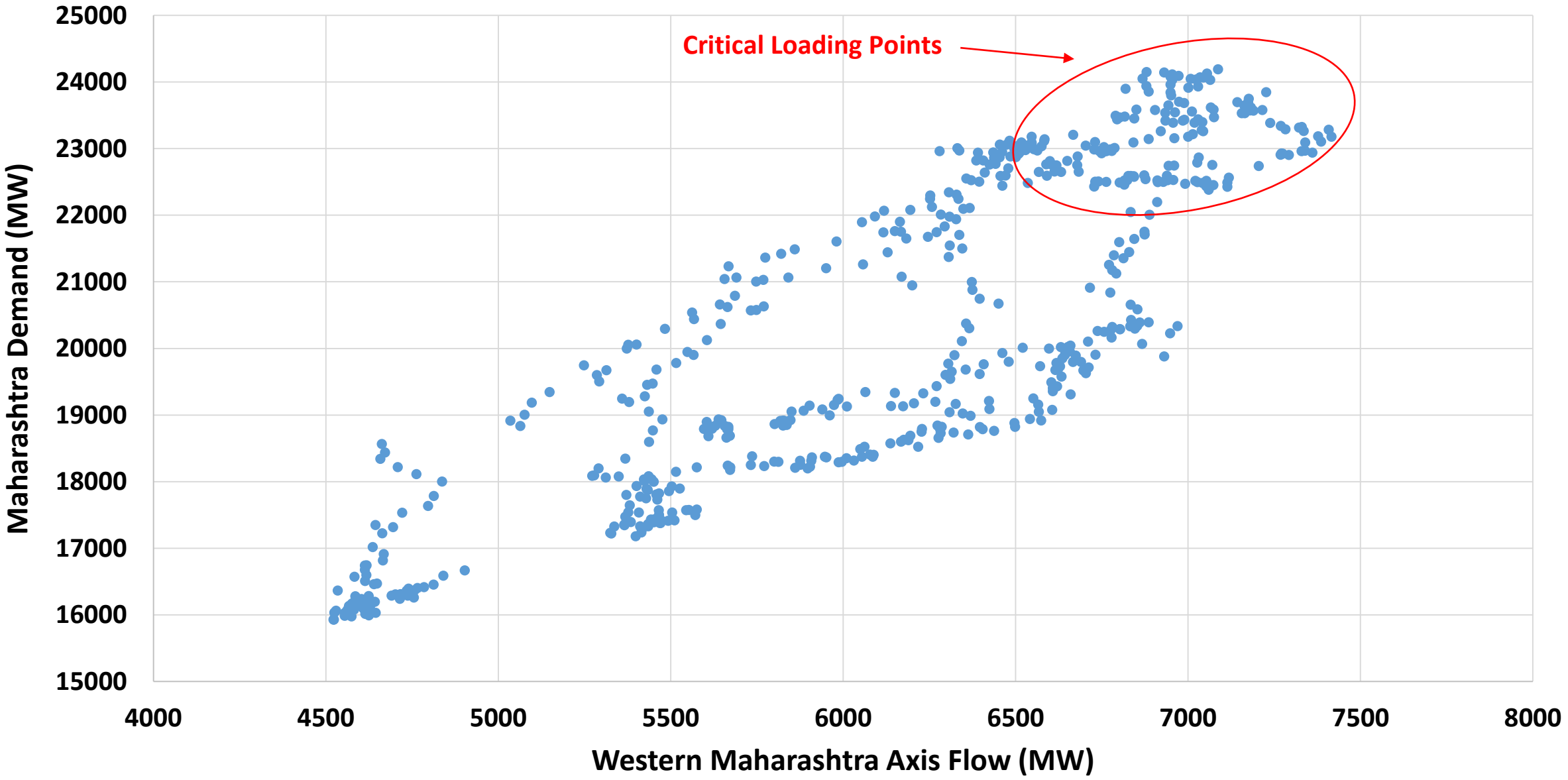
8:00:00 PM
9:00:00 PM
10:00:00 PM
11:00:00 PM
12:00:00 AM
27th Jan 2021 (Wednesday)
28th Jan 2021 (Thursday)

Annexure-V

Western Maharashtra Axis Flow (MW) vs Maharashtra Demand (MW) for 27th and 28th Jan 2021



ANNEXURE-IX

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग
Power System Planning & Appraisal-I Division

To,

(i) Member Secretary (WRPC), F-3, MIDC Area, Andheri (East), Mumbai – 400093
(ii) COO (CTU), PGCIL, Saudamini, Plot No. 2, Sector - 29, Gurugram – 122001
(iii) ED (WRLDC), F-3, Krantiveer Lakhuji Salve Marg, Seepz, Andheri East, Mumbai, Maharashtra 400096
(iv) Chief Engineer (STU), MSETCL, Prakashganga, Plot No.C-19, E-Block, Bandra-Kurla Complex, Bandra (E), Mumbai – 400051
(v) Chairman-cum-Managing Director, Transmission Corp. of Telangana Ltd., (TSTRANSCO) Vidyut Soudha, Khairatabad Hyderabad – 500 082

Subject: Minutes of the meeting held on 14.08.2020 to deliberate upon MSETCL proposal of installation of Kistampeth (Telangana State) – Sironcha (Maharastra State) 132 kV SCDC line with end bays each at Kistampeth and Sironcha S/s by MSETCL and its designation as an ISTS line – reg

महोदया / महोदय / Madam / Sir,

A meeting was held on 14.08.2020 through VC to deliberate upon MSETCL proposal of installation of Kistampeth (Telangana State) – Sironcha (Maharastra State) 132 kV SCDC line with end bays each at Kistampeth and Sironcha S/s by MSETCL and its designation as an ISTS line. The minutes of the meeting are attached herewith.

भवदीय,

(Vikas Sachan)
Deputy Director

सेवा भवन, आर. के. पुरम-I, नई दिल्ली-110066 टेलीफैक्स: 011-26102045 ईमेल: cea-pspa1@gov.in वेबसाइट: www.cea.nic.in
Sewa Bhawan, R.K Puram-I, New Delhi-110066 Telefax: 011-26102045 email: cea-pspa1@gov.in Website: www.cea.nic.in

Minutes of the meeting held on 14.08.2020 to deliberate upon MSETCL proposal of installation of Kistampeth (Telangana State) – Sironcha (Maharastra State) 132 kV SCDC line with end bays each at Kistampeth and Sironcha S/s by MSETCL and its designation as an ISTS line

The list of the participants are attached as Annexure-I.

Chief Engineer (PSPA-I) welcomed all the participants and stated that MSETCL's proposal of establishment of 2X25 MVA, 132/33 kV substation at Sironcha along with 132 kV SCDC line from Kistampeth (Telangana State) with end bays each at Kistampeth and Sironcha S/s has already been deliberated in the 1st and 2nd meeting of WRSCT held on 05.09.2018 and 21.05.2019 respectively. In the 1st meeting of WRSCT, MSETCL proposal was agreed by the members with the conditions that Sironcha 132/33 kV substation (MSETCL) would operate in radial mode from 132 kV Kistampeth S/s. MSETCL was requested to finalize the implementation and operational modalities with TSTCL and submit a proposal to CEA so that the same could be referred to Southern Region Standing Committee on Transmission for the approval of Southern Region constituents. Subsequently, in the 2nd meeting of WRSCT, MSETCL had proposed to convert the Kistampeth – Sironcha 132 kV S/C line to ISTS line which would provide them flexibility to source their power and would facilitate them in energy accounting and other related issues. In the meeting, it was agreed that if MSETCL wants an ISTS scheme to feed Sironcha area, MSETCL needs to submit a detailed proposal, which needs to be studied in coordination with Telangana.

In line with the decision of 2nd WRSCT, MSETCL has submitted the proposal to convert the Kistampeth – Sironcha 132 kV S/C line as an ISTS line for deliberation in the 1st meeting of WRPC (TP) held on 11.01.2020 at Ahmedabad. In the meeting, it was that a separate meeting would be convened with participation from CTU, POSOCO, PSPA-II (CEA), MSETCL and Telangana to further deliberate upon MSETCL proposal. In case, there was requirement of any ISTS scheme in the state of Telangana in Kistampeth area or in its vicinity then schemes could be clubbed together and taken up as an ISTS scheme.

Accordingly, this meeting has convened with participation from Telangana state, CTU, POSOCO, MSETCL and WRPC.

CE (STU), MSETCL stated that the above scheme is currently under implementation and around 20 MW of demand is expected in the area which would be met by Kistampeth S/s of Telangana state through Kistampeth – Sironcha 132 kV S/C line. MSETCL wants the Kistampeth – Sironcha 132 kV S/C line as ISTS line, so that the demand of Maharashtra would be met from their ISTS pool.

TSTRANSCO stated that they are agree for the Kistampeth – Sironcha 132 kV S/C line for feeding Sironcha area (of Maharashtra state). He also stated the Sironcha area would be fed radially from Kistampeth and they would sell the power to MSEDCL. Regarding the requirement of ISTS scheme in the area, he stated that the existing network of TSTRANSCO was sufficient to cater load growth in Kistampeth area and no separate ISTS scheme was required as of now.

MS, WRPC stated that STUs have license to build the line in their territory only and if they want to build a line in any other state, they should take the transmission license from CERC. Previously, it had happened many times that two states could be connected through a line (which is not a part of ISTS) and it would be constructed by both states in the respective portion in their territory. In the current case, if MSETCL want to build the line, they should approach CERC for the transmission license and other procedures for construction of an ISTS line should also be followed.

WRLDC stated that if Kistampeth - Sironcha 132 kV S/C line was to be treated as ISTS line then it should be considered as inter-regional link between SR and WR. In that case, not only MSEDCL but also any entity can apply for open access through this line.

CEA stated that, as TSTRANSCO does not require any ISTS scheme in the Kistampeth area and TSTRANSCO was in agreement with MSETCL for supplying power to Sironcha substation, therefore, the proposal needs to be considered by MSETCL and TSTRANSCO on bilateral basis only. The implementation modalities of the line could be worked out bilaterally between MSETCL and TSTRANSCO.

After the detailed deliberations, following was agreed:

(i) MSETCL has proposed establishment of Sironcha 132/33 kV substation to increase the redundancy of supply, improve the voltage profile and quality of power supply to Sironcha area. Currently existing Sironcha 66 kV substation was getting its feed through 132 km long line passing through dense forest area. The proposal to connect 132 kV Sironcha S/s with 132 kV Kistampeth S/s of Telangana State Transmission Company Limited through 132 kV line involves only 32 km line length and was forest free terrain. TSTRANCO has agreed with the MSETCL proposal.

(ii) With no requirement of any ISTS scheme in Kistampeth area by Telangana, there was no merit in taking up the Kistampeth – Sironcha 132 kV SCDC line as an interstate scheme to serve a load of about 20 MW.

(iii) Kistampeth – Sironcha 132 kV S/C line, traversing two states is an inter-state line, however its implementation has already been taken up by MSETCL based on bilateral agreement with TSTRANCO. As agreed in the 1st WRSCT meeting held on 05.09.2018, the Sironcha 132/33 kV substation (MSETCL) would operate in radial mode from 132 kV Kistampeth S/s in Telangana.

(iv) Regarding the commercial accounting of the energy transaction, WRPC to facilitate the same by deliberating the issue in Commercial Coordination Meeting.

The meeting ends with thanks to Chair.

Annexure-I

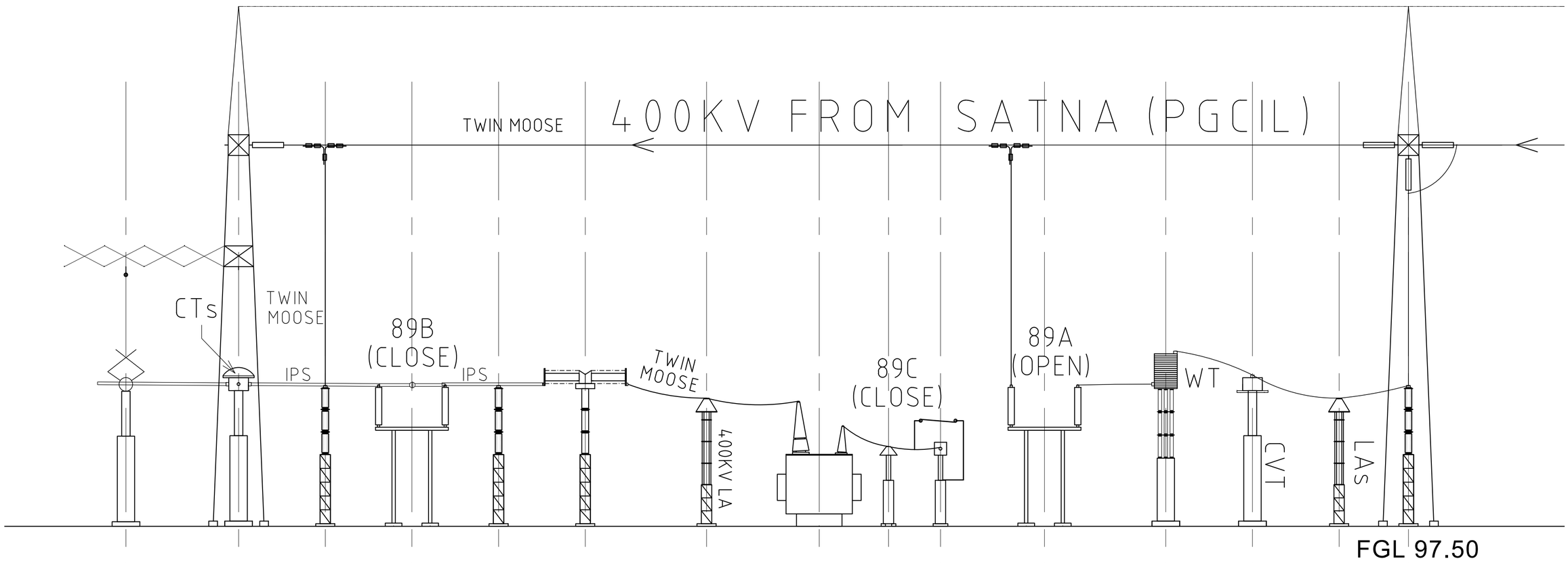
List of the participants of the meeting held on 14.08.2020 to deliberate upon MSETCL proposal of installation of Kistampeth (Telangana State) – Sironcha (Maharastra State) 132 kV SCDC line with end bays each at Kistampeth and Sironcha S/s by MSETCL and its designation as an ISTS line

S.No.	Name of the participants	Organization
1.	Goutam Roy, CE	Central Electricity Authority (CEA)
2.	Ishaan Sharan	Central Electricity Authority (CEA)
3.	Awdhesh Kumar Yadav, Director	Central Electricity Authority (CEA)
4.	Vikas Sachan	Central Electricity Authority (CEA)
5.	Tejas Patil Kiran	Central Electricity Authority (CEA)
6.	Satyanarayan S	WRPC
7.	Partha Sarthi Das	Central Transmission Utility (CTU)
8.	Bhaskar Wagh	Central Transmission Utility (CTU)
9.	Pratyush Singh	Central Transmission Utility (CTU)
10.	Shashank Shekhar	Central Transmission Utility (CTU)
11.	Rajendra Dubey	Powergrid
12.	Pushpa Seshadri	WRLDC
13.	Chitrakshi	WRLDC
14.	M Venkateshwarlu	WRLDC
15.	Shashank Jawelikar	MSETCL
16.	Deepak Rokade	MSETCL
17.	Vinay G Khedekar	MSETCL
18.	Umesh Bhagat	MSETCL
19.	J Ajay Kumar	TSTRANSCO

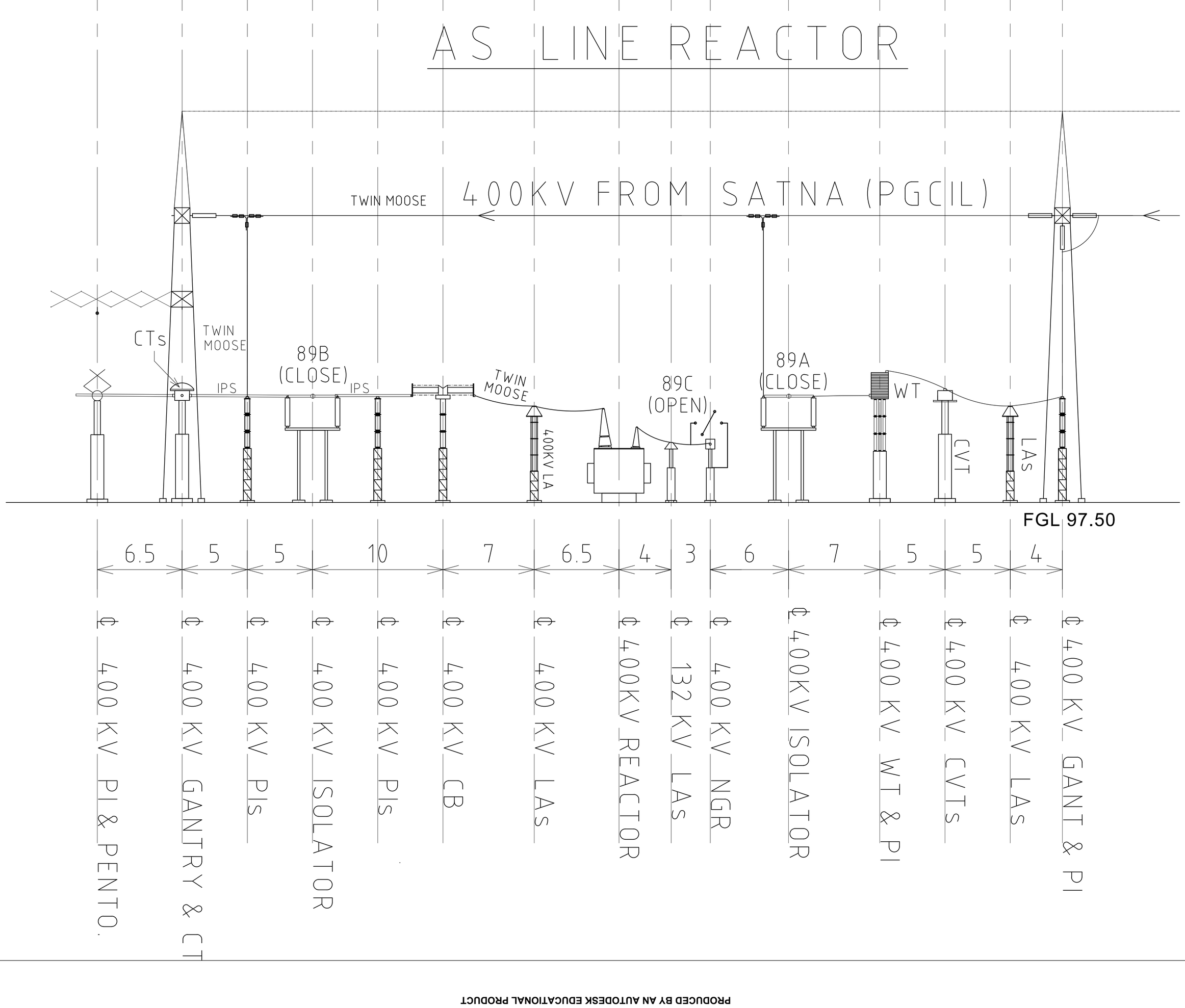
ANNEXURE-X

ARRANGEMENT SHOWING USE OF 125MVAR REACTOR AS LINE & BUS REACTOR

AS BUS REACTOR



AS LINE REACTOR

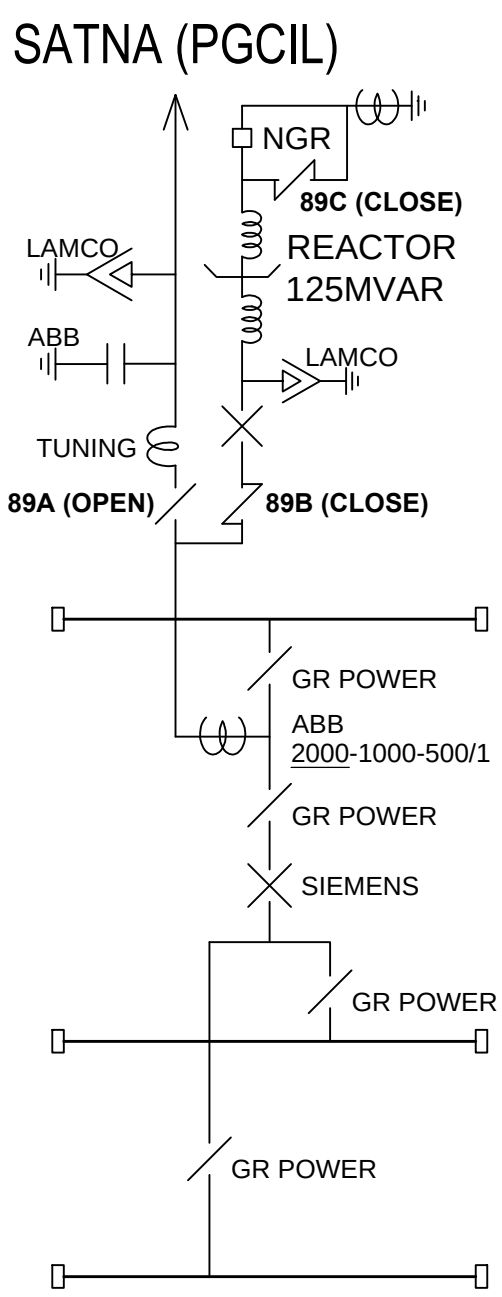


PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

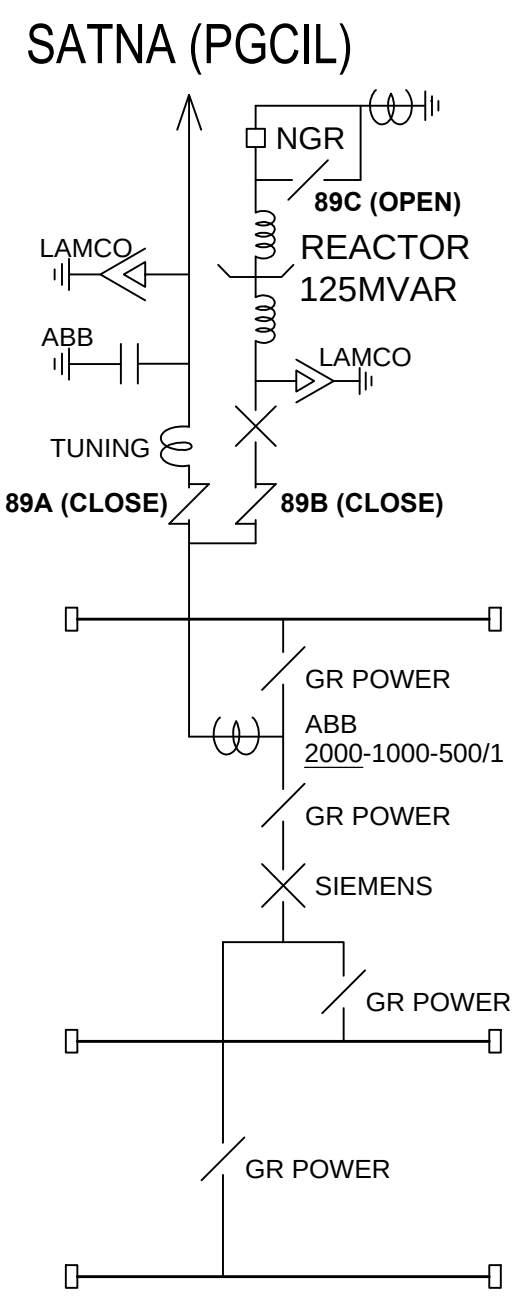
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

ARRANGEMEN SHOWING USE OF 125 MVAR REACTOR AS LINE & BUS REACTOR

As BUS REACTOR



As LINE REACTOR



ANNEXURE-XI

//SPEED POST//

CHHATTISGARH STATE POWER TRANSMISSION CO. LTD.

(A Government of Chhattisgarh Undertaking)(A successor Company of CSEB)

CIN-U40108CT2003SGC015820

Office of the Chief Engineer (P&P) 3rd Floor , State Load-Dispatch Building, Dangania, Raipur (CG)-492013,
Ph. No. 0771-2574234/4212/4209 Fax No. 0771-2574246

No. 02-04 / PL-25(F-1)/ 1315 Raipur/ Dtd - 3 DEC 2020

To,

The Chief Engineer
Power System Planning & Appraisal –I Division (PSP&A-I)
Central Electricity Authority (CEA)
Sewa Bhawan, R.K.Puram-I
New Delhi – 110066

Sub: Request for arranging meeting regarding discussion of Agenda note in respect of Chhattisgarh State Power Transmission Company Limited (CSPTCL).

Ref: 1) 2nd meeting of WRPCTP held on dtd 04.09.2020.

2) Virtual meeting held by WRLDC on dtd 25.11.2020.

Dear Sirs,

On dtd. 25.11.2020 Virtual meeting was held among WRLDC , POSOCO,Mumbai, SLDC & STU,CSPTCL , NSPCL and Bhilai Steel Plant (BSP) C.G. to discuss issue of high loading of NSPCL ICTs loading and regarding Import Capacity of CSPTCL due to restrictions imposed by WRLDC on enhancement of Total Transfer Capacity (TTC) and Available Transfer Capacity (ATC) for 2050 and 2000 MW respectively.

It is to mention here that the problem of overloading of NSPCL ICTs and due to these restrictions imposed by WRLDC on Central Sector Drawl by CG State is not due to any shortcoming/system constraint at CSPTCL but the same is due to improper power evacuation scheme through PGCIL Raipur feeders. Further ,from last 10 years CSPTCL is continuously strengthening the transmission network of state, by commissioning new 3 nos 400/220 KV S/s viz Raita (2x315 MVA)(D.O.C.- 25.03.2013), Jagdalpur (2 x315 MVA) (D.O.C. – 10.09.2017) , Kurud (Dhamtari)(2x315 MVA) (D.O.C.-31.01.2020) & 11 nos 220/132 KV S/s with capacity addition of 4970 MVA . Due to above capacity addition by CSPTCL the loading of 400 KV Khedamara has been reduced considerably (approx 250-300 MW) in last 5 years . Despite this reduction in loading , loading on NSPCL ICTs is not getting reduced due to improper evacuation scheme.

Further,it is to inform that , the evacuation of power from NSPCL through 400KV NSPCL- PGCIL Raipur feeders is not being done due to bus splitting arrangement at 400KV PGCIL Raipur Substation (carried out in 2014). Due to inter connection of various 400KV feeders connected to PGCIL Raipur from IPP's are on the same bus section on which NSPCL feeder are connected and none of the 315 MVA X-mer is connected to this section. As a result in place of evacuation of power of NSPCL through 400KV NSPCL – PGCIL feeders, power is being fed from PGCIL to NSPCL and for drawl 220KV NSPCL – MSDS – Khedamara lines are

the only option available. Therefore, for relief of NSPCL's ICTs loading following measures are required :-

i. Bus rearrangement at 400KV PGCIL S/s Raipur in such a manner that NSPCL power is evacuated through 400 KV NSPCL-PGCIL feeders.
ii. Early installation of 3rd 315 MVA 400/220KV ICT's at NSPCL.

Regarding issue of high loading of NSPCL ICTs ,CSPTCL has suggested some short term measures for temporary solution. These measures require rearrangement of following existing 220 KV lines :-

i. PGCIL Raipur –Bhatapara line .
ii. 220 KV Bhilai –Siltara line .
iii. 220 KV PGCIL Raipur- Khedamara line .
iv. 220 KV Khedamara-Borjhara line.

Therefore concurrence of PGCIL for the rearrangement & approval of WRPC(TP) is required.

In view of above it is requested to arrange meeting urgently to discuss above issues for consideration and approval of proposal submitted by CSPTCL (long term & short term measures) for strengthening and reliability of transmission network of Chhattisgarh State Power Transmission Company Limited (CSPTCL).The proposed agenda points to be discussed in WRPC TP are enclosed herewith.

Thanking you,

Regards

Enclosed :- Proposal for Agenda note.

Chief Engineer (P&P)
CSPTCL : RAIPUR

Er. R. K. Shukla
C.E. (P&P) : Raipur
Date 05/12/2020

Copy to :-

1. The GM (SO), WRLDC, POSOCO, Mumbai is requested to arrange load flow study of proposed rearrangement as per annexure -B.
2. The ED (SLDC) CSPTCL,Raipur.
3. The SE O/o MD CSPTCL.

Agenda Points Related to CSPTCL
for Meeting of Western Region Power Committee (Transmission Planning) (WRPCTP) Meeting

S. No.	Agenda Points	Particulars	Description of the Constraints
1	**ITEM NO 1**	High loading of NSPCL ICT's, requirement of 3rd 315 MVA 400/220KV ICT at 400/220KV S/s NSPCL Bhilai.	**Constraint** : 2 x 315 MVA 400/220KV ICT's installed at 400/220KV s/s NSPCL Bhilai becomes N-1 non-compliant when total loading goes above 400 MW. NSPCL is constantly reporting that the ICT's are remaining in overloaded conditions most of the time. This matter was discussed with WRLDC in the video conferencing held on dtd. 10.05.2019. **Remedial action required :** Requirement of 3rd 315 MVA 400/220KV ICT at 400/220KV S/s NSPCL Bhilai.
2	**ITEM NO 2**	Rearrangement of 400KV Bus at 400KV S/s PGCIL Raipur	**Constraint** : Bus splitting arrangement carried out at 400KV PGCIL Raipur S/s in order to reduce the fault level. After splitting of the buses at 400KV S/s Raipur, all the 3Nos. 315 MVA ICT's are connected in Bus 1 & 2 whereas none of the ICT's are now connected in the bus section 3 & 4 on which the 400KV NSPCL circuit 1 & 2 and other 400KV DCDS lines radiating from generating stations such as NTPC Korba, KSK & JSPL are connected. For power evacuation from this bus 400KV DCDS lines to Wardha and Durg Substation are also connected. **Remedial action required :** Rearrangement of 400KV Bus required at 400KV S/s PGCIL Raipur. The matter was already discussed in 483rd OCC meeting of WRLDC held on 12.05.2016.
3	**ITEM NO 3**	Re-arrangement of 220 KV Bhatapara-PGCIL,Raipur & 220 KV Bhilai –Siltara lines as 220KV Bhatapara- Bhilai & 220 KV Siltara-PGCIL,Raipur lines. (As per annexure –A &B)	**Constraint**: Over loading of existing lines & becomes N-1 non-compliant whenever any 220 KV source line tripped or under breakdown . **Remedial action required:** By this rearrangement The stability/reliability of 220 KV S/s Siltara will be improved as it will be connected to a strong source 400 KV S/s PGCIL,Raipur, also power evacuation from 400 KV S/s PGCIL, Raipur will increased. **PGCIL is requested to concur the proposed rearrangements works (Annexure-A)**

Executive Engineer (PL)
O/o CE (P&P), CSPTCL, RAIPUR

4	**ITEM NO 4**	Re-arrangement of 220 KV PGCIL,Raipur - Khedamara & 220 KV Khedamara-Borjhara lines as 220 KV PGCIL,Raipur – Borjhara line. (As per annexure –A & B)	**Constraint**: Power is wheeled from 400 KV S/s of PGCIL, Raipur through its 400 KV lines, NSPCL's ICTs and its interconnecting 220 KV lines to BSP substation and 220 KV BSP –Khedamara I/c lines to CSPTCL's system . M/s BSP objected wheeling of power to CSPTCL through their transmission lines and requested CSPTCL to take measures to restrict the same. Also Over loading of existing lines of BSP and interconnector between BSP to Khedamara has been observed. **Remedial action required:** This re-arrangement will provide load relief to 400 KV S/s Khedamara and their by drawl from NSPCL,resulting in relief to NSPCL ICT's loading. **PGCIL is requested to concur the proposed rearrangements works. (Annexure-B)**
5	**ITEM NO 5**	Requirement of 3rd 315 MVA 400/220KV ICT at 400/220KV S/s PGCIL Raigarh	**Constraint** : 2 x 315 MVA 400/220KV ICT's installed at 400/220KV s/s PGCIL Raigarh becomes N-1 non-compliant when total loading goes above 400 MW. It has been observed that such condition occurs for almost more than 80 % of the time. **Remedial action required :** Taken up in the 37th WRPC meeting and it was decided to take it up in the next WRSCT and the same was discussed in the 2nd meeting of Western Region Standing Committee on Transmission (WRSCT) held on dtd. 21.05.2019 at Indore.
6	**ITEM NO 6**	Requirement of 3rd 315 MVA 400/220KV ICT at 400/220KV S/s PGCIL Bhatapara.	**Constraint** : 2 x 315 MVA 400/220KV ICT's installed at 400/220KV s/s PGCIL Bhatapara becomes N-1 non-compliant when total loading goes above 430 MW. It has been observed that such condition occurs for almost more than 40 % of the time. **Remedial action required :** Taken up in the 37th WRPC meeting and it was decided to take it up in the next WRSCT and the same was discussed in the 2nd meeting of Western Region Standing Committee on Transmission (WRSCT) held on dtd. 21.05.2019 at Indore.
7	**ITEM NO 7**	Request for providing 02 Nos. 400KV feeder bays at 765/400KV pooling S/s PGCIL Sipat, Bilaspur	**Constraint** : Additional Business Plan for transmission system strengthening of CSPTCL has been approved by CSERC. In this scheme, construction of 400/220KV S/S Bilaspur (Dhardehi) has also been approved. CSERC has further approved to inter

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			connect the proposed 400/220KV Bilaspur substation with 765/400KV Pooling Substation, Sipat, Bilaspur subject to clearance from PGCIL and WRPC. CSPTCL vide letter No. 504 dtd. 13.07.2020 has requested PGCIL to explore feasibility for providing 02 Nos. 400KV bays at 765/400KV Pooling Substation, Sipat, Bilaspur for inter connection with CSPTCL's proposed 400KV DCDS Bilaspur-Sipat line. This inter connection will enable exchange of power between PGCIL and CSPTCL, which will be highly beneficial for system stability and reliability. **Remedial action required :** Feasibility report & consent awaited from PGCIL for providing 02 Nos. 400KV feeder bays at 765/400KV Pooling Substation, Sipat, Bilaspur.
8	**ITEM NO 8**	Feasibility for extending 400KV Alternate source to 400/220/132KV CSPTCL, Jagdalpur from 400/220KV S/s PGCIL Jeypore, Orissa.	**Constraint** : 400/220/132KV S/s Jagdalpur (Parchanpal) was commissioned on dtd. 10.09.2017 and connected from 400KV S/s Raita (Raipur) through 400KV DCDS lines and one circuit of this line is made LILO at 400KV S/s Kurud (Dhamtari). This substation is feeding power to Bastar area and 268 MW load of M/s NMDC Nagarnar Steel plant Jagdalpur. In case of outage (i.e. collapse of tower or breakdown of lines) of 400KV lines it will be very difficult to manage power demand of M/s NMDC Nagarnar steel plant Jagdalpur (268 MW) and consumers of Bastar area. In order to strengthen 400KV network and to provide reliable/stable power supply to the consumers of Bastar area and NMDC Nagarnar, CSPTCL vide letter No. 512 dtd. 13.07.2020 has requested PGCIL to explore feasibility for providing 02 Nos. 400KV bays at 400 KV Substation, Jeypore (Orissa), to interconnect 400 KV substation Jagdalpur with 400 KV substation Jeypore of PGCIL. **Remedial action required :** Feasibility report & consent awaited from PGCIL for providing 02 Nos. 400KV feeder bays at 765/400KV Pooling Substation, Sipat, Bilaspur.
9	**ITEM NO 9**	400 KV Khedamara – Kirnapur (MP) line is kept undesired switched off due to over voltage issue at Kirnapur end	**Constraint** : 400/132KV S/s Kirnapur of MPPTCL system has been commissioned on dtd.19.03.2019 by making LILO of 400KV Bhilai-Seoni line. After commissioning of 400/132KV Substation Kirnapur, 400KV Bhilai - Kirnapur line (122KM)

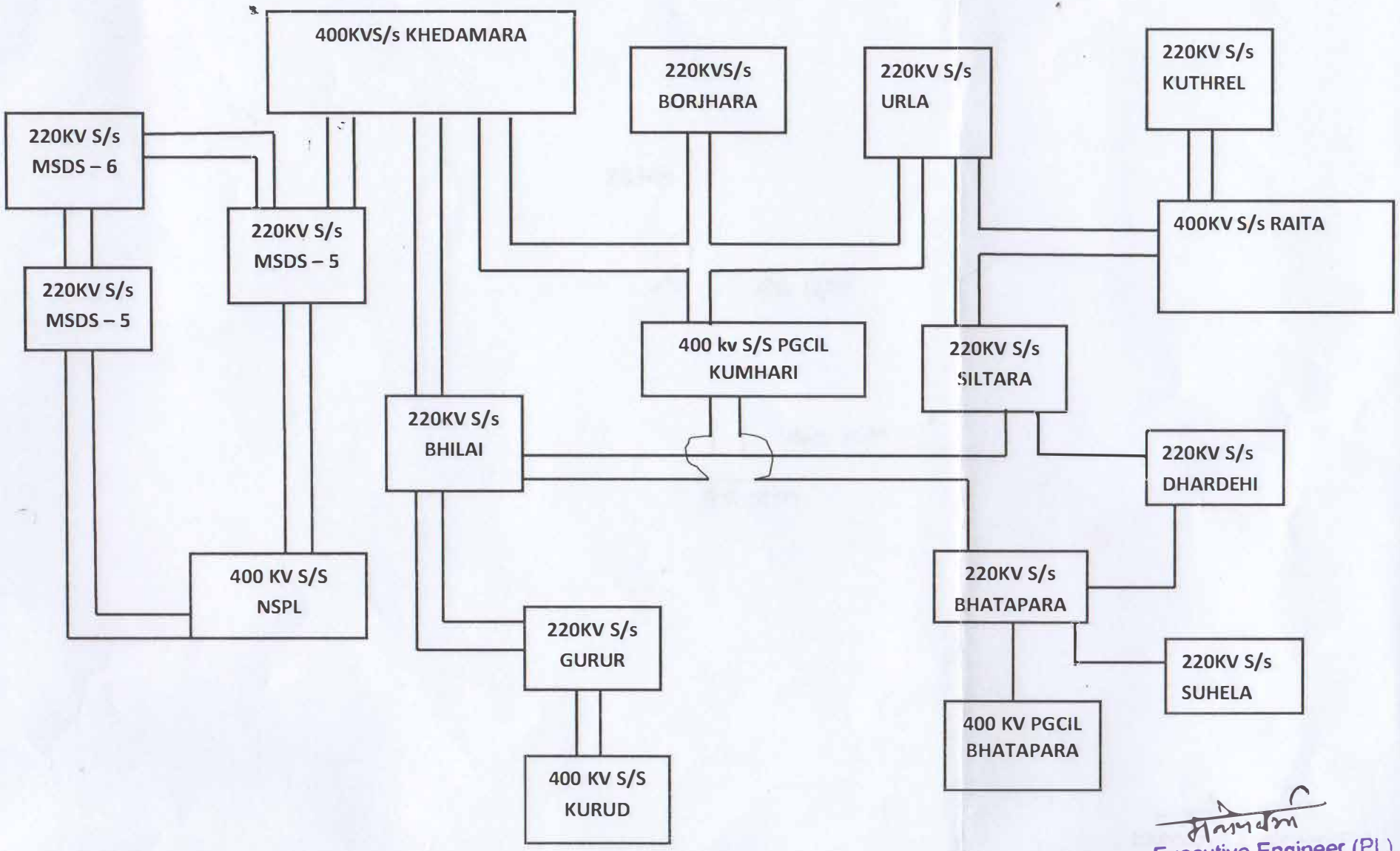
Executive Engineer (PL)
O/o CE (P&P), CSPTCL, RAIPUR

			has tripped frequently on over voltage indication from Kirnapur end. **Remedial action required:** Appropriate action is proposed to be taken at 400/132KV S/s Kirnapur end by MPPTCL, like installation of reactors etc.
10	**ITEM NO 10**	Request for providing 2 No. 220KV bays at 400/220KV S/s PGCIL Raipur.	**Constraint** : Additional Business Plan for transmission system strengthening of CSPTCL has been approved by CSERC. In this scheme, construction of 220/132/33KV S/s Ahiwara has also been approved. In order to strengthen 220KV network and to provide reliable & stable power supply to the consumers. CSPTCL vide letter No. 529 Dtd. 16.07.2020 has requested PGCIL to explore feasibility for providing 02 Nos. 220KV bays at 400KV s/s PGCIL Raipur for interconnection with CSPTCL's 220KV Ahiwara Substation through 220KV DCDS Ahiwara - PGCIL Raipur line. **Remedial action required :** Feasibility report & consent awaited from PGCIL for providing 02 Nos. 220KV bays at 400KV s/s PGCIL Raipur for interconnection with CSPTCL's 220KV Ahiwara

Executive Engineer (PL)
O/o CE (P&P), CSPTCL, RAIPUR

Annexure –A

SLD OF EXISTING ARRANGEMENT



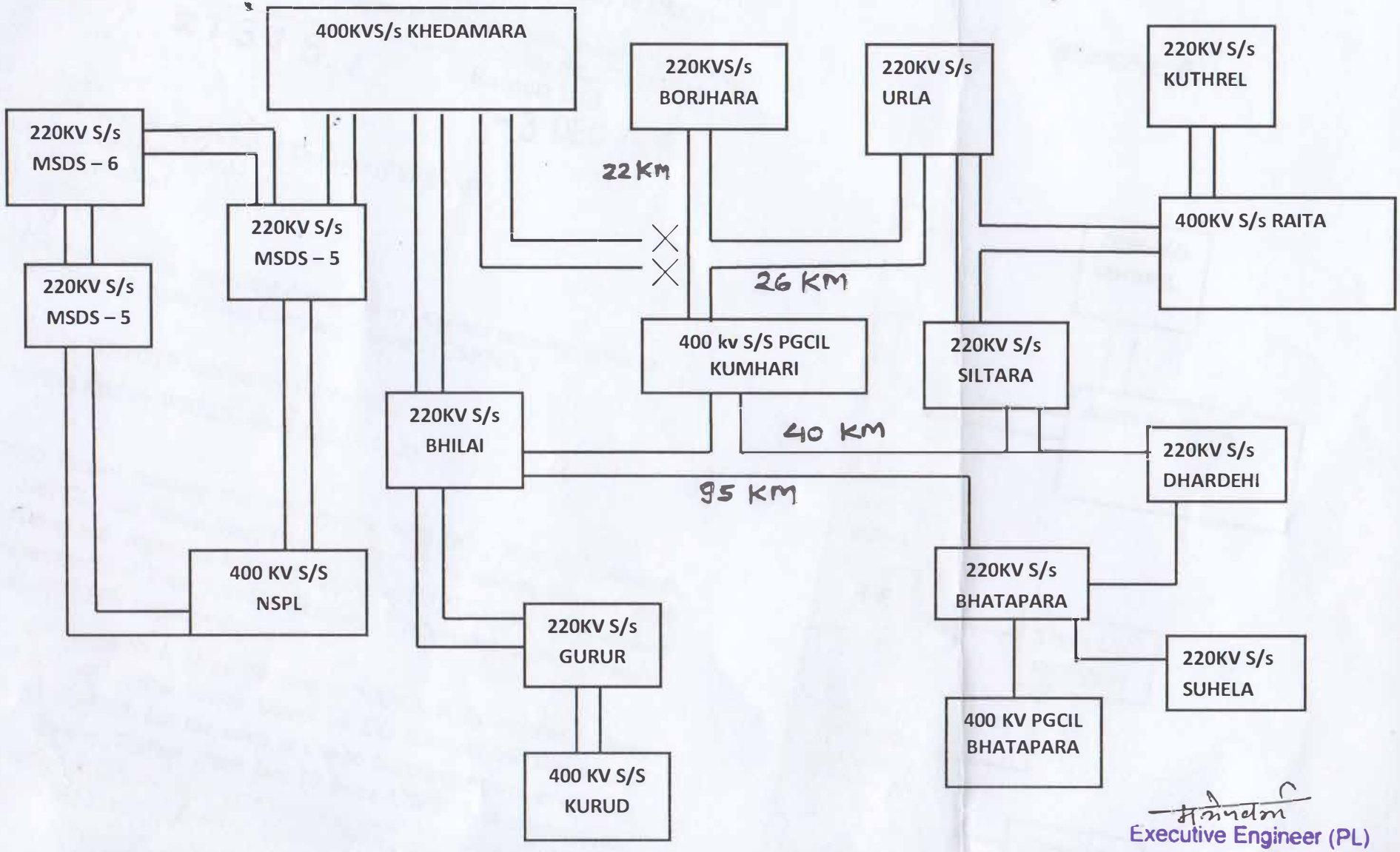
Executive Engineer (PL)
O/o CE (P&P), CSPTCL, RAIPUR

scheme.

NSPCL ICTs is not getting ... in last 5 years . Despite this

Annexure –B

SLD FOR PROPOSED ARRANGEMENT



Executive Engineer (PL)
O/o CE (P&P), CSPTCL, RAIPUR

ANNEXURE-XII

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग
Power System Planning & Appraisal-I Division

सेवा में / **To**

i. COO (CTU) POWERGRID, Saudamini, Plot no. 2, Sector -29, Gurgaon-122 001
ii. CEO, POSOCO, B-9, Qutub Institutional Area, Katwaria Sarai, New Delhi – 110010
iii. Managing Director, CSPTCL, Dangania, Raipur (CG)-492013
iv. General Manager, Bhilai Steel Plant, SAIL, Bhilai
v. General Manager (Operations), NSPCL, Bhilai

Subject: Minutes of the meeting held on 23.02.2021 to discuss the overloading of ICTs at NSPCL, Bhilai, Chhattisgarh – Reg

महोदया / महोदय / Madam / Sir,

Based on the discussion held in earlier meetings held on held on 17.12.2020 & 15.01.2021 and CSPTCL request vide letter dated 15.02.2021, a meeting was held on 23.02.2021 among CEA, CTU, POSOCO, CSPTCL, NSPCL & BSP. The minutes of the meeting are attached herewith.

Yours' Faithfully

(Vikas Sachan)
Deputy Director

Minutes of the meeting held on 23.02.2021 to discuss the overloading of ICTs at NSPCL, Bhilai, Chhattisgarh

The list of the participants is attached as Annexure-I.

1. Chief Engineer (PSPA-1), CEA welcomed all the participants and stated that two meetings were already held on 17.12.2020 & 15.01.2021 respectively to discuss the issue of high loading of 400/220 kV ICTs at NSPCL. Subsequently, CSPTCL vide letter dated 15.02.2021 has requested to approve the proposed re-arrangements to reduce the loading of ICTs at NSPCL and Khedamara as an interim solution and swapping of 400 kV lines at Raipur S/s as long term solution.
2. Director (PSPA-1), CEA stated that the following cases were studied in the All India evening peak case file for the FY 2022-23 to reduce the loading in longer time-frame:

   Case A: CSPTCL network with re-arrangement suggested by CSPTCL
   (i) Re-arrangement of 220 kV Khedamara – Borjhara S/s line & 220 kV Khedamara – Raipur S/c line to 220 kV Raipur – Borjhara S/c line &
   (ii) (ii) Re-arrangement of 220 kV Raipur – Bhatapara (PG) S/c line & 220 kV Bhilai – Siltara S/c line to 220 kV Bhilai – Bhatapara (PG) S/c line & 220 kV Raipur – Siltara S/c line

   Case B: Bypassing of Khedamara – Bhilai 220 kV D/c line with Khedamara – Borjhara/Raipur 220 kV D/c line so as to form Bhilai – Borjhara/Raipur 220 kV D/c line
   Case C: Case B + Re-arrangement of 220 kV Raipur – Bhatapara (PG) S/c line & 220 kV Bhilai – Siltara S/c line to 220 kV Bhilai – Bhatapara (PG) S/c line & 220 kV Raipur – Siltara S/c line
   Case D: Re-arrangements so as to form Raipur-Borjhara 220 kV S/c line, Khedamara-Gurur 220 kV S/c line and additional 220 kV line between Raipur & Bhilai,
   Case E: Swapping of Circuit 2 & 3 of Chandrapur (Bhadravati) with Circuit 3 & 4 of Korba at 400 kV Bus of Raipur (PG) S/s
   Case F: Case E + Re-arrangements so as to from Raipur-Borjhara 220 D/c line, Khedamara-Urla 220 kV D/c line, Raipur-Bhilai 220 kV D/c line, Bhatapara-Siltara 220 kV S/c line, Establishment of 400 kV Dhardehi S/s and LILO of one ckt of Bhatapara (PG) – Suhela 220 kV line at Bhatapara (CSPTCL)

   The SLD of the all the cases are attached as Annexure-II. It is seen that reconfiguration of 220 kV network gives only marginal relief on NSPCL ICTs. Major relief is observed in case of 400 kV line swapping at Raipur. The line swapping would require some time for implementation whereas the re-arrangement at 220 kV network may be completed by CSPTCL in a short time. accordingly, members may deliberate on the various options presented.

3. POSOCO stated that the 400 kV swapping at Raipur S/s is providing good relief but increase in fault level, if any needs to be checked. Further, 400 kV line loading may also be checked for N-1 compliance.

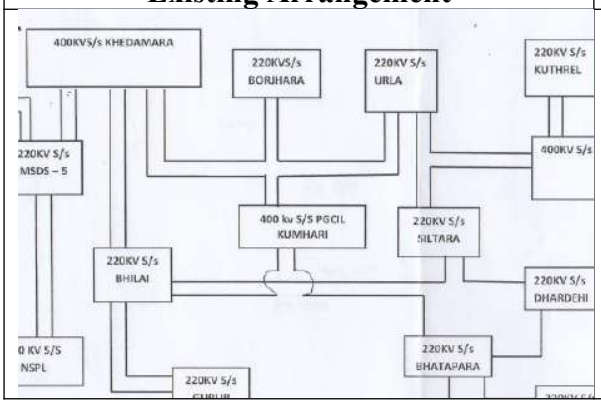
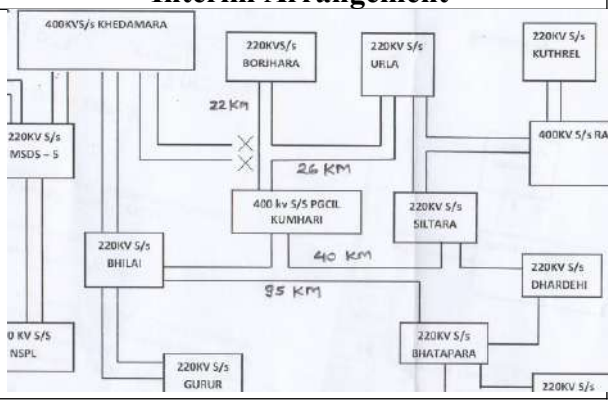
4. CTU stated that the 400 kV line loadings and fault level of various S/s is under prescribed limit and no overloading were observed after line swapping at Raipur S/s. CTU also stated that as per preliminary information gathered from site, line swapping at Raipur S/s would require installation of one new D/c tower and dismantling of six single circuit and two double circuit towers.

5. CEA stated that this swapping is basically restoration of old configuration that existed before the splitting of 400 kV bus of Raipur. Therefore, the same needs to be ascertained through joint site visit.

6. After further deliberations, the following was agreed:
   i. Joint site visit would be carried out by the CSPTCL & Powergrid to ascertain the works needs to be carried out for swapping of Circuit 2 & 3 of Chandrapur (Bhadravati) with Circuit 3 & 4 of Korba at 400 kV Bus of Raipur (PG) S/s.
   ii. CSPTCL would submit their comments regarding re-arrangement of 220 kV lines as proposed in Case B and Case C.
   iii. The minutes of the meeting would be issued incorporating the outcome of Joint visit and inputs of CSPTCL on 220 kV line re-arrangement.

7. Accordingly, a joint site visit was carried out by CSPTCL and Powergrid on 01.03.2021 and the report was submitted to CEA by CSPTCL vide letter dated 12.03.2021 (attached as Annexure-III). Based on the outcome of the site visit and inputs regarding re-arrangements of 220 kV lines of CSPTCL, the following is agreed:

   (i) Re-arrangement of 220 kV feeders by CSPTCL
   - Re-arrangement of 220 kV Khedamara – Borjhara S/s line & 220 kV Khedamara – Raipur S/c line to 220 kV Raipur – Borjhara S/c line.
   - Re-arrangement of 220 kV Raipur – Bhatapara (PG) S/c line & 220 kV Bhilai – Siltara S/c line to 220 kV Bhilai – Bhatapara (PG) S/c line & 220 kV Raipur – Siltara S/c line.
   - As intimated by CSPTCL the above re-arrangement provides marginal relief on NSPCL ICT (2x315 MVA) loadings. CSPTCL may implement the scheme and the same would be brought to the notice of WRPC-TP in their next meeting.
   - Existing configuration and configuration after re-arrangement is as give below:

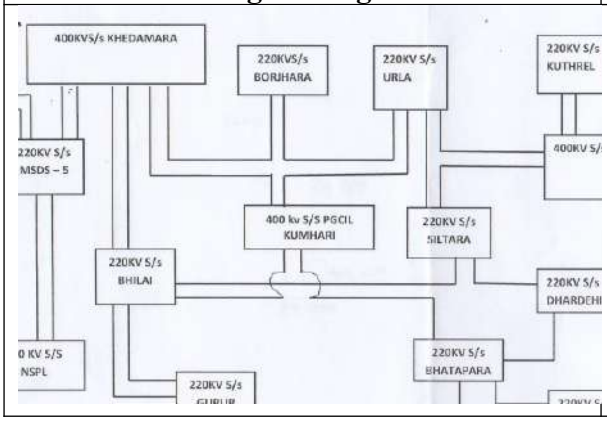
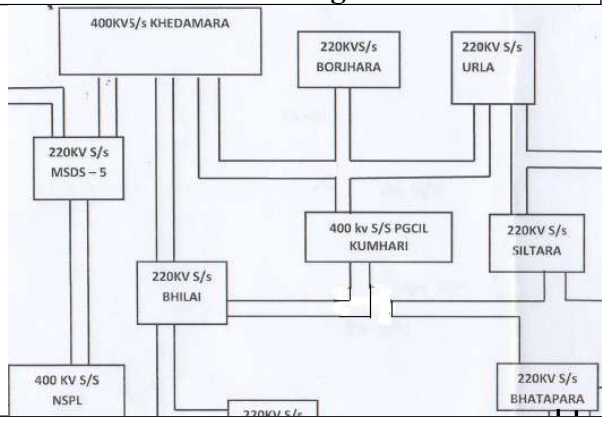
Existing Arrangement	Interim Arrangement
	

(ii) Swapping of Circuit 2 & 3 of Chandrapur (Bhadravati) with Circuit 3 & 4 of Korba at 400 kV Bus of Raipur (PG) S/s.

- Along with swapping of 400 kV ckts Raipur (PG), CSPTCL to carry out the following re-arrangement of 220 kV lines to increase 220 kV feeds to Bhilai 220 kV substation:

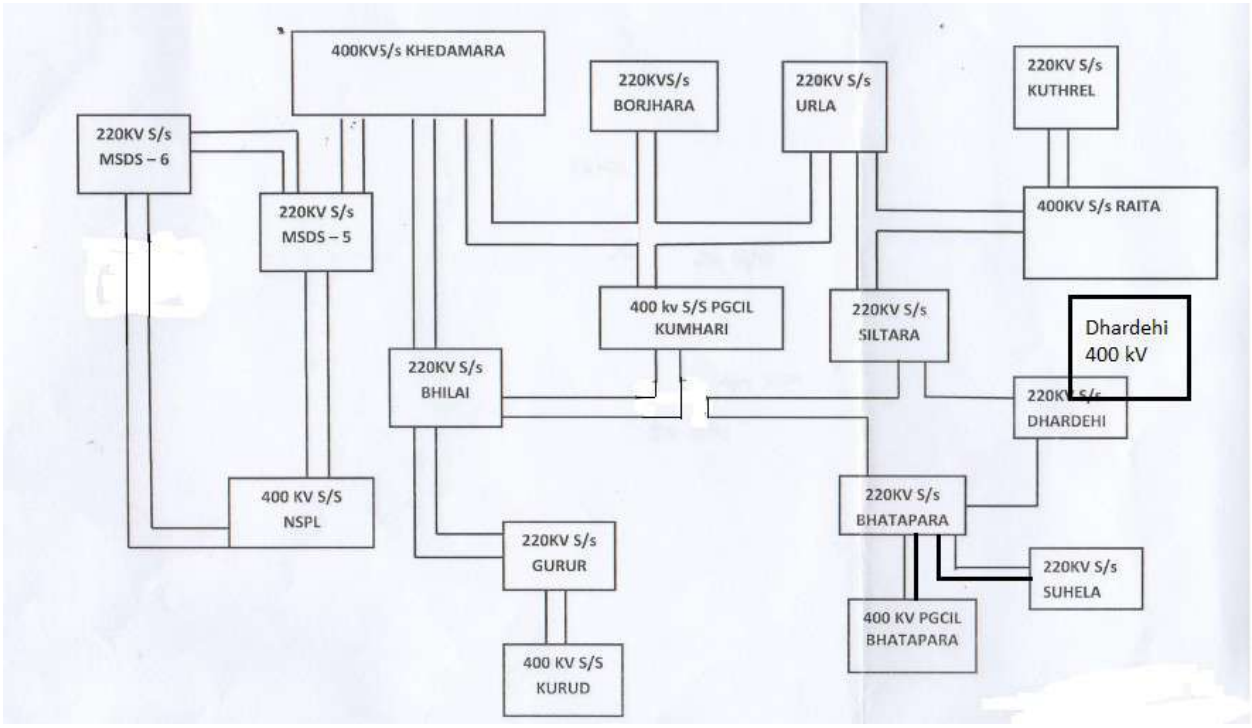
  Re-arrangement of 220 kV Bhilai – Bhatapara (PG) S/c line & 220 kV Raipur – Siltara S/c line so as to form 220 kV Bhilai – Raipur D/c line & 220 kV Bhatapara (PG) – Siltara S/c line- By CSPTCL

- CSPTCL has shown its willingness to implement the swapping works with their own resources in view of the severe load management problem being faced by them due to restricted drawl capacity from ISTS.
- Scheme agreed in principle and the same would be taken up for ratification by WRPC-TP. Regarding the implementation modalities of the scheme CSPTCL to deliberate with PGCIL and convey their decision wrt implementation of the scheme by CSPTCL or as an ISTS scheme
- Existing configuration and configuration after re-arrangement is as given below:

Existing Arrangement	Final Arrangement
	

(iii) In addition, CSPTCL would take up the implementation of the following schemes as Intra-state strengthening scheme:

- Establishment of 400 kV Dhardehi S/s by LILO of one circuit of 400 kV Korba(W) – Raita D/c line and 400 kV Sipat – Dhardehi D/c line. Proposal would be included in the agenda for the next WRPCTP meeting.
- LILO of one ckt of 220 kV Bhatapara (PG) – Suhela line at Bhatapara (CSPTCL).
- The single line diagram showing proposals at (ii) and (iii) is as given below:



Annexure-I

List of participants:

S.No.	Name of the participants (Shri/Smt.)	Organization
1.	Goutam Roy	CEA
2.	Awdhesh Kumar Yadav	CEA
3.	Priyam Srivastava	CEA
4.	Vikas Sachan	CEA
5.	Tejas K. Patil	CEA
6.	PS Das	CTU
7.	Pratyush Singh	CTU
8.	Shashank Shekhar	CTU
9.	Ajay Kumar	CTU
10.	Rajiv Porwal	NLDC
11.	K. Muralikrishna	WRLDC
12.	Pushpa S	WRLDC
13.	Vivek Pandey	WRLDC
14.	Venky Minnakuri	WRLDC
15.	Pradeep Kumar Sanodiya	WRLDC
16.	R K Shukla	CSPTCL
17.	Juvena Gomes	CSPTCL
18.	PC Huddar	NSPCL
19.	Pavan Kumar Nukala	NSPCL
20.	Bensey George	BSP